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PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND  
MONTHLY RECORD OF GEOGRAPHY.



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PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*The Islands of the New Britain Group.*

By H. H. ROMILLY.\*

(Read at the Evening Meeting, November 22nd, 1886.)

A FEW years ago this group, in common with many other South Sea Island groups, was almost unknown, and even at the present time not very much is really known of it. The Germans, by whom it is principally settled, seem to keep their information very much to themselves. They have changed the names of the islands from New Britain and New Ireland, to New Mecklenburg and New Pomerania (Neu Pommern), but it is simpler for our purposes to retain the names by which they were first known. It is unnecessary to discuss their first discovery.

The records of the early navigators are very meagre, and many of them have been lost. It is always uncertain who the discoverers of these groups were, nor does it really much matter. We flatter ourselves that Captain Cook was the first to land in Australia, but it is certain that the Spaniards landed on its western coast and hoisted their flag there more than a hundred years before Cook's visit.

Dampier gives some slight account of New Britain, but he only remained a few days there. He visited the magnificent harbour now called Blanche Bay and hoisted the British flag there. His intercourse with the natives, however, does not seem to have been at all intimate.

I propose in this paper to speak of the New Britain group as it was when I knew it in 1881 and 1883. At that time the white population was very small and very scattered. It was composed of men of all nationalities and conditions of society. We had there a mixture of French, English, German and Italian roughs, runaway sailors, a few survivors of the ill-fated Marquis de Ray's colonising expedition, well-educated gentleman-like missionaries, and one or two men who had evidently once been English gentlemen, but who had, doubtless for very

\* For map see 'Proceedings,' 1886, p. 603.

sufficient reasons; had to leave their homes and bury themselves in the most out-of-the-way spot they could find.

There were two little communities: one at Matupi, a small island in Blanche Bay, and the other in the Duke of York Island, situated in the channel between New Britain and New Ireland. The former was German, and was the headquarters of the great trading firm of Robertson and Fernsheim, of Hamburg, and the other was the abode of the English Wesleyan Mission, at the head of which was the Rev. George Brown. As I have observed in many other places, the tendency of the idle settlers was to live as near as possible to the Mission quarters. No doubt they felt a sense of protection in so doing, and in this opinion they were justified, as on more than one occasion the missionaries interposed successfully between the whites and blacks. There were also isolated traders living by themselves at points on the New Britain coast, but at the date of my first visit no one had resided in New Ireland. At that time the natives of that island were too hostile and treacherous to make that advisable. A small trade in coco-nuts was, however, carried on with them, and on several occasions the island was visited by Mr. Brown, and I believe he once performed the feat of walking nearly across it, and sighting the sea on the east coast.

Before describing any of the habits of the native and foreign inhabitants of this group I will give a short description of the islands themselves, their appearance, and geological formation. On approaching New Britain from the southward the first land sighted is probably the high mountain called Mount Beauteemps Beaupré. This is a tall conical-shaped hill, some 4000 feet in height, generally covered with clouds. It is usually free from them in the early morning and just before sunset, and is at that time an excellent landmark, as it can be seen on clear days at a distance of some 40 miles. In a country where the natural landmarks of the coast are incorrectly or vaguely described in the Admiralty charts the value of so conspicuous an object cannot be over-estimated.

After sighting this mountain, and thereby having ascertained his position correctly, the navigator shapes his course along the New Britain coast, and as close to it as is consistent with safety, in order to avoid the tremendous currents of the mid-channel between the two islands. These currents are very capricious, and he may have the bad luck, as I once had, to be beating about in the channel for a week or ten days without making any progress. It is fairly free from the great danger to sailors in those seas, coral reefs, but it is shaped like a funnel, and is open to the full force of the south-east trade wind, which blows as fiercely in New Britain as it does anywhere.

The sea is one of the most dangerous to small sailing craft that I know anywhere, very short and untrue, with almost conical-shaped waves. Something like it can occasionally be seen on our own coasts

when a strong south-westerly gale blows up the Bristol Channel. The tides have been a puzzle to sailors since they first navigated those waters. On one occasion I was beating down the channel on my way from Matupi to New Guinea in a small schooner. We had a south-east trade wind blowing nearly a gale in our teeth. For a week we made precisely the same points of land on each tack, and as far as we could see we neither lost nor made a yard. One night, just as we were beginning to despair of ever getting out of the channel, and were discussing the advisability of returning to Matupi till the weather should moderate, the current, without any change of wind, suddenly altered its direction from up the channel to down the channel, and in a few hours we were out at sea.

But to resume our cruise. Having made Mount Beautemps-Beaupré, the sailor would hug the New Britain coast till he sighted the next conspicuous landmark, a tall extinct volcano named the Mother. This mountain is situated on a narrow arm of the mainland, which, curving to the southward, helps to protect the harbour of Blanche Bay from the south-east trade winds. To north and south of it are two other extinct volcanoes, the North and South Daughters. Immediately to the eastward of it is a small partially active one, and which for three days in 1878 was in full eruption, while still further to the northward of it are no less than three small craters, evidently extinct for many years, as the vegetation on their sides proves. Blanche Bay evidently has been, and still is, a very active volcanic centre. The small cone, which still has an appearance as if it might any day burst into violent eruption, smokes incessantly. The natives are much afraid of it, though I believe they have no particular superstition concerning it, and on one occasion when I made its ascent in company with a naval officer, we had to go alone, as no native would accompany us. That there is still plenty of latent energy in it, is evident from the fact that at its base the sea-water is so hot for several hundred yards from it, that it is impossible to hold the hand in it. In another part of the bay, not a mile from the mountain's base, is a boiling river of strong sulphurous water, up which a boat can be pulled for several hundred yards. In many places the water is actually boiling. It seems strange that in a country like New Britain, where some thirty or forty per cent. of the natives are afflicted with skin diseases, that they should not have recognised the curative powers of this boiling river. But they are content to continue in their disgusting condition, even with the natural cure at hand.

During the eruption in 1878, a small island of about three hundred yards in length by one hundred yards wide, made its appearance in a night. The natives say it was upheaved, but it appears to be more probable that it was caused by falling mud and debris. The natives all fled in their terror, so that they were hardly fair judges. The whole

surface of St. George's Channel was so thickly covered with pumice-stone, that a German friend of mine who was trying to enter it immediately after the occurrence, could not conceive what had happened, as from a distance it appeared as if St. George's Channel had altogether disappeared and an impenetrable barrier of land taken its place.

For weeks afterwards many parts of the bay were uninhabitable to whites on account of the millions of fish which had been killed by the boiling water in the narrow shallow parts of it. When I lived in Matupi, five years after this event, we had slight earthquake shocks nearly every day, and sometimes such severe ones, lasting for so long, that we fled out of the house for safety. On one occasion, a severe shock of earthquake was the cause of some amusement to us. I had been out shooting one terribly hot day with a naval officer. He had had a severe attack of sunstroke some years previously on the west coast of Africa, and he was very nervous about himself on this account in hot weather. At the conclusion of our day's sport, as we were walking home, we were both, apparently without any cause, precipitated violently on to our faces, and for the next second or two the ground was shaking and heaving, and we did not know clearly what had happened. I very soon recovered myself, as I recognised at once what was the matter, but my naval friend, who had only been one day in the country, and was not accustomed to its eccentricities, in a tone of intense anguish said, "I knew it would happen sooner or later, and now it has come." He made no effort to get up for a few minutes, but by degrees he began to realise that there was nothing the matter with him, and that his supposed attack of sunstroke was due to underground, and not to overhead influences.

The climate of the group varies, as it must do in all the large Pacific islands. On the coast, where the healthful influences of the sea breezes can be felt, there is not much to complain of. During the day-time for seven or eight months of the year, the trade winds blow, but during the night-time the sea breeze usually falls, and its place is taken by the land breeze, which blows from the interior down to the coast and a few miles out to sea. It brings with it malarial poisoning from the swamps inland. I believe, however, the simple precaution of putting on extra clothing after sunset every night would prevent much fever. Matupi, where the head German stations are, is an extraordinarily health place and fever is unknown there. The natives themselves appear to suffer from it quite as much as the whites, and the proportion of deaths from this cause must be very large. They do not, however, consider it a natural death. The only two forms of death they recognise as being natural are old age, not very common, and a death from violence. When a native has fever he accuses some friend or enemy of his of bewitching him, and his family invariably adopt his view of the case.

The vegetation is in many places as luxuriant and varied as tropical vegetation can be. In the interior, especially in protected valleys and ravines where the atmosphere is from year's end to year's end of the nature of a vapour bath, it must be seen to be appreciated. Gigantic forest trees, covered with ferns, orchids, *lycopodia*, and parasites of all sorts seem united to each other and to the earth they spring from, by a beautiful impenetrable mass of foliage. Birds innumerable can be heard, but are only visible to the practised eye of the savage. Insects of every varied size and hue flit about and add a lustre to the scene, and to sum up briefly, the vegetation in the New Britain bush, and the richness of the volcanic soil, can be surpassed in no part of the globe.

There should be no form of tropical agriculture practised among white men which would not be successful in this country. The natives themselves are great agriculturists, and with the smallest possible amount of labour produce crops of the richest possible description. On the occasion of a long walk of mine from the coast to the base of Mount Beauteemps-Beaupré, I was amazed to observe the closeness of the cultivation, and the skill with which the native labourers had selected the sites of their gardens, with a view to combining the richest possible soil with the most inaccessible positions as a protection against their neighbours. In what appeared to be impossible places to get at, fissures in rocks on the sides of steep precipices, one would constantly see small patches of sugar-cane and beds of yam and sweet potato. Even the taro, a root which requires artificial irrigation, could occasionally be seen growing. The native gardeners had taken advantage of every little trickle of water down the hill-sides, and had constructed, by means of dams and artificial channels, little damp patches of soil in which the taro could be grown. The women were the actual labourers in the gardens, but all the little engineering difficulties in making such gardens as these were overcome by the men. Doubtless the great difficulty they have to contend with is the distrust and suspicion with which each man apparently treats his neighbour. One constantly sees large tracts of very fertile land uncleared because of the ease with which any cultivation there could be destroyed by hostile neighbours. They are, therefore, driven to select inaccessible situations for their gardens, and, as a rule, in the interior, each man builds his house in some commanding situation near it.

Now, to leave the interior and return to the coast. To the north of New Britain the sea is an intricate network of coral reefs and small rocky islands. But very few ships have visited New Britain from that side, as the danger for sailing vessels is extreme. New Britain seems to act as a barrier to the trade wind, for while it blows with great violence on its south coast, to the northward of it is usually a region of calms and strong currents. It was my bad fate once to be endeavouring to go from Astrolabe Bay on the New Guinea coast



to the Duke of York Island. For a week we tried to beat through Dampier Strait in vain, and at last we decided to go along the north coast of New Britain and arrive at our destination by that route. For a day all went well, as our previously foul wind, by our alteration of course, became a fair one. But when we had run some hundred miles from the coast of New Guinea the wind gradually died away, and we found ourselves drifting helplessly among reefs and islands innumerable. Many of them were not marked at all on the chart, and all of them that were, were more or less out of position. For four days we had to tow the ship—luckily a small schooner—with our two whale-boats, and very glad indeed we were when a faint northerly breeze, just sufficient to fill our sails, gave us steerage-way in the direction in which we wished to go.

The observations of the few people who have sailed those seas—whalers for the most part, and captains of small schooners fitted out on speculative trading expeditions—have been very incorrect, and more harm is done by placing a shoal or reef incorrectly on the chart than by omitting to place it there at all. As far as my observations of the north coast of New Britain went, I should say it was very thinly inhabited. I personally saw no signs of life anywhere, but it is too much to suppose that a seaboard of some two hundred miles in length should be absolutely uninhabited. How far the natives on the south coast may be relied on I cannot say, but I have been told by them that the north coast is only occasionally visited by wandering tribes. As far as I know, there are not sufficient data in our possession to enable us to form any estimate of the population of New Britain. Roughly speaking, the population might be placed at 100,000 souls, while the New Ireland communities might perhaps muster half that number. There seems to be no doubt that in the little-known districts in the western half of the island the population is more numerous than in the eastern end.

I have coasted, contrary to my inclinations, and by force of circumstances, a great part of its south coast, and the evidences of abundant population were everywhere visible. Smoke could be seen rising in every direction, villages could be occasionally seen, and the coast is abundantly lined with coco-nut palms, a sure sign of dense population. In these island communities there is no better rule to be guided by, for the purpose of ascertaining the denseness of the coast population than by carefully noting the approximate number of coco-nut trees. I believe, if it could be proved, that roughly about twenty coco-nut trees to every head of population would give a fairly accurate result. In New Ireland, the north-western half of the island is abundantly lined with coco-nuts, and it is certainly in that part of the island that four-fifths of the population is to be found.

Before I proceed to give a slight account of the natives of this group, a few words about the appearance of New Ireland may be of interest.

New Ireland presents many distinct features from New Britain. In New Ireland there is presumably as heavy a rainfall as in New Britain, but while there are numerous small rivers in the latter island, in the former, as far as I could discover, there are none worthy of that name. A few small creeks and watercourses there may be on the mountain sides, but there is no visible escape for the enormous amount of rain which falls in the course of the year. It seems unlikely that there can be lakes of any great size, as the configuration of the country renders any such idea improbable.

The island is long and very narrow, that is to say, its extreme width in any place is not more than 30 miles, while its average width is from 10 to 15. A chain of mountains runs directly up its centre which varies from two to six thousand feet in height, so that it will be seen that the ground must everywhere rise very steeply from the sea.

In heavy rains there must be mountain torrents, but I have coasted the whole island round, in fair and foul weather, and never seen anything like a river discharging itself into the sea. On the north coast, it will be seen in the map, that there are several islands placed. At the time of my last visit, as far as I know, they had never been visited. It is most unlikely, however, that that is the case now. The island marked as Fischer Island, I ascertained, was in reality three distinct islands, while Gerrit Denys is certainly two, and perhaps more.

It was supposed on the occasion of my first visit, that New Ireland was entirely deficient in good harbours. Since that time some excellent harbours, protected from all quarters, and large enough to accommodate a fleet of ships, have been discovered at the north-western end, between New Ireland and New Hanover. As I said before, that end of the island is also the richest, and the Germans have taken advantage of their new discovery to station traders there. Their relations with the natives are not always friendly. Some have been killed, and many have been driven away barely saving their lives.

I believe that at the present time no traders have been established in New Hanover, the large island to the north-west of New Ireland. While I was in New Ireland the natives of New Hanover showed themselves most uncompromisingly hostile to me, and though I tried often to land there, I never succeeded in doing so.

The channel between the two islands is a network of reefs, and in spite of all my efforts I never succeeded in penetrating them. There were plenty of canoe and no doubt boat passages from one island to the other, for constantly while my schooner was anchored at Neusa, the name of the northern harbour in New Ireland, canoes would come across from New Hanover, and keeping at a respectful distance from the ship, insult us with awful threats of what they would do if they ever got us in their power. In appearance, New Hanover is far more inviting than New Ireland. The mountains are high in the interior, but the land

slopes gradually to them, and there are evidently many rivers, fertile valleys, and wide-spreading plains covered with the wild sugar-cane which always denotes the richest soil. Doubtless from the north it is more easy of access, but I never had the opportunity of visiting it from that quarter.

Having now touched lightly on some of the more noticeable geographical peculiarities of the New Britain group, it may be of interest to touch equally lightly on some of the peculiar habits of its inhabitants. The ethnologist would find abundant material there for observation and reflection, but it would be out of place in this paper to indulge in an ethnological dissertation on the races which inhabit these three large islands. Of the largest of them, New Britain, we know a good deal, of New Ireland and its people we know a little, while of New Hanover—possibly the most interesting of all, on the principle of “*Omne ignotum pro magnifico*”—we know next to nothing at all. To begin with New Britain. There are three subjects which appear to interest the students of savage races more than any others. Firstly, their laws and ceremonies of marriage, rights of succession to property on account of such marriages, and degrees of relationship resulting from them, and the manner in which their relations by marriage should be treated or ignored. Secondly, their superstitions and the ceremonies which attend them; and, thirdly, the social laws by which they are governed and which control them as to their determination to go to war with their neighbours. Under this last heading also would come the rights of property and the manner in which it is held, a very comprehensive subject, which the limits of this paper will only permit me to touch on lightly. It is obvious that these are subjects which cannot be completely mastered by any one whose residence in the country has not been of considerable duration. The native, as a rule, does not like to be questioned. He credits the white man with possessing universal knowledge, and often imagines he is being made a fool of, and will return evasive or untrue answers. In questioning them about their superstitions they usually show the greatest reluctance to answer.

In New Britain there are some customs they are absolutely forbidden to talk of, and some words they dare not name. It is evident, therefore, that the investigator has to rely principally on his own powers of observation, as he cannot get much reliable information on many points from the natives by word of mouth.

To begin with the marriage laws. The parents of a child betroth him or her usually at a very early age. If it is a boy he has got to work for and pay for his wife before he can marry her, and the sum to be paid is agreed on, having due consideration for the means of the betrothed. The sum is never fixed at too low a price, and it constantly happens that the intended husband is middle-aged before he can marry. Sometimes he gets impatient and persuades his betrothed to elope with

him, but he dare not return to his tribe if he takes so extreme a step as this. Usually when the price stipulated on is nearly paid, the husband builds a small house in the bush at some distance from his village. He then persuades his fiancée to elope with him, but this time with the knowledge of her parents. A complete farce is then acted. When they have had time to get well away, the girl's father discovers that she has been abducted, the bridegroom's father pretends to sympathise with him and vows vengeance against his son for disgracing him. They waste more time in assembling the relatives on either side and preparing a big feast together. The whole conversation consists of threats against their unnatural offspring. When they have finished their feast they arm and paint themselves as if for war, and off they sally into the bush in search of the absconding couple. They know exactly where to go, however, which simplifies matters a good deal, as they have had precise information as to where the little house in the bush has been built. When they arrive there they find the couple gone. They would probably be very much at a loss what to do if they had not gone. They burn the house, however, and return home where they consume more food. In the morning the young couple are back in the village as if nothing had happened, and no further notice is taken of them. The price originally fixed as the price of the girl has, however, to be eventually paid.

It is the habit as far as possible to betroth children to other children belonging to the same tribe, and as many of the tribes are very small, it is not a habit which tends to improve the race. As far as I have been able to ascertain, they do not recognise the relationship of first cousins. In fact in a small tribe nearly all the members of it must be cousins to each other.

I have observed in parts of New Britain, perhaps it is universal, that brothers seem to have common interests. One brother often helps to pay for his brother's wife, and if he died or was killed would probably take her into his house to live with his other wife or wives. She would in every sense belong to him, and her social position would be as secure as formerly.

There is one curious bond of sympathy between these people and their civilised brethren. It is doubtless a prejudice in civilisation, and admits of exceptions. Among the New Britons it admits of no exceptions, and is as stern a law as those of the Medes and Persians. A man must not speak to his mother-in-law. He not only must not speak to her, he must avoid her if he possibly can; he must walk miles out of his way to avoid her path; if he meets her suddenly he must hide, or if he has no time to hide his body he must hide his face. What calamities would result from a man accidentally speaking to his mother-in-law, no native imagination has yet been found equal to conceive. Suicide of one or both would probably be the only course. There is no reason

that the woman should not speak to her father-in-law, but for the mother-in-law there is no mercy. She must, in the ordinary course of events, in native communities, eventually become a mother-in-law, but she is powerless to struggle against fate, and I for one have never seen her make any effort to do so. It would take too long to discuss the subject of succession of property. It is enough to say that the mother's property, if she have any, may descend according to circumstances to her daughter or her son, or go to neither, and the father's may be disposed of in the same impartial way. There are tribal rights, family, and individual rights to be considered, and therefore the question becomes a somewhat complicated one.

One curious feature in the New Britain marriages, and one I should think most galling to the husband, is that occasionally, after he has worked for years to pay for his wife, and is finally in a position to take her to his house, she refuses to go. Human nature, I suppose, is the same all over the world, but engagements are longer in New Britain than in more civilised countries, and the disappointment is proportionately greater. Oddly enough, he is not supposed to have a grievance, nor can he claim back from her parents the vast sums he has paid them in yams, coco-nuts, and sugar-canes. He certainly would have the right of killing any one who presumed to elope with the woman he had worked for so long; but she seldom plays her cards so badly as to compromise herself in a public manner. He has to submit, and no one pities him. It is the custom of the country, and no doubt he submits to it with the best grace he can.

It is difficult to say whether they have any actual religion. Superstitions they have in plenty, and they believe in malignant spirits, but not in beneficent ones. The malignant spirit has, on many occasions, to be propitiated with gifts. There are men who are sorcerers by trade, and they exert an immense influence in their tribes, and not unfrequently amass considerable fortunes. The devices they employ for imposing on their neighbours bear a strange similarity to some of those used by the witches of old in our own country. Figures of chalk or stalactite, or even stone, could be bought and buried in the bush, and the man in whose likeness they had been carved, was pretty sure to die very soon afterwards. The natives have often pointed out to me spots in the jungle where some of these images had been buried, but they would never help me to look for them. I found three or four with great difficulty, and the natives would run shrieking from me if they saw me carrying them home. It was impossible for me to keep them in my house, as no native would work for me while they were in my possession. I therefore pretended to destroy them, and had them buried behind my house till I could take them safely out of the country. The native is very careful to destroy the remnants of his meals. Things like banana skins, fish-bones, &c., are burnt, as he

imagines that if an enemy of his were to steal and bury them, he would shortly sicken and die. Numerous other superstitions they have, but the most remarkable one of all I will describe briefly.

Visitors to New Britain, who have seen the ceremony of the duk-duk as it is called, have not always agreed as to its exact significance. It is a very difficult matter to get natives to speak of it at all, as they imagine that by doing so to a man who is not duk-duk, that is to say, initiated into the mysteries of this superstitious rite, they will forfeit the good will of the restless spirit they fear so much. I will describe how I first saw a duk-duk in New Britain, and give my idea as to the meaning of the performances it went through. It is supposed to be a spirit which makes its appearance at daybreak of the day on which the new moon appears. It invariably comes from the sea, and as soon as there is sufficient daylight for the purpose, two or three canoes lashed together, and having a square platform built over them, are seen slowly advancing towards the beach. The whole community is drawn up to receive them, and they sit in solemn silence, waiting for the moment when the canoes shall touch the beach. On the platform of the canoe are two figures leaping and gesticulating violently, and uttering short shrill cries. They are covered with a loosely made robe or tunic made of the leaves of the hibiscus woven together. On their heads they wear a conical-shaped hat some six feet in height which completely conceals the features. On it is painted a most grotesque human face. Nothing can be seen of the man inside this dress but the legs from the knee downwards.

The dress is supposed to be an imitation of a cassowary with a human head. When the two figures land they execute a little dance together, and run about the beach with a short hopping step, still keeping up the imitations of the cassowary. Not a native stirs or utters a sound, they appear to be very much frightened and there is a very nervous look on their faces. The duk-duk is to stay with them nearly a fortnight, and during that period he is absolutely at liberty to do whatever he pleases. No woman is allowed to look on him, in fact the women have long ago disappeared and are all hidden in the bush. After a time the duk-duk dances off into the jungle, and the natives get up and move off slowly to the village. The same evening an immense quantity of food is brought in, and piled in the centre of the square in the village. As each man brings his contribution the duk-duk dances round him; if he is satisfied he utters his shrill yelp, and if he is displeased he deals the wretched man a tremendous blow with a club. However, nearly everyone brought sufficient food when I saw the ceremony, and very few received the blow with the club. This done, the men all squatted in a circle in the square, and then began what could have been nothing but a ceremony of initiation. A large bundle of stout canes was brought, each one being six feet long, and as thick as a man's little finger. No sooner

was this done, than five or six young men jumped up, and holding their arms high above their heads, received a tremendous blow apiece from the duk-duk. The cane curled round their bodies with a loud crack, and drew blood at every stroke. But in no case did I see a sign of flinching or pain. Immediately their places were taken by other young men, and at the end of the performance, each man standing up in succession had received six or seven tremendous blows. For about ten days the same thing was repeated, and the young men who were qualifying themselves to be admitted into the mysteries of the duk-duk must have been truly glad when those spirits left them in peace. The performance was varied occasionally by the duk-duk taking a club and giving the unfortunate neophyte a tremendous blow in the back. It was considered the right thing to throw something down in the path of the duk-duk, if one met him accidentally, so I invariably carried a supply of tobacco in my pockets while we entertained these visitors, as they had a most disagreeable habit of popping out suddenly upon you from the bush and dancing round you.

I believe the origin and meaning of the whole performance to be this. It is intended to be a power held over the young men by the old ones. The duk-duk is always said to belong to some old man who has summoned it from the sea. In a country where the chiefs of tribes have little or no authority the young men want a great deal of keeping in order. They are carefully kept in ignorance of all the mysteries of the duk-duk. They do not know who is actually dancing in the dress, but they do know that they may be killed by him if the old men have ordered it so, and no one would interfere to prevent it. Again, the old men to whom the spirit belongs get an immense quantity of food contributed to them, and this is a matter of importance, as when they become too old to work in their gardens they are likely to fare badly.

In New Guinea there exists a similar custom, different only in a few unimportant details. I often had considerable difficulty in getting a boat's crew to go up and down the coast with me, as it was always necessary for me to get men who knew the proprietors of duk-duks at the different places we were to visit. In New Britain and New Ireland the people are warlike, but they are fonder of killing their enemies by cunning and treachery than of meeting them in the open field. For this reason it is imprudent to allow natives to walk behind you, unless you are in a place where you know them well, and can trust them.

I did, however, on one occasion see a very big native battle, in which the attacking force must have numbered nearly one thousand men. The tribe with whom I was then staying was also in unusually strong force, or else I am afraid they would have fared badly. They had sent for all their friends to meet me, and the result was that they outnumbered the attacking force, and inflicted on them a crushing defeat.

All, or nearly all the canoes in which they had come were seized,

the enemy was driven along the beach for 15 or 20 miles, and many of them were killed and subsequently eaten. It would take too long to describe the battle. As in the case formerly of the Fijian battles the combatants had to work themselves up to the requisite amount of fury by insulting each other, dancing in front of their ranks and boasting of the deeds they were prepared to accomplish. The women and children accompanied their fighting men into battle, and took up a position in the rear of their army. Whenever one of the enemy was killed, his body was passed back to the women and was by them conveyed to some village to await the return of their lords and masters. I was, I imagine, exceptionally fortunate in being a witness of this battle. The enemy had evidently been preparing for it for years, their canoes were new, and no doubt they supposed that they would inflict on my friends a crushing defeat. They could not have known that I and my little party were staying where we were, or that they would find the tribe in such strong force. Of course I did not allow my boat's crew of Solomon Islanders who accompanied me, and were armed with rifles, to take any part in the fight.

As I have alluded to the fact of the men who were killed being eaten afterwards, I may as well say here a few words on the subject of cannibalism, both in New Britain and New Ireland.

Cannibalism is at the present day a far more common thing than it is generally supposed to be. On the other hand, people talk very loosely about it, and many tribes, especially in New Guinea, are supposed to practise it who have never done so. I cannot absolutely say from my own knowledge that the natives of New Britain are cannibals, though I have every reason to suppose they are. If you ask a man point-blank, as I have often done, if he has ever helped to eat any one, he will deny it for himself, but say that so-and-so did.

They usually appear to be very much ashamed of the practice. That this is not always the case, however, I will presently show. Some eight years ago in Fiji, the Governor, Sir Arthur Gordon, was paying a visit to a mountain chief, who had recently been reconciled to the British occupation and government. The conversation turned on cannibalism, and the impression that he tried to give us was, that he had heard of such a custom, but that none of his people had ever been guilty of it.

A missionary had some time previous to our visit been murdered in the very district in which we were, and had undoubtedly been eaten, and parts of his body had been sent by our host to friends of his belonging to other tribes. He admitted that he had been eaten, by whom he said he did not know; for his part, he said, the idea of eating white man was extremely repulsive to him, as they smoked strong tobacco and drank whisky. On this an old man in the crowd, forgetting his manners and duty to his chief, sprang up and said, "It is a lie; he was as good as any one else, and you know it." His feelings had



carried him away to such an extent that he at all events admitted having helped to eat white man.

In New Ireland, where immediately after the fight I have alluded to I saw them eat the men who had fallen, there appeared to be no shame and no pretence of concealment. They did it, they said, because they liked it, and they had no objection whatever to my being a witness of their proceedings. I am aware that to most people it must be an unpleasant subject, but I think I may venture to describe some of the incidents which occurred on the occasion to which I refer.

The bodies having been hung up by the necks till the return of the warriors, are scalded with boiling water and scraped with the sharp bamboo knife of the country. During this operation, which is performed by the old women, the former merits and accomplishments of each one are discussed with jokes and roars of laughter. This finished, they are taken down and laid on mats. In the village in which I was watching the proceedings, there were six bodies to be operated on. They were cut up by a very old man who kept up an incessant chatter while he performed his duty. Certain parts were kept, the thigh and shin bones for instance, and were no doubt intended to serve as spear-handles at a later date. Each portion was wrapped in many envelopes of stout leaves by the women, and when all the bodies had been cut up they were placed in the ovens which had been previously prepared for their reception. The process of cooking took nearly four days, and during that time the wildest dances and feasting imaginable went on. The heads, however, were reserved for a special purpose. The natives of New Ireland eat a preparation of sago and coco-nut called sak-sak. The brains of these unfortunate men were to be added as a third ingredient. I used to buy sak-sak daily for my Solomon Island crew, but it is needless to say that for the remainder of my stay in New Ireland I did not do so. I have no doubt in my mind, however, that my boat's crew possessed themselves of some of this disgusting mixture and ate it. It is impossible to describe more than the most noticeable features of this banquet. The details were intensely horrid and disgusting, and the women seemed to me to be more brutal and savage than the men. Though I did not remain with them absolutely to the end of the business, I was told that for many days afterwards the natives do not wash at all, as they try to imagine that some trace of their disgusting meal will cling to them.

The trade of these islands is principally carried on between the coast natives and those who live in the interior. The coast natives exchange salt for the food which the bush natives cultivate. There are certain well-known market-places where they constantly meet, and their negotiations with each other not unfrequently end in a fight. The trade with the whites is principally in coco-nuts. When I was there twenty coco-nuts could be bought for one stick of tobacco.

One stick of tobacco represented the twentieth part of a shilling, therefore four hundred coco-nuts could be bought for a shilling. The kernel of the nut cut up and dried in the sun makes a very valuable article of commerce called copra. It is used for making candles, and the refuse makes excellent cake for cattle. It takes about 7000 ordinary nuts to supply one ton of copra. In those days a ton would have cost on the spot about 3*l.*, and as its market value in Europe was from 16*l.* to 20*l.*, the trade was a profitable one. These prices, of course, do not exist now, but I have no doubt the trade still continues to pay. Tortoise-shell is bought in considerable quantities from the natives, also pearl-shell of an inferior quality, and bêche-de-mer. Bêche-de-mer is a large salt-water slug which inhabits the coral reefs. It is split open, boiled, and smoked, and when thus prepared is worth from 50*l.* to 120*l.* a ton in the Chinese market.

Between white men and natives, tobacco is the only money employed. Between the natives themselves a shell money is used, called by them *de-warra*. The *de-warra* is a very diminutive cowry, and the money is supposed to come from the northern end of New Britain. Hundreds of these little shells are threaded on immensely long strips of split cane. A fathom of *de-warra* may possibly be taken as the legitimate tender, that is to say, a piece of *de-warra* is broken off of the length of the extreme stretch of a man's arms extended. Seven fathoms would formerly purchase a good pig, and I have heard of cases where a man's death could be compassed for the same amount. Such is the value of human life in New Britain.

In conclusion, I will say that I consider the country to be one suited to white colonisation. It presents the richest soil, a climate no worse than that of other groups, and not so bad as that of New Guinea, and the people, though undoubtedly savage and suspicious, can easily be managed by firmness, and consideration for their habits and traditions. They make fairly good labourers when not taken away from their own homes, and I see no reason why the extremes of savage and civilised life should not meet on amicable terms in this young country. The Germans, to whom it now belongs, have a most responsible duty before them, and the success or failure of this young colony of theirs depends entirely on the view they take of their obligations to its natural owners.

Before the paper,

The CHAIRMAN (SIR HENRY RAWLINSON) said that Mr. Romilly had been for six or seven years in the Pacific as a Commissioner on behalf of the British Government, and had visited most of the principal islands. He had also written a book which was a model for the travellers of the present day, being both amusing and instructive. After Mr. Romilly had read his paper on New Britain, the meeting would be favoured with additional remarks by a gentleman who knew probably more of the geography of the Western Pacific than any other living man, the Rev. George Brown, who had published a dictionary and grammar of the language, and who would answer any questions on the subject.

After the paper,

The Rev. GEORGE BROWN said that his experience of New Britain and New Ireland dated from the year 1875, when he landed there in company with a party of Fijians and Samoans. He had previously spent between fourteen and fifteen years in Samoa. At the date of his landing there was not a single white man in the group. A few white men had previously called at Port Hunter, but there was no one resident there at the time. He landed on Duke of York Island, and had explored in open boats from a point near Cape Orford on the south-east coast, round Cape Lambert and along the north-west coast to the "Father and Sons" volcanoes opposite to the Duportail Islands. He had also explored the whole of the west coast of New Ireland, and had landed at New Hanover and had communication with the natives. There were not many places in the South Seas of which so little was known as New Britain. Speaking of the early discoveries Mr. Brown said that the Solomon Group was discovered by the Spaniards, under Mendana, in 1567. Mendana made his second voyage to Santa Cruz in 1595 and died there. The earliest distinct notice of the discovery of any of the New Britain islands was in the account of Le Maire and Schouten's voyages in 1616, when they sighted and named St. John's Island and Fischer's Island, and so must of course have also seen the mainland of New Ireland. In 1643, Tasman saw St. John's Island, Cape St. Maria, and discovered Anthony Kaans and Gerritt Denys Islands. All these navigators thought at this time that New Ireland and New Britain formed part of the mainland of New Guinea. This was first disproved by Dampier in 1700, who sailed through what is now known as Dampier's Straits. In 1767, Captain Carteret was drifted by strong currents up Dampier's Wide Bay, so called, and found it to be a wide open channel. This he called St. George's Channel, and named the land on the east side New Ireland. He had landed at Port Carteret and had taken possession of the island in the name of H.M. George III. Bougainville visited the same place in 1768. Captain Hunter visited and named Port Hunter, Duke of York Island, in 1791. After this there was the voyage of the *Coquille* in 1823, and that of the *Astrolabe* in 1827, H.M.S. *Sulphur* in 1840, and H.M.S. *Blanche* about 1872. On a small island in Blanche Bay, called Matupit, or Matupi, some months before he (Mr. Brown) landed there in 1875, two German traders had landed, but after remaining a few weeks they were burnt out by the natives, and shot five of them in escaping to their boats. That was the last attempt to settle in New Britain previous to his landing. He (Mr. Brown) crossed the New Ireland range at an altitude of 3000 feet, and went down to the opposite coast. One of his experiences was a very suggestive one. He had immense difficulty in getting any natives to accompany him across the range. By bribery he got them past two villages, and then they wanted to go back. He told them they could go if they liked. They replied, "You must go back with us," but this he refused to do, and they dared not return alone as they were afraid of being killed to make a meal for the other villagers if they did so, and so ultimately they went on. One of the houses had a ridge pole some ten feet high with the roof coming down to the ground. The ridge pole was covered with alligator and other bones, while the battens were covered with jaw bones of pigs. On one particular batten he counted thirty-five jaw bones of people who had been eaten in that house, some black with smoke, some brown, and some not long picked, and he felt thankful that his own was so far safe, and in its proper position and place. He was in the neighbourhood at the time of the great volcanic eruption, and might say that he had landed on a very new island indeed. A London correspondent of the Melbourne *Argus*, wishing to be funny, wrote that he had been accustomed to subscribe to a library of fiction, but he should discontinue to do so, because he had read in a scientific paper called *Nature*, that the water in a certain bay in New

Britain became so hot that the fish came up already cooked. The fact was, that though the bay was five or six miles across, and no bottom was found up the centre with a thirty-fathom line until a cable's length off the shore was reached, no man could bear his feet in the water for ten days after the eruption, and the fish came up overcooked. Tortoiseshell was obtained from the Hawksbill turtle by burning the fish (which accounted for the marks on the shell), but many turtle had been so much cooked that the shells had floated away from them. He had many times sailed over the very spot where that little island now was. When he first landed on it the soil was so hot that no native could stand on it. There was an immense crater of boiling water, and he wished to find out if it communicated with the sea. The whole island was hissing at every pore, and he managed to ascertain that the centre did communicate with the sea. It certainly was thrown up from the bottom of the sea at a place where there was a shallow reef at the time. Mr. Romilly had mentioned the superstition about mothers-in-law, but he ought to have stated that the mother-in-law was quite as much frightened at the son-in-law. When he (Mr. Brown) was translating the Gospel of St. Mark, he, of course, had to translate the passage about Herod swearing to give the damsel what she asked, even to the half of his kingdom, and he had to investigate the question of the natives' idea of an oath, and he found that the most solemn oath a man could take was, "Sir, if I am not telling the truth I hope I may shake hands with (or touch the hand of) my mother-in-law." He did not know whether Mr. Romilly had travelled up the west coast of New Ireland, but there were some very large rivers there. He had seen some large rivers, such as the Topaia, which gave its name to a district, and indeed New Ireland, on its west side, was one of the best watered islands in the world. The rivers partook more or less of the nature of mountain torrents, and were very soon dried up. Mr. Romilly was quite correct in stating that six feet of strung shells might be taken as the standard of value. The New Ireland money was measured from breast to breast, and the singular thing among such a people was that they had words for "buy" and "sell," and "borrow" and "lend," and "redeeming" a pledge. They also lent out money at ten per cent. interest, and had a word which could only be translated as "selling off at a sacrifice," or "selling under cost price." The marriage customs differed, but as a general rule a man had to pay for his wife. In New Britain when a man proposed he ran away, and there was a lot of crying when they were betrothed, as though they were ashamed of what they had done. He had been told that the concluding ceremony in one district was this. The young couple were brought together in the square, and presents were made by the married women to the girl, consisting of little baskets, digging sticks, &c. Then the chief would come with a great spear and point in one direction, and spear the stem of a banana, and then do the same thing in another direction, and so on, to represent the number of men he had killed. It was a symbolical way of narrating his deeds of valour. If he had killed a man with a tomahawk, he would strike with his tomahawk at an unfortunate banana; if he had killed him with a spear he would spear the banana. Of course he was paid for the performance. The last presents were made by the brother or father to the young man. The first present was a spear, to signify that the young lady was committed to his charge, and that he was her natural protector. Next, they gave him a broom to give to his wife, as a symbol of her domestic duties, and to indicate that she must keep the house clean. Outside, the villages were all remarkably clean. The third present to the bridegroom was a small sapling, with which he was to beat his wife if she did not attend to her duties. With regard to the *duk-duk*, he asked what was the meaning of the tremendous blows that were given, and he was told that those who were struck were supposed to be killed. Their religion was that of all primitive peoples—that the dead were round

and about them. With regard to cannibalism, he had known many instances of it, and was once at a place where the natives were cooking part of a human body within a few yards of him, but he did not know it at the time. There were, however, many who never tasted human flesh, and in most cases the eating of human flesh was a religious rite.

Sir GEORGE BOWEN congratulated Mr. Romilly on the very able and interesting paper which he had read. He himself had been connected with Australasia for 20 years, as Governor successively of Queensland, New Zealand, and Victoria, and of course he took the most lively interest in that quarter of the globe. Mr. Romilly had done good work in the islands which he had visited, and it was well known that he could also write good descriptions of what he had seen. But one point had not been alluded to in the paper, and that was the political relations of the Pacific islands with France and Germany, as well as with Great Britain. He was convinced that a time would soon come when it would be considered desirable to have a formal federation of the Australian colonies. The colonists had strong views respecting the Pacific islands, but those views often differed. There should be an Australasian Dominion, like the Dominion of Canada, which would speak with a single voice of authority for all the British colonies in the Pacific. That voice would command respect both in England and on the continent of Europe. Moreover, an Australasian federation would be a great step towards the desired federation of the entire British empire. Such a federation would probably form a friendly alliance with the great English-speaking federation in America; and the world would thus see a *Pax Britannica*, far transcending what Pliny called the *Immensa Romanæ pacis majestas*.

Mr. DELMAR MORGAN said the allusion to the *duk-duk* reminded him of what he had seen among the natives of the Congo, who had a practice called *Inkimpî*, which appeared to be a kind of novitiate through which the young men passed for a certain time, during which they removed themselves from all intercourse with their friends, and painted their bodies white. At the end of this probationary period there was a grand ceremony admitting them to a kind of Freemasonry.

The CHAIRMAN, in concluding the meeting, said that they were indebted to both the author of the paper and to Mr. Brown for the instruction and entertainment they had afforded. Mr. Romilly had already written one book, and it was to be hoped that he would write many more. Mr. Brown had copious manuscript notes, and had devoted himself to other subjects besides the mere keeping of a diary, a proof of which he had given in his admirable Dictionary and Grammar of the native language, a MS. copy of which he had liberally presented to the Society. He would recommend all travellers in those seas to make a really serious attempt to classify and affiliate the Papuan and Melanesian languages. Until vocabularies were issued, which could be compared, it would not be possible to understand how those islands were originally settled and populated. It was a very interesting branch of linguistic ethnology. Mr. Brown had made a great step in advance in a book which was still in manuscript, and he hoped it would be extended so as to point out the analogies between the New Britain languages and others further afield. In conclusion he proposed a vote of thanks to both Mr. Romilly and Mr. Brown.

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*Journey of the Expedition under Colonel Woodthorpe, R.E., from Upper Assam to the Irawadi, and return over the Patkoi Range.*

By Major C. R. MACGREGOR, 44th Regiment (Ghurka Light Infantry).

(Read at the Evening Meeting, December 13th, 1886.)

Map, p. 68.

I PROPOSE this evening to read to you a paper describing an exploration made in the beginning of last year by a distinguished Fellow of your Society (Colonel R. G. Woodthorpe) and myself, from Sadiya, on the upper waters of the Brahmaputra, to the Kampti Shan country, on the western branch of the Irawadi, and to give you a brief account of the various tribes we met *en route*. The country through which we travelled lies between the north-east extremity of the province of Assam and the upper waters of the Irawadi.

As the mountain chains here lie in a general north and south direction, contrary to the Himalaya, which lie east and west, our route necessarily had to cross the ranges.

After leaving Sadiya, the route lay more or less through thick and tangled forests along the banks of the Dihing river for about 125 miles up to Kúmki (altitude 3600 feet). On leaving Kúmki, the country became mountainous, though still densely wooded, until we crossed the Chaukan range (altitude 9000 feet) and descended into the Bor Kampti valley, where we found a series of plateaus of a more open character, the hills, however, on either side of the valley continuing as thickly forest-clad as on the Assam side of the range.

The country through which we travelled being very sparsely inhabited (a week may elapse without the voyager coming across a habitation of any kind), there are of course no regular paths, and the route lies either along the rocky beds of mountain torrents, or, should these be impassable owing to heavy rains, in the tracks of elephants or other wild denizens of the jungle. A system of blazing the trees, by the hillmen, which obtains in these regions, enables the traveller to thread his way through the seemingly trackless forests. On leaving Sadiya, the most important link in the chain of frontier outposts on the extreme north-east of the province of Assam, the tribes we met were Kamptis, Singphos or Kakhyens (Singpho merely meaning "a man" in their language), Mishmis, Nagas and, in a valley of the Nam-kiu river, Kunnungs, famed for their skill in manufacturing sword-blades and in extracting silver from the ore which abounds in the country they inhabit, and various specimens of barbarous tribes, such as Meeros, &c., who are neighbours of the Kampti Shans.

The climate of the country through which our route lay is excessively moist. During the months of November, December, January, and February there is supposed to be a cessation in the constant downpour;

but this is only nominally the case, as even in the months mentioned we found that scarcely a day passed without rain, and I recollect that it rained in torrents, day and night, the whole of one week in January. The effect of this almost ceaseless downpour is, that an enormous quantity of water finds its way to the west of the waterparting of the Chaukan and Patkoi ranges into the Brahmaputra, viâ the Dihing and other rivers, and to the east into the Irawadi, viâ the Nam-lung and numerous other rivers, the drainage from the Naga Hills to the south being absorbed into the Kyendwen river which joins the Irawadi below Mandalay. Last March, a most interesting paper, on a journey he made up the Kyendwen in 1881, was read to you by Mr. Annan Bryce. Since our annexation of Upper Burma it is of course important that we should have as many friends as possible in the tribes of the far north, and although the Kampti Shans, whom we visited, are not a very numerous clan (I should say that the whole community does not exceed 12,000 souls), yet, owing to their superior civilisation—superior when contrasted with the semi-barbarism of their neighbours—they would prove of use to us; they certainly showed their willingness to be friendly in every way.

Before commencing the narrative account of our journey I must not forget to mention that we were not the first Europeans to visit the country of the Kampti Shans. In 1826, Lieuts. Wilcox and Burlton with an escort of twenty Kampti militia, visited Manchi from Sadiya. Their route coincided with ours, or rather ours coincided with theirs, for two days' march from the mouth of the Dapha river. From thence the travellers, probably not having been told of the somewhat easier and more direct route viâ Kúmki and the Chaukan Pass into the valley of the Nam-kiu, turned their steps more to the north and crossed the Phungan range at a higher altitude than we did. Wilcox did not visit Padao or Langnu and Langdan (Mung Lung), as at that time (sixty years ago), the people of Manchi were at war with their neighbours. Wilcox's narrative teems with information of various kinds, and we (Woodthorpe and I) often wished we had known him and could compare notes. No man, except perhaps Woodthorpe, has done so much for the geography of the north-east frontier as Wilcox.

On the 19th of December, 1884, our party, consisting of Colonel Woodthorpe, R.E., Mr. M. Ogle (Survey Department), Mr. T. Digges La Touche (Geological Survey), Dr. D. Grant, and an escort under my command of forty-five men of the 44th (Gurkha Light Infantry) and twenty men of the Frontier Police, together with the usual complement of native surveyors, coolies, &c., left Sadiya and commenced operations by exploring up the Noa Dihing river. The whole of the party was in the charge of Colonel Woodthorpe, the survey officer on the north-east frontier.

The route from Sadiya to Indong, a Singpho village situated on the

right bank of the Noa Dihing river, and distant from Sadiya 54 miles, needs but little description. We were obliged to cut our way through the tangled jungle, and so free a passage for our elephants, carrying the provisions and baggage of our party. It took us six days to accomplish this journey. *En route* we passed several Kampti and Singpho villages, which we visited, chatting with the inhabitants, sometimes through the medium of an interpreter, and at others conversing in Assamese, which is more or less the "lingua Franca" on the British side of the frontier.

At one Kampti village I noticed that the inhabitants had decorated the graves of their relations with flowers and flags, and was informed that it was customary to do so periodically, like our neighbours across the Channel on All Saints' Day. At another village, of which the great majority of the inhabitants were Singphos (who are by religion spirit-worshippers), we found a Buddhist temple and school, which had been erected principally through the generosity of the head man, who was a Singpho; this was quite an exceptional instance of unsectarian conduct. On visiting the school we found about a dozen boys being taught by the yellow-robed Buddhist priest, who showed us over the temple. The priest informed us that the paper he used for writing on was manufactured out of a creeper, and also showed us a peculiar shaped fan which was used during prayer. In the early morning the "bápu" or priest, and some of his disciples, walk through the village beating a gong and calling people to pray, and also collecting provisions for the day's consumption. At this village (Mung Lung) we obtained through Mr. Needham (the Political Officer at Sadiya), who accompanied us thus far, the services of a Kampti interpreter, called "Deori," who subsequently proved of great use to us when we visited the valley of the Kampti Shans on the Irawadi. The Mr. Needham mentioned is the same officer who, with Captain E. H. Molesworth, made the adventurous journey to Rima on the Tibetan frontier early this year.

The chief of Mung Lung, a venerable looking man, arrayed in a gorgeous flowered Chinese robe, did the honours of his village to us in company with his newest and latest acquisition in the shape of a wife, for whom, we were informed, that he had just paid 80*l.*, 10 guns, 10 slaves, some buffaloes, and 200 beads, was present at a display of fireworks which we gave on the banks of the river in the evening. At this village, as indeed at all the others through which we passed, a Berthon's collapsible boat, which Woodthorpe had brought with him, created a good deal of wonder. This boat proved of the greatest service later on in ferrying our party and baggage over rivers which were too deep to be waded.

On Christmas Day we arrived at Indong. During our stay here the summits of two neighbouring peaks of 6000 and 7000 feet altitude were cleared for survey purposes and temporary houses, storehouses, and a



field hospital (where our clever and energetic young doctor dispensed physic and gave advice to all comers) were erected. We had a constant succession of visitors, comprising Kamptis, Singphos, Nagas, and Mishmis, who were all hospitably received by Woodthorpe and his party. Musical-boxes, wind-up toys, &c., were shown, tricks of various kinds, and occasionally fireworks. The prevalent disease seemed to be goitre, and a large amount of red iodide of mercury was given away; so fond indeed were the Singpho ladies of painting themselves, that their necks, unlovely objects to view at any time, soon became masses of blisters, and I should think most uncomfortable to their owners. It was sought to impress upon our semi-barbarian visitors the benefits which would accrue from vaccination; but they all "drew the line" firmly there, and "would have none of it." Several specimens of coal and of serpentine were brought in for the inspection of our geologist (who was called the "stone man" by the natives). The ash of the coal was rather coloured, but seemed of good quality; the prices asked by the Singphos for the serpentine appeared to us ridiculously large, 30*l.* was asked for a lump 5 lbs. in weight. The Singphos informed me that they had a good market for the serpentine on the Chinese frontier.

The country round Indong was of a flat uninteresting nature, tangled forests and swamps reeking with malaria were the principal features. A few clearances had been made by the Singphos on any high ground which existed, for the cultivation of Indian corn and other articles of food. During the winter, the Dihing river only runs in narrow channels, and numerous grass-covered plains (locally called "Churs") exist several miles in length, forming large islands, inhabited by tigers, buffaloes, and innumerable deer; the last-named supplied our camp with fresh meat, while the river yielded us occasional *mahser* (the Indian salmon), obtained by the rod.

Before I proceed any further with my narrative, I will try and describe briefly the four principal tribes we came in contact with. Probably the majority of my audience know all about them; but some may not.

First, the *Kamptis*, otherwise Shans, probably originally came from China; they are by religion Buddhists. Their history is, that three Shan brothers founded settlements of the Shan race at Mogong in Burma, in Assam, and at Bor Kampti on the Nam-kiu river. The Kamptis come from the same stock as the Siamese, with whom I believe they are identical in language, religion, customs, and dress. The Kamptis possess a written character. Their language is monosyllabic, and very much accented. Words spelt the same may express half a dozen different ideas, according to the way they are pronounced.

Whilst among the Kamptis I compiled a vocabulary of about 600 words, and obtained a few specimens of their writing.

As I have before said, their religion is Buddhism, but in a somewhat modified and tainted form, constant association with their neighbours, who are spirit-worshippers, has imbued them with ideas foreign to the true tenets of Buddhism. The dress of the men consists of a species of kilt and a jacket, and that of the women of a petticoat and jacket, the kilts of the men and dresses of the women resemble Scotch plaids, and they possess, like the Scotch, a large number of patterns and checks. The hair of the women is worn neatly coiled up and fastened with silver and bone pins. Amber earrings are in common use with both sexes. Every male carries a sword in a wooden scabbard.

Secondly, the Singphos or Kakhyens belong to the Tibeto-Burman race and are spirit-worshippers. They have a tradition of a partial flood, in which all the bad people in the plains were drowned; but that one family was kept by a spirit at the top of a mountain, and from this family Singphos (men) reseeded the plains, when the waters subsided, at the end of eight ages of a man's life (about 500 years). The Singphos have a tradition that in the very beginning, there existed on the earth an old man ("Tinglá") and an old woman ("Gúmgai"). In the skies dwelt two spirits ("Nats") called Mútum and Mutá. The terrestrial beings had a son and a daughter; the son wandered about the earth, but the daughter was taken up to the skies by the celestial beings who finally brought her down and married her to the wandering man. From this pair sprang all men.

The marriage customs of the Singphos are simple. A youth should marry his cousin, his mother's niece if possible. Should a cousin not be available, the maternal uncle should arrange for a girl of his class. Should he be unable to procure one, the uncle goes to another family and says, "If you give me a girl for my nephew, I will pay you back in kind when one of your family requires a bride." The father of the youth then gives a feast and presents to the girl's family. Should the bridegroom's father not be in a position to give presents, he gives or sells one of his daughters to the other family in lieu of presents.

A feast given by the parents of the bridegroom (differing from our own custom), ratifies the marriage contract. It is customary for the bride to prepare and serve out the food to the guests on this occasion.

The dress of the Singphos is almost similar to the Kamptis. The men wear kilts and jackets, and the women petticoats and jackets. Married women wear their hair tied on the crown of the head like the men, unmarried women wear theirs tied close to the back of the neck and fastened with silver pins. On the whole, the dress of the men is comfortable and picturesque, and that of the women modest and neat.

During the time we were out on the exploration, I set myself the task of learning the Singpho language, which I found very difficult. My principal instructor was an interpreter and he was far from being an enthusiastic tutor. I found him what children would call "very

trying," and I dare say I was the same from his point of view. However, I managed to collect a vocabulary of about 700 words, and to write a rough outline grammar.

The Singpho language is peculiar for its combination of consonants, which render its pronunciation difficult to a European. There are a quantity of onomatopœic words, principally the names of animals. Many ideas, positive to our minds, such as bad, brave, are rendered negatively in Singpho, as not good, not cowardly. The gender in the brute creation is denoted in a peculiar way, by cutting off the first syllable of the noun and adding lá for the masculine, and cutting off the first syllable and adding ví for the feminine, as shirong, a tiger. Ronglá a male tiger, and rongví a tigress. I generally found my instructors "childlike and bland," but the following little anecdote will show that the veneer of his civilisation was only skin deep, and the interpreter being scratched, the Shan appeared. One day whilst receiving my lesson in the language, I happened to pull out my little Deringer pistol with my pocket handkerchief. Deori pounced on the pistol at once, and went into raptures over it. On my asking him why the little weapon struck his fancy so much, he replied, "It would be so easy to cover it up in the palms of both hands, approach a deadly enemy in an attitude of prayer and reverence with outstretched palms and so quietly shoot him through the head!"

Thirdly, the Mishmis. Those whom we met belonged to the Meju or middle clan. They are a small, active, and very dirty people, of a Mongolian type, flat noses, almond-shaped eyes, &c. Their dress consists of a kind of kilt and a woollen armless coat; their hair is turned up and tied in a knot at the top of the head. The women were neatly dressed, and some of them wore a broad band of thin silver round their heads. The men are armed with a short sword, and either a bow or a spear, a few have flint-lock muskets. A pouch of the skin of some wild animal is generally carried over the shoulders, and contains a pipe, tobacco, flint and steel, also some poison (aconite), to put on their arrow heads. The Mishmis exchange poison and musk deer pods with the Tibetans (whose neighbours they are) for clothing, salt, and swords; and they barter indiarubber, ivory, beeswax, and ginger, for salt, opium, and clothing, with the inhabitants of Assam. The religion of the Mishmis is a kind of spirit-worship. As is often the case among barbarous tribes, the men are much vainer than the women; both sexes, however, distend the lobes of their ears with enormous silver earrings. I thought the men, especially the boys, had sweet and musical voices.

Fourthly, the Nagas. The few scattered hamlets of this clan are situated on the north-western slopes of the Patkoi range. The Singphos and Kamptis always spoke of these Nagas as being subject to them. These people (who are quite distinct from the powerful Angami and Lhota clans of Nagas to the south and west) are miserably poor and

wear hardly any clothing; their arms consist of spears, cross-bows, and hatchets; their religion is spirit-worship; they are tattooed on the face, legs, and arms; their principal trade is in indiarubber.

I now take up the thread of my narrative. On the 12th of January, having completed all arrangements for our depôt and got up necessary supplies, I moved forward up the Dihing river, passing several Singpho villages *en route*. At one of these villages I visited the chief at his house. I was shown over the dwelling, which was, like all Singpho houses, built on piles about five feet from the ground, the eaves of the roof coming down to the level of the platform which formed the floor of the house. There seemed to be a plentiful supply of cats, which the Singphos onomatopœically called "miau." In the house and below the raised floor, pigs, fowls, and dogs abounded. The front of the house was decorated with the horns of cattle slain for feasts. I was offered some of the Singpho wine, called "shiru," and out of courtesy tasted it, but found, as I had suspected from my experience of Assam frontier liquor, that it was very acid and most unpalatable unless one was extremely thirsty.

On the 22nd Woodthorpe, having completed his survey work in the neighbourhood, joined me on the right bank of the Dapha river, where I had established a camp. The Dapha valley was about five miles long and one mile wide; it was covered with short grass, and abounded with deer. A few tigers had also taken up their abode in the valley, a fact which came unpleasantly home to our coolies, two of whom, poor fellows, were carried out of camp at night by a man-eater, who was, I am glad to say, eventually shot. In exploring the plateau to the east of the valley I came across some wild elephants, who, luckily, were quite as much frightened at my appearance as I was at theirs, and saved me the trouble of running away by bolting with loud trumpeting into the neighbouring forest.

From this valley we had hoped to have made the ascent of a peak called Dapha Búm (15,000 feet), búm in the Singpho language meaning mountain, but the route was found utterly impracticable, and no guides were to be had, so the idea was reluctantly abandoned, and we again started eastward, crossing the Dapha river waist-deep just above its junction with the Dihing (or Diyúng as it is locally called). We toiled along the river-bed for three days, sometimes picking our way over boulders of all sizes, from that of a cricket ball to that of a small house, and at others climbing along the precipitous sides of cliffs, making ladders of creepers and trees, or cutting footholds in the rocks to enable our laden coolies (hill-porters) to get along. There had been such a constant downpour of rain for these three days that the river-bed became impassable, and we had to halt for the next three days on some ledges of rock just above the water. When the flood subsided we started forward again, road-making the whole way.

Our freedom from accidents on this as on many other occasions, was principally due to Woodthorpe's engineering skill, and the intrepidity of the Ghurkas of the escort, who would hang over the *precipitous* side of the dangerous places, assisting the coolies with helping hands and cheery advice as to the best disposal of their feet. The difficulties of these marches were greatly increased by the heavy rain which, flooding the river below, drove us to the cliffs above. Not to dwell too long on the discomforts and difficulties, which, after all, are inseparable from pioneering in a country such as the north-east frontier of India. I may mention that we arrived at a place called Kúmki on the 14th of February, and right glad we were to get on a bit of level ground and have a chance of drying our damp and mouldy clothes and bedding. In the valley of Kúmki, which is triangular in shape and about two miles in length by one in breadth, we found two large Singpho villages; these villages had never before been visited by Europeans, and at first their attitude was a very sulky one, though we did all we could to conciliate them; the largest of the two communities did not bring in the customary offering of a fowl and a handful of rice, so we stood on our dignity (a good plan to adopt sometimes when dealing with semi-barbarians), and refused to have anything to say to the people till the usual presents were brought in by the head man. This was done eventually, and then some red cloths were presented to the head men, the musical-boxes were set going, and a display of fireworks given. The inhabitants of this little valley, which is situated on the left bank of the Diyung river in East long.  $96^{\circ} 56' 4''$  and North lat.  $27^{\circ} 17' 10''$  at 3600 feet above sea-level, seemed to have a great idea of the power and influence of the Kampti Shans on the Nam-kiu river, and very little of that of the English. I think, however, that before we finally left the valley their ideas underwent a considerable change, especially after they heard how well the Bor Kamptis had treated us. I mention this, as although Kúmki is only 125 miles to the east of Sudiya, yet the valley had never before been visited by English representatives; Wilcox in his journey in 1826 having taken a more northerly direction after leaving the Dapha river.

Whilst at Kúmki I inquired about the manufacture of gunpowder, and was informed that the proportion of the three ingredients was as follows:—in 100 parts—saltpetre 70, sulphur 15, and charcoal 15. The Singphos obtain their nitre and charcoal locally, the sulphur they get from Assam and Burma; the powder is not granulated, and the Singphos use enormous charges in their old flint-lock muskets. The survey officers mapped out the surrounding country and we made several excursions to peaks ranging from 5000 feet to 7500 feet high, and distant from one to four days' journey. (I reckon the distances in days and not in miles, owing to the extreme inaccessibility of the country. On one occasion it took us three days to cut our way to the summit of a

peak, from which the return journey to camp was performed in seven hours.)

One narrow ridge along which we had to climb had a sheer cliff on one side, and on the other a few bamboos, which were ornamented with rings of sharp thorns at intervals of every three or four inches up the stems; of course, when the choice lay between lacerating one's hands by holding on for support to the thorns on going down the precipice, it "goes without saying" that we preferred the thorny Scylla to the rocky Charybdis. In some places along these ridges the bamboo jungle was so dense and matted together by the weight of the lately fallen snow, that we had to cut our way with the Ghurka knife, often disappearing bodily, slipping between the tangled masses of undergrowth, fortunate if we found our arms left free to commence the work anew of cutting a way out. We noticed on some of the less precipitous ridges where the stunted oak and the gorgeous rhododendron abounded, that rhinoceros had travelled over them, probably when making their way to the salt-licks in the valley of the Turong (the source of the Khyendwen river). I have noticed the marks of wild elephants at even higher altitudes than 7000 feet, but never before those of rhinoceros so high.

Often when the survey officer has succeeded in surmounting all the difficulties of the route up to the summit of a peak, which he has cleared of its trees, he is foiled by the perversity of the atmosphere, which will not afford him the view for which he came. I remember how, in 1875, Colonel Godwin-Austen (who did such splendid survey work in the Sub-Himalayan ranges on both banks of the Brahmaputra), Mr. Ogle, and I remained one stormy week amid snow, sleet, and hail on Mount "Shengore," 7000 feet high, in the Daphla Hills, without getting a view. We were literally a week in the clouds.

On the 5th of March we were all back in camp at Kúmki, not sorry to have our feet once more on level ground. On going through a Singpho village on our return, I, being anxious to air the little knowledge of the language I possessed, called out to (what appeared to me) an ancient dame, addressing her as "Gúmgai," old woman; the lady was very angry, and shouted out, "I am no more an old woman than you are; if you want to see an old woman, I will show you one," and going into the house she produced from the fireside a little old wizened creature whom she pushed forward, saying, "Now, there is an old woman for you." I pacified the Singpho ladies with some tobacco, and retired, feeling properly snubbed for having been so ungallant as to allude to a lady's age.

On the 8th of March, having got up some supplies from our dépôt on the Dapha river, we turned our faces eastwards again, and after five days' hard marching we arrived at the very head of the Dihing river, which was here, at a height of nearly 8000 feet, a tiny rivulet, being near its

junction with the Brahmaputra, over a mile in width. We had great difficulty in procuring a guide, and we had got two marches from Kúmki, when our guide announced his intention of returning. However, with the bribe of a gun, we persuaded him to accompany us. The man amused us much by sending off the gun by a slave to be placed with his Lares and Penates at his village, and on being interrogated as his reason, he replied, "Who knows what will happen to your party; *my* reward will at any rate be safe."

The second day's march from Kúmki we bivouacked for the night on a charming plateau, covered with short grass and dotted here and there with clumps of trees. This plateau about 100 years ago was inhabited by a race of men called Mulliks, probably one of the so-called Naga clans, who originally came from the neighbourhood of the Nong-yong Lake, south of the Patkoi range. These Mulliks, who seemed to have been a most inoffensive people, were ousted from their lands which they had cultivated on the Diyung river by the Kamptis and Singphos, particularly by the latter, and the majority had been either killed or enslaved.

Soon after leaving this plateau, which was 4300 feet above sea-level, we struck a track which our guide informed us led to the Khyendwen valley. On this march some of our coolies broke down, and one was not able to carry himself, much less his load, so Messrs. Ogle, Grant, and La Toucho carried the sick man by turns; and I must mention that this was not the only occasion that sick natives were carried by the Europeans of the party, our young doctor especially being always well to the fore in helping to get sick men along. That night we camped at an elevation of 7500 feet. There was no level ground, so we had to scoop out holes to lie in on the mountain side and make the best of it.

The following day, tramping along through the damp rank jungle, we came suddenly on an old Kampti and his son. The old man was very weak and ill, and could not proceed. We got one of our men to carry him up and over the pass; but the poor man was too far gone, and died on the road. At the little stream where we found the dying Kampti my aneroid read 7100 feet, and it was from this place that the ascent of the pass began. A comparatively easy climb of 1200 feet brought us to the summit, up to which there was a considerable quantity of snow lying about in patches. It was hard work for our coolies, wading through the melting snow. We Europeans were so delighted to be up to our knees in snow, which reminded us of home, that we began to imagine we were schoolboys again, and tried our hands at snowballing. To all the natives, except our guides, snow was quite a new experience, and one Assamese youth amused us by announcing his intention of filling a bottle full and taking it back to Assam to show his friends what a strange thing he had met on his travels!

Up to this (12th March) we had generally travelled together, but as

Woodthorpe and I had made up our minds to visit the Kampti Shans and the valley of the Nam-kiu river (the western branch of the Irawadi), and also to return into Assam via the Turong river (the Khyendwen), crossing the Patkoi range near the Nongyong Lake.

We therefore separated from the rest of the party, taking with us four Gurkhas, and travelling very light. As we were all short of rice, we only took enough to last us into the Kampti country. Messrs. Ogle, La Touche, and Grant, were all anxious to accompany us, but we could not manage provisions for the whole party, so they returned via Kúmki to our depôts at Dapha and Indong. Of course our guide said it was utterly impossible to go on, and that he would not answer for the consequences; however, when he was informed that we intended to go on with or without him, he waived his objection, and off we started. After a dreary march in the pouring rain, we camped that night at a place called Mokoshat (7500 feet). I may mention, once for all, that it poured with rain night and day, all the six days' journey to Bor Kampti.

At Mokoshat, our interpreter said that the downpour was owing to our party burning bamboos, which, being filled with water, exploded, and he was continually calling out, "Don't make a noise, or the Deity will send more rain." Frank Hatton mentions that the same idea obtains among the Dyáks in North Borneo. My companion (Woodthorpe), who had been more or less ill all day with fever and a bad sore throat, became very ill during the night, and I was very anxious about him; however, the next morning he was a little better, so we commenced to climb the Mokoshat mountain (one of the spurs running down from the Phungun range). Having attained a height of close upon 9000 feet, we descended, and making way through the melting snow, bivouacked at a height of 7500 feet. It had been so stormy the whole day, hail, sleet, and incessant rain, that unfortunately we got no view whatever, and it was the same on our return. Our guide informed us, that on a clear day, the Brahmaputra to the west, and the Irawadi to the east, can be seen from the Mokoshat mountain. Owing to the intense cold, and the driving hail and sleet, which caused the track, which we with difficulty made out by the "blazing" of former travellers, to be very slippery, our progress was very slow, and we had to halt on the hill-side without water, except what we got from the skies above. Darkness came on, and our guide ensconced himself in a hollow tree from which he could not be persuaded to budge. Seated cross-legged in his shelter, with a fixed and vacant look on his stolid countenance, he reminded me of a picture I have seen somewhere of "Saiambu," a Hindu deity, called the self-existent and self-complacent one.

On the sixth day, after leaving the bulk of our party, we arrived at the stockaded town of Langnu. There had been a dreary sameness about all our marches; tramping along through the damp rank jungle, all



sodden under foot, had a depressing effect, and we almost imagined that we were being gradually absorbed into the mass of decaying vegetation which existed above, below and around us; it was almost a relief when the route, as it often did, lay along the rocky beds of mountain streams.

Thunderstorms were very frequent. I always think they are grander and more impressive at high altitudes, the crashing among the trees and the awaking of a thousand echoes on the mountain sides, has a greater effect when one is out in the open, especially at night. Apropos of thunder, the Singphos have rather a poetical way of expressing it—for it thunders, they say, “*mou sigadé*,” the cloud is calling out. On our way to Langnu, the site of a Kampti bivouac was pointed out to us where ten Kampti traders on their way back from Assam had been recently surprised and massacred by Singpho robbers, and we were warned to look out on our return journey. The Kamptis afterwards told us that if it were not for fear of Singpho robbers there would be much greater intercourse between the valleys of the Irawadi and the Brahmaputra.

Our great anxiety on arrival at Langnu was on account of food for our coolies and our four Gurkhas, so Woodthorpe and I walked into the town to interview the raja; we were conducted to the town hall, a thatched house with a raised platform, in the centre of which was a fireplace, and after a long delay the raja came in state with Burmese gilded umbrellas carried over him and his brother; gongs were beaten and occasionally a musket was discharged. Among the retinue a conspicuous figure was an individual called the Tongnu, who was dressed in a kilt, a black goat-skin coat and a Burmese red lacquered helmet (somewhat like a fire brigade man's hat); this man's duties are of various kinds, he seemed to combine the office of master of the ceremonies with that of chief of the police. The Kampti Raja said that if he had known we were coming he would have gone to meet us; but I think this was only “a manner of speaking,” our sudden and unexpected descent on the valley probably saved us the mortification of being turned back had the Kamptis got wind of our intention. On the whole we had an amusing and satisfactory interview; rice was promised us and the promise was handsomely redeemed. After the interview we were shown over the stockaded town; the stockade was a double one, 11 feet high with a banquette of earth about four feet high; we were told that the slaves had built the stockade, and were also informed that all the slaves would gladly go to Assam if they could; this I do not believe, as the slaves (so called) seemed perfectly happy and contented. With the exception of a few cases of goitre, the Kamptis seemed a healthy people; a few old people complained of rheumatism, for which we gave them some vaseline, the rubbing of which would do the affected parts no harm (and I am afraid not much good).

A few wild, uncouth-looking Singphos from the adjacent hills

came fully armed into our camp, and the Kamptis seemed much relieved when they had taken their departure. Some Kunnungs came to have a look at the two white men; they inhabit the country to the north-east of the Kampti valley, and are an extremely gentle, pleasant-looking people, small in stature, rather fair in complexion, with their hair cut short in a fringe over the forehead; they had melodious voices and pleasant smiles. I wrote down a few words of their language, which to a certain extent resembles the Singpho, about five per cent. of the words being identical. The Kunnungs are famous for their "daos" (short swords), which they manufacture from iron extracted by them from the ore found near the Nam-Tisán river. They also extract silver from ore which they obtain eight days' journey to the north-east of Langnu. We brought back a small lump of silver ore, which, when assayed at the Bombay mint, was found to yield  $12\frac{1}{2}$  ozs. to the ton. Afterwards, when we visited the chief raja of the Kamptis at "Padao," he said if we would visit his country again he would send us to the silver mines; and he seemed anxious to obtain the services of men who could extract the silver from the ore.

On the 20th March we started for the western branch of the Irawadi, called by the Singphos M'Li-kha ("Kha" being Singpho for river), and by the Kamptis the Nam-kiu ("Nám" being Kampti for river) (the Singphos and Kamptis respectively describe the Irawadi during its whole course to the sea as M'Li-kha and Nám-kiu).

After crossing the Nam-lung river by means of canoes formed out of hollowed trees, we kept along the left bank of the river for six miles, until we came to a large stockaded town called "Langdao." The people objected to our going through their lands to the river; but after an interview with the raja, with whom we shook hands (somewhat to his astonishment), we were allowed to proceed, and three miles further on we struck the Nam-kiu, the western branch of the Irawadi just *above* where it is joined by the Nam-lung. Here we found the river about 85 yards wide, and not deep, in no place more than five feet. The mouth of the Nam-lung is in E. long.  $97^{\circ} 38' 30''$  and N. lat.  $27^{\circ} 15' 30''$ , and 1630 feet above the sea-level.

The river up stream was very pretty, and Woodthorpe made a charming sketch of it, with its "couch of snows," the lofty Nam-kiu mountains to the north as a background. On inquiring, we were informed that to the east, three days' journey off, a river called the Nam-Tisán flowed parallel to the Nam-kiu, joining it lower down. Between the Nam-kiu and the Nam-Tisán we could see a mountain range which was called by the Singphos T-chet Búm. To the east of the Nam-Tisán (or Disán), and five days' journey from that river, another range existed called the Nogmún or Noikon (from this range the Kunnungs obtain the silver ore), to the east of which flowed the Nam-Dumai or Phungmai. This river the Kamptis said was the same size as the

Nam-kiu, that it was formed by three streams which had their origin in the Nam-kiu mountains, which we saw to the north and north-east of the place where we stood (viz. on the right bank of the Nam-kiu, just above the mouth of the Nam-lung). The Kamptis told us that all the branches of the Irawadi have their origin in the snowy range to the north and north-east. The Kamptis said that sometimes a trading party went to China (which they called "Khé Moung"), that the journey took them one month and eight days, that they had to cross in boats two big rivers (after having crossed the Nam-kiu, the Nam-Tisán, and Nam-Dumai). The traders bought opium in China at the rate of 10s. 6d. a pound, but they said it was not so good as the Assam opium, which they could obtain after a journey which only took them half the time it did to go to China; the opium of Assam cost them, however, about 30s. a pound. The Kamptis are not such inveterate consumers of the juice of the poppy as the Singphos. We found that the drug answered very well in the place of money when we bought rice for our party; but, of course, it was very sticky stuff to cut up and divide into small particles, as each individual only brought us a few pounds of rice, and we had to pay each person separately at the rate of a penny a pound; it was a tedious business, and as the people would only transact business with the two white men personally, we were not sorry when the day's bartering was over. We found the Kamptis strictly honest in their dealings, and if we paid a person for ten pounds of rice and only received five pounds at the time, he or she would go back to the town, and bring us the balance without fail later on.

After we had visited the Irawadi we returned to Lungnu very tired, as the day had been excessively hot, and I suppose we felt the heat more, having recently been travelling at high altitudes, between 7000 and 9000 feet; the descent to 1600 feet was somewhat trying. At night we were disturbed from our slumbers by some armed men who came yelling into our camp. We turned out, weapons in hand, thinking that the Kamptis had changed their minds about us; but discovered that our midnight visitors were messengers sent by Lukún, the chief raja of the Kamptis, and that he invited us "to repair to the metropolis." To pay Lukún a visit at Padao was just what we wanted. So we started off the following morning, taking two Ghurkas with us. After being ferried over the Nam-lung our route lay along a level valley covered with short grass and dotted here and there with clumps of trees; the valley is divided into three plateaus, Langnu being on the most southern, and Manchi on the most northern. In the old maps Langnu and Lang-dao were put down under the names of Mung Lung, and Padao (which is now the capital), was called Mung Kampti (the meaning of which is simply the Kampti country). The extreme length of the valley is 25 miles, and the average breadth about 12 miles; and the height above sea-level varies from 1500 to 1800 feet. The number of inhabitants does not

exceed 12,000, and they are divided amongst 13 villages, the most powerful of which are Padao and Manchi. The soil of the valley is very fertile, and very large crops of rice are grown, the rice being stored in excellent granaries. Blood feuds between members of different communities are not unfrequent, and the Kamptis seem to have a lively dread of the surrounding Singphos; otherwise the Kamptis lead a quiet, peaceful life, and are certainly the most intelligent and best behaved people on the north-east frontier. The Kunnungs, who inhabit the lower ranges in the vicinity of the valley, are nominally the vassals of the Kamptis, to whom they pay tribute.

After a nine mile walk, we found a large crowd of armed Kamptis awaiting our arrival, and the nephew of the raja who had brought a couple of ponies for our use. The carved wooden saddles were most uncomfortable, and stirrups very tiring (probably made to fit the naked big toe of a Kampti); however, as our friends evidently intended to do us honour, we mounted, and in noisy procession went to Padao. Muskets were discharged, gongs beaten, and banners and gilt umbrellas were waved overhead by an enthusiastic escort. *En route* we passed some small Buddhist temples with gilt domes, under which were enshrined the usual images of Gautama. Arrived near the capital we were met by the raja's two sons, who informed us that their father was at his country residence on the Irawadi, that he had given orders for us to be well received and that he would visit us. We tried to get a little rest, but closely surrounded as we were by a dense crowd of about 2000 people of both sexes and all ages, rest was impossible. I was very unwell, the sun having affected me the previous day, so crept into our little tent to lie down, whilst Woodthorpe, with his usual good nature, tried to draw the crowd off me by getting out our stock in trade of toys, &c.

Amongst our toys, we found that a dancing doll with golden hair, who (when she was wound up) fired off a pistol, was the prime favourite, the Kampti ladies being very curious in examining the various items of the doll's dress; a growling bear, and a jumping frog were also in great request.

We paid several visits to the town of Padao, which was surrounded by a strong stockade. The raja's dwelling was inside an inner stockade, and at the time of our visit, a new palace (save the mark!) was being erected for the potentate.

On the day following our arrival the raja was brought in with great pomp from his residence on the Nam-kiu river. He was a fine-looking shrewd old fellow, with a certain amount of natural dignity, and seemed to have considerable authority over his people. Before our departure Woodthorpe made a capital sketch of the chief and coloured it; the raja asked that it might be presented to our Queen concerning whom we had told him, dilating on the immense power she possessed, and trying to

give him an idea of the vast extent of country she ruled over in all parts of the world.

The open air darbar which was held in our honour was a pretty and curious, if not a very imposing, spectacle. The chief raja sat cross-legged on a curious carved wooden couch, which was flanked by gilt representations of dragons and covered with a crimson cloth. All the people were decked out in their bravest apparel. Numerous large Burmese gilt umbrellas were held aloft over the inner circle, which consisted of Woodthorpe, myself, our two little Gurkha soldiers, and the raja's party. We were surrounded by over a hundred Kamptis, armed with flint-lock muskets, behind whom stood dense rows of spearmen. The master of the ceremonies, who was gorgeous in a Chinese dress, resplendent with dragons' heads and flowers, amused us very much. Armed with a long stick, he went round during the time the darbar lasted, tapping with no light hand the heads of the front rows of spectators, making them sit down so that those behind could see. The "long stick in waiting" did not seem to discriminate between the bondmen and the free in the force of the blows he administered, but I must do him the justice to say that he "lightened his hand" considerably when tapping the neat, prettily decorated head-dresses of the Kampti ladies who were mixed up with the warriors. Presents were exchanged, and questions asked on both sides. We asked again about the rivers to the east, but the Kamptis only gave us the same information they did near Langdao. The raja said if we could stop he would send us with guides to the silver mines, which he said were eight days' journey to the north-east. Unfortunately we could not stay, as we knew it would be very difficult to get back to Assam as it was.

Our intention was to start at once and carry out our original intention of striking south from Kúmki, and crossing the Patkoi range into the Khyendwen valley, and re-crossing the Patkoi range into Assam, near the Nongyong Lake. This programme we carried out, but with great difficulty, owing to the lateness of the season and the consequent increase in the size of the rivers. Had we remained any longer in the Kampti country we should have had to remain there for another eight months. The Kampti chiefs treated us most kindly, and said they would always be glad to see us again. We returned to Langnu, and on the 25th March commenced our return journey. Before our departure the Buddhist priest, with two of his acolytes, came to wish us God-speed, bringing with them rice and flowers, which they scattered before us, and chanted prayers to the effect that we might have a safe and speedy journey back, that Singpho robbers might not molest us on our path, and that our sick coolies might recover. We were both much pleased with this attention on the part of the Buddhist priests. The Raja of Langnu insisted on sending his brother and half-a-dozen musketeers to accompany us for the first three marches to protect us

against the Singphos, who, the Kamptis asserted, were always on the watch to waylay travellers. With the exception of having our camp invaded by a herd of wild elephants one night, and the usual difficulties of crossing flooded rivers, &c.—difficulties which Woodthorpe's engineering skill and the good work of our Gurkhas soon disposed of—we arrived, on the ninth day after leaving the Kampti country, at Kúmki again. We were most fortunate, just in time in crossing the Diyúng river, as an hour after we had crossed, the river, which was seventy yards wide, became unfordable, and, I believe, remained so for three weeks. On arrival at Kúmki we found, as had been previously arranged, that the bulk of the Survey camp had gone down the banks of the Diyúng to Indong, a small guard with some supplies being left for us. The Diyúng being in a very flooded state, the party, under the able leadership of Mr. Ogle, had (we afterwards learnt) a very rough time of it, and all the three Englishmen of the party, Messrs. Ogle, La Touche, and Grant, had vied with each other in helping the sick coolies over the dangerous places on the route.

I must relate one incident, showing what real good men Gurkhas are. A non-commissioned officer of the 44th Regiment (Gurkha Light Infantry) who had been sent with three soldiers in charge of some rice for us, to await our return on the Assam side of the Chanka Pass, the man thinking something must have happened (we were a few days overdue), took his little party over the snowy pass, and was on his way into the Kampti country to aid us when we met him.

On the 5th of April, Woodthorpe and I left Kúmki and crossed the Patkoi range at an altitude of 5500 feet. For a week we marched down and along the banks of the Turong river (the head water of the Khyendwen); the route was a very bad one, principally owing to the flooded state of the river, which compelled us either to wade waist deep in the torrent, or else to clamber over the huge slippery boulders and cut footholds along the face of steep cliffs. Each day the rain descended in greater torrents and the leeches became if possible more ravenous. We noticed that there were hardly any birds in this region, and the only living things we saw were a couple of tigers, several deer, and some enormous pythons; there were a great quantity of indiarubber trees, some of which bore signs of having been recently tapped by Nagas. At the end of the seven days we came to a small collection of Singpho hamlets, the inhabitants of which seemed very much astonished at seeing us.

We hurried on, as we were short of food, and could surmise what a flooded state the country in front of us was in. On the third day after leaving the Singpho villages, which are situated on the right bank of the Turong river, just above the mouth of the Loglai river (which we had to bridge), we crossed the Nongyong river, partly by swimming and partly by wading, and passing by a piece of water three-quarters of

a mile long and half a mile broad, called Nongyong Lake (which has been fully described and accurately sketched by a Mr. S. Peal, who visited it some years ago), we crossed the Patkoi range at 2860 feet above sea-level, and once more were in Assam.

For the next three days we waded down rivers when we could, and cut our way through the dense cane jungle when we could not, till we were brought up with a round turn by a deep rapid river about 60 yards wide; as we had no food left, and no immediate prospect of crossing the river, a Gurkha swam across to bring us assistance from our party, who were at Indong, a day's journey off. After the departure of our messenger we set to work to make rafts of plantain trees and bamboos, and the next day we crossed our party without losing a man. Woodthorpe (who worked one of the rafts backwards and forwards himself) was as usual most indefatigable; even our phlegmatic old interpreter bestirred himself (seeing that starvation was imminent), and took the whole morning to make a raft for himself, which he capsized as soon as it was launched! The following day we were glad to meet our Gurkha messenger, who was accompanied by Dr. Grant with supplies of food, and on arrival at the Dihing river, which was now about half a mile wide, we found the other members of our party ready to help us to cross with canoes lashed together. The river rose so rapidly that night, that we were not able to cross for three days. After crossing the river Dihing we retraced our steps to Sadiya, and arrived there the end of April, after having been travelling for four months and a half.

The distance from Sadiya to Padao, the capital of the Kampti Shans, is 197 miles, and now that the route is known and surveyed, the journey could be performed in three weeks. Owing to the sparcity of inhabitants on this route and the physical difficulties of the country, I should not think that it would ever do as a possible trade route to China; however interesting it might be to revisit the Kamptis with a view of acquiring more geographical knowledge of the country to the north and east.

The distance from Sadiya over the Patkoi range and *viâ* Nongyong to the mouth of the Loglai river (i. e. where it joins the Turong) is 103 miles, and the journey could be performed in ten days; from the Loglai river to Mainla *viâ* Bisa is about 150 miles. In the dry season the journey from Sadiya to Mainla could be performed in three weeks. On this route there are very few inhabitants, but the country is said to be easier to travel over than the route to the Kampti country. The distance from Mainla to Bhamo is about 130 miles, and the journey can be made in native boats down the Irawadi. Mainla is a Shan town, situated on the left bank of the Phungmai river (the eastern branch of the Irawadi) at its junction with the Nam-kiu (the western branch).

In conclusion, I must express my regret that my old friend Colonel Woodthorpe, who has only just returned to India with the Gilgit Mission,

was not able to write and read you a paper on the journey we took together; he would have been able to give you a much more interesting account of the country and people we saw. I cannot do better than finish by quoting and heartily endorsing the words of Col. Godwin-Austen, in the paper read before the British Association at Aberdeen last year:—"Col. Woodthorpe possesses all the qualifications that make the successful explorer. Great powers of endurance and observation, zeal for his work, brave but cautious, a talented draughtsman, and last, but not least, the tact to make himself liked by the people of the country"; and I may add, by all those who have had the pleasure of travelling with him.

After the reading of the above,

Colonel YULE said he was delighted to hear the testimony which Major Macgregor in his interesting paper had borne with regard to his fellow-traveller, Colonel Woodthorpe; an officer with whose remarkable enterprises the speaker had been much impressed for the last seven or eight years. Colonel Woodthorpe had made several remarkable journeys to the north-east of India, but his explorations had not been confined to that region. He had just returned from a journey in the extreme north-west, beyond the British frontier, through passes which had never before been trodden by any European. Of all geographical problems in Asia which had been dealt with by the Society for many years past, no two had interested him (Colonel Yule) more than those relating to the sources of the Irawadi and the sources of the Oxus. Colonel Woodthorpe had been an explorer in both those regions. The result of his last exploration in the Oxus region had not yet been published, and he believed there were political difficulties in the way of their publication. He was glad also to hear how Major Macgregor had spoken of one whose name perhaps was not very familiar to this generation, but who deserved the highest honour—Lieutenant Wilcox. Sixty years ago there was no more promising explorer or British traveller in existence, but his career was short, and he had been almost forgotten by those who were not specially called upon to study the results of his travels. But every man who had occasion to examine the many problems connected with the sources of the Irawadi must be familiar with the name of Wilcox. Some years ago, when the everlasting question of the source of the Irawadi was discussed at a meeting of the Society, a gentleman who took the heterodox view spoke disparagingly of Wilcox, because apparently Wilcox's facts were contrary to his theories. On that occasion he (Colonel Yule) was called on to speak, and he said a few words on the subject which he might appropriately quote now. "Wilcox was not a man who ought to be treated as this gentleman had treated him. He was one of the most intelligent and competent of writers on geographical subjects, as well as a great traveller. No one could read his papers in the 'Asiatic Researches' without being struck by his acuteness and accomplishments." He was therefore glad to hear how thoroughly Lieut. Wilcox had been appreciated by the most recent travellers in that region. There was another point more personal to himself which he should like to call attention to. Major Macgregor had spoken of the excessive moisture of the region through which he travelled, and the enormous discharge of water which that must send down not only towards the valley of Assam, but also towards the Irawadi. On the occasion to which he had alluded, dealing with some of the assumptions that had been put forward, he (Colonel Yule) said, "It was vain to assume quantities of rain in a country about which there were no data. It was very possible that the rainfall near the sources of the Irawadi was very excessive, the position being like the end



of a great funnel. Colonel Prejevalsky had ascertained a fact which was entirely new to geographers and physical philosophers. Where the Hoang-ho left the mountains forming the north-west boundary of China, he came suddenly from the dry steppes of the north upon a mountain country of the most extraordinary moisture; and further south Abbé David, who went up the Yangtze-kiang into the eastern part of Szechuen, came upon a continuation of the same country. He stated that if a man fired a gun he brought down a heavy shower of rain! The supposition of excessive rainfall north of Kampti was very probable, from what was known of the Kasia Hills, where the rain was most excessive. He thought it very possible that the key to the extraordinary discharge of the Irawadi might be that there was an extraordinary rainfall among the hills. But the question might be considered from another point of view. The Mogoung river-mouth was the highest point on the Irawadi that had been reached by any European travellers from Burma. Colonel Hannay, Dr. Bayfield, and others were all obliged to leave the Irawadi there, and to go towards the Assam hills. They were all struck by its magnitude at that point, as was also Dr. Griffith, who was perhaps the best observer among them. But many years ago he (Colonel Yule) calculated the basin of the Irawadi above that point, and he found it to be about the same as that of the Rhine at Cologne. And it was easy to imagine what a tremendous flood the Rhine would be if it were fed by only one-half the rainfall of the Kasia Hills!" That was a long shot, and he was rather pleased to learn from Major Macgregor that it hit the mark.

General J. T. WALKER, R.E., said it was a great gratification to him to hear such an interesting account of the expedition, and to find that Major Macgregor had written so kindly and enthusiastically of his old friend, Colonel Woodthorpe, who was one of the ablest and best officers in a Department which contained many able and excellent men. It would have been a great pleasure to Colonel Woodthorpe to have read a paper on the subject himself to the Society; but he happened to be one of those willing horses whom Governments were very glad to have an opportunity of riding, and no sooner had he returned from his expedition to the Upper Irawadi than he received a telegram asking him if he would be willing to accompany Colonel Lockhart's expedition from Gilgit to the Hindu Kush range and Afghanistan. The authorities knew all he had gone through, and they had some qualms of conscience as to whether it was quite fair to him to send him off immediately on another arduous expedition; so they telegraphed to inquire whether he felt up to going. Of course, he replied that he was quite ready to go, and he joined the expedition very speedily; but I have been told that on his arrival Colonel Lockhart, seeing how worn and wan he was, said he was afraid a mistake had been made in asking him to come. However, it turned out that so far from being a mistake, it was a good thing for Colonel Woodthorpe. The bracing climate of Afghanistan and the Hindu Kush did him a great deal of good, and was as good for him as a visit to his native country. He had done admirable work on that frontier. Twice he had crossed the Hindu Kush, and although political reasons prevented the immediate publication of his work, it was to be hoped that it would be published eventually. No sooner had he returned to Simla than he volunteered to go to Assam and explore the proposed line of railroad down to Bamo in Upper Burma. The Government decided on postponing that undertaking for the present, but they gladly availed themselves of his services, and sent him to Burma, where he now is.

The line of country through which Colonel Woodthorpe and Major Macgregor passed was not an easy one in which to carry on a continuous survey, but the position of the Irawadi and its distance from Sadiya were fixed by Wilcox sixty years ago within two miles of the position recently determined by Woodthorpe. A year and

a half ago Mr. Gordon read an elaborate paper to the Society in which he endeavoured to prove that the Sanpo river of Tibet came down into the Irawadi, and was in fact the upper source of that river. He carried it over a course which was almost precisely identical with a range of mountains indicated on the wall-map illustrating Major Macgregor's paper, and then down into the Irawadi, crossing the course of the Lohit Brahmaputra, as given by Wilcox from native information. Mr. Gordon said he was quite ready to accept everything that Wilcox had done personally, but not what he got from native information. Only a very few weeks elapsed before Mr. Gordon's conjectures were conclusively negatived. Lieut. Needham travelled from Assam up to Rima, and showed that the eastern branch of the Brahmaputra flowed continuously from Rima into Upper Assam. It was therefore perfectly impossible that any river could cross this region and pass into the Irawadi. A second corroboration was obtained by the work of Colonel Woodthorpe and Major Macgregor, who had reached Mr. Gordon's Irawadi, and found it only 60 yards broad, and not more than five feet deep, rising in hill ranges immediately to the north, and not a continuation of the Sanpo, which rose 1500 miles away in Western Tibet. These were very valuable geographical facts, and he was glad to find that his old friend Colonel Woodthorpe had been able to throw some light on the question of the sources of the Irawadi.

Dr. G. WATT said that Manipur, through which he had travelled, was a small valley surrounded by a series of mountain ranges, and to reach it from Cachar nine ranges had to be passed over, crossing in most cases the same river, which flowed backwards and forwards in a most circuitous way. In the valley of Manipur the rainfall was only about 39 inches, or the average of Great Britain, but 17 miles off on the mountains which formed the north-east ranges, the rainfall was as much as 120 inches, and towards the Naga country to the north it became greater and greater in certain limit tracts. In the Khasia Hills 600 inches might fall in one place, and 20 miles off only 50 inches. Such transitions were very frequent. The word Naga was applied to many of the races along the north-eastern frontier of Assam. From some of the things exhibited to the meeting he fancied that Major Macgregor and his party had got into one or two of the extreme ends of the Naga country proper, probably a branch of the Angami Nagas. The kilt on the table was an Angami one—the symbol of a triple murderer. When a man took the head of one enemy he was allowed to wear one row of shells on his kilt; when he killed a second he might wear two rows, and when he killed a third he might wear three rows, but after that no more rows of shells were added to the kilt. Another specimen on the table was the "V.C." of the Angami Nagas, which was worn by their heroes. It differs very little in style from that met with in the south-west, the head-quarters of the Angamis. The country of the Angami Nagas was a little to the south-west of the Singpho country. One of their peculiarities was the social system which prevailed in their villages. A village was divided by one or two walls into different sections, or *khéls*, and each section was occupied by a distinct branch of the Angami Naga family, often speaking different dialects, never intermarrying, and knowing nothing of each other, but occasionally fighting with one another, and still they were only divided by walls. A common house was erected at the meeting points of the wall, and there the young men of the village watched night and day what the members of the other *khéls* were doing.

One point with regard to the rainfall was worthy a passing remark. Nothing in Manipur struck him as a botanist more than the remarkable transition of vegetation in that small region. Major Macgregor had alluded to the oak and the rhododendron, but he (Dr. Watt) gathered twelve or more species of oaks, many of which were new to science, and ten or twelve species of rhododendron in Manipur

alone. It would be extremely interesting to know what particular oaks and rhododendrons the recent expedition came across. One of the rhododendrons in the Naga Hills was found in the Himalayas by Sir Joseph Hooker, and it was named after a distinguished officer, *Rhododendron Falconeri*. This species was nowhere met with in the immense tract of country between the Naga Hills and Sikkim. There was also the *Rhododendron Dalhousæ*, an epiphytic rhododendron which grew on a hill 30 miles north of Darjeeling. When he went up to the Naga Hills he found these species throughout the whole country, at an altitude of about 6000 to 8000 feet, and these rhododendrons never occur in Sikkim below 10,000 to 13,000 feet. There were many instances of plants falling in their altitude as the traveller passed to the east and south-east from Sikkim, until at Moulmein a rhododendron was found growing near the sea, a circumstance which was not met with in any other part of Asia. Primroses showed the same tendency to falling in their altitude in the direction indicated. He was inclined to think that there was something in that region which, apart from pure geography, was of vital interest. Sarameti, which was under 13,000 feet high, the natives said had snow all the year round, whereas on the Himalaya the lowest point on which snow occurs is 17,000 feet. He himself was on the shoulder of Sarameti in May, and it was then covered with snow, and in April, when he went to the top of Japvo, in company with the Chief Commissioner of Assam, he enjoyed snowballing with one or two companions at an altitude of 9000 feet above the sea. In Manipur the whole valley, 3000 feet high, was covered with hoar-frost in December. He thought this was a point of very great importance, and one which should be thoroughly investigated; what was the cause of this falling of altitude in the vegetation? Major Macgregor had travelled with Colonel Woodthorpe and Mr. Ogle; with the latter gentleman, he (Dr. Watt) had had the pleasure of sojourning for three or four months in the Naga country, and the officers of the Burma Manipur Expedition, so ably conducted by Colonel J. Johnstone, had obtained a good deal of information, but much still remained to be done, not only in settling the head-streams of the Irawadi, but in exploring the many other points of interest in that region.

Mr. J. ANNAN BRYCE said his experience of those regions was at a lower level than that described by Major Macgregor. But there were one or two points with regard to which he thought some information was desirable. He wished to ask Major Macgregor, if it ever became necessary for the Government of India to have a railway from Assam to Burma, at what point his experience would suggest that it should be constructed. Another question he desired to ask was whether he thought a trade would ever be developed between the upper regions of the Irawadi and the valley of Assam? Reference had been made to the Singphos trading in indiarubber, and he would like to know if that and the other articles produced in the upper valley of the Irawadi at present found their way down to the lower reaches of the river, or across the Patkoi range into Assam. Mr. Gordon in his theory with regard to the sources of the Irawadi entirely underestimated the actual facts. The river Linwin rose to an enormous height during the rainy season, to 40 and 50 and 60 feet above the dry season level, and yet Mr. Gordon in his discussion of the question assumed that the rainfall on the Linwin was *nil*.

Major MACGREGOR said it would be very difficult to construct a railway from Assam to Burma, but from Makum, where there was now a station, it was not impossible to make a railway over the Patkoi Pass viâ the Nongyong Lake to Mainla. It was not impracticable to do that, but at the same time he considered it very difficult. He did not consider that the Kamti Shan country would be a good trade route to China. The only trade route that could be established would be over the Patkoi range, which could be crossed at 3000 feet, and so on to Mainla, from whence

he believed a fortnight's journey would take the traveller into Yunnan, where there might be some trade, but he was not sufficiently acquainted with that region to say whether there was much trade or not. Most of the country through which the railway would pass was very desolate. With reference to Mr. Bryce's question about the destination of indiarubber and other articles produced in the upper valley of the Irawadi, Major Macgregor stated that at present all articles were taken into Assam where there was a settled government and a good market, and were shipped via the Brahmaputra and Dhubri line of railway to Calcutta.

Mr. HOLT HALLETT said that Mr. Colquhoun and himself had proposed the connection between India and Burma, so as to join the Indian with the Burmese railways, and did not propose the construction of a railway over the terrible hills, to the east of the Upper Irawadi, into China. Their route to China lay in a north-east direction, starting from Maulmain, a seaport at the mouth of the Salween river. The Burmese railways were now being constructed to Mandalay, from thence they could be extended to Bhamo, and they certainly would be before long. From Bhamo they propose that the line shall be extended through the Tsenbo defile, which lies five miles to the north, and is 20 miles in length. This defile narrows the river Irawadi in one place to 50 yards, and could be easily crossed at some convenient point by the railway. From the north end of the defile the line would be continued up the basin of the Mogoung river into the Hookong valley. Officers who had passed over this route stated that between Mogoung and the Hookong valley they did not pass over mountains, but only among small spurs or hills. Proceeding from the Irawadi there would be no heights to cross between the Hookong valley and the Nongyong lake, which lay near the Patkoi Pass, as the Nongyong was a tributary of the Turong, which is a branch of the Khyendwen river that passes through and drains the Hookong valley. The Patkoi Pass, according to the paper, was only 2860 feet above the sea, considering that Bhamo was 430 feet above the sea, and that the Brahmaputra at Makum was at least the same height, the rise to the crest of the pass would not be 2500 feet. Such an obstacle was inconsiderable when it was remembered that Burma now formed about one-fourth of our Indian possessions, and that the railway was intended for the connection of our neighbouring Indian and Burmese provinces. He was glad to hear that the Government of India intended as soon as possible to carry out the survey, and that Mr. Colquhoun was about to be appointed Deputy-Commissioner of Mogoung. He knew that gentleman well enough to be certain that he would not rest satisfied until a feasible route, as they had every reason to believe theirs to be, was traced out through the small tract of country which at present separated and blocked our Burmese and Indian railway systems.

The CHAIRMAN (General R. STRACHEY, R.E.) said that before proposing a vote of thanks to Major Macgregor for his extremely valuable and interesting paper, he wished to make a few remarks on some apparent peculiarities of the climate of the region. There appeared to be a very curious lowering of the general temperature there, which was shown by the fact that though the latitude was only about  $27\frac{1}{2}^{\circ}$  N., snow was found on the ground in April and May, at an altitude of 9000 or 10,000 feet; whereas far up in the north-west, in latitude  $30^{\circ}$  N., no snow would be found at that time of the year at a similar altitude. He should consider that the peculiarities of the vegetation of Manipur compared with Assam, to which allusion had been made by Dr. Watt, were connected with this. It was to be noted that the valleys which Major Macgregor had visited were at a comparatively low level, only 1500 or 1600 feet. Bhamo was only about 400 feet. Immediately to the north rose abruptly what was really a permanently snowy range. There could be no doubt that the warm currents of air coming up the valleys of the Irawadi and the Salween and meeting these snowy mountains

produced an enormous precipitation of rain, which during the winter fell as snow. The consequence seemed to be that there was snow there at a very much lower level than in the mountains further to the north. That an immense quantity of rain fell on the upper portions of the valley of the Irawadi there could be no question. The rainfall at Sadiya was upwards of 100 inches in the year, and for a succession of months from May till September it was not less than 15 or 16 inches on the average, and even in the dry months, which Colonel Woodthorpe and Major Macgregor selected as particularly practicable for their purposes, there were four or five inches per month. If it had been a rainy year they might have had double that quantity. Such a rainfall seemed in itself quite sufficient to account for the large volume of water that was drained off by the lower portions of the Irawadi, and anybody who knew what the climate of Tibet was must be perfectly aware that even with a course of several hundred miles in Tibet, the river would pick up but a small quantity of water, which would have but little effect in swelling the stream in the lower parts of Burma, in comparison with the enormous volumes which were collected from the rain which fell in Upper Burma. He had roughly calculated that a monthly fall of rain of 18 inches over a square degree would mean 65,000 cubic feet per second for the whole month. That would give some idea of the enormous quantity of water supplied by the rainfall, though of course the whole of it was not carried off by the rivers, a considerable part of it being absorbed. Major Macgregor mentioned that at an elevation of 8000 feet the snow weighed down the bamboos. That was a very peculiar feature of the climate. With regard to communication between India and Burma, he confessed that the very last way in which he should ever dream of attempting to connect India with Burma, would be through Assam over the mountains at the head-waters of the Irawadi. He would not say it was impossible, but he should be very sorry to be a shareholder in any company that put its money into such a concern. In conclusion he returned the thanks of the meeting to Major Macgregor for his paper.

*Journey of Mr. J. T. Last from Blantyre to the Namuli Hills.*

We have received the following letter from our traveller, Mr. J. T. Last:—

FOOT OF MOUNT CHALI, NEAR NAMULI PEAKS,  
*August 5th, 1886.*

I LEFT Blantyre on the 12th of July, and reached this place near Namuli on the 3rd of August. I have camped at the foot of Mount Chali, which is a little to the south of Namuli, instead of at Namuli, because my coast men would not be able to bear the continuous cold at the high elevation.

On leaving Blantyre our path lay past the Scotch Mission station, then by a road to the east we went on to the foot of Ndilandi Hill. Here we camped for the night, and the next morning we crossed over a pass on the east side of Ndilandi and went along the plain to Mount Kiladzulu. The country traversed is undulating, with large marshes and bogs here and there. The rivers Lunzu, Ikinguni, Muombezi, and Nangoma were crossed during the day. They are all small now, but during the wet season they have a considerable flow of water. I was delayed four days at Mount Kiladzulu, owing to difficulties with the local native porters. On starting again we crossed the wide plain which lies between Kiladzulu on the west and the Milanji range of mountains on the east. We reached the hill Macheмба, at the north end of the Milanji range, on the morning of the third day.

The country traversed is generally flat, with here and there patches of fairly good land, but generally the ground is poor and barren. In places there are large bogs, which make this plain almost impassable in the wet season. The chief rivers crossed were the Mnamazi and the Palombe. The former rises in the Bwanji hills, west of Mount Kiladzulu; on its way it receives the Mwenji, which rises on Kiladzulu. The Mnamazi then goes on to join the Palombe. This latter is a considerable river, some 40 yards wide, with banks 20 feet high. In the wet season the river is filled. This is shown by the dried grass, sticks, and débris on the trees on its banks. The Palombe rises on the north-west side of Milanji and flows on into the south end of Lake Shirwa or Kilwa, as it is sometimes called.

I found the chief on Macheмба Hill to be an old acquaintance. He made me very welcome at his village, and brought me a present of fowls and flour. There is plenty of food here, among other things dried fish from the lake. The next morning we started for Manzi hill. The chief Kadua, or Macheмба, went with me some distance on the road to show the way. I had given him a return present for what he had given me on my arrival at his village. My general practice is to give a present somewhat larger or of more value than that I receive. When a present is not made by the chief I give the ordinary present of two yards of calico. In the case of great chiefs, or troublesome ones, presents have to be given according to circumstances.

Our journey from Macheмба to Manzi was by the east end of Macheмба, along the north side of Mount Cheza, then in a northerly direction to Mount Manzi. All the country at the north of Cheza is very fertile, but it was depopulated a few years ago by Chikuri, the King of the Mangoni, who in his turn was driven back by the Aolo Makuas, into whose country we were just entering. Further on we came to a large deserted village surrounded by well-cropped gardens. The chief of the place had lately died, and, according to custom, the people had gone to build a new village elsewhere. At the south side of Manzi there is a very large marsh, some three miles across, and extending all along its south and east sides. Now the marsh has a hard, cracked crust, but during the rains it is quite impassable.

From Manzi we went on to Lake Limbi. This is a long, narrow pool, forming the head-waters of the Sombani river. It is some 200 yards wide by three miles long. There are a number of hippopotami in the lake, and fish in abundance, but no crocodiles. The old chief Mpandakaru having refused to give me a guide, we had to return to the main road, which leads to Kango Hill, and after following this for some distance we found a path which led to a ford over the Sombani near its egress from the lake. This we crossed, and then struck across the forest to the district under the chief Mlumbi. In the evening we reached a partly dried up stream, and there camped for the night. The whole of the country passed over was very poor, with coarse grass and stunted trees, and no water. We moved on the next morning, and reached early the fertile, well-cultivated district under the chief Mlumbi. He received us very kindly, and at once gave us a place to camp in. Food of all kinds was abundant and cheap. The following morning, when we were ready to start, many men came forward and wanted to carry loads for a piece of calico. There is here a great scarcity of cloth, for no European has passed this way before, and trading caravans seldom visit the district. The common dress is a piece of the bark of the miyombo tree, hammered out to form a kind of cloth. With many the dress is very scanty indeed.

In a part of Africa like this, which has never been traversed before by any European, local guides are absolutely necessary; anything new to the natives implies danger; he therefore is on the alert, and often the most simple thing may upset the native mind, and produce trouble and disaster. Often we passed through

large villages without seeing a male about the place. They were all out with their guns and spears, and had located themselves alongside the path in the forest, ready for any emergency. When, however, they saw we were accompanied by some men from the last village and that they gave a good account of us, they became at once friendly and supplied us with what we wanted, and so we went on from place to place.

We reached the village of the chief Miyanga who had accompanied us from Mlumbi's, about noon. In the afternoon I wanted to ascend a little hill named Kuzi, not far from which we had camped, but the people living in a village at its foot refused me permission on the ground that I had camped at another village instead of theirs. As they were all more or less under the influence of drink, I did not attempt to reason with them, but simply returned. Besides, I did not wish to have any dispute with the natives, but to act in such a manner that there would be a clear road between Zomba and Namuli for my men to pass by. The head man of almost every village is independent, even when he is living in the territories of another chief. Should the chief of a district wish the head man to remove his village against his will, there would probably be an appeal to arms first. The chiefs are continually fighting with each other, but should an outside enemy appear they all combine to oppose him. This was the case when the Mangoni King, Chikuri, attacked the Alolo and Lomur, and had to retreat.

From Miyanga's we went on to Mmakawa's and thence the next day to Ana Mwinye's. The country is of an undulating character, varying in quality of soil. There are a few small streams of little importance, which flow into the Lumanana.

We reached the village of Mahuti towards evening. Here we were received amicably and food was supplied in abundance. The people here dress in a most primitive style, especially the women. On chief Mahuti being asked the reason for this, he said that their custom was that women should not wear more than they did until they had borne children. The next morning we went on to Mkwai's village and rested for a short time. Mkwai undertook to go with me to Namusula's town. At Mkwai's I saw a woman with an enormous "ndomya" or lip-ring, it was quite  $3\frac{1}{2}$  inches in diameter. This is the common ornament of the women in all these districts. In addition to this, some of them wear a brass or iron nail from 4 to 7 inches in length. It is passed through a hole in the lower lip and left hanging in front of the chin. When the lady cannot afford a metal ornament of this kind she utilizes a piece of stick which she covers with beads.

Namusula being the most powerful chief in these districts, I had to give him a considerable present. He seemed pleased with what I gave him, and said he would take care to see that my men were well treated whenever they might pass through his district. I stayed with him till the next day.

On Monday, August 2nd, we left Namusula's and went on to Ana Koroa's, who the next morning conducted us over the Lukugu river into Ana Guruwe's district. Here we were received by Ana Guruwe's son-in-law, who led us on to the chief's principal village. After we had rested in the village square for a short time, Ana Guruwe came out, followed by some of his men, and after some introductory ceremonies placed three houses at our disposal and said we could alter or arrange them as we pleased. He brought me four fowls and some rice. The next morning I made him up a good present, which has pleased him very much. Shortly afterwards he brought me a goat. Several small presents were brought in from minor chiefs, which for the sake of establishing a friendly feeling amongst all the people were received and acknowledged by a rather larger present in return. As the chief and people are so friendly disposed, and the locality suitable, I feel I cannot do better than make this my head-quarters, and from this place visit all the surrounding country.

*The late Dr. G. A. Fischer's Expedition for the Relief of Dr. Junker.*

A PRELIMINARY report from the pen of the late Dr. Fischer on this important but unfortunate expedition, the progress of which we have noted from time to time, is published in the current number of Petermann's 'Mitteilungen.' It will be remembered that the expedition was fitted out at the expense of Dr. Junker's brother, the banker of St. Petersburg. Dr. Fischer's choice of routes was made in ignorance of the hostility of the new King of Uganda. In preference to the route through the Masai country and the district of Usoga, and also of the usual caravan route to Victoria Nyanza via Tabora, the traveller decided to proceed direct to Kagehi, on the southern shores of the lake, by the road which the Pangani caravans take to the district of Umbugwe. After some delay, a favourable start was made from Pangani, on the 3rd August, 1885, the party numbering over 200. The general direction taken was west-north-west over the hilly country to Nguru, to the flat tablelands of the South Masai territory, until the district of Irangi was reached. The want of a guide, and the scarcity of water along the road, compelled the traveller to alter his plan and to turn to the south-west. Skirting the country of Usandawi, he travelled for a short distance along Stanley's old route through Uwerewere. On the 14th October he reached Usure, having crossed the small river Muaru or Wembare (Stanley's Liwumba), which he ascertained does not, as represented by Stanley, join the Simiu, but loses itself, in the dry season, in the plains of Wembare, and in the rainy season forms a lake. These plains, according to the traveller's barometrical observations, are at least 325 feet below the level of the Victoria Nyanza. Leaving Usure after a rest of seven days, and passing through Usukuma, and along the banks of the Simiu, he eventually reached Kagehi on the 16th November, with his stock of goods considerably impoverished, owing to the excessive and frequent tribute demanded by the chiefs of the many districts traversed. Here the rumours as to the impassability of Uganda, which had reached him for the first time in Irangi, were confirmed, both by the Arab traders and by two messengers sent by himself across the lake to the English missionaries in Uganda, and he had to abandon the route. To this fact must be attributed the failure of the expedition, as the traveller's stock, consisting chiefly of cotton goods, was selected for the natives of Uganda, while the people of the countries through which other routes lay buy nothing but copper wire and beads. The only route that seemed open to him was that round the east side of the lake, and then to Wadelai through the country to the north of Ussoga. Accordingly, on the 11th January, 1886, after a stay of eight weeks in Kagehi, unhealthy in the rainy season, the time having been occupied in collecting geological and botanical specimens, the traveller set out.



Rounding Speke Gulf, and crossing the Simiu and the Rubana, the party entered the sparsely wooded country of Shashi, with its mountains 5000 feet above the sea, and its dry, treeless plains, the haunts of the zebra, gazelle, gnu, &c. Spades are much sought after by the agriculture-loving people of Shashi. The territory of Niawassi, which was then traversed, is inhabited by a mixed population of Kuavis and Bantus. The Bantu language is spoken, but the manners and customs are Kuavi. A toilsome march through tall grass where there was no path brought the party to the uninhabited region of the Mori river, and thence into the important and densely populated country of Kawirondo, the physical features and inhabitants of which are described by the traveller in detail. Crossing Njoro the party reached its chief town, Ulala (Thomson's Kwa Sundu), the headquarters of the Mohammedan caravans. His slender stock of wire and beads being almost exhausted, Dr. Fischer states he would have parted willingly with weapons and ammunition in exchange for corn, but the natives themselves were suffering from famine; thus his last hope of proceeding further north was dashed to the ground. With only a meagre stock of *durrha*, the traveller on the 22nd March set his face eastwards to Lake Baringo, and following practically the route taken by Thomson on his outward journey to Victoria Nyanza, reached the south end of the lake in the first week of April. Being unable to obtain here any fresh stock of goods, he left the lake on the 13th April, and with sorrowful heart commenced the long march to the coast. Again following Thomson's route in a south-south-westerly direction, and passing to the east of Lake Nakuro, he arrived at the north end of Lake Naivasha. He then struck across the highlands of Kinangop with the view of reaching Mianzine, but being from lack of means without a guide, he lost his way, and after a weary march, contrived to reach a Kikuyu village on the west slope of the southern end of the Aberdare range, the whole party being in a most exhausted condition. Here, fortunately, the traveller's cotton goods found a ready market, and he was able to replenish his stock of provisions. Under the direction of a guide the journey was resumed across the range at a height of over 8900 feet, but the party was shortly afterwards deserted by this guide and left to spend two days in a bamboo thicket. Guided by some natives the party marched for some miles through the thickly populated and richly cultivated district of Kikuyu, in the direction of Mount Kenia, two glimpses of whose cloud-covered summit were obtained. Then turning south-west, the traveller, after numerous adventures not altogether of a peaceable kind with the inhabitants, left these wooded highlands, which he describes as the most beautiful and luxuriant he had ever seen in East Africa. Proceeding through the district of Ulu, he marched along the east of the Ulu range, across the head-waters of the Ssabaki, and thence viâ Kissigau to Wanga on the coast, where he arrived

on the 14th June last after an absence of eleven months. Dr. Fischer, although unsuccessful in the immediate object of his expedition, has nevertheless added much valuable information to our knowledge of the geography of Eastern Equatorial Africa, more especially of the east coast of Lake Victoria Nyanza.

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### GEOGRAPHICAL NOTES.

**Dr. Junker** reached Zanzibar on the 11th ult., and is now on his way to Europe, where he is expected to arrive about the middle of January. He will bring detailed news regarding the position of Emin Pasha and the present state of the countries through which lies the best-known route between his province and the East Coast. In a telegram from Zanzibar to Mr. J. T. Wills, Dr. Junker gives us the very interesting information that on his late journey he penetrated westward (from the Monbuttu country) down the Welle-Makua river as far as 22° E. long., finding it generally navigable. At 22° E. Dr. Junker was only about 150 miles distant from the point on the Mobanji tributary of the Congo, reached by Mr. Grenfell in the steamer *Peace*. The conclusion is therefore irresistible that these rivers are connected. With regard to Emin Pasha, it is announced that an English private expedition, under the command of Mr. Stanley, and supported by a grant of 10,000*l.* from the Egyptian Government, is about to be despatched.

**The Crater-lake of Chala, on Mount Kilimanjaro.**—Mr. J. A. Wray, writing from Sagalla, on November 19th last, informs us that he has succeeded in reaching the edge of the water of the picturesque Lake Chala, of which Thomson gave so charming a description after passing its borders. Mr. Wray says it is about three miles long by one mile wide, and the banks so steep that a descent to the water is impossible except at one place on the western side. He found the water clear, cool, and perfectly sweet, though the lake has no apparent inlet or outlet. It contains fish, and numerous waterfowl were swimming on its surface, the flapping of whose wings, when they took to flight, produced a sound, through confused reverberation in the deep well-like basin, like the rushing of a distant railway train. The steep banks, about 1000 feet in height, are well wooded, and vegetation clothes their surface down to the water's edge. There is no mark of higher water, and it probably keeps the same level all the year round. The cries of birds had a peculiar sound, and Mr. Wray had no doubt that it is these noises which have given rise to the native myth, viz. that a Masai village formerly stood here, which was swallowed up by the lake; the people of Taveta believing that they hear voices, the lowing of cattle, and so forth.

**Count Pfeil's Journeys in East Africa.**—In connection with the German East African Association, Count Pfeil has recently made two

important journeys in East Africa, the first of which resulted in the acquisition for the Association of the large territory of Khutu; the second was principally occupied with the exploration of the Ulanga river. An interesting account of these operations has been contributed by the traveller himself to Petermann's 'Mittheilungen' (1886, No. 12). Starting in May 1885 from the German station of Muinie in Usagara, he crossed the Mukondogwa valley and traversed the plain of Makata. He discovered a large village, hitherto unmarked on our maps, called "Mbamba," which is situated in Makata about two days' march from Myombo. During the two days of his stay there no less than nine native caravans arrived. He resumed his march southwards across the Rufutu range, then turning directly east entered the district of Khutu, and again south he struck the Rufiji near the 36th parallel. On his road to the Rufiji he passed through Rubehobeho, the scene of Keith Johnson's death. Continuing his journey down the river by boat, he arrived on the coast at Mbumi, the last part of the route having been accomplished by land.—The second journey was commenced in October 1885. His starting-point was again the station of Muinie. With the view of exploring the plateau of Uhebe the traveller crossed the Rubeho range and the Ruaba river, and then marched through the dry treeless country situated between the latter and the mountains of Uhebe. His journey along the tableland extended as far as Kuirenga, then retracing his steps he again crossed the Rubeho chain more to the south, and turning abruptly southwards arrived on the banks of the Ulanga at Nga-homa. This important river, hitherto unknown, for Thomson on his journey to the Central African lakes mistook an arm of the river for its main stream, was ascended by the traveller, in company with a friend and twelve men, for a distance of about 150 miles, as far as the little village of Muinga, in long. 35° 5' E. and lat. 9° 5' S. The return journey was also accomplished by boat down the river to the Suguli Falls, below which the river is known as the Rufiji. Here the party struck across the country in a due east direction and arrived on the coast at Kilwa Kivinji in February 1886. The general direction of the Ulanga from Nga-homa is west for a long distance, and then south-west to its source, which lies among the mountains to the north-east of Lake Nyassa. Above Nga-homa it flows through the Mahenge territory, between the Lipingo range on the right bank and the mountains of Uhebe on the left. Its banks are generally steep and well-defined, but in places where the valley broadens the river overflows in marshes. Its breadth at Nga-homa is 330 yards, while at its narrowest point it measures nearly 90 yards. The depth in its lower course exceeds 20 feet at many points, and is never less than 10 feet; thus this important waterway is navigable for small steamers for a long distance. The volume of water in the river is very large even in the dry season, considering the few and unimportant tributaries which it receives. In its broad stretches the

Ulanga is studded with islands, the haunts of birds of gay and varied plumage. The natives live close to the banks, and are described in detail by the traveller, whose notes on the fauna and flora of the region possess special interest.

**Dr. Lenz's Expedition.**—Further news has been received from Dr. Lenz, dated Kibonge, April 20th, Nyangwe, May 19th, and Kasonge, June 1st. In company with Herr Bohndorf, in canoes supplied by Tippo-Tip, Dr. Lenz ascended the Congo to Nyangwe, taking forty-eight days between Stanley Falls station and that town, including detentions of several days at Kibonge and Riba-Riba. For the first few days a good many cataracts were met with, and four times they had to transport the canoes overland, over ground to a large extent marshy and covered with bushes. Two days above the last cataract, about lat. 1° S., Kibonge (named after its chief) was reached, a very extensive settlement of Arabs and Zanzibaris, on the right bank of the river. It was founded only nine years ago by a Nyangwe trader, independent of Tippo-Tip. It consists of some hundreds of what we may call homesteads, spread over a great space, with a few thousand inhabitants. It lies very low and is most unhealthy, especially for Europeans. Dr. Lenz found great changes along the river since Mr. Stanley descended. The natives in many places have retreated from the banks, to make way for Arab trading settlements and enormous rice-fields. Nowhere, Dr. Lenz states, has he seen in West Africa so many and so extensive rice-fields. In the neighbourhood of Kibonge provisions of all kinds are abundant. The whole life of the place reminds one more of East than of West Africa. The natives here live deep in the forest, are to a large extent cannibals, and make use of poisoned arrows. After leaving Kibonge, the banks in many places were found to be thickly wooded, with numerous signs of former native settlements, now deserted, owing to the inroads of the Arabs. After passing the mouth of the Kasaka, the banks showed evidences of native settlements, some of them hostile, and others on friendly terms with the Arabs. The Arab settlement of Riba-Riba was reached on May 2nd. This place is named after its chief, a Mahomedan negro from Nyangwe; it is only four years old, and though not so large as Kibonge, does a great business in ivory. Riba-Riba was left on May 5th, and next day the mouth of the Elila was reached, a river on Stanley's map, on the right bank, without a name, in the neighbourhood of which Stanley puts a place named Urangi. The banks now became comparatively well peopled, and on the 9th they became very steep, and the current rapid. On the 10th a cataract (Tutumbe) was passed. Another cataract was passed on May 15th, the cataract region here bearing the name of Gulunga Wuesa. Nyangwe was reached on the 16th. After passing the last cataract the river expanded greatly, and both sides were bordered with numerous inhabited grass islands, the channels between which are bewildering. Nyangwe lies about 100 feet above the river. It is not

a compact town, but a cluster of small settlements, outside which are great rice-fields and banana plantations. Caravans are continually coming and going, so that the population varies almost daily. The town contains some very well built houses of sun-dried bricks. Provisions are abundant and living cheap. Nyangwe, Dr. Lenz states, is by no means the important trading place which it is generally thought to be in Europe. Though still prosperous, it has lost much of its importance since Kasonge, a few days to the south-east, has become so great. It is not at Nyangwe, but at Kasonge, that caravans for Lake Tanganyika are fitted out. Kasonge is Tippo-Tip's head-quarters, and he is all-powerful. Dr. Lenz arrived at this place on May 20th, and was the guest of Tippo-Tip. Kasonge is surrounded by hills, with mountains in the distance eastwards. The houses in Kasonge are arranged in streets, many of them large and handsome, while the rice-fields are some distance from the town on the neighbouring hills. It is the great centre for the ivory and slave trades. Tippo-Tip has a great rival here in Said Mohamed Kasuenda, though the two are on good terms. At the date of his letter (June 1st) Dr. Lenz did not know how long he would remain at Kasonge. It is evident, from what he tells us, that the whole of the region traversed by him is in the power of the Arab traders; that it is becoming thickly peopled by themselves and their dependents; and that the cultivation of rice is rapidly extending.—It may be well to recall the fact that Dr. Lenz went out with the object of reaching Dr. Junker and Emin Pasha; the former we know is now safe at Zanzibar, and if Dr. Lenz continued his journey as he hoped to do, he may by this time be within hail of Emin Pasha. The latest telegraphic news, however, is that Dr. Lenz has been compelled to abandon his intention of reaching the Albert Nyanza.

**Prejevalsky's recent Journey in Central Asia.**—We hear from M. Venukoff that Colonel Prejevalsky has returned to St. Petersburg from his country seat, where he has spent the summer reposing after the fatigue of his late journey, and that he is preparing for publication the results of his great expedition. Many of the principal scientific men of Russia and other countries are engaged on the examination and description of the natural history collections made in the deserts of Mongolia and on the Tibetan plateau, and it is reported that the cost of bringing out the work will exceed 3200*l.* sterling. A chapter of the personal narrative will appear very soon in one of the Russian periodicals as a specimen of the work.

**Progress of Russian Exploration in Northern Asia.**—M. Venukoff also gives us the following details regarding recent Russian scientific work in Asia. MM. Potanin, Skassy, and Bérésosky have lately returned from their expedition in China and Mongolia, bringing immense collections in anthropology, zoology, and botany, besides maps of the countries

which they have traversed during their three years' journey (1884-6).—**M. Tchersky**, an old political exile in Siberia, has just published at St. Petersburg his geological map of the borders of Lake Baikal, together with explanatory text in a separate pamphlet. It is an excellent work, which adds greatly to our knowledge of the physical geography of this great water basin, the best known of all the Asiatic lakes, thanks to his labours and those of his predecessors, **Dybowsky** and **Godlefsky** (also *ci-devant* Siberian exiles, but now professors in Poland), and the eminent naturalist **Dr. Radde**, besides numerous Russian surveyors.—**M. Krasnof**, the eminent botanist and physicist, on his return to St. Petersburg, after his journey in the **Tian Shan** and **Chinese Turkistan**, has entertained the Russian Geographical Society by a brilliant lecture on the **Balkash** basin, in which the general principles of physical geography were applied in a searching and effective manner to the geographical description of the region and of **Central Asia** generally.—The subject of the desiccation of the **Siberian lakes** continues to engage the attention of the Russian Geographical Society. Basing his case on the facts adduced in **M. Venukoff's** memoir,\* **M. Yadrintzoff** has urged on the Russian Geographical Society the necessity for more thorough investigations, and a committee has been nominated for the purpose, consisting of **MM. Stebnitsky, Tillo, Mushketoff, and Schmidt**. It is expected that an expedition will be despatched to study the subject on the spot.

**Merv.**—A correspondent of the '*Petersburger Zeitung*' has forwarded interesting details on the present condition of **Merv**. A fortress has been built on the lofty right bank of the **Murghab**, whilst the modern town of **Merv** extends along the left bank. Both are connected by a bridge, somewhat slightly constructed of wood and iron. The climate is stated to be most unfavourable to Europeans, and nowhere in this region, except at **Penjdeh**, is the number of sick so numerous. **New Merv** numbers between two and three thousand inhabitants, more than half of whom are officials and workmen employed upon the railway, the remainder being traders of all nationalities, including **Armenians, Persians, Bokharans**, and many adventurers. A weekly market takes place outside the fortress, at which provisions, fruits, vegetables, game, cattle, felt, carpets, straw mats, wooden and leather ware, cotton stuffs, &c., are sold. Most of the things sold are "cheap and nasty." **Cafés chantants**, drinking-shops, and still less innocent places of resort abound.

**Russian Expedition to the New Siberian Islands.**—According to the latest news of the expedition under the leadership of **Dr. Bunge** and **Baron von Toll**, the travellers have failed in their attempt to cross the **Glacial Ocean** and reach the **New Siberian Archipelago**, in consequence of the reindeer being attacked by distemper, in the vicinity of **Ust-**

\* In the '*Revue de Géographie*,' July 1886.

Yansk and Nijni-Kolymsk. They intend, therefore, to remain for some time in the district in order to dig up the complete skeleton of the mammoth which they have found there.

**Iceland.**—Dr. Labonne reports to the Geographical Society of Paris (26th August, 1886) from Akreyri in northern Iceland, that he had just crossed the island from south to north through the central desert or Sprengisandr. The journey was accomplished on a pony, and without either tent or provisions. On the 14th July he made an ascent of Mount Hekla, and with very favourable weather, rarely experienced there, obtained an extensive view from the summit, embracing the Westmann Islands, 60 miles distant. Several small columns of steam issuing from small fissures in the rocks were the only indications of the activity of the volcano. Its height above the sea-level, a disputed point among explorers, he ascertained with the aid of a good barometer by Dutrou to be 5096 feet. The thermometer at the base of the mountain registered 57° Fahr. (14° Cent.), and at its summit 18° Fahr. He saw the large geyser in full activity, the column of boiling water rising over 100 feet into the air. He was assured by his guide that for the last two years the geysers had been very active, although recent travellers have asserted that they were gradually becoming inactive. Dr. Labonne stayed three days in this district in order to find traces of the former vegetation of the country, which the "Sagas" or hymns of the ancient Icelanders describe as luxuriant, whereas at the present time the only tree found is the *Sorbus Aucuparia*. At the suggestion of M. Bureau, professor of palæontological vegetation at the Natural History Museum of Paris, the traveller tried to find traces of this vegetation under the beds of silica round the basins of the geysers. He was fortunate in obtaining a large piece of rock, situated at a depth of about 16 feet, incrustated with leafy stems of the *Betula alba*, *Salix capræa*, and *Salix arctica*. This valuable specimen will be submitted to competent authorities on his return. Meanwhile a superficial examination shows that the size of these stems and leaves is not larger than that of existing shrubs. It may be remarked that the formation of a bed of silica 16 feet deep would require at least 1000 years, or about the time that the island has been known to Europeans. The valley of the geysers, now denuded of vegetation, was formerly covered with small shrubs, which owe their disappearance not to any change of temperature, but to the fact that the natives pluck them up in winter for firewood. The traveller concludes by remarking on the exceptional cold experienced last August in Iceland, due to the icebergs remaining stationary on the north coast of the island.

**Mr. Seton-Karr's Account of Mt. Saint Elias.**—Mr. C. Mitchell Grant, Secretary of the Geographical Society of the Pacific, San Francisco, informs us that Mr. Seton-Karr states that Mount St. Elias is not less than three miles to the east of the 141st meridian, and over thirty miles from the coast, thus being in Canadian territory. With regard to

the river named after Mr. Jones of the *New York Times*, he says that he considered it was produced by the melting of the enormous glaciers in the neighbourhood. He estimates the area of Agassiz and Guyot glaciers (so named by the party) as not less than 1800 square miles, including their tributaries. The Tyndall glacier is the principal glacier, descending directly from the south-west face of the mountain. He also considers the Icy Bay or Jones river to be larger than, and not identical with the Riko Bolshe Vuala of Portoff. Lieut. Schwatka stated that it was too large to be produced merely by the melting ice. Mr. Karr, who ascended 400 feet higher than Woods, and over 1000 feet higher than Mr. Schwatka, saw no break in the chain, and nothing but fields of ice in every direction, from the highest point reached below the clouds. The party claim to have made the highest ascent ever recorded above the snow-line.

**The New French Census.**—From the preliminary statistics of the census of France, which was taken on May 30th last, we find the population at that date to be 37,885,905. This shows an increase on the census taken December 18th, 1881, of 213,857, in 5½ years, or at the rate of only .1 per cent per annum. This is a great falling-off in the rate of increase from that between the census of 1878 and 1881, when it was .415 per cent. As in the former period there has been a considerable decrease in the population of some of the departments.

**The New German Census.**—The results of the German census taken December 1st, 1885, show a much greater rate of increase. The population then was 46,844,926, as compared with 45,234,061 five years previously, showing an increase of 1,610,865, or at the rate of .71 per cent. per annum. But even this is a falling off from the two previous periods; between 1871 and 1875 the increase was at the rate of 1.01 per cent. per annum, and between 1875 and 1880 at the rate of 1.14 per cent. per annum.

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## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Third Meeting, December 13th, 1886.*—General A. STRACHEY, R.E., F.R.S.,  
Vice-President, in the Chair.

**PRESENTATION.**—*Edwin Hanson Freshfield, Esq.*

**ELECTIONS.**—*Henry Anderson Bryden, Esq.; Sir Duncan Campbell of Barcal-dine, Bart.; Alfred James Day, Esq.; William Keswick, Esq.; Percy Mathews, Esq.; William Prince, Esq.; George Sadler, Esq.; James McDougall, Esq.; Ernest Henry William Tripe, Esq.; Rev. Ernest E. Wood; Henry Page Woodward, Esq.*

The paper read was:—

“Journey of the Expedition under Colonel Woodthorpe, R.E., from Upper Assam to the Irawadi and return over the Patkoi Range.” By Major C. R. Macgregor (Bengal Staff Corps). *Ante*, p. 19.

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## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris.**—November 5th, 1886: M. A. GERMAIN in the chair.—This was the first meeting of the Society after the recess. Among the announcements made by the Secretary were the following:—The National Congress of French Geographical Societies would be held next year (1887) at Havre, simultaneously with the International Naval Exhibition; Lieut.-Col. Gallieni had just started to take the chief command on the Upper Senegal and the Upper Niger; M. E. Visard was on the eve of departure from Saint Louis on a new journey into the interior of Africa.—M. Alphonse Pinart presented two short papers by himself on the State of Panama, in which he gives some interesting ethnographical details on the Cunos Indians; these papers form part of a proposed series of fifteen.—M. T. Barbosa Rodrigues, Director of the Botanical Museum at Manaos (Brazil), sent a copy of a work just published by him on the river Juapery and the Indian tribes inhabiting its banks. The author was the first to explore this river. He further transmitted his own surveys of the Capim, Yamunda, and Urubu rivers.—It was stated that M. Leon Poirier had bequeathed to the Society the sum of 200,000 francs (8000*l.*) the interest on which was, according to the conditions of the legacy, to be invested every three years in an annuity (never to exceed 6*o*l.) to be awarded to one or more travellers of French birth whose works should be considered the most valuable to science.—An important communication was forwarded by M. Leon Dru, on the results of his mission in regard to the proposed canal between the Volga and the Don.—M. Venukoff forwarded a summary of recent geographical work in the Russian Empire. He gives some of the results of M. Tchernichev's barometrical observations in the south of the Ural Mountains (1882-5). The Ural Mountains are, from a hypsometrical point of view, the least known of any range in Europe. M. Tchernichev has determined the precise altitude of ten summits possessing an elevation of over 3280 feet (1000 metres). The Academy of Sciences of St. Petersburg has just published General Tillo's memoir on magnetism in Siberia, which is accompanied by a map, showing that the horizontal component of the magnetic force of the earth diminishes towards the east across Northern Siberia under from 65°-80° latitude, but increases under the 50°-52° parallels. The return to Russia of MM. Potanine, Skassy, and Beresovsky was daily expected. They had explored the north-west of China and a considerable part of southern Mongolia. M. Skassy has determined more than a hundred astronomical points and several hundred altitudes. MM. Ignatiev and Krasnoff had completed their studies on the Khan-Tengri group in the Thian Shan, and had penetrated to the south as far as the town of Ush-Turfan. M. Krasnoff had proceeded into Russian Turkestan and the region of Merv in order to examine the flora of the country in its relation to the vegetation of Eastern Turkestan. M. Groum-Grjimalilo, whose object was to study the flora of Eastern Pamir, had met with extraordinary difficulties on his journey. He had visited the environs of Kashgar, but had not succeeded in penetrating into the mountains of Upper Pamir in consequence of the bad weather.—Several communications were read upon Tongking, one from Lieut. L. de Mazenad, giving an account of a journey along the Upper Mekong, which was found to be navigable as far as the Kong Falls, and one from M. de Montaignac, announcing a scheme for the organisation of the Muongs which had been proposed by M. Gouin, the French Resident, and M. Moulié, Chancellor, and had been favourably received by the natives. M. Gouin transmitted a short paper on the Muongs, which will be inserted in the Quarterly Bulletin.—Two short notes were read from M. E. Renou, Director of the Meteorological Observatory of the Parc du St. Maur, on the altitude of several points in Morocco, and on the different routes from Morocco to Timbuctu.—

Dr. Rouire presented a *résumé* of the paper just published by him in the Bulletin of the Geographical Society of Lyons, which deals with the hydrography and orography of Central Tunis and its agreement with the Ptolemaic account. He has been able to identify all the peaks mentioned by the latter, and to confirm his hydrography.—A communication was read from Dr. Ten Kate on his recent operations in Guiana. He started from Paramaribo on the 15th December, 1885, to visit the natives on the Upper Surinam, but was compelled to return on account of the exceptional dryness of the season and the consequent shallowness of the river. He then sailed down the coast to Albania, a small colony on the Lower Maroni, where he visited the Indians along both banks of the river. He proceeded next to Georgetown, intending to accompany M. im Thurn on a journey up the Pomerun river, but the absence of the latter in Europe compelled him to alter his plans. He accordingly embarked on a steamer up the Orinoco and reached Angostura on the 7th of March. From this point he struck across the country to Cumana, where he arrived after a journey of eighteen days. He described briefly the natives and physical features of the districts through which he passed. The people, mostly Indians and halfbreeds, are very poor, in consequence of the numerous political revolutions and the drought of last summer, when swarms of grasshoppers invaded the country, devouring the harvests of maize, cassava and sugar-cane. Directly after leaving Angostura the traveller crossed the vast sandy Llanos and passed the three rivers, Morichal, Tigre, and Guanipa. Then the route led over a chalky and schistose sierra with almost impracticable paths. Among the mountains, which are very little wooded, he stayed a short time in the beautiful valley of the Guácharo near Caripe, where he visited the celebrated grotto of which Humboldt gave the first description. On the 30th March he reached Cumana, which has suffered greatly from earthquakes; along the Gulf of Cariaco he visited the Guayquery Indians. An attack of marsh fever compelled him to seek a more temperate climate, and after a stay of some weeks in the United States he returned to Holland.—The Minister of Public Instruction communicated a letter dated 27th June, 1886, from M. A. Thouar, according to which the traveller, after a laborious journey from Tarija, had reached the Bolivian frontier where he had been attacked by fever. Later news mentions his arrival at Sucre and his recovery from two further attacks of fever. He intended to return to Buenos Ayres through Chaco about the end of December.—From Chili, M. R. Serrano sent an account of the recent geographical and hydrographical works executed in the country, which include several new surveys along the coast, and a large part of Tierra del Fuego.—Captain Soaville addressed a letter on the Pitcairn and 'Norfolk Islands, upon which a discussion arose, M. Depping, M. de Quatrefages, and Dr. Hamy taking part.—In conclusion, M. Bouquet de la Grye, of the Institut, read at the invitation of the Chairman, a short report of the meeting of the French Geographical Societies which took place at Nantes during August.

— November 19th, 1886: M. A. GERMAIN in the Chair.—A communication was read from M. Hangsen-Blangsted on the physical aspect of Denmark during the eleventh century as compared with its present state.—A letter from M. Venukoff gives the relative altitude of the highest point (Lake Bolshoe) of the canal uniting the Obi with the Yenisei, as 62 feet above the level of the former river at its junction with the Kite, and 180 feet above that of the latter at a corresponding point. As Lake Bolshoe is three times nearer to the Yenisei than the Obi, it follows that the slope on the eastern side is much greater than on the western.—Recent observations made by M. l'Abbé Desgodins at Phedong (Tibet), were transmitted to the Society by his brother.—Captain Bernard forwarded from Fort National (Algeria), the report of the mission in South Algeria with which he was charged in the winter 1884-5.—Reference was made by the General Secretary to the

report that MM. Capus and Bonvalot, the French travellers in Central Asia, had been arrested in Afghanistan. The Chairman stated that an application would be made to the Minister for Foreign Affairs for his intervention if the news were confirmed.—M. G. Depping read a letter from Comte Fressinet de Bellanger giving the results of his investigations on the locality of the grave of Tavernier. He establishes the fact that the great traveller was buried in the Protestant Cemetery near Moscow.—A communication was made by M. Guerin on the subject of geographical teaching by means of stereographic projection, i. e. representing the earth as seen in parallel perspective. He was of opinion that this method was the simplest and most easily understood.—The Chairman announced that the general meeting of the Society, at which the Secretary's report on the progress of geography would be read, would take place on the 17th December, and that the Annual Banquet has been fixed for the 20th December. M. Ferd. de Lesseps would preside.—M. Rouvier, French Consul at Buenos Ayres, in a despatch of 26th September, addressed to the Minister for Foreign Affairs, announced the discovery of auriferous bearings in Tierra del Fuego, more particularly in the country round San Sebastian Bay.—In conclusion Captain Longbois read an account of his journey to Shoa, the object of which was the exploration of the Awash and its basin. His remarks were, however, of an ethnographical rather than of a geographical character.

**Geographical Society of Frankfurt-on-Main.**—December 8th, 1886, Fiftieth Anniversary. The President of the Society, Senator Dr. von Oven, presented a report of the fifty years' work of the Society, which, having been founded on December 9th, 1836, is the oldest in Germany, that of Berlin alone excepted. Prof. Theobald Fischer of Marburg then delivered an address in which he traced the progress of geographical science during the past fifty years. A large number of Honorary members were elected in celebration of the event, including the Presidents of the Geographical Societies of Berlin, Madrid, Paris, Turin, Leyden, and London, Prof. Nordenskiöld, General Prejevalski, Dr. Schweinfurth, Prof. B. Studer, Major Powell of the United States, Mr. E. G. Ravenstein, &c.

**Geographical Society of Munich.**—December 3rd, 1886. Lieut. Baron von Gravenreuth read a paper on Eastern Africa, in the course of which he gave an account of an expedition up the Pangani, in which he took part. Owing to the desertion of the carriers the expedition failed to reach Mt. Kilimanjaro. A station, Korogwe, was founded on the Pangani. In conclusion the author gave a general account of the territories recently acquired by Germany in Eastern Africa, and spoke favourably of their natural wealth and hygienic conditions. Prof. Dr. Brenner then read a paper on Olaus Magnus's Map of Northern Europe, the original of which, dated 1539, was discovered by him in the Munich Town Library. (Comp. 'Proceedings,' 1886, p. 790).

**Geographical Society of Berlin.**—December 4th, 1886: W. REISS in the chair.—At the commencement of the proceedings the Chairman alluded to the recent sudden death of the meritorious African traveller Dr. G. A. Fischer, and stated that the Geographical Society of Hamburg at their sitting of the 2nd December had decided to send to the parents of the traveller the gold Kirchenpauer Medal, being the first year of the award of that mark of honour. The Chairman also greeted, in the name of the Society, Prof. H. Kiepert on his safe return from Asia Minor, and expressed his satisfaction that the serious accident said to have befallen him proves to be a false report.—Captain Henning then addressed the meeting on his two years' residence in China and Korea in the Chinese service. The speaker dilated more especially on the peculiarities of the Chinese character, and the position of the Chinese in relation to western civilisation. He was of opinion that the adoption of western ideas by the

Chinese would bring with it no injury to Europe, as they would be able to do nothing without Europeans. China, moreover, is not so rich a country as generally supposed, proof of which is afforded by the facts that a family can live there very comfortably for 30 dollars a month, and that the Viceroy of Canton, for example, has an establishment far inferior to that of many private persons in Europe. He believes it to be incorrect to attribute the emigration from China to over-population. China, on the average, was not so over-populated a country as the aspect of its large cities and coast districts has led observers to assume. Captain Henning added that Peking, with 50 square kilometers of area, has only 600,000 inhabitants, whilst Berlin with 63 square kilometers has 1,400,000, and London with 320 square kilometers has 4,000,000.—Dr. Stapff (formerly geologist to the St. Gothard Railway), then read a paper on the geology of the neighbourhood of Walfish Bay and the Kuisip Valley, from which he had returned a few months ago, and of which he had constructed an excellent geological map. He laid stress on the great influence exercised by the loose sand in connection with the wind on the configuration of the ground and on the rocks. At first sight one would suppose the great quantity of polished and rounded stones encumbering the ground in many places were due to water action, whereas, in fact, the rounding and polishing have been effected by the wind-driven sand. The periodical mortality of fishes in Walfish Bay he attributed to the occasional submarine eruption of sulphuretted hydrogen gas, of which he perceived traces at the southern entrance to the bay.

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

### EUROPE.

**Essays on the Street Re-alignment, Re-construction, and Sanitation of Central London, and on the Re-housing of the Poorer Classes ; to which Prizes offered by William Westgarth were awarded by the Society of Arts, 1885.** London, G. Bell and Sons, 1886 : 8vo., pp. vi. and 276, plans. [Presented by the Council of the Society of Arts.]

[**France.**]—**Voies Navigables.** Manuel des distances comprises entre les principaux points de chaque voie. Paris, Imprimerie Nationale, 1882 : 12mo., pp. 352. [Presented by the French Minister of Public Works.]

This is useful as a reference book for the lengths of French rivers and the distances between the leading positions thereon.

**Lebour, G. A.**—**Outlines of the Geology of Northumberland and Durham.** 2nd edition as regards Northumberland. Newcastle, Lambert & Co., 1886. [Presented by the Author.]

**Veröffentlichung des Königl. Preussischen Geodätischen Instituts.** Lothabweichungen. Heft I. Formeln und Tafeln sowie einige Numerische Ergebnisse für Norddeutschland. Der Allgemeinen Konferenz der internationalen Erdmessung im Oktober 1886 zu Berlin gewidmet. Berlin, P. Stankiewicz, 1886 : 4to., pp. x., 94, and 26, plates.

### ASIA.

[**Cobham, C. Delaval.**]—**An attempt at a Bibliography of Cyprus.** Nicosia, 1886 : 12mo, pp. 12.

The author states, in a note, that he has here attempted to register the titles of books treating of Cyprus, its people, history, numismatics, epigraphy, and language, of which he has found any trace.

## AFRICA.

**Bentley, [Rev.] W. Holman.**—Dictionary and Grammar of the Kongo Language, as spoken at San Salvador, the Ancient Capital of the Old Kongo Empire, West Africa. Compiled and Prepared for the Baptist Mission on the Kongo River, West Africa. London, published by the Baptist Missionary Society, and Trübner & Co., 1886: 8vo., pp. 244, plate. [Presented by R. N. Cust, Esq.]

**Hore, Annie R.**—To Lake Tanganyika in a Bath Chair. London, Sampson Low & Co., 1886: 8vo., pp. x. and 217. Price 7s. 6d. [Presented by the Publishers.]

There is, of course, nothing new to the geographer in Mrs. Hore's interesting little volume. She endured with pluck the well-known hardships of African travel, though one regrets that it was considered necessary to subject her infant child to the fevers and other trials which afflicted the poor little fellow. The book is useful as showing that European women as well as men can live and flourish in some parts of Africa; though it should be remembered that the site of Mrs. Hore's home is unusually healthy. Captain Hore has built his house on the island of Kavala, off the west side of the lake, near the London Missionary Society's station of Mtowa. Mrs. Hore gives some interesting details concerning her own and her husband's work among the natives. There is a route map and a map of Lake Tanganyika.

**Laws, [Rev. Dr.] and Mrs.**—The Tshigunda Language of the Lower Zambesi Region, East Africa. Vocabularies by Rev. Dr. and Mrs. Laws, Free Church of Scotland Mission. Privately printed by the Livingstonia Mission Committee, 1886. Edinburgh, James Thin: 12mo., pp. 64.

**Laws, [Rev.] Robert.**—Table of Concords and Paradigm of Verb of the Chinyanja Language, as spoken at Lake Nyasa. Edinburgh, James Thin, 1885.

**Sims, A.**—A Vocabulary of the Kiteke, as spoken by the Bateke (Batio) and kindred tribes on the Upper Congo. English-Kiteke. London, Hodder & Stoughton, 1886: 12mo., pp. xii. and 190. [Presented by H. G. Guinness, Esq.]

## AMERICA.

[**America, United States.**]—Department of the Interior. United States Geological Survey. J. W. Powell, Director. Bulletins of the United States Geological Survey, Nos. 27-29. Washington, Government Printing Office, 1886: 8vo., map and plates. [Presented by the Director of the U.S. Geological Survey.]

No. 27. Report of Work done in the Division of Chemistry and Physics mainly during the Fiscal Year 1884-85.—No. 28. The Gabbros and Associated Hornblende Rocks occurring in the Neighbourhood of Baltimore, Md. By George Huntington Williams, PH.D.—No. 29. On the Fresh-water Invertebrates of the North American Jurassic. By Charles A. White, M.D.

——— [Tenth Census of the United States. 1880.] Vols. xvi. and xx. Washington, Government Printing Office, 1885-1886: 4to., maps and illustrations.

**Bancroft, H. H.**—The Works of Hubert Howe Bancroft. Vol. XXII. History of California. Vol. V., 1846-1848.—Vol. XXIX. History of Oregon. Vol. I. 1834-1848. San Francisco, The History Company, 1886: 8vo., pp. (Vol. XXII.) xv. and 784 (Vol. XXIX.), xxxix. and 789, maps.

**Harrower, Henry D.**—Captain Glazier and his Lake. An inquiry into the history and progress of exploration at the head-waters of the Mississippi since the discovery of Lake Itasca. New York, Ivison & Co. [1886]: 8vo., pp. 58.

Although we cannot admire the spirit of personality in which this pamphlet is written, it must be admitted that the author has brought together much useful information with reference to explorations at the source of the Mississippi previous to Captain Glazier's expedition. Mr. Harrower maintains the identity

of Lake Glazier with the well-known Lake Elk. With reference to the source of the Mississippi, Mr. Harrower contends that the main thing to do is to determine and locate the watershed which separates the Itasca basin from the sources of the Red River of the north on the one hand, and from the head-springs of tributaries of the Mississippi on the other. Having definitely outlined the drainage basin to the south of Itasca, it is worth while to trace the principal feeders of the lake to their springs, to determine the area drained by each, the volume of their flow, and the rapidity of their currents, to measure the elevation of their extreme sources above the level of Lake Itasca, and to find how far they are perennial, and how much of their currents dry during a portion of the year. Other points will also be solved, such as changes in the water-supply of the region, alterations in levels and dimension of lakes and ponds, and also whether any time Elk Lake and Itasca Lake were a continuous body of water. Indeed, at the date of issuing Mr. Harrower's paper (Oct. 1886), he states that his publishers had themselves sent out an expedition "fully equipped with instruments for the complete survey and delineation of the region which supplies the chief feeders of Lake Itasca."

**[Jamaica.]**—The Handbook of Jamaica for 1886-87: containing historical, statistical, and general information concerning the island. Published by authority. By A. C. Sinclair and Laurence R. Fyfe. London, Stanford, 1886: 8vo., pp. xii. and 548.

This is one of the most useful and exhaustive of colonial handbooks, containing a good deal of information useful to geographers.

#### AUSTRALIA.

**Queensland.**—Report on the Geology and Mineral Resources of the Districts of Kilkivan and Black Snake. (By the Assistant Government Geologist.) Brisbane, J. C. Beal, Government Printer: folio, pp. 8, maps and plans.

**Robinson, [Sir] W. C. F.**—The Physical Geography of the South-west of Western Australia: a Paper read before the South Australian Branch of the Geographical Society of Australia, on the 27th September, 1886. Adelaide, E. Spiller, Government Printer, 1886: 8vo., pp. 18, map.

#### OCEANIA.

**Brown, [Rev.] G., and Danks, B.**—A Dictionary of the Duke of York Island Language, New Britain Group; also, a Grammar of the same, and an Introduction. By Rev. G. Brown, F.R.G.S., &c. [In manuscript.] Sydney, 1882, 8vo., pp. vi., lxx. and 328. [Presented by the Rev. G. Brown.]

**Gabelentz, [Prof.] Georg von der.**—The Languages of Melanesia. [From the 'Journal of the Royal Asiatic Society of Great Britain and Ireland,' vol. xviii., Part 4.] 8vo., pp. 7. [Presented by R. N. Cust, Esq.]

**Melanesian Mission.**—The Island Voyage, 1885. Ludlow, C. A. Partridge, 1885: 8vo., pp. 53, map. [Presented by R. N. Cust, Esq.]

#### GENERAL.

**André, Richard.**—Ethnographische Karten. In 'Mittheilungen des Vereins für Erdkunde zu Leipzig,' 1885, pp. 175-240.

This is a serviceable list, with critical remarks, of 170 ethnographical maps relating to various parts of the world.

**Clark, Latimer.**—Transit Tables for 1887. Giving Mean Time of Transit of the Sun and of certain Clock Stars for every day in the year. Compiled from the 'Nautical Almanac' for popular use. London, Spon, 1887[6].

**Döllen, W.**—Zeitstern-Ephemeriden auf das Jahr 1886 für die Zeitbestimmung mittelst des Tragbaren Durchgangsinstruments im Verticale des Polarsterns. St.-Petersburg, 1886: large 8vo., pp. xxiii. and 27.

Izvestiya Imperatorskago Russkago geographicheskago obshestva. Tom. xxii. Vypusk 3. St. Petersburg, 1886: pp. 225-352, with map.

This number of the 'Proceedings' of the Russian Geographical Society contains the following articles:—The influence of Russian colonisation on the character of the Stavropol region, D. Ivanof. Information on the Northern Ural, with map, E. Feodorof and P. Ivanof. Geodetic and cartographical works of the corps of military topographers in 1885, besides notes and reports of the expeditions. Under the last-named heading are three letters from the well-known scientific traveller and explorer N. Potanin, dated from Sining, Tonkir, and Gavtai the 22nd March, 2(14) April, and 11(23) June, 1886.

M. Potanin writes these letters on his way back to Russia from the north-eastern borders of Tibet. His party consisted of M. Skassy, topographer, and M. Bérézofsky, naturalist. Besides these Mr. Parker of the China Inland Mission joined the party and was to accompany them to Su-chau. Potanin's last letter describes their march across the Nan-shan mountain range separating the basin of the Yellow River from the plains of Southern Mongolia. The passes were 13,000 feet high, and the valleys not much below 10,000 feet. At the end of April they found Lake Koko-nor still covered with ice though Prejevalsky in 1873 saw it open a month earlier. M. Potanin mentions extensive gold-diggings seen by him in the valley of the Bardun, and outcrops of coal in this and the adjacent valley of Lonsir. He came across a people called Yeguri living in the northern parts of the Nan-shan range between Kan-chau and Su-chau, and believes that he is the first to make their existence known in Europe. They suffered severely during the late Mahommedan rising in Western China, and their numbers were reduced to some 800 families. They speak the Mongolian language, and are subject to the governor of Kan-su. The Chinese call them Hwang-fan; their ancient tribal names have disappeared, having given place to Chinese names referring to the number of horses each tribe had to pay as tribute to the Emperor of China. The Yeguri are all Lamaists by religion and possess seven monasteries. They are ruled by elders appointed by the Chinese authorities.

A route survey of M. Potanin's journey based on 46 astronomically determined positions has been executed by M. Skassy. M. Bérézofsky remains in Kan-su till 1887, to hunt and collect specimens of natural history.

Some interesting particulars of an expedition to Khan Tengri, furnished by A. N. Krasnof, are in the same number of the *Izvestiya*.—[E. D. M.]

Jahresbericht am 25 Mai 1886 dem Comité der Nicolai-Hauptsternwarte abgestattet vom Director der Sternwarte. St. Petersburg, 1886: 8vo., pp. 52.

**Lanesson, J.-I.**—L'Expansion Coloniale de la France. Avec 19 Cartes hors texte. Paris, Félix Alcan, 1886: 8vo., pp. xxiii. and 1016. Price 10s.

There have been a good many books recently on the French colonies; that of M. Lanesson is one of the most carefully written and complete. It includes Algeria, Tunis, and Madagascar, and in the case of each colony gives a fairly satisfactory account of the geography and ethnology, followed by sections on the history of the colony, its expansion, its industries, its trade, and its administration. M. Lanesson in his introduction discusses the subject of colonisation from what he calls a natural history point of view. The modern migration is simply the continuation of the movements which have prevailed among restless humanity from the first, movements which have led to the peopling of the earth, to the mixture of races, to the suppression of the weaker by the stronger, to those conditions which we recognise as civilisation. "This colonial expansion, which at the present time impels the greatest nations of Europe towards the most distant and wildest regions of our globe, appears to be simply the destined and necessary manifestation of the life of these nations. Like Athens and Sparta in Asia, like Rome in Gaul, France, England, and Germany seek

in India, Oceania, the extreme East, the riches necessary for the satisfaction of their wants. In exchange they carry with them into distant regions, with the products of their industries, the genius which animates them. If you ask me to strike in millions the balance of this double operation, I would make reply that it matters little to me to know what the conquest of Gaul cost the Roman people; I am satisfied to know that France of the present day is the result of the colonial expansion of Rome, as the Algeria, Indo-China, Madagascar, Tunis of the future will be the result of the colonial expansion of France."

**Philipsson, Alfred.**—*Studien über Wasserscheiden.* In 'Mittheilungen des Vereins für Erdkunde zu Leipzig,' 1885, pp. 243–402.

This is one of those thorough studies in scientific geography, so common in Germany, and hitherto so rare here. Prefixed is a long and useful list of authorities which the writer has consulted on the subject. The monograph is divided into four sections. In the first the author deals with what he calls the first or original positions of water-partings. Under this head he endeavours to show the importance for its history of the last emergence of a land from the sea; the connection of water-partings with the relief of the land at the time of this occurrence; the preparation of a relief suitable for a water-parting (1) by the forces at work during the submergence of the land, (2) by the forces at work under the sea, (3) by those at work at the time of emergence. He then goes on to sketch the position of water-partings after the emergence of various types of land-surface—surfaces of abrasion, stratified plateaus, soft lands, regions of folding, or crumpling, regions of upheaval. In the second section the author deals with the displacement of water-partings under the heads of the fall of water-partings to a position of stability; factors which can effect changes in water-partings; and the obliteration and re-formation of water-partings. In the third section he deals with the topographical morphology of water-partings under the heads of peculiarities of the vertical cross-section, the vertical longitudinal section, the horizontal projection. In the fourth section the author treats of the course of water-partings in various regions of the globe, arranged under his previous classification of types of surface. The author endeavours to arrive at a satisfactory definition of a water-parting. The definition of water-parting as the boundary between river-basins he considers too vague. The definition of a water-parting as the boundary line between two directions of drainage he considers too wide. He offers the following as more satisfactory than either:—A water-parting is that line which divides two different directions of surface drainage from each other. Finally, he divides water-partings into two great groups:—1. Those which stand in approximately complete relations with the present arrangement of their sub-structure; these he designates Concordant Water-partings. 2. Those which do not stand in any such relation, and which the author designates as Discordant Water-partings.

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The following works have also been added to the Library:—

**Carlyle, [Rev.] J. E.**—*South Africa and its Mission Fields.* London, J. Nisbet & Co., 1878: 8vo., pp. viii. and 325.

**Mitchell, [Mrs.] Murray.**—*A Missionary's Wife among the Wild Tribes of South Bengal.* Extracts from the Journal of Mrs. Murray Mitchell. With Introduction and Supplement by Dr. George Smith. Edinburgh, John Maclaren; London, J. Nisbet & Co., 1871: 12mo., pp. viii. and 70.

**Mullens, Joseph.**—*Missions in South India, visited and described.* London, W. H. Dalton, 1854: 8vo., pp. vii. and 191, map.

**Proceedings of the General Conference on Foreign Missions, held at the Conference Hall in Mildmay Park, London, in October 1878.** Edited by the Secretaries to the Conference. London, J. F. Shaw & Co., 1879: 8vo., pp. viii. and 434.



**Smith, George.**—Fifty Years of Foreign Missions; or the Foreign Missions of the Free Church of Scotland in their Year of Jubilee, 1879–80. Fourteenth edition. Edinburgh, J. Maclaren & Son, 1880: 8vo., pp. 79, maps and illustrations.

**Wilson, [the late] John.**—Indian Caste. Bombay, Times of India Office; Edinburgh and London, W. Blackwood & Sons, 1877: 8vo., pp. 450, 228, and xxii. [The above six works were presented by Dr. George Smith.]

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## NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

### THE WORLD.

**Ribero, Diego.**—The 2nd Borgian Map by —, Geographer to His Majesty, in Seville, 1529. Reproduced by W. Griggs in Photo-chromolithography from the original in the Museum of the "Propaganda" in Rome. W. Griggs, Peckham, S.E., 1886. Price 1*l.* 1*s.*

This is a very well executed facsimile reproduction of the second Borgian map by Diego Ribero, which through the kindness of His Holiness Pope Leo XIII. was permitted to be sent from the Archives of the Propaganda, Rome, to the West India Section of the Colonial Exhibition, all previous applications to the predecessors of the Supreme Pontiff for permission to copy this map having been refused, though on one occasion the request was made at the instance of the United States Government. It is presumed that the original of this map must have been commenced about 1494, and finished 1529, possibly for Charles V., in order to settle some difficulties with the Portuguese, relative to the vexed question of possession of the newly discovered lands, and it forms part of the valuable collection left to the Sacred Congregation of Propaganda by Cardinal Borgia, the last of the family, who died 1830. On the upper margin there is an inscription in Spanish, in which it is stated that the map contains all that has hitherto been discovered of the world, made by Diego Ribero, geographer to His Majesty, in Seville, 1529, and continues along the lower margin as follows:—"Which is divided into two parts according to the agreement made by their Catholic Majesties of Spain and King John of Portugal in Fontesilla, A.D. 1494." The line of division as made by Alexander VI. is shown on this map, with the addition of a flagstaff on each side, at the foot of the map, one of which carries the Spanish, and the other the Portuguese flag. The names of the principal towns in each country are given, those in England being Bristol, York, and Londres. The Irish towns are written in Celtic; Jerusalem is placed about 1500 miles distant from where it really exists, and has three crosses to indicate Calvary. Russia is covered with representations of men, trees, and beasts, as indeed (after the manner of the early cartographers) are all countries in those places where the geography was little known. The delineation of the coasts of North and South America is interesting as showing how little of the west coast was known at the time the map was produced. Labrador is the farthest northern limit of America laid down, and a note is made that it is a country found by the English, and of no use. In one corner of the map is a quadrant, with directions for its use, and in the other an astrolabe. The work of reproduction has been beautifully executed by Mr. Griggs, and the lettering is particularly sharp and clear.

**Petermann's** 'Geographische Mitteilungen.' 3tes Indexheft. Übersicht der Karten 1875–1884. 4 sheets. Justus Perthes, Gotha, 1886. (*Dulau.*)

These are a most valuable set of indices of all the maps published in Petermann's 'Geographische Mitteilungen' for ten years (1875–1884). The system is that which is usually adopted in index maps, with the addition of the

use of different colours in the lines, by which the scales of the maps referred to can be ascertained; dotted lines indicating physical or statistical maps. The number of maps given in this well-known geographical work is so great, that the periodical publication of such indices as these has become almost a necessity, and will be duly appreciated by all who have to refer to the back numbers of Petermann's 'Mitteilungen.'

## EUROPE.

**Central Europa.**—Karte von Central Europa zur Übersicht der Eisenbahnen, einschliesslich der projectirten Linien, der Gewässer u. hauptsächlichsten Strassen. Nach amtlichen Quellen bearbeitet von W. Liebenow, Geheimer Rechn. Rath im Kgl. Preuss. Ministerium der öffentl. Arbeiten. Scale 1:1,250,000 or 17·2 geographical miles to an inch. Berlin, 1886. Verlag, Stich und Druck des Berliner lithogr. Instituts. Price 10s. (*G. Philip & Son.*)

**Deutschen Reiches.**—Karte des —. Scale 1:100,000 or 1·3 geographical miles to an inch. Herausgegeben von der Kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1886. Sheets: 120, Anklam; 452, Kreuzburg; 586, Pfalzburg; 602, Strassburg i. E.; 604, Calw. Price 1s. 6d. each. (*Dulau.*)

**Paris.**—Nouveau Plan de —, 1887. Scale 1420 feet to an inch. Lanée, Editeur Géographe, Paris. Gravé et imprimé par Erhard. Price 2s. (*Dulau.*)

## ORDNANCE SURVEY MAPS.

Publications issued during the month of November 1886.

## 1-inch—General Maps:—

SCOTLAND: 121 (Outline), 73 (Hills), 1s. 9d. each.

## 6-inch—County Maps:—

ENGLAND AND WALES: Brecknockshire: 26 N.E., S.E., 32 N.E., S.E.: 1s. each. Cambridgeshire: 8 S.W., 23 S.W., 35 N.W., S.W., 36 N.W., S.W., S.E., 57 S.E.; 1s. each. Cardiganshire: 6 N.W., 10 N.W., 14 S.E.; 1s. each. Carmarthenshire: 25 N.E., S.W., S.E.; 1s. each. Devonshire: 30 N.W., N.E., 89 N.W., 113 S.E., 119 N.W., N.E., S.W.; 1s. each. Dorsetshire: 7 S.W., S.E., 8 N.E., 19 N.E.; 1s. each. Gloucestershire: 29 S.E., 38 S.W., 54 N.E., 56 N.E., S.E., 57 S.W., 59 S.W., 63 N.E., 64 S.W., 67 S.E., 68 N.E., 69 N.W., 72 N.E., 73 S.E.; 1s. each. Herefordshire: 18 S.E., 28 S.E., 29 S.W., 31 N.E., S.E., 32 N.W., 34 S.W., 36 S.W., S.E.; 1s. each. Leicestershire: 43 S.W., S.E., 49 N.W., N.E., S.W.; 1s. each. Lincolnshire: 7 N.E., 8 N.E., 12 N.E., S.W., S.E., 28 N.W., 37 S.W., 63 S.W., 77 N.W., 85 N.W., N.E., S.W., 95 N.W., S.W.; 1s. each. Merionethshire: 15 N.W., 23 N.W., N.E.; 1s. each. Monmouthshire: 1, 2s. 6d.; 15, 26; 2s. each. Montgomeryshire: 4 N.W., 13 N.W., S.W.; 1s. each. Norfolk: 2 S.W., 4 S.W., 21 S.W., 32 N.W., N.E., S.W., 44 S.E., 51 N.E., 54 N.W., N.E., S.W., S.E., 69 N.W., S.W., 81 N.W., 91 S.W.; 1s. each. Nottinghamshire: 37 S.W.; 1s. Oxfordshire: 40; 2s. 6d. Somersetshire: 15 N.E., 41 S.E., 81 S.W., 88 N.W., N.E., S.W., 92 N.E.; 1s. each. Suffolk: 31 N.W., 89 N.E., S.E.; 1s. each. Warwickshire: 12 S.W., 18 N.W., S.W., 19 S.E., 25 N.E., S.E., 26 N.W., 28 S.W.; 1s. each. Wiltshire: 3 S.W., 18 S.E.; 1s. each.

## 25-inch—Parish Maps:—

ENGLAND AND WALES: Cambridgeshire: XLIX. 2, 3s.; LV. 14, 4s. Devonshire: XIV. A, 14; CXXVIII. 8, 3s. each. Area Books: Bradstone, Coryton, Kelly, 1s. each; Liffon, 1s. 6d.; Sowford, 1s.; Thrushelton, 1s. 6d. Gloucestershire: LKV. 11, 3s.; LXV. 14, 4s.; LKV. 15, 3s. Area Books: Admington, Chipping Campden, Clopton, Cow Honeybourne, Dorsington, Hidcote Bartrim, Ilmington, Kemerton, Long Marston, Mickleton, Quinton, Tewkesbury, Twynning, Walton Cardiff; 1s. each. Herefordshire: VII. 10, XIV. 9, XX. 8, 3s. each. Huntingdonshire: XX. 4, 3s. Leicestershire: XXIX. 10, 3s.; XXIX. 15, 4s.; XLIV. 10, 3s.; XLIV. 13, XLV. 10, 4s.; XLVI. 10, 3s.; L. 8, 6s. 6d.; LI. 5, LIII. 14, 3s. each. Area Books: Bottesford, 1s. Lincolnshire: IX. 7, 10, 14, 3s. each; IX. 15, XVI. 16, 4s. each; XVII. 2, 7, 8, 10, 11, 3s. each; XXVI. 9, 4s.; XXVI. 10, 11, 13, 14, 3s. each; XXVI. 15, 4s.; XXVI. 16, XXXIV. 3, 3s. each; XXXIV. 4, 4s.; XXXIV. 5, 6, 3s. each; XXXIV. 8, 4s.; XXXIV. 11, 5s.; XXXIV. 15, 4s.; XXXIV. 16, 3s.; XXXV. 1, 2, 4, 6, 8, 12, 13, 15, 3s. each; XLII. 4, 16, 4s. each; XLIII. 14, XLIV. 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, LI. 6, 3s. each; LI. 5, 4s.; LII. 1, 2, 3, 7, 8, 9, 10, 12, 13, 14, 15, 16, 3s. each; LX. 9, 4s.; LX. 11, 13, 3s. each; LX. 16, 4s.; LXI. 1, 5, CKIV. 13, 14, CKXIII. 1, 3s. each. Montgomeryshire: XIV. 11, XXI. 4, 7, 8, 16, XXII. 6, XXVII. 14, XLII. 1, 9, XLIII. 3, 3s. each. Norfolk: XIII. 4, XVIII. 2, 3s. each; XIX. 1, 4s.; XX. 5, 11, 15, 16, XXXIX. 9, XL. 11, 3s.; XL. 12, 4s. Area Books: Ashby with Oby, Billingford, Bio Norton, Bressingham, Burgh St. Margaret, Mantly, Postwick (detached), Sandringham, South Lopham, Stokesby with Herringby, Swanton, Morley, Toft Monks (detached Nos. 1 and 2), Tottenhill, Upton with Flashy, West Newton, 1s. each. Northamptonshire: X. 10, 3s.; XV. 8, 6s. 6d.; XVI. 5, XXII. 14, 3s. each; XXIX. 13, 4s. Nottinghamshire: III. 11, 4s.; III. 12, 15, IV. 5, 6, 9, 3s. each; IV. 10, 4s.; IV. 11, 5s.; IV. 14, 3s.; IV. 15, VII. 4, 7, 16, 4s. each; VIII. 14, 3s.; X. 9, XI. 9, 4s.; XIV. 3, XVI. 13, 3s. each. Area Books: Averham, Bradmore, Epperstone, Kirlington, Lodge on

the Wolds, 1s. each; Bedford Saint Mary, &c., 2s. 6d.; Southwell, 1s. 6d.; Staunton, Upton, 1s. each. **Shropshire:** Area Books: Coreley, Farlow, Hopton, Wafers, 1s. each. **Somersetshire:** LI. 4, LI. 7, 4s. each; LII. 7, 6s. 6d.; LII. 13, 14, 4s. each; LIII. 11, 15, LXV., 10, 3s. each. Area Books: Bedminster (part of), Burnett, Chelwood, Chew Stoke, Churchill, Congresbury, Corston, Keynsham, Nailsea, Priston, Saltford, Stanton Drew, Stanton Prior, Whitechurch, 1s. each; Winford, 1s. 6d. each. **Suffolk:** LXI. 12, 3s.; LXXXVII. 7, 5s. Area Books: Battisford, Bosted, Burgh Castle, Carlton Colville, Chevington, Creeting St. Mary, Flixton, Flowton, Gunton, Harbest, Hopton (near Botesdale), Kenton, Kirkley, Little Stonham, Lowestoft, Mickfield, Nettlestead, Oulton, Somersham, Somerton, Stanton, 1s. each. **Warwickshire:** XXX. 7, 5s.; XLV. 4, 8, XLVI. 5, 3s. each. Area Book: Tamworth, 2s. **Wiltshire:** VII. 11, 3s.; VII. 14, 4s.; VII. 15, XXVIII. 3, XXIX. 1, 3, 5, XXXIV. 6, 3s. each; XXXIV. 13, 5s. **Worcestershire:** XXIII. 7, 5s.; XXVIII. 15, 16, XXXIII. 11, 15, XLII. 15, 4s. each; XLIX. 3, 6s. 6d. Area Books: Bengeworth, Bentley, Pouncefoot, Crophorne, Dormston, Hampton Lovett, Holdfast, 1s. each; Inkberrow, 1s. 6d.; Kington, North and Middle Littleton, Offenham, Saint Nicholas, South Littleton, Stock and Bradley, Westwood Park, 1s. each.

**Town Plans**—10-foot scale:—

ENGLAND AND WALES: Cambridge, XL. 14, 11, 12, 13, 14, 17, 18, 19, 20; XL. 15, 6, 11, 16, 21, 2s. each. Devises, XXXIV. 13, 5, 9, 15, 20; XXXIV. 14, 1, 2, 7, 12, 16, 2s. each. Kettering, XXV. 10, 6, 7, 11, 12, 16, 17, 19, 21, 22, 23, 24; XXV. 14, 1, 3, 7, 8, 11, 12, 13, 17, 2s. each. Leicester, XXXI. 15, 6, 17, 2s. each. Peterborough, VIII. 7, 12; VIII. 11, 14, 18, 24; VIII. 15, 9, 13, 15, 19; VIII. 16, 6; 2s. each. Shepton Mallet, XLI. 8, 23; XLI. 12, 5, 6, 7, 8, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25; 2s. each. Wells, XLI. 1, 24; XLI. 5, 3, 4, 5, 6, 8, 9, 12, 13, 17; 2s. each. West Bromwich, LXXVIII. 6, 20, 22, 23, 24; LXVIII. 10, 2, 5, 7, 9, 13, 17, 24, 25; 2s. each. Wolverhampton, LXII. 6, 6, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 23, 24; LXII. 10, 4, 5, 8, 9, 10, 14, 15, 19, 20, 25; LXII. 14, 5; 2s. each. Yeovil, LXXXIII. 13, 10, 15, 24; LXXXIII. 14, 22; XC. 2, 1; 2s. each.

(Stanford, Agent.)

AFRICA.

**Abessinien.**—Übersichtskarte der Reiserouten des Kapitän A. Cecchio und des Ingenieurs G. Chiarini im südlichen —, 1876 bis 1881. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' 1886, Tafel 15. Justus Perthes, Gotha. (*Dulau.*)

**Aequatorialen Ost-Afrika.**—Vorläufige Skizze von Dr. G. A. Fischer's 3ter Reise im —, 3. August 1885 bis 14 Juni 1886. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Taf. 19. Justus Perthes, Gotha, 1886. (*Dulau.*)

**Afrika.**—Karte von —, mit besondere Berücksicht der deutschen Kolonien. Scale 1:10,000,000 or 133·3 geographical miles to an inch. W. Liebenow. Berlin, Berliner Lithographische Institut. 4 Blatt. Price 6s. (*Dulau.*)

**Kongo.**—Die Nebenflüsse des mittlern —, Lulongo, Tschuapa, Mobangi u. a. Nach den Aufnahmen von Premierleut. Curt v. François und Reverend George Grenfell im englischen Missionsdampfer "Peace," 1884 und 1885. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 16. Justus Perthes, Gotha. (*Dulau.*)

**Madagascar.**—A Map of — (Madagaskara), by Captain S. Pasfield Oliver, F.S.A., F.R.G.S., late Royal Artillery. Scale 1:2,661,120 or 36·5 geographical miles to an inch. London: Macmillan & Co.

This is a very nicely drawn map, on which the present state of our geographical knowledge of Madagascar is well represented. The coast-line is taken from the Admiralty charts, and the interior from the explorations and surveys of the most recent and reliable travellers. The hill shading is based on that of the map of the French War Department, compiled by Col. Regnaud de Lannoy de Bissy, and the nomenclature is from Grandidier's Géographie, with corrections and accents by Richardson and Pickersgill. Towns, forts, and villages are indicated by symbols.

**Ost-Afrika.**—Originalkarte von Joachim Graf Pfeil's Reisen in —. Okt. 1885 bis Febr. 1886. Scale 1:1,750,000 or 23·9 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Taf. 18. Justus Perthes, Gotha. (*Dulau.*)

## AMERICA AND WEST INDIES.

**Canada.**—Mackinlay's Map of the Maritime Provinces of the Dominion of —, compiled from recent surveys. Scale 1:480,000 or 6·5 geographical miles to an inch. 4 sheets. Published by G. Philip & Son, London and Liverpool.

In this map, which is carefully drawn, and has been brought up to date, all county boundaries, townships, railways and roads are laid down, and all the principal heights are given in feet. The work has been neatly executed, but it is somewhat over coloured; this is very apparent in the N.E. sheet, many of the names of places in King County, Prince Edward Island, being quite obscured, and the smaller indentations on the coast quite hidden; this is so perceptible that it is to be hoped in any future editions of this map that may be published, a lighter shade of transparent colour may replace the dark and opaque shades which go so far to mar its utility.

**Puerto Rico.**—Mapa Topográfico de la Isla de —. Publicado por G. W. & C. B. Colton y Comp<sup>a</sup>. Nueva York, 1886. Scale 1:250,000 or 3·4 geographical miles to an inch. Price 9s. (*G. Philip & Son.*)

Though this map gives a considerable amount of detail as regards the interior of the island of Puerto Rico, it is greatly wanting in the manner in which the physical features are illustrated; the hill-shading, which has been done in chalk, is so confused that it would be difficult to trace the valleys, or even the direction of the mountain ranges. The limits of departments and roads are laid down, and the comparative importance of the towns is indicated by symbols; the heights of the mountains are not given.

**Vereinigten Staaten und von Canada,** Landwirtschaftskarte der — für das Zensusjahr 1880 bez. 1881. Von A. Supan. Scale 1:7,500,000 or 102·7 geographical miles to an inch. Nebenkarte, Verbreitung der Weizenkultur nach Brewer. 1:30,000,000. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft Nr. 84, Taf. 1. Justus Perthes, Gotha. (*Dulau.*)

— — — — Industriekarte der — für das Zensusjahr 1880 bez. 1881. Von A. Supan. Scale 1:7,500,000 or 102·7 geographical miles to an inch. Nebenkarten: Verbreitung der Tabakkultur im Jahre 1879; 1:30,000,000. Verbreitung der Baumwollkultur nach Hilgard; 1:11,000,000. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft Nr. 84, Taf. 2. Justus Perthes, Gotha. (*Dulau.*)

## AUSTRALIA.

**New South Wales.**—Map of —. Scale 1:2,100,000 or 29 geographical miles to an inch. E. Stanford, London, 1886. Price 3s.

**Queensland.**—Map of —. Scale 1:4,000,000 or 55·5 geographical miles to an inch. E. Stanford, London, 1886. Price 3s.

**South Australia.**—Map of —. Scale 1:4,000,000 or 55·5 geographical miles to an inch. E. Stanford, London, 1886. Price 3s.

**Victoria.**—Map of —. Scale 1:2,100,000 or 29 geographical miles to an inch. E. Stanford, London, 1886. Price 3s.

## CHARTS.

**Admiralty.**—Charts and Plans published by the Hydrographic Department, Admiralty, in September and October 1886.

No.		Inches.	
298	m =	8·8	Newfoundland:—St. John's harbour, 1s. 6d.
956	m =	0·11	West Indies:—Guadeloupe to Trinidad. 2s. 6d.
924	m =	1·0	Bay of Bengal:—Tavoy river. 2s. 6d.

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No.		Inches.	
218	m =	4·0	Bay of Bengal, Mergui archipelago:—Mergui harbour. 2s.
955	m =	2·0	Borneo, north-west coast:—Loutut point to Gaya head, including Gaya and Sapangar bays. 1s. 6d.
925	m =	1·5	Australia, north-coast:—Port Darwin. 2s. 6d.
926	{ m = m =	{ 5·0 6·0	{ New Guinea, north-east coast:—Ward Hunt strait. Yasaiasa anchorage. Luther anchorage. 1s. 6d.
604	Africa, west coast:—Plans added. Olongubuna point anchorage. Fernand Vaz entrance. Cape Lopez bay and entrance of Ogowé river.		
1807	Australia, Carpentaria gulf:—Plan added, Norman river entrance. (Potter, agent.)		

## CHARTS CANCELLED.

No.		Cancelled by	No.
298	St. John's harbour .. .. .	New plan, St. John's harbour .. .. .	298
603	Cape Lopez bay .. .. .	New plans on .. .. .	604
835	Plan of Tavoy river on this sheet ..	New plan, Tavoy river .. .. .	924
218	Mergui harbour .. .. .	New plan, Mergui harbour .. .. .	218

## CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2593. North sea:—Ameland to Jade river. 2291. Norway, west coast:—Bergen to Stav fiord. 121. Baltic sea:—Koster islands and approaches to Strömstad. 2346. Baltic sea, Sweden:—Winga sound or Götheborg Skärgård. 2664. France, west coast:—D'Arcachon point to Coubre point. 178. Africa, north coast:—Stora and Philippville anchorages, &c. 2480. North America, east coast:—Block island to Great Egg harbour. 355a. North America, east coast:—Chesapeake bay. 456. Jamaica:—Port Royal and Kingston harbours. 2004. South America, east coast:—Colonia roads. 561. South America, west coast:—Magellan strait to gulf of Penas. 1229. Africa, west coast:—Santa Cruz to cape Bajador. 1877. Africa, west coast:—Gaboon river. 679. Madagascar:—Looké, Leven, Andrava, and Vohemar bays. 920. Indian Ocean:—Diego Garcia. 453. Red sea:—Islands in southern portion of Red sea. 835. Bay of Bengal:—Bentinck sound. Port Owen. 2056. Eastern archipelago:—Sunda strait. 2111. Borneo, west coast:—Nosong point to Ambong bay. 949. Eastern archipelago:—Ports in Philippine islands. 930. Eastern archipelago:—Anchorage between Borneo and New Guinea. 2875. Japan:—Setouchi or Inland sea. 2351. Australia, north-east coast:—Cape Tribulation to cape Flattery. 2421. South Pacific ocean:—Tonga or Friendly islands. (Potter, agent.)

**North Atlantic Ocean.**—Pilot Chart of the —, October, November, December, 1886. Published at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander u.s.n., Hydrographer to the Bureau of Navigation.

## ATLASES.

**Australia.**—The New Atlas of —. The complete work containing over one hundred maps, and full descriptive geography of New South Wales, Victoria, Queensland, South Australia and Western Australia, together with numerous illustrations and copious indices. Sydney, John Sands. Price 2l. 2s. (this part). (Stanford.)

This is the first part of an atlas of Australia, which, when complete, will consist of one hundred large maps of the divisions, districts, and counties of the Australian colonies. The present issue contains a large amount of letterpress, in which a general description of the physical geography, geology, natural history, means of communication, aborigines, &c., of Australia is given; this is followed by a more detailed account of New South Wales which contains much useful statistical information. With the exception of five maps, consisting of

the World in Hemispheres and in Mercator's Projection, a general map of Australia, one of Tasmania, and another of New Zealand, the remainder of the atlas is devoted to large scale maps of the counties of New South Wales, in which the boundaries of parishes are shown, and as the parishes themselves are marked with a number, by referring to the index the name can be ascertained. The illustrations contained in the letterpress are good. The general maps contain some serious omissions and errors, and in those of New South Wales, the physical features are very roughly indicated.

**Borghans' Physikalischer Atlas** (begründet 1836 von Heinrich Borghans), 75 Karten in sieben Abtheilungen, enthaltend mehrere Hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Vögelkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartack, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Borghans. Fünfte Lieferung. Inhalt: Nr. 23, Nord- und Ostsee. Nr. 35, Witterungs-Anomalien in Europa. Nr. 54, Verbreitung der Vögel I. Sechste Lieferung. Inhalt: Nr. 36, Wetterkarten und Zugstrassen. Nr. 45, Areal ausgewählter Ordnungen. Nr. 55, Verbreitung der Vögel II. Götta, Justus Perthes, 1886. Price 3s. each part. (*Dulau*.)

Map No. 23 shows the Hydrography of the North Sea, the Baltic, the English Channel, and the Bay of Biscay; there are also fourteen inset maps in which illustrations are given of the formation of sandbanks and dunes. Map No. 35 gives the isotherms and isobars for Europe in the months of December 1874-1880, these showing a very marked difference in results. Map 54 shows the distribution of birds, Class No. 1, throughout the world, and an inset map, on a very reduced scale, is given showing the distribution of animal life according to Professor Wallace. No. 36 is a weather and wind chart. No. 45 shows the distribution of typical plants, and No. 55 the distribution of birds, Class No. 2. All the maps are beautifully drawn, the lettering is clear, and the symbols and colours well chosen.

**British Empire.**—The Queen's Jubilee Atlas of the —, with Descriptive and Historical Notes and Statistical Tables. By J. Francon Williams, F.R.G.S. London, George Philip & Son, 1887. Price 1s. or bound in cloth 2s.

This atlas, in addition to the maps, contains thirty-four pages of explanatory notes, in which a brief sketch of the history and geography of each British Colony is given. A valuable statistical table of the form of Government, populations, area, imports, exports, &c., will be found at the beginning and end of the book. The maps are fairly drawn, and are not overcrowded with names.

**France.**—Album de Statistique Graphique de 1885. Ministère des Travaux Publics. Paris, Imprimerie Nationale, 1886. (*Dulau*.)

This atlas contains statistical information of great value with regard to means of communication, and the transport of merchandise by rail and water in France. The maps are twenty-one in number; the first eleven have reference to railway enterprise in 1883, then follow seven maps giving statistics with regard to internal navigation, one illustrating the proportions of the mercantile marine of the principal countries in 1883, and concludes with two diagrams having reference to the tramways and other means of communication in Paris from 1860 to 1884. The system adopted in these maps is simple and easily understood, in addition to which each sheet contains explanatory notes.

**Fritzsche, G. E.**—Nuovo Atlante Geografico ad uso delle Scuole Normali e Secondarie designato sotto la direzione dell' Ingegnere Dottore Luigi Hugues da G. E. Fritzsche. Fascicolo Secondo. 8 carte. Torino: Ditta G. B. Paravia e Comp. 1887. (*Dulau*.)

This is the second issue of an atlas intended for the use of schools. After some introductory remarks, there follow thirteen pages containing statistics

with reference to populations, areas, and physical geography. The maps are eight in number, and are well calculated for the purpose for which they were published.

#### ASTRONOMICAL.

**Moon.**—The Handy Map of the ——. T. K. Mellor, F.R.A.S., del. Horne, Thornthwaite, & Wood, Opticians, London. Price 3s.

Though there are many published maps of the moon, they are, for the most part, drawn on too large a scale to be of much service to the student of selenography, who may only be possessed of a telescope of small aperture, and who may desire, in the first place, rather to study the moon as a whole than any particular portion of its surface. For the use of such beginners as these this map is well suited; it is handy in size, gives the names of about 300 formations, in the same manner as mountains, lakes, &c., are named on terrestrial maps, and not as is frequently the case with maps of the moon, by numbers which require reference to an index. This is a great advantage for the student when it is remembered that his work is almost always carried on by the light of a lantern, and often in winter nights when the fingers are cold and it is extremely inconvenient to turn over the leaves of books of reference. In the matter of price this map has the advantage of being cheaper than any other of the same class. It shows the positions of the different objects of interest without professing to be pictures of them, and by its aid the student of selenography would soon become familiar with the principal features of the moon's surface, when he could carry his studies further with the aid of more elaborate maps; but until then, this map will be quite sufficient for all his wants.

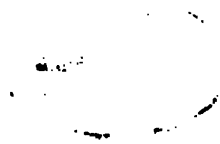
**Planisphere.**—Philips' Revolving ———, showing the principal stars visible for every hour in the year. G. Philip & Son, London. Price 2s.

This planisphere is an improvement on those previously constructed, as it revolves in a frame instead of a centre-pin, which in the older form soon worked loose; it is also smaller, more handy, and the constellations are clearly shown in white on a dark ground, without pictures, which only tend to confusion. As the aspect of the heavens, in the latitude of London, with regard to the principal fixed stars, can be exhibited with this planisphere for every hour in the year, it should be useful to those who, having no previous knowledge, desire to study astronomy.



Edw. Waller, lith., Red Lion Square.





PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
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*The Dragon Lake of Pámír.*

By Major-General Sir HENRY C. RAWLINSON, K.C.B.

I DESIRE to draw attention to the excellent geographical work performed by Mr. Ney Elias in his recent journey of 360 miles across the Pámír Plateau, from the vicinity of Yengi-Hissar to Shignán. When Major Trotter, some years back, first brought this Central Pámír track to the notice of geographers, in the Appendix to Sir D. Forsyth's *Turkistan Report* (p. 457, Route XXVII.), I ventured to suggest to the Society \* that it represented the famous trade-route of antiquity, by which the caravans of Rome passed from Bactria along the "Vallis Comedarum" to the famous Stone Tower on the border of the Chinese territory; and I further undertook to show from a reference to various historical notices, that it had been used as a military road in comparatively modern times; but I had not then sufficient evidence to prove that Hwang-Tsang, the Chinese traveller of the seventh century, had followed the same track, or that the famous Dragon Lake, the central point of Jambu-dwipa, and the holiest spot in the whole Buddhist cosmogony, which he had assigned to this region, was really to be identified on the line between Kashgar and Shignán. Mr. Ney Elias's journey has thrown an unexpected light on this subject. We now find that the Rang-Kul, which occurs at the seventh stage from the eastern border of the Pámír Plateau, and which, with the exception of the great Kara-Kul Lake, lying far away to the northward, is the largest expanse of water throughout this mountain region, answers very closely to the description of the Buddhist pilgrim. The *Si-yu-ki* says that the soil is impregnated with salt, yet that the waters of the lake are sweet. Mr. Ney Elias found that the banks of the lake were covered with efflorescent and incrustated salts, while the water was considered to be fresh. The colour is stated by both authorities to be a deep clear blue, and the multitude of wild fowl which cover its surface and swarm around its banks, attracted the special notice, both of the older and

\* 'Proceedings R.G.S.,' vol. vi. p. 502.

more modern travellers. But the most curious proof of identity is to be found in the Dragon myth which attached to the lake. The Buddhists of Central Asia, confounding this northern basin with the Mánasarowar Lake of Tibet, gave it the mystical name of Anava (or Anavatatta) and supposed it to be presided over by a dragon, whence the title of Nagahrada or Rávanahráda; and Mr. Ney Elias was able to trace the same belief among the Kirghiz of Rang-Kul at the present time. The following extract from his report will show, indeed, that the Dragon King reigns supreme in Pámír to-day, just as he did in the time of Hwang-Tsang, or perhaps 1000 years previously.

“In following the track down the south shore of the Rang-Kul a rock or cliff is passed, standing about 100 yards from the water's edge, and presenting a sheer front of about 100 feet in height towards the lake. This is called the Cherágh-Tásh, or “lamp rock,” famous over these regions for a light which always burns in a cave, near the top of the cliff, and is the object of a good deal of superstitious awe on the part of all Kirghiz, Shignis, and others who know the locality. To all appearance a steady white flame burns within the cave, but even with a powerful field-glass I could make out nothing more. My impression was that there must be some phosphorescent substance far back in the cave, but this, I was assured, was quite an erroneous view, the real fact being that vast treasures are stored in it, which are guarded by a dragon with a large diamond set in his forehead, and it is this diamond which shines by day and night. The cliff did not appear difficult to scale, but no native of these parts would ever venture to pry so closely into the secret of the light as to attempt to enter the cave.”

In the real Buddhist cosmogony the four rivers of Paradise are supposed to issue from the Dragon Lake, but Hwang-Tsang merely notices the two principal streams, the Sita to the east and the Po-tson or Oxus to the west, and of these it is in reality only the western outlet which by an underground course of nine miles is said to communicate with the Ak-Beitál, and thus to fall into the Murghábi, which joins the Penj at Wamár, on the confines, as Hwang-Tsang says, of Ta-mo-si-tie-ti, or Darwáz. His derivation of the Sita or Kashgar river from an eastern opening in the lake, as well as the enormous dimensions which he gives to the lake (three days' journey from east to west, and five days' journey from north to south), are due to the usual proneness of Orientals to exaggeration, but do not affect the general accuracy of his notice.

I may add that Mr. Ney Elias, in two positions, on the Little Kara Kul and the Yeshil Kul, discovered memorials of the passage of the Chinese troops, who in 1759 pursued the fugitive Khojas as far as the latter point in their flight to Badakhshan, and also found a Persian inscription in Shignán, said to be 600 years old, relating to a local boundary. The improvements which his survey operations introduce into the map of Pámír, as laid down by recent Russian topographers,

are important, but cannot be duly appreciated or discussed until the Government of India finds it in conformity with the public interests to publish Mr. Ney Elias's Report for general information.

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*Explorations in South-Eastern New Guinea.*

By REV. J. CHALMERS.

(Read at the Evening Meeting, January 17th, 1887.)

Map, p. 140.

To a Fellow of this Society, the Rev. W. G. Lawes, belongs the high honour, I think, of being called the father of New Guinea travel. Before him little had been done in penetrating into the interior of the island, and no name has been more used by after travellers, as a password to known and unknown tribes, than that of "Misi Lao," the well-known missionary. My first travel began with his influence and the frequent use of his name, and through him my first tramp was made easy by the confidence natives had in him. Under this influence they accompanied us as far as white man had then got.

You will forgive me if I run hurriedly over my first travels before giving a detailed account of a trip I made two years ago to the district around Bald Head.

I first landed in New Guinea in 1877, but it was not until 1878 that I began my travels in unknown regions. I am a missionary of the London Missionary Society, and as such, in carrying out the wishes of the Directors, it fell to my lot to seek for healthy localities for the settlement of native teachers. These native Christian teachers with their wives were introduced from the South Sea Islands. They are the true pioneers in New Guinea, and to them travellers of all kinds, scientists, and explorers, as well as Christian missionaries, owe much. Permit me to say that these South Sea Islands teachers must be credited with the greater part of the success attending the peaceable proclamation of the British Protectorate; and the gallant commodore, whose high honour it was to proclaim that protectorate, thoroughly recognised this fact. Since then, the late Major-General Sir Peter Scratchley again and again said to me how much he wished he could get such men and women to assist him. They are, though Polynesians, true Britons to the backbone, and swear by Queen Victoria and her officers; and wherever they go the Queen is one of their great subjects of conversation, a kind of fairy tale, with which to charm; and often have I seen uncouth savages listen with starting eyes and open mouth when "Victoria's" greatness and goodness have been told.

In the beginning of 1878, my wife and I, on board the mission steamer *Ellengowan*, visited the whole coast from China Straits to Hall

Sound. Previous to this trip very little had been known of all that coast-line.

On referring to any old charts you will find that between Heath Island and the Leocadie, there is a part of the coast entirely unexplored. This was visited by us. It was a large bay, which we named "Inverary Bay," and sailing through it, landing at two places, we passed into a very good harbour between the Leocadie and the mainland. We were soon on friendly terms with the natives, who were very anxious we should come and live with them. They gave the largest island of the small group in perpetuity to the London Missionary Society, on condition that a teacher was placed amongst them. There are no natives living on the islands, and there are only small villages on the mainland near by. On the island passed over to the Society, is a tree rent from top to bottom by lightning. A poor woman took refuge under it in a storm, and sat on the roots and was killed; the only case I have known in the tropics of any one killed by lightning. From there you pass on to Catamaran Bay, where there are numerous villages, and, with the exception of Tano Sina, as fine a lot of natives as are to be found anywhere. We entered this bay near to South Cape on Suau or Stacy Island, where it opens into what it has been proposed to call "Port Erskine," after the gallant commodore who proclaimed the Protectorate.

Passing on from Port Erskine, round Rugged Head, is Ross Bay, and beyond it is Farm Bay, at the head of which is Baxter Harbour. Beyond Tree Point is Lawes Bay, followed by Fyfe Bay, just inside the Roux Islands, where we came near leaving ourselves for good.

From this we went west to Meikle Bay, where I landed, and crossed with an interesting crowd to a great lagoon, called Poroai ("piggish water"), and then to Ellengowan Bay, Port Dudfield, Argyle Bay, through what we wished named Port Scratchley, and in to Mullens Harbour. We then tried to navigate Poroai, but found it piggish indeed, a very shallow lagoon, with a strong current running out. After explorations showed that this current was caused by two large streams running in to the lagoon: the "Hercus" and the Jones; one from the east, the other from the west. At Dufaure Island, on travelling round it, I was greatly interested in the view the natives took of me after exchanging names with the pleasant little chief Meandi.

We found Orangerie Bay a sickly hole, and so kept on still west, visiting those splendid harbours, Port Milport and Port Glasgow, discovered by Goldie, and then we anchored in Mayri Bay. The following morning we visited Mailiukolo or Toulon Island.

Spending a few days in Amazon Bay we kept westward, and discovered Baxter Bay, and passing the bay of clouds and rain, Cloudy Bay, discovered Sandbank Bay, Domara, and the river, and then on by a splendid passage inside of the reef to "Cheshunt Bay," just beyond Cape Rodney, and went up what we called "Reynolds River." The

following day we went in and out amongst the numerous islands called "The Brethren," and on to McFarlane Harbour, where I saw the mouth of what has since proved a good large stream, ascended by the late Mr. Beswick, and named by him the "Clara." Here begins the great Aroma district, which I afterwards travelled through with some danger. Behind this are the districts of Animarupu and Quaipo. In the former we found the people suffering from famine; they were afraid to descend to the plains because of the Aroma tribe, and on the hills a long drought had killed off their food. They had much the appearance of Dahuni natives, and were different from those of the Aroma district.

The Quaipo natives are of the Hood Bay tribe, that is Kerepunu, Kalo, Kamali, Babaga, and Hula, and I think Palauai and Sara belong to them also. Saroa is a very fine district behind Round Head, with a large population.

Along the coast ridges of Mount Astrolabe are several villages of natives belonging to the inland tribe of Koiari. On their first meeting with us they were somewhat troubled, but after a little, tobacco smoke had a wonderful effect in assuring them we were friends.

To the west of Port Moresby I ascended the Edith river to beyond Doura. Since then that tribe has been nearly decimated, and the few remaining seek shelter with Mr. Page, an excellent gentleman, who has had a large quantity of cedar cut in the neighbourhood, and who, wherever he has been on New Guinea, has shown himself a true friend of the natives. Along the banks of the Edith there is very fine country which I believe the Protectorate Government professes to have secured. I have at Doura met with natives from the western spurs of Mount Owen Stanley, and I once hoped through them to have ascended that mountain before I came to England. I deeply regret that your Mr. Forbes, for lack of money, has not been able to accomplish the ascent of Mount Owen Stanley, and I do hope he will not return to England until he has had the mountain under his feet. He is the only real explorer we have had. He has already done splendid service by his carefully prepared charts, and with his courageous wife, deserves the support and sympathy of all societies interested in science. I feel sure our great Australian colonies will assist him, and already Victoria has taken the initiative.

West of Doura is Kabadi, the district that supplies Port Moresby with food during the months of scarcity. I ascended the Aroa river to the villages, and, after visiting them all, proceeded inland towards the Yule Range, crossing various streams, which, when followed down, may be found to be the affluents of the Coombe's river that falls into the bay, just beyond Jokea. We passed through well wooded country, and, in some parts, large sago plantations. The women wear very little clothing, but the men are respectably covered. Like all inland natives, we found them very fond of salt. They were greatly delighted when, on my return to the coast, I left with them about 10 lbs. They are light-

coloured, much like the Mekeo natives, who live at the back of Hall Sound. Between Kabadi and Hall Sound is Naara, a district of nine villages. On my first appearance in one of their villages they were having a dance, so that we were in their midst before we were noticed. I caused great consternation, and the large feather head-dresses were thrown aside, and spears and clubs quickly sought. We laughed at them, and just walked to a platform and sat down. We were soon friends, and well acquainted with one another through the pipe.

The large district of Mekeo stretches from behind Hall Sound, and away towards Mount Yule. The Lolo district lies around Hall Sound. Maiva and Kivori lie between Hall Sound and Cape Possession, and from that cape to Orokolo is what is called the Elema district. These have all been travelled through and friendly relations begun and continued for some years.

My first real inland trip was from Catamaran Bay to Discovery Bay, in Milne Bay, when I was accompanied by Mr. Chester, so well known in connection with the Queensland annexation of the then unannexed part of New Guinea. We were everywhere well received. The range of mountains from the head of Milne Bay to China Straits, Cloudy Mountain, and on to Argyle Bay, have no connection with the great Owen Stanley Range, and I proposed calling this whole range the "Lorne Range."

At other times I have travelled inland from Port Moresby. In starting from this point I took what is, I suppose, the longest tramp yet made in New Guinea. We went in by Munikahila to Eikiri and Kupere, and then turning east we travelled to Sogeri, through Moroka and Favere, and on to the McGillivray range, following the Kemp-Welch river, and came out at Kalo, in Hood Bay. Once an attempt was made to take us, but it failed.

The country was very rough, and the travelling difficult, more so from having our own swags to carry. Frequently, when travelling inland in new country, we have each had to carry our loads, and often from sunrise to sunset. Natives refused to assist us, saying they were afraid to go to other places. The real motive for such refusal usually is the desire to prevent the traveller going on to others, who might thus share in the advantages of his barter goods. There is also the childish pleasure of being able to tell others they had seen a white man who is their friend and that he had given them presents.

I have several times been inland since, and my last trip was with Mr. Forbes, just before leaving New Guinea last May. We hoped to get natives to assist us to make a dash for Mount Owen Stanley. All was arranged, but when the morning of the start broke, lo! our native friends had vanished; they started during the night for their own villages, and we had to return. Forbes had then to break up his camp and return to the coast.

I have frequently revisited many of the places whose names I have mentioned, and at not a few there are mission stations. Travelling slowly from tribe to tribe, and making friends ahead, I believe to be the best and safest plan for exploring New Guinea. The country will be better known, and the natives become real friends. After the first meeting with natives it does not do to be over familiar, as it is true in New Guinea as well as elsewhere that "familiarity breeds contempt." Kindness with firmness, and a good pinch of common sense will always help a man along and open up his way before him.

I was long anxious to take a trip to the west in one of the trading canoes from Port Moresby. Yearly the lakatois, as they are called, leave port in September or October, and go as far west as Elema, and Namau, the district lying around Cape Blackwood and Bald Head. They remain there until after the north-west monsoon sets well in, when they return with their cargoes of sago.

At last an opportunity offered, and I took a passage in the *Kevaubada*, a lakatoi, made of three very large dug-out canoes. These are strongly lashed together, bulwarks are built on, and at each end is a covered place for the captains and mates to sleep. In the centre was a raised place like a crate, and placing a plank on the top covered with a mat, I made that my berth. The last few days before sailing were devoted by the owners of the lakatois to sailing about the harbour and racing with one another. There were altogether six lakatois to leave port that season. I selected the *Kevaubada*, because it was commanded by two men I felt greatly interested in; Vaaburi, the great story-teller, and Aruako, the once robber chief of the Motu tribe.

Two days before the fleet sailed, the place was all bustle, and men, women, and children were all alive, getting the pottery packed on board, and selecting from the accumulated stores of barter several articles most valuable for trading in the Elema district. When the morning had come the lakatois all start across the bay. Tears flow freely, and the wailing is loud and long, but becomes worse when the small canoes, mostly occupied by wives and sweethearts, leave at Kohu, about two miles from port. Anchors—large, heavy stones—are taken on board, farewells are looked and said, and we are away for the west. A few men who have played the part of pilots, leap into the sea at Idler's Bay and swim ashore, and so with a good fair breeze we soon come into Caution Bay. We had two large crab-toe shaped sails, and after seeing these all right, tears were dried and *hehonas*, their sea songs, were begun with the beating of gongs. Remarking that we seemed to be going very slowly, I was answered, "Remember we have just left, and all the friends are still holding on to us, wait until to-morrow and you will see." At midnight we anchored between Cape Suckling and Hall Sound, and in the early morning all were busy getting firewood and water on board. Little cooking had been done up till now. The captains had their food



cooked in their own pots and on fires close to my quarters. Two men were specially told off to attend on them. When off particular parts of the coast only certain kinds of food can be eaten, and not until we passed Yule Island were yams produced. Crossing the entrance to Hall Sound several bunches of bananas were placed at each mast as an offering to the spirits who might hinder progress; and standing forward was our robber chief, shaking a bunch of cassowary feathers, and appealing for a good run. The tide runs with considerable strength into Hall Sound, hence the difficulty of keeping well out, and crossing safely. When we approached the Yule Island side, the chief went aft with his feathers, and went through the same performance. Safely across the Sound, the singing, which had been stopped, began again, and a number set to preparing food, taking the bananas from the masts, and getting them ready for cooking.

During the voyage, nothing was allowed to be thrown overboard. Fires were soon blazing on the platform running round the lakatoi, just outside the bulwarks, and general happiness prevailed. On the evening of the fifth day, we were off the mouth of the Annie river, and just after sunset, crossed the bar in a terrific sea. When getting inside the breakers, we were boarded by a noisy crowd of natives, who threatened to sink us. In the dark the confusion was terrible, and it was not remarkably pleasant to have big dark savages throwing their arms round us to embrace. When it was reported I was on board, there was a terrific shout, and every one must come and make friends. I had with me a native lad from China Straits, and he too became an object of interest. On getting up to the village of Vailala, I landed and made friends with a chief, who gladly gave me accommodation in his *dubu* or temple. Many came to visit me from all parts during the few days I stayed. I was very anxious to visit Namau, the cannibal district around Bald Head, but could not move on until I had seen the two Orokolo chiefs, as I wanted them to assist me. I found Orokolo and Namau were at enmity with one another, and the Orokolo chiefs could only accompany me part of the way.

When the two chiefs came in I gave them presents, which my host thought was wrong, and he became terribly vexed and expressed himself in strong language, saying, no one had any business to come there and get presents from his white man. I too became vexed and expressed myself in strong terms, saying, I must see my friends, and that all must come and see me, and no one must interfere; that I could do what I liked with my own, and that seeing my host was angry with my friends I should return to the lakatoi and remain on board until I left for the west. I went out on to the platform and called two of the crew, who came, when I told them in a loud voice to pick up my things and take them on board. Several had armed, and to a stranger to savages affairs would have looked serious. When the lads were picking up my

iron box the old chief came, threw his arms round me, and tears rolling down his cheeks, begged me to stay, that he was sorry, was my friend, and I could always have my friends to see me. I gave him a small present, and he at once started, and got me some cooked sago. Many times in my travels I have had to take the same decided action.

Arrangements were made with some natives who would all go as far as Orokolo, but only two would risk going further. Aruako, the robber chief, was to be my interpreter, and another Motuan, Aruadaera, to go as my friend. The night before, in the dark, Johnnie and I got some food and barter out so as to be ready for an early start in the morning. I left the greater part of my things in charge of the old chief, who proved faithful, for on our return everything was as we had left it.

Johnnie had an old musket with him, of which he was proud, and for which I was thankful, as several times he supplied our larder with fresh meat. We travelled along the beach to Orokolo, and when some distance from the first village we saw a crowd of natives approaching, and at their head my friend Apohe the chief. The welcome was great, and we were led up to a coco-nut plantation, where we were regaled with young coco-nuts that all enjoyed. After resting some time we continued our journey to Apohe's dubu, where we had again to rest, and had a supply of cooked sago and coco-nuts brought and laid before us. In the afternoon Apohe led us on to Mama, the other chief's dubu. The old fellow, dressed with a small coloured bag I had given him on his head, and standing on the front platform of his dubu, called on us to come and take possession, and on ascending Apohe handed us over to him.

The next morning, after breakfast we started, and were accompanied as far as the Alele, the mouth of a large river now seen for the first time. Seven years ago I sailed along the coast and saw the openings marked on the chart, and named them with the note that they were reported to be the mouths of a very large river.

Our Orokolo friends returned, and natives from Maipua, one of the numerous large villages around Bald Head, to whom I had sent word a day or two ahead, came across in canoes and took us over. The canoes were different from all I have seen anywhere else; a large log of wood dug out, open at both ends, so that in a sea the water could wash right through, carved, and no outrigger. At first, being without an outrigger, and twenty-three restless excited natives on board, some standing, some sitting on the gunwales, and a few on small pieces of wood at the bottom, I felt dubious of our not being upset, but pulling well up the stream, because of the strong current, it being ebb tide, we safely crossed on to the other side. Beyond several small islands we saw the main stream, which by-and-by we were to cross. On the Namau side we were joined by a number of other canoes, and then proceeded along various winding creeks, which form islands, along the

edges of which grows the nipa palm in great abundance. In districts where the sago does not grow, and where the nipa can be had, the leaves are used for thatching. Passing through a large creek, we came to a wide opening into what proved to be a large river, and which I named in honour of a friend the "Wickham." We paddled up some distance, and saw where the Alele branches off, and I feel very hopeful that this discovery will be of use to us in future travels. I had not gone prepared to ascend the river any great distance, so for the present contented myself with what I had seen, and crossed over, descending on the other side to a creek, along which we went.

We were certainly a very merry company. My interpreter was in his glory with old friends and an abundant supply of areca-nut. My friend was singing my praises, and, altogether, I was certainly a wonderful being to these savage cannibals. A heartier, jollier lot of fellows I never want to be amongst. They would paddle a little, then they would stop to inspect my feet, having persuaded me to take my boots off, and all must come along and feel them. To exhibit my chest, I must stand up, throw my shirt aside, all must feel, and then they all gave one terrific shout. When we first went to the East End, I often exhibited my chest, until an old chief, who became much attached to Mrs. Chalmers, brought in to her a present of a man's breast, saying it was the best piece, and she must have it. After that I was a little chary, and very seldom exhibited my chest. Now, although amongst a thorough-going lot of cannibals, I felt we were such good friends that I willingly did it.

It was now evident we were nearing a village from the number of canoes about, and at last I was asked to stand up in the canoe, orders given to all others to sit down, and all other canoes ordered out of the way. My new-made friend, the chief, Ipaivaitani, sat near me, and when we entered the village, called out my name, and intimated I was his friend. Accustomed though I had been for years to native towns and villages, this was certainly quite a new experience. Everywhere people standing on the bank of the creek, all noisy, but not a weapon to be seen. Large and well-built houses, with great figures in front painted on native cloth. Streets formed by laying logs of trees along the swamp in front of the houses; everywhere small creeks intersecting the town, over which bridges of wood were built; and, as we paddled along, crowds ran on to meet us at my friend's wharf.

Never before had I seen a town or village built in a swamp that at every high tide was covered. Everybody appeared well, hearty, and really happy. I landed on a tolerably well-built wharf, and walked along a kind of bridge to a very large platform in front of Ipaivaitani's dubu. He himself led me by the hand, women and children remaining behind, men and youths preceding and following, until we came to the dubu itself, where I was met by a number of old men, who waved their

hands and bade me welcome. Inside and on each side of the long beautiful aisle, were seated young men, legs crossed and arms folded, not speaking a word, whilst I was led down the aisle by the chief, followed by the old men, until we came to near the end, where we stayed a few minutes, and I was then told to return, on doing which, all the seated ones rose, followed me out, and general conversation went on. That I was presented to the gods I have no doubt, and that I was received in a friendly spirit was just as sure. The temple, for a native building, was really good. In front was the large platform, and immediately under the great high peak in front was a large verandah, on which the men sat, sheltered from the sun and rain. Rising from the verandah were three large posts, supporting what I have called the peak, about 80 feet high. Standing just inside these posts, I looked down an aisle nearly 200 feet in length. All down either side was hung with what looked like splendid silk curtains, and these were made from the young frond of the sago palm split up when quite new. The flooring of the aisle, two feet broad, appeared to be a dark-stained highly polished wood, and carved with figures of men, crocodiles, and cassowaries; this was made from the skin of the sago palm, and received its high polish from the blood of victims dragged along to the end where the most sacred place was, and the constant tread of numerous feet. Inside, the whole place was divided into compartments, in each of which were fires, where the owners spent much time in eating and sleeping. In a large open space near to the sacred place were pins to hang skulls on. These during our visit were down, being cleaned and dressed; and, having a compartment close by, I had a good opportunity of seeing them—in fact, some being too new, I found a difficulty in getting through my light dinner prepared by Johnnie. The skulls were all carved, and done over with many colours. A feast would soon be on, and the heaps of skulls would disappear, because all would find their places on the skullery pins. That head-gear once belonged to inland natives, who were killed, brought into the dubu, presented to the gods, then cooked and eaten.

The length of the temple was, as I have said nearly 200 feet. The floor was quite level, but the roof tapered from the high peak until at the farther end it was not more than nine feet high. At that end there was an enclosure which no natives went near, and I was anxious to know what was inside. I was told not to go near, as it was very sacred, and death would be the fate of any who attempted to enter, except those whose duty it was. My interpreter and my friend would not come near, and I begged the chief to allow me to enter. He kept some distance off, and begged me to remain outside. My interpreter, seeing my great anxiety to enter, told them I was a queer fellow, went everywhere, saw everything, and no harm came to me, and perhaps it would be so now. I was allowed on that to enter, but no one would accompany

me. When my eyes became accustomed to the darkness I saw six wicker-made gods with the mouth of a frog, enormously large and open, the body of a dugong, measuring about nine feet in length and seven feet high. Altogether they were hideous looking things. I put my hand into the mouth of one, and was somewhat startled when out flew dozens of small bats, which disturbed those in the other images, and soon the whole place was full. Outside they were in great consternation and begged me to retreat, as I would certainly die. I told them I was all right, and when I had seen a little more I should return to them. The following morning I again entered with one of the sorcerers whose duty it was to attend therein. My interpreter was just outside, coming nearer than the day before, and the old man who accompanied me told me they, the images, were very sacred, and called Kanibu. Before going to fight they were consulted, and also in sickness, death, or trouble. Bodies of the slain, pigs, armshells, and other valuables were presented to them. Bodies of the slain were dragged down the long aisle, and placed just outside, near to the partition, where they were left for some time, then dragged to the outside and disposed of. The idols were greatly feared, and no one even spoke disrespectfully of them.

The peak or cap resting on the long posts over the verandah at the entrance was thickly studded with arrows. When the tribe have made a successful raid on their inland enemies, each warrior on his return to the dubu shoots an arrow into the cap in honour of Kanibu.

There were several other dubus in the place, larger and smaller than the one I have described.

My interpreter and friend spent the evening and on until I retired to rest about midnight, telling what they heard at Port Moresby, and what they could remember of the teaching. I spread my blanket on the platform, and with my few clothes and boots for a pillow I was soon asleep. The morning sun shining straight upon me, roused me, and I was astonished to hear the robber chief still holding forth but very hoarse. All night through he was telling them all he could remember and answering questions. Polygamy is very prevalent, and many of their customs are, to say the least, very peculiar.

The natives live chiefly on sago, and have only very small plantations. In the creek were rafts of sago palms ready for sago preparation, and along the banks of all the creeks were women beating and squeezing the pith.

Wishing to visit the whole district, I was decidedly, though good-humouredly, given to understand I must not. They wanted the great honour of first reporting my visit, and then, when I returned to see them again, I should be taken everywhere as their friend.

My return was the occasion of a kind of holiday. Men, women, and children accompanied us in their canoes. Having tried to interest them the night before by singing a song, they got me to sing again, to the

great delight and amusement of all. It is an accomplishment I became aware of possessing only after my arrival in New Guinea. Often have I seen hundreds of savages wild with delight when "Auld Lang Syne" was sung, and the enthusiasm passed describable bounds when the joining of hands took place, and then all would seek to do the same, and imitate our singing with shouting.

I parted from these cannibal children of nature, hoping to return, and I still hope that soon after my arrival in New Guinea I shall be able to revisit Namau, and from there do something more to open up that great and interesting island.

Captain W. H. HENDERSON, R.N., said that his knowledge of New Guinea was very slight indeed, compared with that possessed by Mr. Chalmers. He was Commander of the *Nelson* and was in New Guinea for about five weeks during the proclamation of the Protectorate; he had brought to the meeting a collection of weapons at the request of the Secretary. The only two occasions on which he went inland were when he went a day's cruise from Port Moresby, when he attempted to ascend the Cloudy Mountains from Cape South. He succeeded in getting up the mountain, about 3000 feet above the level of the sea, and there spent the night. He had a very hard climb over steep precipices, and when he reached that elevation he could see nothing, because of the thick bush. People who had never been to New Guinea had not the faintest conception of the state in which the natives existed. They lived in what were known as village communities, not having yet reached the tribal state. Along the coast he believed there were about eight distinct languages, and these included a very large number of dialects, but there was no chief who had supreme power, or, so far as he was aware, any power beyond two or three villages. For the purposes of trade, the inhabitants of different districts paid visits along the coasts, but their fights and their quarrels were between themselves, one village having a feud with another speaking the same language. A person who wanted to travel there could not get porters to take him from one village to another, because the natives were afraid to go on account of these feuds. Their religion was a form of ancestor worship; they applied to the witch, or sorcerer, or spiritist, about everything that went wrong. They had not the slightest knowledge of any natural cause, and every ill that happened to them was put down as being caused by the spirit of some deceased ancestor, or probably by the spirit of some one in a neighbouring village. If a death happened, naturally, accidentally, or in fight, it was a case of blood for blood; and when an illness took place, the sorcerer said, "It is somebody, or the spirit of somebody, in a neighbouring village who has caused this," and then the friends were bound to have blood for blood. It did not matter much whether it was a man, a woman, or a child, as long as they succeeded in killing some one belonging to the village with which for the time being they had a feud. With regard to the weapons, from Port Moresby as far east as Elema, they used bows and arrows, samples of which he exhibited to the meeting, but to the westward of Port Moresby there was a strong dividing line beyond which only spears and clubs were used. All their spears were made of coco-nut wood, with no metal at all. Like all savages, if they could take an adversary unawares they would do so, and if they could surprise a village or a canoe they would put the occupants to death; but if they actually met in fight, they threw their spears at one another from a distance, challenging one another to personal combat. On one of the Killerton Islands two neighbouring villages had had a fight the day previously to his visit. Three men had been nastily wounded with flesh wounds from spears, and they came to the native

teacher's house to be dressed. These spears inflict very serious wounds, tearing the flesh. A stone club simply consisted of a round wooden handle with a sharp circular piece of stone at the end. The wooden clubs would stun a man, but the stone ones would cut his head open. The natives lived in a state of abject fear, life being absolutely uncertain. They never knew when a raid might be made upon them. When they went to their barter or to cultivate their plantations, they did not know but what an attack might be made upon them. One of their weapons was a man-catcher. If when two tribes were fighting one put the other to flight, the pursuers lassoed their enemies with the man-catcher over the head, and a sharp point behind piked them in the back of the neck. He was told that that weapon was also used in the Malay Archipelago. The people had no knowledge of metal, and were living in a stone age. The large canoes were hollowed out with stone adzes. The natives were beginning to know the value of iron now, but they had no means of working it. For ornaments, about Port Moresby and to the westward, they wore large bones through their noses, from six to nine inches long. A more valuable form was a piece cut out from a large shell and ground down. Their ears hung down and had tremendous gashes in them in which they put rough tortoise-shell earrings. Wives were purchased with dingo and wallaby teeth and shell necklaces, these latter being ground down with great labour, and armlets cut out from shells. Throughout the whole length of the coast the natives chewed the betel-nut, using with it lime. Every native carried with him a gourd with lime made from burnt shells, and when they were chewing the betel-nut they put their wooden knives into the gourd and then sucked them. They grew tobacco of their own, though they much preferred European tobacco; their manner of smoking was very peculiar, they sat down in a circle, a small cigarette was wrapped up in a leaf and put in what might be called their pipe—a piece of bamboo open at one end; one man then applied his mouth to the end and drew as hard as he could till he had filled the tube with smoke; then he removed the cigarette and handed the pipe to the senior man present, who, putting his mouth to the small hole, drew out as much smoke as he could at one inspiration, the process being repeated for No. 2 and so on. They made armlets and necklaces from different kinds of teeth. Their shields were of primitive form, made of wood ornamented with matting and feathers. He greatly regretted that New Guinea and the Western Pacific had not been studied by some student of primitive culture, for very soon the present customs of the people would disappear. He believed an immense amount of information might be obtained by those who were capable of tracing out primitive customs. To the west of Port Moresby the canoes were hollowed out from big trees. A large mat sail was used, and they could only sail with wind free, but further to the east the form of the canoe was different, the sides were built up of boards, which were secured to one another with fibre, the holes made to pass the lashing through being caulked with gum from a tree to prevent leakage. These canoes sailed very well on a wind, but the natives were not what might be called skilful sailors, even in the arrangement of their own canoes. The houses were everywhere built on piles from six to eight feet out of the ground, in some places very substantially. In Port Moresby and district, which was the centre of the Protectorate, the houses were built in the sea and in lagoons, and were exactly similar to the lake dwellings of prehistoric times. For eight months of the year the south-east trade wind blew, and of course the mountains on the south-eastern peninsula condensed the vapour which it brought, so that part of the country was exceedingly wet, while the western part was dry. The season changed in October or November, and from the beginning of the year the north-west monsoon blew in an opposite direction until April; this was the wet season in the west. On the whole, the eastern end of New Guinea was exceedingly

wet. Many people imagined New Guinea was a place adapted for colonisation, but those who thought so forgot the conditions. The climate was unhealthy, the population scanty, the amount of land used for cultivation exceedingly small, and the natives were in a state unfitted for labour. They could not be depended upon for labour, and in a country situated between the Equator and 10° south it was impossible for Europeans to undertake outdoor labour; therefore colonisation meant the introduction of coolies or of some race that could labour in the tropics, which would inevitably lead to the extermination of the natives. It should also be borne in mind that the amount of tropical products required for the civilised countries of the world was very small, the necessities of life came from temperate regions, very little besides spices and coffee came from climes such as New Guinea. The natives of New Guinea no more understood what continuous labour meant than how to fly; they were simply accustomed to live from day to day, to getting just the amount of food they wanted, building their houses and making their weapons and ornaments; generations must pass before they would have the slightest knowledge of the relations between masters and servants as understood in civilised countries. To suddenly change their condition from the primitive state in which they at present exist would mean extermination for them. The London Missionary Society, through Mr. Lawes and Mr. Chalmers, have rendered New Guinea accessible to Europeans. Their mode of operations is as follows:—they put Polynesian teachers, who are superior to the Papuans by several degrees, into selected stations along the coast; being born Christians, and being able to read and write, they very soon learn the languages of the natives amongst whom they dwell. These native teachers were left alone, a small cottage being built for them, and as they were superior beings they soon acquired great power and influence among the natives, who went to them in their troubles, and whose chiefs looked up to them. In his opinion it is only by working on these lines that improvement can take place, that is, by introducing people from the Western Pacific, who were akin to those in New Guinea, who sympathised with them and understood their feelings, but did not mind their childishness, and could gradually teach them to cultivate the land and to work. He was sure that any other form of colonisation would work mischief. Of course one other thing should be done, namely, to consolidate the power of the most promising chiefs: if the High Commissioner selected the most powerful chief in any district, and was able to consolidate his power, it must tend to the advantage of the natives generally. There was plenty of room for exploration. Nothing was really known of the interior; there might be valuable land and minerals, when resources of that sort were found it would be time enough to think of permitting and controlling colonisation by whites. There was one case in which a chieftainess wielded power, but she was the only woman in New Guinea known to do so.

Mr. G. R. ASKWITH said he went with Sir Peter Scratchley on his late expedition to New Guinea, and he could speak the truth of the descriptions given by Mr. Chalmers and Captain Henderson. Mr. Chalmers was a most wonderful man in respect to exploration in South-eastern New Guinea. He had seen far more there than any other white man, and had travelled over country as different as the barren land round Port Moresby is from the tropical region of Dufare Island. He had mighty influence with the natives whether as arbitrator, or friend, or religious teacher, or sorcerer, or as all of these, and it might be that he had taught some to believe in one Supreme Being whose influence was for good, rather than in the host of devils and ghosts of the dead by whom they were wont to believe that they were oppressed. In New Guinea, as in other savage countries, pioneers had a very difficult task before them. One difficulty was the want of chiefs, and another the lack of carriage. The want of chiefs made it almost impossible for a traveller to go far from a friendly



village, because no chief had sufficient power to give convoy for defence, but Sir Peter Scratchley hoped that in time he might be able to raise the importance of the head-men. In Burma the same difficulty arose. The Buddhist priests there, to a certain extent, took the place of the chiefs, but in New Guinea the sorcerers had not so much power as the priests in Burma. One way of spreading British influence in the island would be to establish Commissioners at various points along the coast, especially if these Commissioners should have some knowledge of medicine. Fever, skin diseases, and leprosy opened up a vast field there, through which men with some medical knowledge could gain influence amongst the natives. With regard to the carriage of goods, of course, a European could not carry much in such a tropical climate, and in addition to that, the means of barter were extremely restricted. Tobacco was of the greatest importance. At Port Moresby the mission house really lived by tobacco, but he would be afraid to say that a traveller could cross New Guinea by means of tobacco. At the mission house no service could be secured without payment in tobacco, which was really the current coin of the country. The worst of it was that the demand for tobacco was small. The natives were very soon satisfied, and then they would not do any more work till their supply ran out. Mr. Forbes found at his camp that that was the chief difficulty, and so he tried to use rice, a great quantity of which he had brought for his Malay servants. The natives liked it far better than their yams, and would soon do anything for rice.

The Rev. Dr. WRIGHT said that New Guinea was first sighted by d'Abreu, but the principal exploration there had taken place during the last ten years. From what he had just heard, he believed there was hope for the future. Thanks to the London Missionary Society, there were men along the coast who now had friendly relations with the people, and were able safely to pass in and out among them. Four of the Gospels were now printed in the language of Port Moresby, so that those interested in philology and comparative grammar could study the language. There was a large mixture of Malay as well as Papuan in the language, and there was evidently a linguistic relationship between all the islands of those seas. The language of the little island of Sabai also had been reduced to a written form, and one Gospel had been printed in the language of South Cape. From the languages, it might be possible to find what the people themselves were, and what position they occupied in the history of the world.

Mr. R. N. CURT said it was more than 100 years ago that Captain Cook discovered the islands of the South Sea. Within a few years afterwards the London Missionary Society was formed, and that society had led to most marvellous discoveries in geography and philology. They started at Tahiti, spread on towards the Loyalty Islands in the direction of New Caledonia, and when the time came moved forward to New Guinea. Mr. Chalmers belonged to that society. From island to island their agents went, spreading civilisation and carrying the greatest blessings that could be received by the human race. All the great Continental scholars had received with astonishment the communications which came from the South Seas. Four languages had already been discovered by Mr. Lawes and Mr. Chalmers, and many more were in process of being discovered. They and other men of the same stamp had exposed themselves to peril and danger, carrying their lives in their hands, and had contributed to Science in the most marvellous way.

Captain WHARTON (Hydrographer to the Admiralty) wished to give his testimony to the great utility of missionaries not only in New Guinea but in other parts of the world. This had been brought home to him very practically in his position as supervising the surveying ships of Her Majesty's Navy. Some forty years ago, when Captain Owen Stanley made the first survey of South New Guinea in the

*Rattlesnake*, he met with very great difficulties everywhere on account of the hostility of the natives. There were now, however, two surveying vessels there, and their labours had been very much lightened by the missionaries. He was glad to have this opportunity of thanking Mr. Chalmers for the great assistance he had been to those vessels. He had just received a letter from the commander of one of the ships, who owed his life, indirectly, to the missionaries. The latter said: "I had a narrow escape myself last month, if native report is true. I had taken a station near the coast-line about two months before, and on passing it I landed for a few minutes to get a few more angles. I had the son of the native teacher of Dinner Island with me as interpreter, and took one blue-jacket, and—I suppose for the only time I ever landed in New Guinea—I omitted to take our pistols from the boat. It appears that the natives, supposing I should revisit the spot I had marked, had decided to tomahawk us, and had laid their plans. These matters are invariably talked over first, and seldom is a murder committed without consultation. They then discovered I had the native boy with me, whose father has considerable influence everywhere, and while they were discussing this new phase we had landed and cleared off again before they had done their talking. This information came to Mr. Forbes, and he warned me."

Dr. DOYLE GRANVILLE, in response to a request to address the meeting, said he was quite unprepared to say anything at present, but he hoped to have an opportunity on a future occasion of laying before the Society an account of his journeys in New Guinea, supplemented by some sketches.

Sir RAWSON RAWSON said that of course climate was an exceedingly important matter when colonisation had to be considered. About three years ago he had occasion to make inquiry into the climate of New Guinea, and he found that the whole of the south coast was scarcely habitable by Europeans, that there was only one point, Port Moresby, at which any Europeans were living, and that even Port Moresby itself was very unhealthy. He wished to ask Mr. Chalmers what information he could give with regard to the climate on the coast, and as to any improvement as the interior was penetrated? Did he think the coast would become more healthy by means of clearing and drainage? Captain Henderson considered that the natives were so indisposed to labour that nothing could be made out of them, but Mr. Chalmers at the Colonial Institute said they were prepared to labour for the purpose of barter, and that they carried the fruits of their labour to the western part of the island in order to purchase sago and other commodities. If this were so, all that was needed was that they should be educated to work, and then they might become an able and useful class of labourers in their own interest.

Mr. KERRY NICHOLS said that he visited New Guinea some ten years ago, and had always been of opinion that there were two races there,—the Papuan extending along the western coast, the southern portion of the Gulf of Papua, and the Malayan in the eastern portion of the island, while further still the Papuans were found in the New Hebrides, and as far south as New Caledonia. He wished to ask Mr. Chalmers whether he had been able to trace the distribution of races to any considerable extent.

Rev. J. CHALMERS in reply said that the climate of New Guinea, not only on the coast, but inland, was very unhealthy. For some time teachers resided close to the Owen Stanley range, and their experience was that it was just as unhealthy as the coast. A few years ago the *Melbourne Argus* expedition failed because all the party got sick, and several of them had to be carried back to the coast by the natives. With reference to labour, he would say that the New Guineans would not work as between master and servant, but if they were left to plant and raise what they could

barter for themselves they would do it. They would work for three days and then sit still for a day : on the fifth day they might come to work again for two days, but then there would be another day set apart for trade. He looked upon them as a hard-working lot of natives, doing a great deal more planting than the islanders of the South Pacific ; but if a capitalist went there and required them to work from six to six, and from Monday to Saturday, he would not get them to do it. He did not see the necessity of taking the land from the natives when they could be encouraged to plant that which would be of use to Europeans. Why should Java and the islands in the eastern seas alone supply our spice, when it could be grown by the natives of New Guinea? He believed that the western part of the island down to Cape Possession was inhabited by the Papuans. From Cape Possession to Hall Sound there was a meeting of races, words of both the Malay and Papuan language being spoken. The Malays were, he believed, fighting their way from the far west on the north coast, and had come down to Huon Gulf. He considered that the Papuans were in possession of the country from Goodenough Bay to Huon Gulf. He had been three times on that coast, and had paid many visits to the shore, and the natives there were pure Papuans, while from Goodenough Bay round to Cape Possession they were of Malay origin.

Captain HENDERSON said he considered the natives were in such a state that they did not understand labour in the European sense ; they worked hard for themselves, but it was spasmodic work.

The CHAIRMAN offered to Mr. Chalmers the thanks of the Society for his extremely interesting paper, which had given rise to so instructive a discussion. He was quite sure the members would join him in congratulating themselves on having had present with them a gentleman whose reputation was so celebrated among geographers as one of the forerunners of civilisation in a very distant part of the earth. They must all hope that he would return to the scene of his past labours, and that the Society would receive the advantage of those labours, and that the people among whom he worked would have the very great benefit of his assistance in the paths of civilisation.

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*The Physical Geography of Japan, with Remarks on the People.*

By Dr. EDMUND NAUMANN.

Map, p. 140.

IN 1875 I entered into an agreement with the Japanese Government, accepting the position of professor of geology at the School of Mines at Tokio. On my arrival in Japan I found that the school had been broken up, and in consequence a new engagement was signed, entrusting me with a professorship of geology, mineralogy, and mining at the University of Tokio. In 1878 and 1879 I submitted to the Japanese Government a memoir on the advisability of a geological survey being undertaken, with special reference to the economical requirements of the country. My proposals were accepted, and I was entrusted with the general direction and control of the survey, a yearly sum of about 10,000*l.* being allotted for its cost ; and after the necessary preparations had been made, field work was commenced in September 1880. At the outset the staff consisted of four foreigners and twenty-two Japanese assistants.

The number of foreigners was however soon reduced, and I was obliged to take the entire burden of conducting the topographical and the geological surveys upon myself. Owing also to deficiencies in the staff, the lack of funds, and the generally unsettled state of the country, the surveys could not be carried out in so perfect a fashion as I could have wished. It may be mentioned that all the assistants and draughtsmen had to be trained to their work, before the surveys could be carried on systematically. A further obstacle of some magnitude was encountered when the question of publication arose. Many experiments had to be made before the method which has been employed for the production of the printed maps could be perfected. That most of the difficulties mentioned have been happily overcome is a circumstance, in a great measure, due to the intelligence and zeal of my Japanese co-operators.

The Japanese islands are no other than the most elevated portions of an enormous chain of mountains, rising from the ocean bed, the deepest that has ever yet been fathomed. An idea of the considerable differences of level existing in this region may be formed by conceiving that two mountains like Fujinoyama, whose summit, the highest in the Japanese archipelago, attains an altitude of 12,425 feet, could be placed one upon the other in the deepest part of the Tuscarora basin without projecting above the surface of the sea. In fact, the summit of Fujinoyama rises no less than 39,853 feet above the deepest part of the neighbouring ocean. In no part of the world does an area of such comparatively narrow extent as that comprising the Fujisan and the Tuscarora basin show such enormous differences of level. Considering the Japanese chain as one continuous mass, the lowest parts of which are submerged, this great wave of the earth's surface bears the same relation to the Pacific basin as the Himalaya mass does to the Indian peninsula. The dimensions of these two colossal earth-waves are almost equal. The figures given might lead to the erroneous supposition that a very steep slope exists on the Pacific side. On the contrary, the ocean-bed on that side rises very gradually to the coast-line, making an angle of not more than about  $3^{\circ}$ , whilst on the opposite side the inclination is very slight indeed. The general character of the Japanese earth-wave establishes its close relation to the Asiatic continent. In fact, it is nothing else than the advanced frontier of Asia, and not a chain of volcanic ejections accumulated over a fissure in the ocean-bed, as certain famous geographers of past periods conjectured.

Examining the chain more closely, we find that innumerable excavations have been made in its surface by erosion; that it shows a peculiarly furrowed aspect; and that certain extensive depressions and cuttings are in accordance with the laws of orographic configuration. To understand its formation we are under the necessity of uncovering the surface, and of consulting the geological structure of the chain. It

would have been impossible for any skilled topographer to have arrived at such an understanding of the orography as to establish the natural divisions of the mountain mass as a whole, even after many years' more surveying than I have devoted to the subject, without studying its geology. So my explanations would be quite unintelligible if I neglected to point out the fundamental laws of geological structure.

According to recent investigations, the formation of mountain chains is due to the continual contraction of the earth through secular cooling. Strata deposited by the great water-basins in a horizontal position are pushed and raised into folds. In connection with the folding action due to lateral pressure, the strata often split into a number of sections, and through the fissures igneous masses rising from greater depths find their way. Observation proves the Japanese chain to consist of a long series of folds, and these folds run as a rule in the same direction as the island chain itself. In some places, however, they are diverted from their normal course. The greatest regularity of structure is met with in the southern part of the chain, where three differently shaped and differently constructed zones, indicated by Shikoku, the Inland Sea, and Chugoku, can be distinguished. Here the folds are strictly parallel to the general direction of the chain. But if we follow them in an eastward direction, we find that they all curve upwards, and this the more intensely the nearer we get to a large transversal depression, a kind of cleft or fissure in which a number of volcanoes have sprung up. Fujinoyama, for instance, is situated in this cross fissure. On the other side of the cleft the folds describe a still more decidedly abnormal curvature. They imitate the shape of a hook, with its inner side turned towards the Japan Sea. Northward from the cleft as far as the latitude of Sado and Sendai, the folds run for the most part transversely to the island chain. Undoubtedly the disturbance in the regular folding is more marked in Northern than in Southern Japan. Still further northward, however, they resume a normal direction. All the phenomena of geological structure hitherto observed tend to show that a pushing or thrusting movement acting from the side of the Sea of Japan has caused the folds to rise and to advance in the direction of the Pacific Ocean. This advance could not however, take place regularly everywhere. The horizontal forward movement was checked at the point where at present the chain is found to be split by an enormous fissure. According to my view, this great and most interesting disturbance was caused by the close approach of another large chain of mountains stretching from the Tokio Bay down to the Bonin Islands, and styled the Shichito chain. This opinion is principally supported by the fact of the two chains being connected just where the disturbance occurs.

The irregularity just described is not the only one met with. It must be remarked that the folds, besides being disturbed by the great transversal cleft, are not continuous throughout, even where a regular

course is observed. This is on account of the chain having been torn into a number of sections, which have then advanced unequally. The island of Yesso is furthest advanced, and the northern portion of the main island more so than the section lying between the cleft and the latitude of Sendai. I have indicated the approximate lines of dislocation in the accompanying map. Another dislocation of this kind, though of smaller extent, is shown by the disconnection between the crystal schists of the Kii peninsula and the band of the same system in Mikawa.

In addition to the foregoing general remarks on the geological structure of the Japanese islands, attention may be called to the existence of extensive longitudinal fissures through which igneous masses have issued during past ages. Volcanoes and volcanic action play a very humble part in the history of this development. If we compare, as has been done by old geographers, the Japanese chain and the other chains girding Eastern Asia to garlands of flowers, then the volcanoes might be likened to small pearls threaded among these garlands. In the mountains of Japan fossils of the remotest periods are met with, and no doubt can prevail but that those horizontal movements described above commenced at a very early date, and have continued with varying force down to our own day. One of the most interesting of the fossil-yielding rocks is that which I have called "Radiolarian slate," a rock filled with beautifully shaped microscopical skeletons of animal life of a low order. These slates are of great geological age and of marked interest, inasmuch as their composition proves them to be of a formation corresponding to that of the mud from the deepest part of the ocean bed. We learn from these slates that the Japanese chain, or a large part of it, was submerged deep beneath the ocean surface during some portion of the Palæozoic era. The Radiolarian slate is a deep-sea sediment, and perhaps the oldest sediment of this kind known.

I wish to draw attention to the magnetic map of the Japanese islands. It will be perceived that there is a most remarkable correspondence between the lines of equal declination (the Trogones) and the leading lines of geological structure above described. In general the magnetic lines exhibit very striking and quite unexpected irregularities, and these irregularities are found to be in most intimate connection with the abnormal curvatures of the folds. The serious discussion which followed the reading of a paper of mine before the Seismological Society of Japan in 1882 showed how far these irregularities were unexpected. For my own part, I was convinced from the very beginning of the geological survey, at a time when the magnetic data were still scanty, that there must be a connection between those phenomena which are caused by the magnetic force of our globe and the internal condition of the earth's crust or of the earth itself. With this point in view I started the magnetic investigations. In a comparatively short time the general magnetic survey, comprising no less than two hundred complete

observations at a like number of stations, was accomplished by Mr. Sekino, one of my former topographical assistants. The results are extremely satisfactory. It will be observed that the magnetic lines are influenced in their course by the great transversal cleft just in the same manner as the folds. We might even say that the deviations of the lines of equal declination and the fold lines coincide to a certain extent. Where one of the great lines of horizontal dislocation, separating two unequally advanced sections of the Japanese Archipelago, crosses the chain, the trogones describe bends and sinuosities of a most peculiar character. These results open an entirely new field of research, and I hope that they may be an inducement to a continuation of similar investigations, so that some light may be thrown upon those still very obscure pages relating to the causes of magnetism and to the internal condition of the earth.

Among the two hundred declination values obtained by Mr. Sekino, the highest was obtained for a place near Morioka, in Northern Japan, where the declination amounted to over  $7^{\circ}$ , which is considerably more than in any other part of the country. This proves the existence of some local abnormality, a fact supported by results of another kind which I will mention. At the beginning of the present century a Japanese astronomer named Ino Tadayoshi undertook by order of the Government a survey of the whole country, in course of which the coast and a few of the more important roads were laid down pretty accurately. This work is of the highest historical and scientific interest, and would well deserve to be dealt with in a special paper. Ino Tadayoshi had heard and read in foreign books of the variation of the compass. Nevertheless he denied its existence. He even went so far as to attribute the declination observed by Europeans to an error in the compasses used by them, and to maintain that the fact of his own compass-needles constantly pointing due north was owing to the superiority of his instruments, which he always constructed himself. Now we know that the variation is at present increasing in Japan about  $4'$  per annum, and that it has been increasing for a considerable time past. This furnishes an explanation of Ino's obstinacy. Because the zero meridian, the meridian of no declination, passed through Japan in his day, he was led into the belief that anything like variation of the compass did not exist, and that Europeans were seriously mistaken in assuming such a phenomenon. Ino neglected the declination, which really existed except along the line of the zero meridian, and as he has given the direction of a great many peaks by lines and figures in his map we are enabled to determine the change of variation for the last eighty-five years. I have made an attempt to establish the system of trogones for Ino's time, following the method indicated, and the results of this investigation are laid down in the above-mentioned paper. The most interesting result is that I arrived at the discovery of a very remarkable magnetic disturbance,

which must have existed at the date when Ino made his observations, near a volcanic mountain in the neighbourhood of Morioka, in the same region where Mr. Sekino found the highest declination value amongst his two hundred observations. Perhaps this discovery of a great magnetic irregularity existing not less than eighty years back may be worthy of attention, as it was established a long time before anything could be known concerning the exceptionally large declination of the present time.

On one of my maps I have laid down the boundaries of the area over which the great earthquake of 1854 extended. This boundary line again closely approximates to the lines of geological structure. The curve describes two great waves rising from a common base that lies in Southern Japan and strikes with the folds of Southern Japan. From a more minute inspection of this earthquake curve it can be seen that the oscillations were finally arrested by the great transversal cleft. It is nearly eight years ago that I determined the course of this line at a time when my knowledge of the geology of Japan was very limited indeed, and when I had not the slightest idea that almost every detail of the curve could be accounted for by laws of internal structure, as established by later investigations.

The study of geology is just as indispensable to the orographer as the study of anatomy is to the sculptor. No clever artist would think of representing the beauties of the human form as those of a hollow figure. The physical features of Japan present a fine example for the verification of the intimate and mutual dependence of those sciences whose object is our globe. After having made ourselves acquainted with the general laws of geological structure we shall be better enabled to understand the language of the external features of that part of the surface we are at present dealing with. I have already stated that the Japanese chain is composed of three bands or zones. The outer zone situated on the side of the open ocean consists of mountain land presenting the appearance of an originally flat mass modified by erosion. The upper parts of the mountains are flat and but slightly rounded, the numerous and sinuous valley cuttings steep-sided and narrow. Very distinctly marked appears the inner boundary of this outer zone, corresponding to the inner border of a narrow continuous belt of crystalline schists and indicated by very regularly developed "longitudinal" valleys. This boundary plainly shows the course of the leading lines of the folds already spoken of. The greatest height attained by it on the island of Shikoku is about 7726 feet. Near the great transversal cleft, for which I have proposed the name "Fossa Magna," it gradually thins, and in consequence of being strongly compressed, its summits in this region reach heights of about 10,000 feet. It may be recommendable to adopt the name Akaishi Sphenoid for this colossal triangular mass of mountains. To the right of the Fossa Magna lies the mountain land of Quanto, still



further north the Abukuma mountain-land, and again beyond this the Kitakami mountain-land, all of them belonging to the outer zone. The median zone is a depression in Southern Japan filled by the Inland Sea. In Northern Japan we meet with a median range of high peaks of about 6000 feet, set with many volcanoes. The median zone is the zone of highest volcanic activity as far as Northern Japan and Kiushiu are concerned. A longitudinal fissure is indicated by the enormous masses of erupted rock accumulated in this zone. Concerning the inner zone, its most characteristic features are shown in the occurrence of isolated volcanoes rising out of circular basins formed by sudden depressions. Such basins are, commencing from the south and continuing northward, the Sanpei basin, the Daisen basin, the Gassan basin, the Chokai basin, the Moriyoshi basin, and the Twaki basin. The median zone of Southern Japan passes by transition into the inner zone. Crossing from the Inland Sea to the Sea of Japan we first pass through hilly country which gradually rises until the broken range of elevations running along the coast is reached. This range, though fairly high, appears but low in comparison with the mountains of the outer zone. It will be of the utmost satisfaction to me if my endeavours to explain by the foregoing brief remarks the general physical conformation of Japan have proved sufficiently clear and intelligible.

My travels and surveys extended over the whole country, with the exception of Yesso and the smaller islands. The total length of the routes travelled over and shown in the sketch-map amounts to about 6000 miles, of which 3000 miles were actually surveyed. The surveys were plotted on the spot, a plan I consider to offer such considerable advantages that I recommend it to any traveller who establishes his routes by constant measurements. Some field sketches I have made show the method of working, and will possibly prove of interest to surveying travellers. One of these sketches shows a route 21 miles in length leading right across the mountains, and laid down in one day during the hottest period of the year. I am convinced that this is about the maximum amount of this kind of work achievable. On an average, I have accomplished about  $12\frac{1}{2}$  miles per day. From 1881 to 1885 my travels and surveys were undertaken with the object of establishing in the shortest possible time the general laws of configuration and of structure governing the mountains of Japan. These reconnaissance surveys, in which I was assisted by a few topographers and geologists, have only just been accomplished, and their results are laid down in the extensive series of maps which I have brought home.

The character of the country is mountainous, and the variety of mountain forms, the luxuriance of vegetation, the abundance of flowers in spring and the beauties of foliage in autumn, the clearness of the atmosphere, which seems to bring distant objects nearer to the eye, and the numerous streams of rushing water make it one of the most charming

spots in the world. The island mountain-chain is interspersed with a large number of volcanic cones, many of which have been the scene of destructive eruptions within historical times. At present hardly any of them are really active, and an eruption is an exceptional event. Nine years ago, however, I witnessed a magnificent eruption on the island of Oshima, situated at the entrance to the Gulf of Tokio. A column of fire, caused by masses of molten lava which were thrown into the air to a height of sometimes 1000 feet, issued from a small cone built up on the bottom of an enormous circular crater. We were so close to this igneous fountain, that when taking our lunch at the edge of the large crater, we felt as warm as if sitting near a good fire. On the return journey to Tokio, our little steamer, which, as a rule, only made the trip between Yokohama and Yokosuka, and was certainly not built to face the open sea, encountered a typhoon, and it certainly appeared as if after having escaped the fire we were to be swallowed up by the waters. The storm had at the same time been raging with such violence at Tokio, that our friends there were astonished at our unexpected return.

By far the greater number of the loftiest summits are volcanoes, and very fine views are obtained from these. I cannot imagine any subject worthier of the brush of an artist, than sunrise as seen from the top of Fujinoyama. When during the summer months night flies away and morning approaches, crowds of pilgrims in white dresses and large flat hats collect under the waving flags of the huts on the summit and wait upon the wild and rugged lava plains for the first rays of the sun. They are all strong and well made men, whose faces tell stories of severe hardship. The play of colour in the sky is of indescribable loveliness, whilst down below, the mountains seem to rise slowly from one vast sea of shadows. Suddenly, like lightning, the sunlight floods the highest crags of lava on the summit of Fujinoyama, the stone huts, and the crowds of humbly praying pilgrims.

Still more fascinating than the view from the top of Fujinoyama is that from Chokaisan, a volcano on the north-western coast of the main island. From the bottom of a huge circular crater rises an obelisk-shaped mass of lava, much broken and furrowed, and surrounded at its base by vast snow-fields. It is extremely steep, and looks as if formed of enormous blocks artificially heaped up by giant hands. The highest part consists of a broad plate of lava, which is somewhat difficult to climb, and which looks as if it would fall at any moment. Standing at the edge of this plate one enjoys an entirely unbroken view all around. At sunrise the triangular shadow of the volcano is seen thrown in sharp outline upon the surface of the neighbouring sea. As the sun rises the salient angle of this shadow becomes gradually more obtuse, and the shadow itself diminishes and finally disappears. I have seen here the play of colours in still greater perfection than at Fujinoyama. Like a gay greeting to the morn, the long reverberating notes of the trumpet

shells blown by the pilgrims who have arrived at the edge of the crater, re-echo amongst the steep and rugged precipices. Beyond a few hot-springs at the foot of the mountain, there are no traces of volcanic action. But the priests tell us that centuries ago two enormous fiery snakes issued from the mountain side and crept into the sea, where they at last disappeared amidst steam and foam.

One of the largest and wildest mountain masses in Japan, having many peaks of nearly 10,000 feet in height, extends in the vicinity of the western coast of the main island where the latter has its greatest breadth. It is commonly styled the Shinano Hida range. The Tateyama is the most interesting of all the giants in this range. Of quite a different shape from that of its southern brethren Norikura, Ontake, &c., it also consists of different material. The sharp wedge-shaped ridge called Tateyama, adorned with white bands of snow between green patches, is separated from a range to the eastward by an extremely steep and deep ravine. This ravine a little further down is roofed over by lava, so that the stream flowing through it appears to empty itself into the bowels of the earth. On the western side are extensive slopes on which the largest and most interesting solfatara in the whole of Japan is situated. The Japanese call it Figoku which means Hell, and indeed no place in the whole world could remind one more of the infernal regions. From hundreds of openings steam is emitted with a shrill hissing noise, and sulphurous vapours belch forth in large volumes. At the edge of the solfatara I found some small mud volcanoes in regular action. On some of the openings grew graceful flower-like cups of a beautiful yellow colour formed of minute and glittering crystals of sulphur. These cups were in one case about six feet in height. I tried to secure one of these lifeless yet delicate flowers, with the help of some long rods, but found it impossible on account of the unbearable heat. Tateyama is one of those famous mountains, which like Fujiyama, Chokaisan, and others, are yearly visited by crowds of pilgrims. The rocky wedge-shaped back of the ridge is reached by scaling the southern flank. Having ascended the ridge the traveller finds himself on a kind of small platform and enjoys a superb view extending over the deeply-serrated, rugged and jagged Shinano Hida range to the south. Like a huge needle, the Yarigadake projects from the confused mass of ridges. To the east, a fascinating picture unveils itself like a vision. There the smoking Asamayama rises as if swimming on silver clouds, surrounded by faint blue ranges of hills. To the far west the surface of the Japanese Sea reflects the sunlight. At sunrise a Buddhist priest, clad in rich garments, takes his stand on a small platform further to the middle of the ridge, where a miniature temple is erected, and celebrates service. It is a picture full of life and colour when hundreds of pilgrims move along the narrow path winding between deep precipices, to reach the temple high above them, where the priest is praying.

Nearly ten years ago I ascended Tateyama in company with large crowds of pilgrims. Amongst them was an old man of seventy, with weary eyes and feeble limbs, who was accompanied by a tall handsome lad of about fifteen, his grandson. The old man looked as if he were on the point of death. Four coolies had to work hard to help him up the steep and rocky flank of the ridge, and I would never have believed that a mountain like Tateyama could have been ascended by a man in his condition if I had not seen it with my own eyes. What energy must be requisite to accomplish a pilgrimage under such circumstances. His young companion troubled himself but little about his sick grandfather. He bounded from block to block, gazed at the woods and flowers and appeared to have eyes for anything but the poor old man at his side. I shall never forget the contrast presented by the two pilgrims, the contrast between youth and age, between life and death.

When I arrived at the sea-shore after my Tateyama journey, on which some of my students accompanied me, I was well received at the house of a Japanese officer, a relative of one of my companions. Here, at Namerikawa, I took a few days' rest, and then engaged a junk for Niigata, which lies about 120 miles further north. The captain of the junk assured me that it would not take more than three days to get to Niigata. We started at night, because, as the captain said, we should not catch the breeze from the mountains during the day. When I went on board I had occasion to witness a very strange spectacle. Far out in the open sea I saw a huge fire. Red and yellow flames rose from the surface of the water. At intervals the sound of voices travelled shorewards, and as I stood, too intent on what I was witnessing to ask for an explanation, the riddle appeared to develop itself into a perfect miracle. Shrieks, yells, and fragments of wild songs were distinguishable; the flames drew nearer and nearer, and I could make out amongst them human figures which rose from the waves for a moment or so, but only to dive back into the waters again. It was like a dance of devils. But the flames gradually lost their brightness, and finally died away with the songs and cries of the demons until nothing gleamed through the darkness of the night, save the lights of the lanterns on shore and the stars in the sky, and nothing was heard but the slow movements of the waves and the exclamations of the boatmen. Then a huge mass propelled by numerous fins, like a swimming myriapod, approached the shore. When this miraculous sea-monster touched land I went to view it, and found it to be a large raft moved by a crowd of swimming boys. These were the dancing devils, who had taken the raft, heaped up with straw, wood, and like combustibles, out to sea, in order to amuse themselves in a kind of sham fight by the firelight. Those who succeeded in mounting into the raft strove to prevent the rest from getting into it, but were at the same time assailed by their comrades, who sought to pull them back into the water.

The journey on board the junk was the most miserable one I ever made in my life. I envied the Japanese, who could sleep in any posture whatsoever, whilst I tried in vain to arrange my aching bones in a horizontal position on the very uneven surface of the rice-bags with which the junk was laden. During the day the mountains, basking in the bright summer sunshine, did not lend any breeze to swell our sails, and so we camped on the sandy shore, which was at any rate clean, and therefore preferable to the dirty fisher-huts, but where we were nearly roasted by the sun. After we had travelled in this way for a couple of days, I decided to leave the junk, and was fortunate enough to discover a very nice temple, with a hospitable priest. Here I settled down, and as it was evening, soon fell asleep. But I had scarcely slept an hour, when my Japanese servant aroused me, and announced a splendid wind. Hoping to get to Niigata by the aid of the newly-risen breeze, I hurried back to the shore and got on board again after some serious difficulties, as the junk was rolling heavily. Now came the worst part of the journey. When morning broke the wind fell, to my satisfaction, though certainly not to that of the sailors. I had had enough of it. We had spent four days in getting half-way to Niigata, and I continued the journey overland in a sedan chair, on horseback, and lastly by boat, arriving at my destination at two o'clock in the morning, with a stomach as empty as a vacuum. I was, however, fortunate enough to be taken for the German ambassador, in consequence of the similarity of the Japanese words *Roshi* and *Riyoshi*, one of which means ambassador and the other professor. An ambassador may expect to be supplied with sardines, ham, steak, and anything else, even at two o'clock in the morning; a professor, as a rule, not.

Some 30 miles north of Niigata the Miyomotegawa flows into the Sea of Japan. This is one of the most romantic rivers in the whole country. Following its course we soon enter a narrow gorge, with sides so steep that it is for some distance quite impossible to keep close to the water. Further up we saw the river with its confluents descending from an enormous mass of mountain, amidst which two peaks, *Asashi* and *Ide*, appeared especially prominent. The Miyomotegawa abounds in fish, especially in the lower part of its course. The Japanese have a multitude of methods of catching fish, upon which it is scarcely necessary to enter, as most of them have been shown in the Fisheries Exhibition. I will, nevertheless, refer to one plan which I have been told is also in use in Scotland. A small platform is erected at the river side at a point where the water rushes over foaming rapids. Here a man takes his stand with a harpoon. Three or four others entering the water, occupy themselves in trying to drive the fish towards the platform. I have seen young lads working up a rapid where anybody not accustomed to this kind of sport would have been swept away by the tremendous force of the current. These fellows, however, were moving through the foaming

waters like the fish themselves. The man on the platform throws his harpoon as soon as a fish comes near enough, and very seldom misses one. Should a fish succeed in passing the platform, a man a little higher up stream prevents it from escaping.\* Another interesting method of fishing, chiefly practised in Southern Japan, is by means of cormorants. This is pursued as a sport by many people of the higher classes. In some places it is practised at night by the aid of fires.

Let us return to the wild mountain mass near Niigata, which, as I have mentioned, is crowned by the peaks Asashi and Ide. The upper valleys of these mountains are extremely steep. Ascending a ridge means rough and difficult climbing, and moving along it is commonly just as dangerous. So deep and steep-sided are they that blocks from the weathered granite surface, when set in motion, roll down to the bottom with tremendous velocity. Many parts of this mountain region are not accessible in summer-time. But in the early months of the year, when snow fills the chasms and the surface is hardened all over by the constant change of temperature from thawing during the day to freezing during the night, it is possible to cross them without difficulty. Then the farmers leave their smoky huts and set out bear hunting, leading a rough life amidst the snowy mountains. They sleep in small pits sunk into the snow by means of fires kindled upon it and fed by boughs from the tops of the trees projecting above the surface. The masses of snow which accumulate in the mountainous regions and even on the west coast of Northern Japan are enormous. There are villages which frequently experience a fall of over 20 feet of snow. In an ordinary farmhouse you will find, at any hour of the day, the whole family gathered round the open fire, which is also used for cooking purposes. The smoke of this fire is supposed to escape through a hole in the roof right above it, but it sometimes fills the whole house and causes much pain to the eyes. I have had to spend many a night in such a shelter when the winter storm was raging without. As I was obliged to carry on my surveys as late in the year as possible I was surprised several times by the first snows when trying to get across a mountain pass. In such cases retreat was a necessity. Once I had started earlier than my Japanese companions and being quite alone, lost my way. It took me a long time to discover a cluster of houses, but even then it was difficult to obtain access to them. People had already settled down for the winter and the outer gates were fastened up all round. During the winter people in the mountains, of course, do very little work. I know a village in the north of the main island, called Kiriake, where the inhabitants after their breakfast go to the baths, which are fed by hot springs, and remain in them for the whole of the day enjoying the heat.

The extent of the Japanese islands in a north and south direction, and the mountainous character of the country, are the causes that any

\* I saw this method of fishing in the Miyakogawa valley, Northern Japan.

variety of climate can be found within their limits. Climate changes with the level as well as with the latitude. On the ocean side of Southern Japan the palm tree, the orange tree, and the camphor tree flourish. Some small islands near this coast may be found covered with flowers at the beginning of February, when the lake of Suwa in the interior of the main island is frozen over so firmly that fairs are held upon it. A decided difference of climate prevails between the continental side and the ocean side. That of the latter is more equable, being warmer in winter and cooler in summer. Once at the end of November, when crossing the Mikuni pass on my way from Niigata, I saw all the mountains white with snow behind me, whilst the country on the Tokio side was still wholly covered with verdure. On the Pacific side the climate is a normal insular climate, and from the South Cape of Kiushiu up to the neighbourhood of the capital Tokio the warm current known as the Kuroshiwo, the Gulf Stream of the Pacific, has a considerable influence upon the temperature.

Those parts of Japan which have not to suffer from snow or cold, are of course of greater importance in respect to agriculture. Moreover the character of the coast and the number of good harbours afford facilities of communication which give Southern Japan a further economical advantage over the northern parts of the country. In former times when the empire was split up into a number of dominions ruled by the so-called daimios, who were feudal chiefs with a certain military power, the three provinces of Satsuma, Tosa, and Choshui were the most powerful. Up to the time of the recent restoration of the Mikado's government they used to play the most important part, and even at the present day the ministry is, with but few exceptions, composed of natives of Satsuma and Choshui. This further shows how the intellectual power also remained with Southern Japan. Very remarkable is the geographical situation of these three provinces, a circumstance which has no doubt had a great deal to do with their political importance. Each of them was easily defensible on account of its natural boundaries, sea on the one side and high mountains on the other, and each had a good and important port. Choshui is situated on the narrow straits of Shimonoseki, the inlet to the inland sea, one of the most important gates to the whole of Japan. Here the military class are always on the alert, and as, owing to the number of vessels constantly passing by, information was easily procured, not only from all parts of Japan but also from abroad, measures could be concerted accordingly. The Choshui-Samurai was always considered to be a good soldier, but more on account of his strategical qualities than in consequence of his bravery in open battle. The Satsuma man is a soldier who is seen to the best advantage when fighting, a soldier to the core, full of energy and earnestness, and straightforward in his sayings and doings.

Tosa is a rich country, and its people are renowned for their honesty

and truthfulness. Here I met with true friendly feeling, and I enjoy the remembrance of the days spent in a village of this province. At the beginning of 1885 I revisited the island of Shikoku to perfect some details of my previous surveys and explorations. After crossing the mountain chain extending between Kawanoye and the Naruto Straits, I entered the valley of the Yoshinogawa, and engaged a boat to go up the river in order to observe the geological formation at the part where the stream crosses the main mass of the mountains of the island. We had to ascend the rapids, and this was a most interesting journey. Several times the boat had to be attached to ropes secured to some projecting rock further up stream, in order to let it swing from the rocky to the flat shore. The Yoshinogawa valley, where it crosses the mountains is of extreme beauty. Nowhere could one see a more beautiful deep emerald green than that of the water, while the mica schists appear like silver in the sunshine, offering a strong contrast to the black shadows of the numerous fissures and caves. Unfortunately I met with an accident to my foot when jumping across a stream, and became unable to walk. When I got to Kawanoye, beyond which place the boatmen refused to go on account of the dangers, I had a sedan-chair made of bamboo, with a board for a seat, for which I paid the undoubtedly small sum of 10*d.* Carried by two coolies, and kept in a position by no means comfortable, I tracked the course of the Yoshinogawa, some time passing along steep precipices with the river some hundred feet below. We had to cross a number of tributaries of the Yoshinogawa, which were bridged over by tree-trunks, connecting huge blocks of stone lying in the bed of the river. I confess that I sometimes felt a little uneasy when I found myself amidst the raging waters. But my coolies were to be relied on. They delivered me at Riasekimura, where I was well received by my friends, in as sound a condition as could have been expected.

It was at the beginning of January that I started from Hiteyoshi, one of the old castle towns of the province of Higo, to proceed to Kagoshima, the capital of Satsuma. Much snow had fallen on the previous day, and it was bitterly cold. The road soon led up a small valley, and not very long afterwards I found myself on a kind of slightly rising plateau, nearly covered with snow. My servant and a Japanese draughtsman who accompanied me were behind with the luggage, and I pursued my way quite alone. The plateau appeared endless, and it was not until I had gone a distance of about six miles that I reached its edge. Here at the frontier of Satsuma this plateau ends in steep cliffs, and I found myself on the edge of an enormous crater surrounding the famous volcanic group of Kirishimayama. The view from the edge of the plateau, after seeing nothing but slightly undulating country was fascinating. Down below extended tracts of fertile and highly cultivated country, along the crater cliff flowed a broad winding river, from out the crater rose a mass of mountains



crowned by a number of lofty peaks, and far away in the background towered the graceful cones of Sakurashima and Kaimondake.

The greater portion of the province of Satsuma consists of a low tableland of white volcanic tuff with much pumice. This tableland is very sterile. The northern parts of the province, which are hilly, and where the valleys are highly cultivated, are of greater value. The southern section of the Satsuma peninsula deserves to be praised as one of the finest spots in the whole country. There are some charming lakes, situated very close to the sea-shore, which have been craters in former times. The summits of the hills offer beautiful views over the bay of Kagoshima, the neighbouring coast, and the volcanic islands of the Liuki-chain. Kaimondake, a fine conical mountain, stands like an outpost, being only connected with the mainland by a narrow neck.

The recent history of Japan has been praised by some writers, blamed by others. I may be allowed to submit some opinions derived from a long intercourse with all sections of the Japanese people. My duties and my travels brought me into close contact with farmers, merchants, manufacturers, and others, in different parts of the country, an advantage which only the travelling observer has occasion to enjoy.

Japan is an agricultural country. Nearly half the people are tillers of the soil. The number of inhabitants exceeds that of England; the average density of population being about the same as in this country. Among the crops grown, rice takes the foremost place; but can only be grown in those parts of the country which are capable of irrigation, such as plains and valleys. Hillsides and dry tracts of land are chiefly sown with barley and wheat, with the addition of beans, peas, millet, Indian corn, potatoes, &c. The cultivation of tea is very important, notably for export, as is that of the mulberry-tree in connection with the manufacture of silk. In Northern Japan we meet with the lacquer tree; in the southern part of the country with cotton, with certain plants from which paper is manufactured, the tobacco plant, &c. The style of living is simple, modest, and devoid of luxury. In addition to rice, which forms the staple of the daily food, fish and vegetables are commonly eaten. Comparing our dwelling-houses with those of the Japanese we might say that the former are distinguished by substantial and lasting qualities, while the Japanese structures are light, airy, and perishable. Even a Japanese of the first-class does not require roomy lodgings; he feels more at home in a small place; often living without any other furniture than the charcoal braziers. A small garden, gay with flowers in the spring, and commonly attached to the best room in the house, is hardly ever wanting, and is frequently supplemented by some stone lanterns, and perhaps also a miniature pond with gold fish. Should the house be in a place from whence a fine view can be obtained, the owner will be justly proud of this circumstance. In one of the places which I visited, the beauties of the scenery and the wide view

were alluded to in a Chinese poem hung upon the wall, the approximate translation being: "Thousand miles—one glance."

One of the great obstacles to progress is offered by the dependence upon the Chinese language. Only the spoken language is Japanese, and even in this the use of Chinese words is regarded as a sign of education. Public documents, scientific books, newspapers, &c., are all written in a mixture of Chinese and Japanese. There is another style of writing, called Hirakana, quite independent of the Chinese, which is chiefly used by women, and another known as the Karakana, a system of phonetical characters chiefly used in combination with Chinese. A Chinese character stands as the symbol of a conception. The number of these characters is enormous. If you ask a Japanese to read off the name of a certain town or of a certain mountain from a map he will be found unable to do so if he be not acquainted with the locality in question. These names can commonly be read both in the Japanese and in the Chinese way, and it is always doubtful which transliteration is the one in use. Another example may serve to show how obstructive the use of Chinese must be. Suppose a military force be sent to a certain part of the interior to suppress a riot or to encounter any enemy. The officers in command may be provided with excellent maps on which the names are given in Chinese. In such a case much difficulty is sure to be met with in reading the maps. Or take the reverse case. A surveyor working amongst the mountains learns from the inhabitants the name of a certain peak, or of a certain locality. To write it down in Chinese he must ask the people for the necessary character. But perhaps they do not know this. In such a case he cannot write it, and perhaps drops it altogether, making the very common remark, "Shikata-go-nai," which means "It cannot be helped." A Chinese and an educated Japanese could exchange ideas in writing, but not by speech. The employment of Chinese as a generally adopted means for the transmission of thoughts, nevertheless offers certain advantages. The inoculation, so to say, of the brain with Chinese characters which has been in practice for a thousand years has tended wonderfully to develop the faculties of memory. In this way we may account for the cleverness commonly shown by Japanese students in the branches of elementary learning. The use of Chinese as a written language, by necessitating the constant employment of the brush, has also been an important factor in the development of art. For drawing, the soft brush is certainly much more suitable than the hard pencil. Merely by his lessons in writing the Japanese pupil early obtained a certain facility of touch, a certain command over the representation of form by lines.

When, some thirty years ago, western civilisation, equipped with its imposing armour of science and its technical appliances, drew near Japan, it was just at the most favourable moment for forcing its way into the country. Internal struggles had broken down the feudal system, the

old rights of the Mikado were restored, and after years of civil war the work of peace began. Civilisation was the word. What could have been more convenient in such a case than to apply the foreign pattern to the new organisation of public order? For the administrative system for the navy, the army, the post, the telegraph, &c., foreign models were speedily adapted. It must be remarked that those changes did not take place spontaneously. The ends aimed at by the Imperial party during the civil war were of a political character, the civilising reforms were not anticipated. Had those civilising reforms been the direct result of internal development, no doubt they would have been undertaken with a great deal more moderation, steadiness, and perseverance.

The acquisitions made up to the present are commonly looked upon with admiration. Certainly the Japanese deserve our full sympathy for their endeavours, and it cannot be denied that they have been in some degree successful. We hope that the final result will be favourable to them. The rate of advance desirable depends, in my opinion, altogether upon the opening up of the country. And the country must be opened up some time or other, in consequence of the constant pressure acting from without. When it is so opened up, it will be shown how far the power of the Japanese has been developed to become an agent in international struggles. The power of the people should be strengthened both intellectually and materially. In the latter direction the Geological Survey was expected to become an important aid to progress. The chief object of this survey was the systematic investigation of the local and physical conditions of the country and the dependence of the population upon these conditions. From the result of these investigations proposals were to be drawn up for the utilisation of the country's resources. The entire work was therefore a species of applied geography. I am extremely sorry at not having been able to convince the Japanese Government of the high importance, nay, of the necessity of the undertaking, and the surveys are consequently being continued without much attention being paid to the practical aims with special reference to which they were originally started. I may be allowed to express the hope that the Geological Survey of Japan may still become what it was intended to be, namely, a mediator between science and the economical requirements of the country.

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*Captain Maitland's and Captain Talbot's Journeys in Afghanistan.*

A VERY interesting piece of exploration was completed in Afghanistan in the autumn and winter of 1885 by Captain P. J. Maitland and Captain the Hon. M. G. Talbot. These two officers ascended the valley of the Heri-rud, past Obek (visited by Khanikoff) as far as Daulatyar. Here the party struck upon the route followed in 1837 by Captain Arthur

Conolly in his adventurous journey from Cabul to Khiva, of which unfortunately no complete record exists, though there are some interesting extracts in the 'Calcutta Review' for 1851. At Badghah, where Conolly must have probably turned off northwards over the mountains to Maimanah, Captain Maitland was shown a certificate in Persian from Colonel Conolly, stating that he had received important services from Muhammad Azim, the late Ataluk or petty chief of the district. The story told to Captain Maitland was, that the Ataluk and his men had beaten off an attack made on Conolly, but from the latter's diary it would seem that matters did not come to actual fighting, though on one occasion, at least, things were very near to it. Crossing the water-parting between the two head streams of the Heri-rud, the Sar-i-jangal and the Lal streams, Captain Maitland ascended the course of the latter, through a well populated and cultivated valley. Large flocks of sheep and goats were seen, the former of which supply the skins for a large number of *postins* or woollen coats made at Kabul. The winter is severe, and snow closes all the roads from the middle of November till the middle of February, and for forty or sixty days after that the country is said to be absolutely impassable even for pedestrians, the clayey roads being very deep and slippery, and every little stream a raging torrent. The Hazarahs appeared to be a simple, good-natured, industrious people, but of no value for fighting. The women did not seem to merit the character for immorality ascribed to them. There is a welcome absence of crime in the Hazarajat, which is no doubt due to the comparatively tractable nature of the people. Captain Maitland's route from the upper valley of the Heri-rud into the Yaikolang or Yak Walang valley is difficult to trace, owing to the unsatisfactory nature of the existing maps,\* but it lies probably along the same line as that taken in reverse direction by Captain Conolly. The pass over which they crossed, descending upon Zari in the Yak Walang valley, is called the Bakkak Kotal, and Captain Maitland says it is the only real difficulty on the whole road between Herat and Bamian, and much worse, so far as he knows, than anything on the Besud road between Herat and Kabul. This latter road was examined by Dafadar Muhammad Akbar Khan, who had instructions to follow the main Kabul road through Besud to Gardan Diwal, and continuing along the Kabul-Bamian road to cross the Irak pass and join Captain Maitland at Zubak in Bamian. This was carried out by the Dafadar, and his topography has furnished a reliable knowledge of the remainder of the main road from Kabul to Herat. The point where the Besud and the Bamian routes diverge is a small deserted fort, called Kala Sofarak, between the Lal and Kerman valleys, and forty-one miles from Daulatyar.

The Yak Walang stream comes from a watershed to the east, on the

\* The most trustworthy of the old maps is the large one prepared by Eldred Pottinger in 1840, on the scale of eight miles to the inch.

other side of which the drainage is to Bamian. Its principal course is at the Band-i-Amir or Band-i-Barbar, a series of curious natural dams forming seven narrow and deep lakes. It forms the upper course of the river called Balkh Ao or stream of Balkh, along the course of which runs the ancient road from Bamian to Balkh. Part of this road was examined by Captain Maitland, and *en route* he visited the ruins of Chahilburj and Khana Yahudi. On a high scarped hill between the two are the ruins of Shahar-i-Barbar, which according to tradition was once the capital of kings who ruled over a country most of which is now included in the Hazarajat. The people are said to have been called Barbar, and to have been in possession of the country, when the Tartars or Mughals, from whom the Hazaraks are said to have sprung, first invaded it. Captain Maitland considers that they may have been Tajiks of the same stock as those now living in Badakhshan. An excursion was made to the celebrated Band-i-Amir lakes, which are mentioned by the poet Moore under the name of "Bendemeer's stream." From thence there are roads to Kamard and to Mazar-i-Sharif by Dara-i-Yusuf. The former is very difficult, and the latter by no means easy in certain places, but nevertheless important. On crossing the high flat watershed of the Yak Walang [and Bamian streams the main features of the country became apparent. On the north side of the main range stretches a vast broken plateau diversified by small ranges and scored by deep valleys and ravines, but there is a tolerably well defined elevated tract lying between the Rud-i-Band-i-Amir on the west, and the Ghorī or Kunduz river on the east. It thus fills up, with the exception of the narrow valley of these rivers, the whole space between the Hindu Kush and the high mountains about the sources of the Hari-rud and Murghab. The plateau slopes gently to the north and parts of it are fairly level. It comes to an end about the latitude of Haibak, but between it and the plain of Afghan Turkistan is another range or narrow irregular plateau rising to a considerable height above the latter, and sharply defining the boundary between the valley of the Oxus and the Kohistan. This range runs east and west at a distance of five to twelve miles from the towns of Tashkurgan, Mazar-i-Sharif, and Balkh, and appears to extend from near Shibarghan on the west to not far from Kunduz on the east. This feature was a great surprise, for it is hardly indicated on the map, and is not mentioned by previous travellers. The main plateau is intersected by three very deep parallel valleys, running from west to east and draining to the Kunduz river. The first is that of Bamian near the main range, the next that of Saighan, and the third Kamard. North of Kamard is the rather high ridge which the road crosses by the Kara Kotal, and from its farther side the long deep defile of the Tashkurgan stream runs north through the whole remaining lengths of the plateau to that town.

At Bamian, which is about 380 miles from Herat, and 132 from

Daulatyar, the officers stayed several days and examined the famous idols—a detailed account of which was written by Captain Talbot—the caves and ruins. To see Bamian alone, Captain Maitland remarks, was worth all the trouble of the journey. Full details were obtained respecting the three passes over the main range from the lower end of Bamian, viz. the Panjfilan, the Irak, and the Shibar or Shabar. Bamian is a deep valley bounded on the south by spurs of the main range, here known as the Koh-i-baba. On the north side is a long mountain over which there are only one or two indifferent tracks. The main road goes up the valley westward, and for some miles through a defile from which two parallel roads lead to Saighan, the population of which, as of Bamian, is Tajik with a certain admixture of Hazarahs. The valleys, though narrow, are well cultivated, and there is abundance of fruit. The hills, however, are too high and rocky for the *daima* cultivation so universal in the Hazarajat, and grain is imported. All the way along the route Captain Maitland found a constant stream of people migrating from the country about Kabul to Afghan Turkistan, a movement which is always proceeding more or less, but which was at that time more marked than usual on account of the scarcity at Kabul. To the valley of Kamard, which is just beyond Saighan, there are three roads, the Maidanak, the celebrated Dandan Shikan or “tooth-breaker,” and the Doht-i-Sufed, which appears to be the best of the three, as well as the shortest line to Bajgah. The lofty cliffs inclosing the valley of Kamard are very striking, and the land is excellently cultivated, but there is not much of it. Passing through Bajgah, the farthest British post occupied in 1839, and Rui, Khuram was reached, whither Ferrier claims to have come from Balkh, and from thence to have turned off eastward to the Rud-i-Band-i-Amir. The opinion, however, of both Captain Maitland and Captain Talbot is that Ferrier's travels were drawn up from hearsay information and that he probably never left Herat.

At Haibak the two officers parted company, Captain Talbot proceeding into the valley of the Ghori, while Captain Maitland prepared to continue the journey via Mazar-i-Sharif and Sar-i-Pul, to rejoin the British Commissioner, Sir Joseph West Ridgeway, on the Murghab. Accompanied by a Mehmandar from Sardar Ishak Khan, the Governor-General of Afghan Turkistan, Captain Maitland proceeded to Taskhurghan, a large town embedded in fruit-trees, and possessing a fine covered bazaar of 450 or 500 shops. Some distance out on the plain to the north are mounds marking the site of Khulm, the capital of the former Khan. It was abandoned by one of the last Khans, as the water supply was liable to be cut off, and Tashkurghan built instead nearer to the hills. The Governor, a learned Ghilzai named Purdil Khan, called on Captain Maitland and personally accompanied him through the citadel and over the bazaar. He had known Sir Herbert Edwards at

Multan in past years, and had also lived at Lahore. The friendly behaviour of the Afghans was here very striking, and the people continually assured Captain Maitland that the English and the Afghans were now one, and that he was to consider himself in his own country.

Here the plain of Afghan Turkistan is bounded on the south by the high range already mentioned. Its spurs are insignificant and the great level expanse stretches almost from the base of the hills away north to the Oxus, the nearest point of which is somewhat less than thirty miles from Tashkurghan. The plain is an alluvial flat, resembles portions of the Panjab, and is watered here by the Tashkurghan stream run off into irrigation canals, but the cultivation does not extend very far. To the west the plain is fertilised by the water of the Band-i-Amir which supplies eighteen canals (*nahar*) through the whole tract from Akcha nearly to Tashkurghan. On the way to Mazar-i-Sharif one crosses the Abadu Kotal, where Sardar Muhammad Jan and two others were put to death by the Amir's orders a few years since. Captain Maitland was honourably received at Mazar-i-Sharif, and the day after his arrival he took a ride outside the town, the country about which is very well cultivated, and is intersected with numerous irrigation ditches. The town is now thoroughly established as the capital of Afghan Turkistan, Balkh being at the present day a comparatively insignificant place, quite unworthy of the prominent place it occupies on most maps. Mazar-i-Sharif is not so large as Tashkurghan, but is increasing rapidly in size and has quite outgrown its walls, which were never more than sufficient to protect the place from marauding Turco-mans. It possesses a citadel built, as usual, on a mound, and contains an arsenal moved from Takhtapul, the military cantonment six miles west.

The Sardar, or Governor-General, received Captain Maitland and later on Captain Talbot with great friendliness. He is a rather stout, good-natured looking man of seven or eight and thirty, is very handsomely dressed, and affects all the state of a royal personage. He is said to be a hard-working administrator, to keep everything in good order, to be popular with the Afghans, and is everywhere spoken of as a humane ruler.

Captain Talbot quitted Mazar by the road going south up the Band-i-Amir river, which enters the plain through a gap in the hill S.S.W. of Mazar, the regular road going in a different direction through Balkh and Akcha to Shibarghan, and thence to Sar-i-Pul and Maimanah. The country traversed along the former route consists entirely of low grassy, but often steep-sided ridges, running from the high hills on the south to the outer range on the north. There are many fertile and well cultivated valleys in this tract all draining to the Sar-i-Pul stream. The low ridges, hills, and hillocks of light sandy soil, covered with grass in spring and summer, are characteristic of Afghan Turkistan, and cover a great part of its surface. They extend also west of the

Murghab, and merge into the rolling downs of Badghis. Dafadar Sahibdad Khan ascended the Band-i-Amir stream some three marches beyond Tukzar, which was reached by Captain Maitland. Some fifty miles of the course of the river therefore remain unexplored, but reliable information about the road has been acquired.

At Sar-i-Pul Captain Maitland was very hospitably received by the Governor-General. The town itself is a mass of orchards, something like Tashkurghan, but in a wide valley, surrounded by low hills. The Mamanah valley is well cultivated and populated; the town is perhaps two-thirds the size of Herat, and stands in an open, cultivated plain; there is a large covered bazaar, but the houses of the town are very poor, and irregularly distributed within the area enclosed by the walls. From Maimanah Captain Maitland marched 53 miles to Chahar Shamba, arriving there on the 16th of December, exactly three months since leaving the headquarters of the Mission at Deh Afghan, in the Herat valley.

Captain Talbot in his notes remarks that the Balkh Ao runs in a narrow, deep valley, closely shut in by precipitous hills several thousand feet higher. North and east of it there is a plateau rising gently northwards for many miles, and culminating in rounded knolls about 11,000 or 12,000 feet high. The edge of the plateau facing the river is abruptly precipitous, while beyond the culminating knolls there is probably a pretty steep drop to the north. The whole of the region is uninhabited, except where the plateau is intersected by the Dara Isuf.

The general results of the expedition are that the Herat triangulation has been carried to Bamian, and connected with points in the immediate neighbourhood of those fixed by the Kabul triangulation. It is possible that some point may be found to be common to both surveys, and so afford a check on the work. From Bamian triangulations have been carried northward to Tashkurghan and the immediate neighbourhood of Mazar, while points have been fixed north of the Oxus and east of Kunduz. The heads of the Hari-rud and Balkh Ao rivers have been surveyed, not completely, but all the main features have been obtained. The road from Daulatyar to Bamian has been surveyed, as also that from Bamian to Haibak and Tashkurghan, and from Haibak via Ghori to within two marches of the Chahardar Pass. All the country overlooked on either side the route has been sketched, a total area of about 9000 square miles having been surveyed and reconnoitred on the one-eighth inch scale, and sufficient points fixed trigonometrically to determine the greater part of the Helmand valley, a large portion of the country between the Balkh Ao and Tashkurghan rivers, and the unsurveyed portion south of the Oxus from the meridian of Tashkurghan to that of Khanabad.

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*A Journey in the Province of San Paulo, Brazil,  
in July-September 1885.*

By R. F. HOLME.

ANY interest which an account of this trip, made in the long vacation of 1885, may have for members of the Royal Geographical Society, will consist not so much in any new facts which it may bring to light, as in showing that, however much the science of geography may be neglected by the junior members of the University of Oxford as a study, yet the practical application of the science finds some devotees. The primary objects of the expedition were sport, and the unequalled excitement to be produced by penetration into unknown lands. When we started, we had no idea to what part of Brazil we were actually directing our steps, nor could we get any definite information from books or from persons who had been to Brazil, as to what kind of adventures we might expect to encounter. To these facts may be attributed the paucity of results, from the scientific explorer's point of view, that we have attained. We had no scientific instruments whatever with us, except a compass and a field glass. We had thought of taking a photographic camera, but the discouraging remarks of an adviser, who assured us that we should never reach country that was not well known, coupled with motives of economy and a desire to reduce our baggage in bulk as much as possible, made us change our minds; and we have never ceased to regret it. The banks of the Piracicaba below the town, and those of the Tieté have never been painted or photographed.

On reaching Rio, we found that our friends there could give us no better advice than the discouraging people at home: so we shook the dust off our feet, and at 5 A.M. on July 28th left Rio by train. The fares were rather heavy, because they charged for all luggage that went in the van. But after this first journey we learnt by experience, and put nearly all our baggage under the seats of the carriage. We had a considerable amount of baggage, for we had brought a tent and canteen and other requisites for camping-out from England, and had purchased a large amount of ammunition in Rio. The price of *two* first class tickets to San Paulo was 58,800 reis: and our baggage was charged 24,700 reis. The price of one second class ticket to San Paulo is 15,500. The exchange was rather low then, making about 50 reis go to the penny, or 1s. 8d. to the milreis, or thousand reis, whereas the milreis ought to be 2s., its par value. On leaving Rio we had 752,000 reis with us, or about 60l.

We reached San Paulo soon after 6 P.M. It was here that we first succeeded in getting practical information about the interior, which decided us to go to Piracicaba on the river of the same name. The journey from San Paulo to Piracicaba cost us altogether 34,000 reis

including baggage. The second class fare from San Paulo to Piracicaba is 8250.

Piracicaba is a flourishing town, mostly built of blue, one-storied houses, on the top and sides of a steep hill below which flows the glorious river Piracicaba. There are two fairly good hotels, a Roman Catholic church, a Protestant church, a sugar mill on the north side of the river, and a cotton mill on the south side. There are no buildings on the north side except the sugar mill. There is a very large percentage of Germans in the town; in fact nearly every shop is kept by a German. The sugar mill is managed by a Brazilian; the cotton mill is managed by an Englishman, assisted by a United States American. This was the only Englishman we discovered in the town, except two Manchester men who worked in the cotton mill. They had been there some years, and said they liked the country very much, as it was never cold.

At Piracicaba is a magnificent waterfall. From here the rivers are navigable for canoes all the way to the Paraná, with the exception of two portages, said to be very easy, on the lower Tieté.

There are some small steamers which run from Piracicaba to Porto de Lençoes on the Tieté when the water is high enough, to convey coffee up the river. When the water is too low, their place is taken by small iron barges, which are punted along at a fine pace by about twelve men. At intervals down the river there are four or five "stations," where wood is stored for the steamers, and where people living near the river can bring their coffee to be taken on board the steamers. The stations are mostly in charge of a solitary man.

At Itapura, the junction of the Tieté and Paraná, is a colony of Bugres Mansos, or tame Indians, under a Brazilian governor. Twice in the year a canoe is sent from Itapura to Piracicaba conveying a despatch from the governor, and returning with stores for his consumption. The journey takes about a month each way. We met this canoe on its way when we were down the river.

Besides the steamers and barges, there is no other kind of craft on the river except "canoes," which are dug out of solid trees, and vary from about twelve feet to thirty feet long. These they punt up stream, and generally paddle down stream.

The south bank of the river at Piracicaba is lined for about half a mile with negresses of all sizes, in various degrees of nudity, washing clothes. With the exception of the river men, who are engaged on the steamers and barges, none of the inhabitants, it appeared, had ever been down the river. Along the south bank is a row of houses occupied by these river men. The houses, consisting of two or three rooms, were clean and sweet, and generally painted some bright colour inside, but totally destitute of furniture or ornament, save for a small table, a chair or two, and a hammock. The people seemed to prefer sitting on the

floor. With the help of a German shopkeeper, named Gottlob, who acted as interpreter, we engaged a Brazilian of the name of Candido Camargo to be the captain of the expedition. Gottlob was such a very bad interpreter, that our arrangements with Candido were of a most indefinite kind, and we started not quite knowing what agreement had been come to. We paid 100,000 reis down, and finally started on August 4th, with four men and a boy, some dogs, and three canoes, two of which were tied together, the third going separate. On our return on September 4th, we paid them 272,000 reis more. For this they provisioned us, though we took extra stores on our own account to the value of about 30,000 reis, and they also provided ammunition or anything else which they required for their own use. The provisions which they brought were sacks of beans, farinha de mais, salt, sugar, rice, coffee, salt pork, and jerked beef. Our meals really consisted of what we shot or caught.

We reached the juncture of the Piracicaba and Tieté on August 10th, and Porto de Lençoes on the 12th. I may remark that in the map of San Paulo which I recently sent to the Royal Geographical Society, the Piracicaba river is made to join the Tieté too high up. It really joins the Tieté considerably lower down, i. e. nearer to Porto de Lençoes. We spent ten days down the Tieté, and started back from Porto de Lençoes on August 23rd, reaching Piracicaba on September 3rd.

The *camarados* were very pleasant, light-hearted men, and were very kind to us. Though we started without knowing a word of Portuguese, they took such trouble with us, that we were soon able to say and understand as much as ever we wanted. We had a dictionary with us. They were all Roman Catholics. They worked very fairly hard at punting and paddling, though hard work was obviously not natural to them.

Three of them, including Candido, said they worked at Piracicaba for a few months in the year as brickmakers, and spent the rest of the time hunting and fishing on the river. They had all been as far as Lençoes, except the boy: it was the first time he had gone far down the river.

The fifth man was a regular backwoods huntsman, who lived in the forest some miles from Piracicaba. He was the owner of the dogs. He was a good shot, a wonderful ventriloquist, imitating the noises of various birds with remarkable ability, and was very agile in making his way through the tangled forest. He used flint and steel in preference to matches.

They were all keen upon sport, though their guns, of French or German make, were of the most miserable description. The men all smoked cigarettes; the boy smoked a pipe. They brought some rum, but seldom appeared to drink any, and were always sober. They had very poor appetites, and after a long day's work would frequently eat nothing more than a plateful of rice and farinha.

As to the rivers, their general character may well be compared with portions of the estuary of the Dart, notably that part called Sharpham

Woods ; or a still better idea may be got from parts of the Teifi, between Kilgerran Castle and Cardigan. The denseness of the forest will be understood when I say that we almost invariably had to cut down a number of trees to make room for our tents, and that we seldom had occasion to use our tent-pegs, but merely tied the tent-ropes to trees.

At a rough estimate I should put the average width of the Piracicaba at about 120 yards, and that of the Tieté at about double. They are, with occasional exceptions, shallow enough to permit of punting.

There are ten rapids between Piracicaba and Lençoes ; none of them cause any trouble in going down stream, but five of them are difficult to punt a loaded canoe against. There are five lakes adjoining the river, three on the north bank, and two on the south. Three of these are little more than marshes ; but two of those on the north bank are magnificent sheets of water, one of them being about two miles long.

The two large lakes are clearly portions of the river which have at some former time been cut off by a new bank silting up. They all teem with birds and alligators.

A few miles below Piracicaba there are some lofty peaked hills : beyond these there is no high land to be seen all the way to Lençoes, with the exception of the high banks, which run along nearly the whole way.

On the first day's journey down stream from Piracicaba we passed three rapids, including the two worst ones on the river.

While near to Piracicaba we passed occasional cottages on the bank ; but after the first few miles we saw no more signs of life until we came to a small house, on which we encamped.

On the second day the banks were especially high, and the forest especially thick. A few miles from the river was a farmhouse, which was empty and deserted, the former occupant being dead. On that day we saw no other houses.

On the third day we encamped by a hut which had been erected by some hunters and deserted.

On the fourth day the banks were lower, but the forest was less dense. We saw one cottage during that afternoon.

On the fifth day the banks were high again, but with beautiful sandy beaches every mile or so ; and for about a mile in the middle of that day's journey they were of steep rock running sheer into the water. That day we passed one of the steamer stations, and three lakes—two on the north bank, and one on the south.

On the sixth day we passed two lakes—one on the south bank and one on the north, the latter being the largest of all the lakes. We passed no houses that day, but stopped at night by a deserted cottage.

On the seventh day we saw no houses, and reached the mouth of the Piracicaba during the afternoon. On that day we passed two fierce rapids, the Piracicaba flowing into the Tieté with a rapid of about a mile in length.

On the eighth day we passed five rapids, one only being of any importance. On that day we passed two or three cottages, and on the ninth day reached Porto de Lençoes. Below Porto de Lençoes we passed several rapids, but none of any importance.

The sport consists of tapir, deer, capibara, and peccary, all of which we got. We were unable to get dogs for tigers (as they call pumas and jaguars), but one night a puma chased one of the dogs, and once, while we were peccary hunting, one of our dogs was killed by a puma. There are also ocelots, ant-eaters, bugios, monkeys, armadillos, coatis, pacas, hares, alligators. A prepared tapir- or deer-skin can be bought for about 2000, a capibara skin for about 500. The birds appear innumerable, but I may mention the pomba, bigua, uru, macuque, jahu, wild geese and ducks, toucans of various species, parrots, parroquets, humming-birds. We saw three or four snakes only, for in winter they mostly hibernate, and for the same reason insects were no great plague. There were, it is true, carrapatos (ticks), mosquitos, and "jiggers," but not in sufficiently large numbers to be a serious trouble. Among the numerous fishes that we caught I may mention the *dourado*, or Brazilian salmon, the *maudi*, a scaleless fish with long feelers, and the *casudo*, which is perfectly black, and which the men cooked, using its own skin as a pot to cook it in.

Just below Lençoes was a specially deep hole, where there were to be caught to any extent large fish called *surubim*, not unlike *maudi*, but weighing on the average about 20 lbs. We also caught one *jacu*, an enormous brute of the same kind, about 5 feet long. The *jacu* was too coarse to eat, but all the other fish were excellent. The *surubim* were, however, better dried than fresh. So we dried in the sun all that we caught, and ate some on the voyage up stream, selling what we had over at 1000 a piece.

At the village of Porto de Lençoes dwells a Brazilian of the name of Cardia, with his wife and sister-in-law, who insisted on lodging and feeding us while we were there. They were well-to-do and well-educated people, speaking French fairly well. Senhor Cardia keeps a shop, at which everything imaginable can be bought. The house is one-storied, and there is no glass in the windows, which are closed at night with shutters. Higher up the bank was a larger house, half built, belonging to a brother of Cardia's. There were only two other houses in the place. One belonged to a man called Louis, whose father had been a Swiss, and who was a professional peccary hunter. The other house belonged to a blacksmith called Francisco, a married man, who made little else than horseshoes and *fouces* (instruments for cutting down the brushwood in the forest). He had made his anvil himself, but his vice had come from England.

On approaching Piracicaba I went to see the house where the parents of Pedro, our *caçador*, lived. It stood about two miles away from the

north bank of the river. Three huts stood in a clearing; two were barns, the third was the house, which was built of posts stuck into the ground at intervals of four or five inches, without any plaster or other covering, so that we could stand at one end of the house and look right through it into the country beyond. It was, in fact, a cage, not a house. It consisted of three rooms—a kitchen, a bedroom, and a sitting-room—which only differed from one another in containing respectively a stove, a bedstead, and a couple of benches. The roof was thatch; the floor, mud; doors there were none, not even in the outer walls, but merely gaps.

The various other cottages which we passed on the river were of much the same description, except that most of them had a certain amount of mud plaster on the walls. It must have been very cold in Pedro's house on winter nights, for there was generally a slight frost. The days were hot, but not as a rule oppressively so. As far as the day is concerned, we gathered that there is little difference in temperature between summer and winter. The difference is felt in the nights, which are cold in winter and hot in summer.

The rapid change of temperature at about 9 A.M. and 6 P.M. was very striking. There was at night generally a thick mist, which often did not lift until about 9 A.M.

The only product of the district in which any large trade is done is coffee. The country people bring this, unground, in sacks containing five *arrobas* each.

They were paid 20,000 per sack. There is also a certain amount of maize, sugar, and cotton produced; and bananas and oranges grow in profusion where once planted, and are for the most part allowed to rot on the trees, or are given to the pigs.

It is unfortunate for the district that the rivers flow, so to speak, the wrong way. For this reason, I apprehend, it can never become a timber-producing country. But for conveyance of other products it is very conveniently situated, a few days' voyage up the river bringing the product to Piracicaba, which is only two days by railway from Rio, or one day from Santos.

It is only at the rapids that the adverse stream becomes a difficulty, and this may be largely remedied by simple appliances. On the bank just above the worst rapid there is already placed a large windlass, by which boats coming up can be hauled over the difficulty. Windlasses placed at all the rapids would remove the only obstructions to the navigation of hundreds of miles of those magnificent highways.

We saw, no doubt, the sunny side of the country, when the cold nights kept down the insects and the snakes. The malaria, which generally finds some victims during the summer months, can be avoided by the simplest remedies. It is only the poverty, ignorance, and slovenliness

of the residents that gives it its opportunity. For the sportsman the country is a paradise; and whether the colonist would find it different, I cannot say.

#### GEOGRAPHICAL NOTES.

**The Emin Pasha Relief Expedition.**—Since our last issue the plans of this important expedition have been completed. It is managed by a committee of private individuals sitting in London, and its commander, Mr. Stanley, left England on the 21st of January *en route* for the East Coast of Africa. Mr. Stanley's staff will include six or seven Europeans, and the route is finally decided to be via the Congo from the West Coast. But as the large native force of guards and porters has to be engaged in Egypt and Eastern Africa, the expedition will be formed at Zanzibar, and conveyed thence in a fine steamer of 2000 tons round the Cape of Good Hope to the mouth of the Congo. The party includes an accomplished surveyor and a naturalist, and the interests of science will be sedulously cared for. Our Council have subscribed the sum of 1000*l.* towards the expenses, with a view to that sum being applied in aid of the geographical exploration of the country to be traversed, and in hope that the results of such exploration may be communicated for publication by the Society.

**Dr. Oscar Lenz** has arrived at Zanzibar, and is now on his way to Europe. In the new number (12 of Band xxix.) of the 'Mitteilungen' of the Vienna Geographical Society, we find his map of the Congo between Stanley Falls and Kasonge, the stretch which, it will be remembered, he took fifty days to traverse. This map contains much information as to the nature of the banks and the people who inhabit them. As Dr. Lenz's last letter was dated from the Upper Congo, just six months ago, and as he has no doubt stopped at various points on the route, his journey has been comparatively rapid. But, as an instance of the great advance in this respect in recent years, we may state that the London Missionary Society has established a monthly mail from Zanzibar to their stations on Lake Tanganyika. The mail caravan consists of eight men, who perform the journey so rapidly that letters from Mr. Hore, at Lake Tanganyika, are received in England in about three months after they are sent off. Through delays in the transmission of certain parts of the machinery Mr. Hore has not yet been able to complete the steamer he has had on the stocks for about three years.

**The Mang'anja and Yao.**—According to a letter of the Rev. A. Hetherwick, of Blantyre, the Mang'anja (a Mang'anja), otherwise Maravi, are split up into a number of tribes, speaking distinct dialects. The tribes with whose languages the writer is acquainted are the following:—  
1. The Mang'anja proper, at the foot of the Shiré Falls, to the west of the Shiré. 2. The Mbewe, on the lower Shiré, near the Ruo. 3. The

Shirwa, sometimes called Nguru or Nyanja, on the islands of Lake Shirwa and in a few scattered villages on Mount Zomba. These are the people among whom the first Universities' Mission was planted, at Magomero, but who were scattered by the great Yao invasion of 1860-67. 4. The Mbo, who once lived to the west of the Shiré cataracts, but were driven from their homes by the Mangoni. Only a remnant of them preserves its independence by intrenching itself among the rocks, and keeping a strict watch on all suspicious parties of the Mangoni people. 5. The Chipeta, who once lived to the south-west of Nyassa, but who have been destroyed or scattered by the Mangoni. Many of them live at Blantyre as slaves of the Yao, who bought them of the Mangoni. 6. The Chewa, of the Tumbuka, both to the west of the lake. Their dialect much resembles that of the Chipeta.—According to the Rev. W. P. Johnson there are four dialects of Yao, viz. Masaninga, Machinga, Amakali, and Mwembe. To this the writer would add Mangoche, thus named after the Mangoche Hill, to the south-east of the lake, whence the tribe were driven in 1860 by the Machinga. Many of them live now near Blantyre. The Machinga now occupy Zomba, Chikata, Mponda's, and Mkata's on Mangoche mountain. The Lomwe appear to be a sub-tribe of the Makua, and the Anguru, on the eastern shore of Lake Shirwa, and the Takhwani, on the road to Quilimane, are akin to them. The language of the Quilimane people is known as Chuabo. The tribes in the Zambezi delta speak languages which seem to be akin both to the Makua and Mang'anja. Of one of these, the Kwaga, the writer has prepared a vocabulary and a grammatical sketch.

**Exploration of the Lokenje.**—In the new number (10 of Band xiii.) of the 'Verhandlungen,' of the Berlin Geographical Society, Lieut. Tappenbeck describes his journey down the Lokenje river, the great river which, after joining the Kassai, flows into the Congo from the south. Lieut. Tappenbeck takes up the story after Lieut. Kund was prostrated from his wound. His people had to make their own canoes, and run the gauntlet of hostile natives most of the way down the river. In its central course it varies from 300 to 500 yards in width, sometimes getting narrower, and flowing between thickly wooded banks. As it approaches the Kassai, the forests recede, the river widens, and its banks become marshy. It is studded with muddy islands, and in its lower course swarms with hippopotami, its banks abounding in bird-life—geese, storks, pelican, flamingoes, ibises, and many other varieties. The language of the people met with was quite unintelligible to the natives who accompanied Lieut. Tappenbeck.

**Deep-sea Soundings off the Norwegian Coast.**—In consequence of the continuous stormy weather prevailing last summer and autumn on the west coast of Norway, the deep-sea soundings carried on there were somewhat curtailed. However, last year a triangle, extending from



Skomvær ninety Norwegian geographical miles to sea and up under the Lofoden Islands, was sounded, and it was found that the "bank" referred to in the 'Proceedings,' 1886, p. 724, approaches, as was anticipated, the shore further northward, so that west of Skomvær it lies ninety Norwegian geographical miles from the shore, but west of Andenæs only 30 to 36 miles. As it was impossible to extend the soundings so far north, the bank has therefore not yet been charted. But from previous soundings it appears that at Andenæs it lies only a few miles off the shore, and that the depth sinks from some seventy fathoms, somewhat abruptly, to about 400 fathoms. West of Skomvær the depth falls suddenly from 150 to some 300 fathoms. It appears, therefore, that a bank far larger than the so-called "Storeg" by Aalesund has been discovered, and, it is anticipated, one which will be equally important to the cod fisheries. Captain Fabritius, the leader of the expedition, intends provisionally to make an addendum to the existing charts, on which will be drawn that part of the bank which has been measured. About six miles west of Skomvær, a shoal was found where the depth was only 30 feet of water.

**Lake Balkash.**—The following notes on some of the geographical results of explorations of MM. Krasnoff and Ignatief in the neighbourhood of Lake Balkash are taken from the current number of Petermann's 'Mitteilungen.' The river Kara-ssu marked on existing maps does not exist; it has been confounded with the river-bed of the Kara-ssai, which is dry throughout the year. The streams of the At-Lessken range have long been dry. The most important points of the Chu-Ili chain are the Andrakai and Kan-Tau, from which other spurs shoot off. The water of the river Ili is being diverted to the eastern arms of the delta; the western channels have become mere pools of standing water. For three years the water in the main stream has not overflowed, while the Kurli arm of the delta is becoming filled. The Kamau country is rich in woods and reed-banks. The Kirghises sow millet when the Ili overflows; where the lakes have receded they sow wheat. Between the desert of Kurgan-Kum and the mountains lies a level steppe. The desert of Tau-Kum can be traversed in all directions. Many routes are known to the Kirghises, along which in the spring good water can be found. MM. Krasnoff and Ignatief have recently discovered in the Khan-Tengri group a new glacier called the Mushketof, which exceeds in size the well-known Ssmenof glacier.

**Indian Survey Programme of Current Season.**—The work of the Survey of India during the present field season consists of the following operations:—

*Trigonometrical Branch.*—Owing to the paucity of officers available for field parties, the electro-telegraphic operations for determination of longitudes carried on last year are suspended, and one officer is being employed instead to take astronomical observations for latitudes from Jubbulpore to Madras. A party are extending a series of secondary triangles along the Madras coast from the Kistna

river southward, and erecting beacons, &c., for the marine surveyors. Tidal observations are being taken at eighteen ports, and lines of spirit-levels will be carried from several ports connecting them with triangulation stations, so as to get as correct a value as possible for the heights of the latter.

*Topographical Surveys.*—The party which has finished the survey of the Andamans was under orders for Upper Burma, but owing to the disturbed state of that country has proceeded to survey the Nicobar Islands, a task which it is anticipated will occupy one field season. The Baluchistan party was considerably strengthened during last season, owing to urgent demands of the military authorities for special large scale surveys, and was employed on surveys on the two-inch scale in the Kwaja Amran range and neighbourhood of Quetta. It is now resuming the general survey of Baluchistan on the half-inch scale in continuation of previous work. Another survey now completed is that of Cutch, and the party lately engaged there, as well as that recently employed in South Deccan, will be transferred to revenue survey work in the Central Provinces. The Gujerat party will be split up into two, one to continue the Gujerat survey on the two-inch scale, and the other to survey the forest reserves in the Thana Collectorate on the eight-inch scale. During the autumn and early summer months the Himalayan party were to operate in the Kulu and other hill States about Simla, and in Kangra during the winter and spring, returning to recess quarters for the monsoon months. Captain Hobday, who has been surveying the Andamans, has joined the troops in Upper Burma, and with the aid of an assistant superintendent and a few European surveyors, is engaged on such survey work as the military movements will render feasible. The completion of the Mysore survey enables the party which has been working there for many years to undertake the topographical survey of the Madras Presidency, an important task, to which reference was made in a previous number of the 'Proceedings.' Rajputana is still far from completed, but the pressing needs of the Baluchistan survey have necessitated the former party being transferred to the latter region, where it will co-operate with Baluchistan party No. 1. The South Mahratta survey party will be divided into two sections, one for forest reserves and the other for topography, of which an area of more than 25,000 square miles, including Goa, awaits completion. For the important, but technical class of work known as Revenue surveys, which include in some instances cadastral or field by field surveys, thirteen parties are assigned to the following localities:—Akyab, Basti, Bilaspur, Gorakhpur, Jubbulpore, Kamrup, Muzaffarpur, Punjab (Gurdaspur, Amritsar, and Shahpur districts), Raipur, Sambalpur, Saugor, Seoni, and Chindwara.

*New Survey of Calcutta.*—This much needed want is shortly to be undertaken. The last survey was made by Mr. Simms, C.E., in the years 1847-49. It was purely topographical, and not only was no register of owners or occupiers prepared, but no demarcation of the Government holdings was attempted, and nothing was then done to ascertain the parties responsible to Government for the revenue. This was subsequently done by Mr. Heysham in 1851, and took five years to accomplish, but during the past thirty years many changes have taken place and the work requires revision. The new survey is also necessary for municipal purposes, for Mr. Simms's survey was plotted on the scale of 100 feet to an inch, which is too small. The new survey is to be on the scale of 50 feet to the inch, and will include all roads, footpaths, buildings, and drainage works, and other necessary details.

**Russian Expedition to the New Siberian Islands.**—We learn that a telegram has recently been received by the Russian Academy of Science announcing the complete success of this expedition, under the  
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leadership of Dr. Bunge and Baron von Toll, and the return of the travellers to the mainland about the end of October last. The news at present to hand is very meagre, but it appears that operations were commenced in the spring by the despatch of a stock of provisions and a boat to the island of Kotelny, the outward journey being accomplished in thirteen days and the return in three. On 29th April Baron von Toll set out for the island of Ljachow, with the object of examining the island before the arrival of the bulk of the party, who followed later, under the superintendence of Dr. Bunge. In the summer the two leaders separated, Baron von Toll spending the greater portion of his time on the island of Kotelny, while his companion made a thorough exploration of the island of Ljachow. Earlier in the year they had explored in company five islands. In view of the very important results which may confidently be expected from this expedition, we await with interest the publication of fuller details.

**The Muir Glacier, Alaska.**—To the 'American Journal of Science' for January, Mr. G. Frederick Wright contributes an account of his own investigations of the Muir Glacier of Alaska, one of the largest glaciers in the world. It enters an inlet of the same name at the head of Glacier Bay, Alaska, in lat.  $58^{\circ} 50' N.$ , long.  $136^{\circ} 40' W.$  Glacier Bay is a body of water about 30 miles long and from 8 to 12 miles wide (but narrowing to about three miles at its upper end) projecting in a north-west direction from the east shore of Cross Sound. Near the mouth of Glacier Bay is a cluster of low islands, named Beardslee, twenty-five to thirty of them, composed of loose material, evidently glacial débris, and in striking contrast to most of the islands and shores in south-eastern Alaska. These, like the other land to the south, are covered with forest, whereas the islands and shores in the upper part of the bay are entirely devoid of forest, having no doubt recently been covered with glacial ice. The upper end of the bay is divided into two inlets of unequal length, the eastern one being Muir Inlet, a little over three miles wide at its mouth, and extending to the north about the same distance, narrowing at the upper end to a little over one mile, where it is interrupted by the front of the Muir Glacier. The mountain on the east side of Muir Inlet is 2900 feet high, that on the west 3150, rising to about 5000 two or three miles back. The base of these mountains, metamorphic slate, is so much contorted, that Mr. Wright found it impossible to ascertain their system of folds. The width of the ice where the glacier breaks though between the mountains is 10,664 feet, a little over two miles, though the actual water-front is only one mile. This front terminates in an angle projecting about a quarter of a mile below the north-east and north-west corner of the inlet. The depth of the water 300 yards south of the ice-front is 516 feet, and the height of the ice at the extremity of the angle in the middle of the inlet 250 feet, with perpendicular front. Further back it rises to 300 and 400 feet, the

surface of the glacier rising to the east and north-east about 100 feet to the mile. On going out in that direction on the ice, seven miles, Mr. Wright found himself 1050 feet above the bay. The main body of the glacier occupies a vast amphitheatre with diameters ranging from thirty to forty miles. Nine main streams of ice unite to form the grand trunk, coming from all directions, and no less than seventeen sub-branches were seen coming in to join the main streams from the mountains near the rim of the amphitheatre. Numerous rocky eminences rise above the surface of the ice, their surfaces smoothed and scored, and glacial débris deposited everywhere upon them, showing they have been recently covered by ice. On the side from which the ice approached these islands, it rose like breakers from the sea-shore, several hundred feet higher than it was on the lee side. The lee side of these islands seemed to be the beginning of important sub-glacial streams of water, brooks running into the depression as into a funnel, and causing a backward movement of ice and moraine. The ice in the eastern half of the amphitheatre is moving much more slowly than in the western half. Here and there the surface is interrupted by superficial streams of water, occupying narrow shallow channels, running for a short distance and then plunging down into *moulins* to swell the larger current. From the front there is a constant succession of falls of ice into the water. From the measurements and observations made by Mr. Wright, it would seem to follow that a stream of ice presenting a cross section of about 3,500,000 square feet (5000 feet wide by about 700 feet deep) is entering the inlet at an average rate of forty feet per day, making about 140,000,000 cubic feet per day during the month of August. The indications that the Muir Glacier is receding, and that its volume is diminishing, are indubitable and numerous. On the other hand, near the south-west corner of the glacier, the streams are uncovering a forest of cedar trees in perfect preservation, standing upright in the soil as they grew, with the humus all about their roots.

**Sources of the Mississippi.**—In connection with the notice, in our last month's issue, of Mr. Harrower's pamphlet on Captain Glazier and his lake, it deserves notice that in tracing the history of the exploration of the sources of the river, he altogether omits to mention the visit of Mr. Featherstonehugh in 1835, as described in his 'Canoe-voyage on the Minnay Soter,' what was then named the Minnesota being regarded as the main stream of the Mississippi. Featherstonehugh spent some time in the district, visiting Lake Travers or Pamidji, which he wrongly thought sent its waters northwards. While wandering about the ridge, or rather plateau, called the Coteau de Prairie, Featherstonehugh looked down upon, but could not approach what, from his map, was evidently Lake Itasca, which is recognised as at least the approximate source of the river. Of course he was not the first to visit this lake, which was seen and surveyed by Lieut. Allen in 1832.

**German New Guinea.**—The opening up of Kaiser Wilhelm's Land will be greatly facilitated by a journey made by Admiral von Schleinitz and Dr. Schrader up the Empress Augusta river. This important waterway, situated close to the western border of the country under the German Protectorate, was navigated by the Admiral in the steamer *Otilie* for a distance of 224 miles. Further progress could not be made, owing to the shallowness of the river, the journey having been undertaken during the dry season. The ship's steam launch, however, proceeded 112 miles further to a point situated in  $4^{\circ} 16'$  S. lat. and  $141^{\circ} 50'$  E. long. Judging from the quantity of water in the river, the voyage could have been continued for another 50 miles, but fuel ran short. For over 200 miles from its mouth the river flows through extensive plains; then its course suddenly changes, and it assumes the character of a mountain stream, forcing its way through hills of gneiss, mica-slate, and quartz, but the velocity of its current remains uniform. Thirty miles further up, the river again resumes its peaceful course. The settlements on its banks were only found at long intervals. The level plains of the country offer great facility for pasture and for the cultivation of rice, sugar-cane, &c. Fuller details of this interesting voyage will be found in part No. 4 of the 'Nachrichten über Kaiser Wilhelm's Land' (1886).

**The Longest Rivers in the World.**—The latest contribution on this controversial subject is a communication made to 'Petermann's Mitteilungen,' by Major-General A. von Tillo, of the Russian Staff. He gives in a table, with notes, the following estimates of the eight longest rivers of the world—(1) Missouri-Mississippi, 4194 miles; (2) Nile, 4020; (3) Yang-tsze-Kiang, 3158; (4) Amazons, 3063; (5) Yenisei-Selenga, 2950; (6) Amur, 2920; (7) Congo, 2883; (8) Mackenzie, 2868. He takes the length of the Missouri-Mississippi from the 'Report upon the Physics and Hydraulics of the Mississippi River,' by Captain A. S. Humphreys and Lieutenant H. A. Abbot, and the measurement of the Nile from Perthes' new map of Africa. General Tillo's data for the length of the Amazons is the map of South America, published by Iljin in St. Petersburg, and prepared by General N. Kaulbars, on scale 1 : 6,300,000; the length being reckoned from the source of the Marañon to the island of Bailikwe. The length of the Yenesei-Selenga is calculated from the Russian Staff map, on scale 1 : 4,200,000, of the Russian dominions in Asia. The principal difference between the above list and that of M. C. A. v. Klöders, published in the sixth part of the 'Zeitschrift' of the Geographical Society of Berlin, is the length of the Missouri-Mississippi, which the latter gives as 3658 miles.

**The British Association Committee on Geographical Education.**—It will be remembered that at the Birmingham meeting of the British Association, a committee was appointed "for the purpose of co-operating

with the Royal Geographical Society in endeavouring to bring before the authorities of the Universities of Oxford and Cambridge the advisability of promoting the study of geography by establishing special chairs for the purpose." A meeting of the committee was recently held, at which were present Mr. Vernon Harcourt and Professor Moseley from Oxford, Professor Hughes from Cambridge, the Rev. Canon Carver, the Rev. E. F. M. McCarthy (Birmingham), and Mr. E. G. Ravenstein. We are happy to say that the members of the committee fully recognised the educational value of the scientific study of geography, and are agreed in thinking that geography should occupy a place among the subjects of study in our national universities. They resolved to request the Council of the Association to give their support to the representations and offers which have been made by the Council of the Society. The members of the committee not present concur, we believe, in the resolutions come to. They are Prof. A. Newton, Professor Bonney, Canon Tristram, Rev. H. B. George, Rev. A. R. Vardy, Rev. H. W. Watson, Captain Douglas Galton.

**Aarau Geographical Society.**—Under the title of 'Fernschau,' we have received the first number of the 'Jahrbuch' of the Aarau Geographico-Commercial Society. It contains, among other matter, two original papers of some interest; one describing the visit of a Basel missionary to Kumassi in Ashanti, in 1881, and the other a brief paper advocating reform in geographical education, by Dr. Hermann Braunhofer.

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## CORRESPONDENCE.

### *On the Teaching of Geography.*

HAVING lately read with very great interest the Educational Report of the Royal Geographical Society, I am inclined to think that a few remarks by one who has had considerable experience in teaching this subject may not be unwelcome. My remarks will apply principally to provincial grammar schools and others of that standard.

First, as to the faults to be found in the present system. I consider the greatest of these to be the too great importance attached to what is usually called political geography, which, in reality, is nothing but the learning by heart of the positions of a great number of towns, the larger proportion of which are of very little general interest, and those things for which they are celebrated, the most worthless trash often being included in this latter category. No reason is ever given for the accumulation of towns in certain districts, or for the greater richness and prosperity of one town more than another, matters which are generally within the comprehension of any child.

Then, again, the physical features of a country, on which everything else depends, and which are therefore the most important, are really scarcely touched on at all. The more conspicuous headlands, inlets, mountains, and rivers are just mentioned, and no general idea of the lie of the land or of the nature of the surface soil is given. The description of perhaps the most important factor of all—climate—

is given in a few big-sounding words beyond the comprehension of most children, and no mention is made of the why or wherefore, which is just what the childish mind is constantly inquiring after.

But perhaps the greatest fault of all in the modern system is learning by heart all that is in the usually very bad text-book without the due use of the atlas. Most teachers will probably tell their pupils to refer constantly to the atlas, but how many pupils do so refer to it? Unless the lesson is prepared under keen supervision I fear in the majority of cases the atlas is never looked at. And why? Simply because the pupil does not know how to read a map, and it therefore becomes a very uninteresting object to him. And very naturally so. We could none of us feel interested in a book placed before us if it were written in an unintelligible language. I think it would be a very good thing if, in the case of younger children, the text-book were abolished altogether, and they were taught solely by lectures, or rather talks.

I would in every case begin with a course of physical geography, together with a certain amount of mathematical, explaining everything by references to phenomena of local occurrence, so far as is possible. The physical geography should be largely illustrated by experiments, the simpler and more homely the better, and it would be a very good thing to give a few lessons in physics, illustrating the general properties of solids, liquids, and gases.\*

Instead of large and expensive wall-maps, generally of a very inferior description, outline maps, drawn on the blackboard and filled in as the lesson proceeds, would be better. If it is objected to this, that it takes up too much of the teacher's time in drawing an outline before those lessons in which the outline is not treated of can start—then have permanent outlines drawn in paint on American cloth. These can be rolled up, and then occupy little space when put away. The cloth takes chalk exceedingly well. With this and a supply of coloured chalks much really valuable work can be done at very little cost. As the teacher goes from one subject to another, the pupil can follow, filling in a blank map on paper placed before him. It will keep him attentive and interested from beginning to end, and the lesson will be a source of pleasure to teacher and pupil alike—at least, so I have found it. I should start first with the outline, and fill in the mountains and rivers, not forgetting to draw sections in various directions across the country. Then take the meteorology, next the forest, arable, pasture, and waste lands, and the distribution of minerals. Finally, the distribution of industries, bringing in the most important towns, followed by the ethnology and political divisions.

In the next place there ought to be large numbers of pictures. If the class is large the lantern should be used, but if small, woodcuts and photographs would do. In this province I think the Society might do most useful work by publishing illustrations typical of the scenery, inhabitants, animals, and plants of various districts, and if in addition actual specimens of the products could be obtained, it would indeed be teaching in clover. At present it is only possible to obtain illustrations from a vast number of books, and these have then to be photographed, or copied in some other way, if a permanent collection is desired, and the cost becomes considerable even when the teacher can copy them himself. Where space can be procured a room ought to be set apart for these collections. In large towns specimens might perhaps to a large extent be borrowed from the local museums.

I am inclined to think that it is a national disgrace that we have not a museum,

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\* I should, if the Society thought fit, be glad to communicate a series of papers on Physics and Chemistry as applied to Geography, using in all cases the simplest possible apparatus.

or even a department of one, entirely devoted to geography, in which models, maps, sections, photographs, and specimens are all exhibited under the heads of their own particular districts. If such could be formed—and ours certainly ought to be the nation to do it, considering we have colonies and settlements in every quarter of the globe—it would vastly further the cause of geographical education.

With regard to mathematical geography, so-called, it is usually taught in a most slipshod manner, and I believe there is a generally prevailing impression that it is too hard for children of nine and ten. My experience shows me that it is perfectly possible—even with no apparatus except a rough home-made blank globe—to get them to understand latitude and longitude, the seasons, and phenomena of day and night thoroughly. Then map projections can generally be explained by the aid of diagrams. As to the correct reading of a map—so far as the parallels and meridians go—why should the pupil not be made to draw a map on a blank projection from a copy made on another? He certainly ought to fix the position of places accurately on a blank map when only the latitude and longitude are given.

In conclusion, it seems to me a great pity that geography, as a school subject, is not taught as a science by the science master, rather than by classical men, who rarely have any aptitude for the work, except perhaps willingness. It must be generally admitted that physical geography, or physiography, dealing as it does with all those natural phenomena which come most generally under everyday observation, is well calculated to develop the observing and thinking faculties of the youthful mind, much more so than the very meagre smattering of chemistry or physics which a boy or girl generally acquires at school, and therefore let it be the child's first introduction to the study of nature.

University College, Liverpool,  
January 18th.

W. RHEAM, B.SC.,  
*late Assistant Master in Queen Elizabeth's  
Grammar School, Wimborne.*

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## Obituary.

**Sir T. Douglas Forsyth, K.C.S.I., G.B.\***—The late Sir Thomas Douglas Forsyth, whose recent death, at the age of fifty-nine, has been deeply felt and deplored by a very wide circle of relatives and friends, and who was so well known as a distinguished member of the Civil Service in India, whom we shall speak of in this brief memoir as Sir Douglas, was born at Birkenhead in 1827—the tenth child and third son of his parents. He went to Sherborne School, in Dorsetshire, where he remained only a short time, and then proceeded to Rugby, of which school Dr. Arnold was Head Master, succeeded soon afterwards by Dr. Tait, who became Archbishop of Canterbury, and under whose tuition Sir Douglas remained until he went to Haileybury College, having obtained a writership in the Bengal Presidency from Mr. Lyall, formerly M.P. for London. The Principal of Haileybury College was the late Rev. William Melvill, and here he greatly distinguished himself, gaining five gold medals for proficiency in Oriental languages and law. In 1848 he sailed for India, and at Fort William College, in Calcutta, he obtained a gold medal and three prizes for “high proficiency.” About this time the Punjab, after the second Sikh war, was annexed to British India, and Sir Douglas was appointed Assistant Magistrate at Saharunpore, and next year Joint Magistrate and Deputy Collector at Simla. In 1851 he was Assistant Commissioner of Kangra, and in

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\* By W. Forsyth, Esq., Q.C., LL.D.



1856 Deputy Commissioner of Umballa (the Commissioner being the late Mr. George Barnes), when the mutiny broke out. While holding these various appointments, his great ability and devotion to duty gained him the full confidence and approval of his superiors, and no one of the young civil servants gave brighter promise of an eminent career. Nothing could exceed the energy and courage shown by him at the momentous crisis of the mutiny. He called upon the Maharaja of Puttiala to assist us, and secured his loyalty to the British side, which example was followed by the adhesion of the Rajas of Jheend and Nabha. The chief duty that devolved upon him was to provide the means of transport for the troops on their march to Delhi, then held by the rebels and besieged by us, and to his active exertions it was greatly owing that the Punjab regiments were able to accomplish their difficult march. He raised a police force for the defence of Umballa, and protected the road leading from that place to Kurnaul.

In 1858 he was promoted to the office of secretary to Sir Robert Montgomery, the Chief Commissioner of Oudh, and a warm and affectionate friendship grew up between them which lasted until the end of his life. We may mention that one of his daughters married a son of Sir Robert, who had the highest appreciation of his character and ability, and frequently sought his advice, which he always found to be wise and judicious. In 1860 he became Officiating Commissioner in the Punjab, and received the order of C.B. for his services in the mutiny. In 1863 he was Commissioner of Lahore, and in 1865 Commissioner of Jullundur.

Having in 1869 come to England on furlough, a signal proof was given of the confidence reposed in his judgment and thorough knowledge of Indian politics, by his being entrusted by Lord Clarendon with the responsible duty of going on a mission to Russia for the purpose of coming to an understanding with the Russian Government on the vexed question of the north-western frontier of Afghanistan, so as to define it, and thus afford no pretext for Russian aggression in that quarter. He proceeded to Russia by way of Constantinople, and had several interviews with Prince Gortchakoff, and one with the Emperor Alexander II. He received the most distinct and positive assurances on these occasions that the Russian Government acknowledged the frontier pointed out by him to be the true boundary, and a declaration that there was no intention on the part of Russia to disturb it. Moreover, that Afghanistan was considered to be out of the sphere of Russia's policy. It was the strong opinion of Sir Douglas, and we believe that he repeatedly gave the advice, that a boundary line should then be drawn and formally accepted by Russia, which, if done, would have obviated subsequent misunderstandings and conduct on the part of Russia which recently brought us to the brink of war with that country. He had always a rooted distrust of the policy and good faith of Russia, and thought that the only course to be adopted towards that power was to say to her, "Thus far shalt thou go and no farther, or the alternative is war."

Sir Douglas had always taken a warm interest in the question of trade between India and Central Asia, and as one proof of this we may mention that the village of Palampore, in the Kangra Valley, was created by him to facilitate the transport of merchandise between the two countries.

After his return to India, and while he was Commissioner of Umballa, a serious disturbance broke out at Kouka in his district, which he with great promptitude and energy suppressed. Several executions took place, by the order of the Deputy Commissioner, in the absence of Sir Douglas at Delhi, and he approved of his conduct. For this he was censured by Lord Napier and Ettrick, then acting provisionally as Governor-General, but it was subsequently acknowledged that his action was right, and it is generally admitted that he had saved the Punjab from what might have been a very grave disaster.

In 1870 he was selected by the Governor-General, Lord Mayo, to conduct a mission to Kashgaria, then an almost unknown region, and previously visited by only one Englishman, Mr. Shaw. The ruler of the country was the Emir Yakooob Beg, otherwise known by the name of the Atalik Ghazi, and the object of the mission was to negotiate a treaty of commerce between India and his territory. The access to Kashgaria was very difficult, owing to the chain of lofty mountains that intervene, some of them attaining the altitude of 18,000 feet, and the whole of the complicated arrangements for the journey devolved upon him. Unfortunately, the Emir was absent on an expedition, and as the instructions of Sir Douglas required him to return to India before the commencement of the winter, he was unable to obtain an interview, so that on this occasion the mission was abortive.

In 1872 Sir Douglas was transferred to Oudh, and became Commissioner of Fyzabad, and next year, Lord Mayo having determined to send a second mission to Kashgaria, was appointed Envoy, and this time he was more successful. He stayed some time at Yarkand and Kashgar, and had several meetings with the Emir, discussing with him not only the terms of a treaty of commerce, but also the nature of the relations between Russia and Kashgaria, which seemed threatened with the possibility of Russian aggression. A report of this mission was printed in a bulky volume, which contains a large mass of useful information on the politics, natural history, and condition of Eastern Turkistan. Next year Sir Douglas was made a K.C.S.I., an honour conferred upon him by the express desire of Her Majesty, although the number of the members of the order was then complete, and there was no actual vacancy.

He was appointed additional member of the Legislative Council of India, and in 1875 was sent to Burma by Lord Northbrook as envoy to settle a question of disputed boundary, which he successfully accomplished, having an audience of the King at Mandalay.

Next year, 1876, he resigned the Indian service, and came to England, where he resided until his death, occupying himself by taking a prominent part in the direction of several Indian railways. He was director of the East India and Scinde and Punjab Railways and chairman of the Southern Mahratta and the West of India Portuguese Guaranteed Railway Companies, the formation of which was mainly due to his exertions. He also became Member of Council of the Royal Geographical Society, and took a warm interest in its proceedings, having by his extensive travels—in which he had visited China and Japan, and crossed the American Continent—made himself acquainted with the chief parts of the globe. He was also much interested in the promotion of tea cultivation in India, and while in England took an active part in the direction of two tea companies, whose property is situated in the Kangra Valley.

Sir Douglas had the art of winning the attachment of the natives of India in an extraordinary degree. He was endeared to them by his uniform courtesy and kindness, and he was always anxious to see them advanced to posts which they were fitted to fill. He was emphatically their friend, and they knew it. A striking proof of their feeling towards him was shown on the occasion of a visit he paid to India three years ago, accompanied by his elder brother. When in the districts of the Punjab which had been under his authority great numbers of natives came from distant parts to welcome him, and testified in the most unmistakable manner the affection with which his memory was treasured in their hearts. He was indeed one of the most generous and unselfish of men, and never so happy as when he had the opportunity of doing acts of kindness to others. As was truly said in one of the very numerous letters received on his death, he was "the ideal of an English gentleman."

He married Alice, daughter of the late Mr. Thomas Hall Plumer, of Canons Park, and granddaughter of Sir Thomas Plumer, Master of the Rolls, and has left his widow and three daughters to mourn his loss.

**Captain C. George, R.N.**—The former well-known and universally esteemed Curator of the Map Department of our Society, Staff-Commander Christopher George, died on the 2nd of January, at the age of 77 years. He was in the Society's service for a period of 20 years, namely, from June 1857 to June 1877, at which latter date he resigned, owing to the failure of his eyesight, an infirmity which was quickly followed by nearly total blindness. In his earlier life Captain George had seen much active service in the Navy, chiefly in the scientific branch. He was born at Limehouse on the 14th September, 1809, and entered the Navy as second-class volunteer in January, 1828. From master's assistant on the *Britomart* (1828 to 1830), the *Savage* and *Nimrod* (1831 to 1835), and the *Sulphur* (to 1837), he rose to be second master in the *Sulphur* (1837-1842), and *Fisgard* (1842-3), acting-master and master in the *Tartarus* (1843-1846), and senior assistant-surveyor on the *Fisgard* (1846-1854). As naval surveyor during the last 19 years of his service he was engaged successively under Captains Beechey, Kellett, Collinson, and Sir Edward Belcher, on the west coast of America, among the islands of the Pacific, and on the coast of China, and afterwards on the south-west coast of Ireland. During the whole term of his service, 26 years 4 months, he was only 10 months without a ship, that interval being in the first seven years. He obtained the rank of commissioned officer in November 1843. In the China war of 1841, he was in action at the taking of the forts on the Canton river up to the city of Canton, surveying in advance for the fleet to proceed, and operating with the Naval Brigade, with the troops in rear of the city. For this service he received the China silver medal of 1842.

Captain George invented the spiral cord method of filling the mercurial barometer, and two instruments now bearing his name, viz. the double sextant and the artificial horizon. For these he received a medal at the International Geographical Congress of Paris, 1875. His knowledge and skill as a surveyor and mapper were employed, whilst connected with our Society, in computing the observations of travellers, and in instructing them prior to their undertaking their explorations. Amongst his pupils were some of our most renowned travellers, including Du Chaillu (for his second journey), Thomas Baines, Captain Burton, and Sir C. Baker.

## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Fourth Meeting, January 17th, 1887.*—General R. STRACHEY, R.E., F.R.S.,  
Vice-President, in the Chair.

ELECTIONS.—*Edward C. Adams, Esq.; Henry Alexander, Esq., B.A.; Geo. H. Barclay, Esq.; Alfred H. Burton, Esq.; Chas. Chewings, Esq.; Jas. G. Frazer, Esq.; Jas. Rodolph Glover, Esq.; Philip H. Graham, Esq.; Robert Kilpatrick, Esq.; William Martin, Esq.; M. H. M. P. de la Martinière; T. W. Moulton, Esq.; Major Wm. Norton Persse, R.A.; D. Macdonald Robertson-Macdonald, Esq.; Lieut. Walter Henry Simpson (Bengal Staff Corps); Edward Stallibrass, Esq.; Hans Sloane Stanley, Esq.; Clinton Brazil van Tuyl, Esq.*

### THE EMIN PASHA RELIEF EXPEDITION.

Previous to the reading of the paper, the CHAIRMAN announced that the Council of the Society had that day passed the following Resolution:—

“An expedition to be conducted by Mr. H. M. Stanley having been organised for

the relief of Emin Pasha, under the control of a Committee formed in London, and the Council of the Royal Geographical Society being satisfied that valuable new geographical data are likely to be obtained by whichever route the expedition proceeds, resolves that a grant of 1000*l.* be made to the managing committee of the expedition with a view to that sum being applied in aid of the geographical exploration of the country to be traversed, and in hope that the results of the exploration may be communicated for publication by the Society."

The CHAIRMAN added that he hoped the Resolution would receive the approbation of the members. The announcement was received with applause by the meeting.

Sir RAWSON RAWSON mentioned that he had just learnt from Mr. Stanley that he proposed to start for Egypt and Zanzibar on Friday, the 21st.

The following paper was then read:—

"Explorations in South-Eastern New Guinea." By the Rev. J. Chalmers. See *ante*, p. 71.

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## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris.**—December 3rd, 1886: M. A. GERMAIN in the chair.—A communication was read by the Secretary from the Commercial Geographical Society of Havre, with reference to the appointment of a Permanent Commission to carry into effect the resolutions of the Annual Congress of the Geographical Societies of France; the opinion of the Society was invited as to the scope and composition of this committee.—A letter was read from M. Ch. Toret confirming the conclusions of Comte de Bellanger, announced at the last meeting, upon the precise locality of Tavernier's grave.—M. Hangsen Blangsted informed the Society that the delegates appointed by the governments of Sweden and Denmark to advise upon the proposed submarine tunnel between the island of Zealand and Sweden, had issued a report unfavourable to the scheme.—A letter dated 30th August was read from Vicomte E. de la Panouse, giving a short account of his travels in South Africa. Since 1882, he had traversed the country between the Cape of Good Hope and the Zambesi, but being unprovided with astronomical instruments he had been unable to take observations for verifying existing maps. He was then to the north of the Zambesi, and it was his intention to proceed to Lake Bangweolo, descend the Loangwe to Zumbo, and then crossing the Zambesi to make his way to Mangwe, a village about 200 miles east of the Falls. He would return to Tete through the country of the Mashonas. He requested the Society to lend him the necessary instruments for taking observations. He was defraying the cost of his journey by elephant hunting.—M. H. Duveyrier called the attention of the Society to an excellent map of the French possessions in Senegal, which was exhibited in the hall. This map had, he said, been carefully prepared by Captain Monteil, and embodied all the results of the most recent explorations in the country.—M. Germond de Lavigne gave an account of the excursion recently made by him through Portugal to Cape Vincent and Cape Sagres. An interesting resumé of his mission to Iceland was given by Dr. Henry Labonne.\*—The General Secretary then read a letter dated 21st October, 1886, from Dr. Neis, who wrote from the hospital of Hanoi. His party had suffered from the attacks of pirates, and also from political complications which had only recently been solved. However he had succeeded in collecting a large amount of valuable geographical information regarding the district between the Black

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\* 'Proceedings R.G.S.,' 1887, p. 52.

River and the Mekong. He intended to rest for some weeks before recommencing the winter campaign on the frontiers of the two Kuangs.—In conclusion the Chairman announced that the Second General Meeting of the year, to be held on the 17th December, would be presided over by M. Ferd. de Lesseps, who would also take the chair at the Annual Banquet.

—December 17th, 1886: M. FERDINAND DE LESSEPS, President of the Society, in the Chair.—This was the second General Meeting of the year. After the Chairman's opening remarks, M. Maunoir, the General Secretary, read some extracts from his Annual Report, on the operations of the Society, and on the progress of geography during the year. The Report will be published as usual in the Quarterly Bulletin of the Society.—The Chairman then called upon M. Désiré Charnay to read a paper on his mission in Yucatan, with which he had been charged by the Minister of Public Instruction. This was, M. Charnay said, his fourth voyage to the peninsula. He had again visited the town of Izamal to search for the bas-reliefs mentioned by Landa the historian, as existing on the base of certain pyramids. He had discovered a few, and also some wall paintings, which gave him the key to the decorative style of the ancient inhabitants. He had been prevented from visiting an Indian village called Koba, in consequence of a raid through the country by this savage tribe; but he had found to the north of Valladolid an Indian town, hitherto unknown, named Ek-balam, or "the Black Tiger," which also belonged to the third epoch of Toltec civilisation. He made some interesting archaeological discoveries at this place and also at an old Maya cemetery in the island of Taïna, about 24 miles north of Campeche, on the other side of the peninsula. The Chairman after thanking M. Charnay for his interesting paper, and referring to the award of the Legerot prize made to him two years ago by the Society, stated that the Central Commission had just decided that M. Charnay should be the first traveller to benefit by the Poirier bequest, which, it would be remembered, was to be given to travellers of French origin, whose travels and works were considered to be most valuable to science and commerce.—M. de Lesseps presented an album of photographs representing the present state of the works of the Panama Canal.

**Geographical Society of Berlin.**—January 8th, 1887: Herr W. REISS in the chair.—The Chairman, at the commencement of the meeting, gave an account of the progress of the Society during 1886. Nineteen papers by travellers had been read at ten meetings, of which ten papers related to Africa, six to Asia, and three to South America. The number of ordinary members increased from 946 to 976. The library received the addition of 456 volumes, the map collection 68 sheets of maps. The Council have decided on printing a catalogue of the library, and it will appear in the course of 1888. For the proposed monument at Cape Palmas to Dr. Nachtigal, the amount of 11,347 marks had been subscribed in consequence of the appeal of the German Geographical Societies; but as this sum is insufficient, a fresh appeal would shortly be made.—Dr. van Rijckevorsel of Rotterdam, who in 1874–1877 travelled through the East Indian Archipelago to study the magnetic phenomena of the region, and afterwards (in 1881–1884) travelled in North-eastern Brazil with the same object, determining the magnetic elements at 135 points from Pará to Rio Janeiro, read a paper on his journey in Sumatra. He travelled from Bencoolen viâ Taba Penandjung to Kepajang, crossing with a caravan of porters the extraordinarily rugged and volcanically-disturbed Barisan mountains. The river-valleys in this region are very deep, and form in places, otherwise level, deep gorges with very steep escarpments. From Tebing Tinggi the traveller passed in a travelling car through a barren district of bamboo woods to Muara Bliti on the Klingi. Here a raft was built, and on this the Klingi and afterwards the Musi were navigated, Palembang

being reached after a journey of three weeks. The population of Palembang is upon the whole much more industrious and active than the rest of the Sumatra people. A great obstacle to the rapid development of the island is the slow increase of population, which in this respect offers a strong contrast to Java, which since the Dutch conquest has increased to nearly 30 million souls. One cause of the small increase in Sumatra is the circumstance that wives must be bought and are very dear, many men in consequence remaining single. The immorality of the people, besides, is very great, and abortion is elevated into a science.—Staff-Surgeon Dr. Wolf, member of the Wissmann Kasai expedition, gave the meeting an account of his travels and discoveries in the Southern Congo Basin. From Makenge, the chief town of the Baluba kingdom, he visited the Bakete tribe living more northerly on the Lulua, and the Bakuba, who dwell between the Sankuru and the Lulua, being the first European who has reached those regions. Returning thence to Luluaburg, Dr. Wolf took part in the exploration of the Kasai, and returned then alone from Stanley Pool to Mukenge. From here he undertook, with the help of the steamer *En Avant*, lent to him by the Congo State, the exploration of the Sankuru and Lomami, from which journey he returned in July 1886 to the mouth of the Congo.

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

### EUROPE.

**Den Norske-Nordhavs Expedition 1876-1878.**—[The Norwegian North-Atlantic Expedition 1876-1878.] XVI. Zoologi. Mollusca. II. Ved Herman Friele. Christiania, Grøndahl & Sønns, 1886: imp. 4to., pp. 44, 6 plates. [Presented by the Editorial Committee of the Norwegian North-Atlantic Expedition.]

**Du Fief [J.]**—*La Densité de la Population en Belgique et dans les autres Pays du Monde.* Bruxelles, Vanderauwera, 1887: 8vo., pp. 53. [Presented by the Author.]

This a useful investigation on the density of the population of Belgium with special reference to the means of subsistence. The author does not seem to think that at present there is any reason to be alarmed at the increase of the population. He gives comparative statistics of the population of other countries from the same point of view.

**[Geographical Memoirs.]**—*Die Vergletscherung des Salzachgebietes, nebst Beobachtungen über die Eiszeit in der Schweiz.* Von Dr. Eduard Brückner.—*Orometrie des Schwarzwaldes.* Von Dr. Ludwig Neumann.—Hefte 1 and 2 of *Geographische Abhandlungen*, herausgegeben von Prof. Dr. Albrecht Penck in Wien. Wien, Eduard Hölzel, 1886: 8vo., Heft 1, pp. x. and 183; Heft 2, pp. 185-238. Price 20s. per vol. of 30 sheets with supplements. [Presented by Professor Penck.]

These two first parts of this new geographical serial publication bear out the promise of the prospectus, already referred to in the 'Proceedings,' and are creditable to the enterprise of the publisher. It is not meant as a rival to any existing serial, but as a means of giving to the world memoirs in scientific geography which it would be difficult to find a place for in any existing medium. Both memoirs are good examples of exhaustive studies in local geography. The particular region investigated by Dr. Brückner is the south-east borderland of Bavaria and Austria, with Salzburg as the centre. He has worked out every trace of the effects of past glaciation on the geographical features of the region, and in the concluding chapter deals with the Lake of Geneva and its former

extension, and with the ice-period on the northern slopes of the Alps. The second memoir, by Dr. Neumann, is as thorough a study of the orometry of the Black Forest as is Dr. Brückner's of the Salzburg region. Both are fully illustrated with maps and diagrams, and may be taken as good examples of the valuable and instructive results to be obtained by thorough and competent research in local geography.

[Switzerland.]—A Handbook for Travellers in Switzerland, the Alps of Savoy and Piedmont, the Italian Lakes, and part of Dauphiné. 17th edition, revised. London, Murray, 1886: two vols. 8vo.; vol. i. pp. lxxxviii. and 295, vol. ii. pp. 297-559. Price 10s.

This new edition has been brought up to date as far as possible with regard to railways, population of towns, inns, and general information, from personal knowledge, the best Swiss authorities, and the notes with which the editor has been favoured by travellers.

#### ASIA.

[India.]—The Dawn of British Trade to the East Indies, as recorded in the Court Minutes of the East India Company, 1599-1603; containing an account of the formation of the Company, the First Adventure, and Waymouth's Voyage in search of the North-west Passage. Now first printed from the original manuscript, by Henry Stevens, of Vermont, with an Introduction by Sir George Birdwood, Kt. C.S.I., M.D. Henry Stevens and Son, London, 1886: 8vo., pp. xxiv. and 331. Price 21s. [Presented by the Publishers.]

The late Mr. Henry Stevens did excellent service in reproducing, at great expense, these records of our earliest commercial connection with India. The original manuscript had found its way to the Public Record Office, where it fell under the notice of Mr. Stevens. He had it most carefully copied, a task of great difficulty, owing to the decayed state of some of the manuscript, and the difficulty of deciphering some of the writing. The result is what may be regarded as an absolutely faithful copy of these curious records, with all their interlineations and obliterations. For any one desirous of tracing the history of our connections with India, the volume will be of great value. To the geographer, the records connected with Waymouth's first abortive voyage in search of a North-west Passage, the preliminary meetings of the committee, the outfit of the vessels, and the evidence taken as to the results, will be of interest. True, a good deal of this has already appeared in the fifth volume of the Hakluyt Society's publications. Sir George Birdwood's introduction is interesting; while Mr. Henry N. Stevens has supplied a most copious index.

Izvestiya Vostotchno-Sibirskago Otdiela Imperatorskago Russkago Geographicheskago Obshchestva. Tom. xvi., Nos. 4-5. Irkutsk, 1887: pp. 196.

This number of the proceedings of the East Siberian Section of the Russian Geographical Society is almost wholly taken up with the affairs of the Section, its finances, protocols of meetings, &c., &c. There is a letter from M. D. Butin to Count Ignatieff on the subject of the proposed canal to unite the Ob and Yenisei, some particulars of Dr. Bunge's expedition, and a report by MM. Vagin and Bobrovnikoff on the statistical work to be undertaken in Eastern Siberia. It is pointed out that there is a great want of agricultural statistics for this part of the Empire, whereas European Russia has been thoroughly surveyed in this sense.—[E. D. M.]

Rein [Professor J. J.]—Japan nach Reisen und Studien, im Auftrage der K. Preussischen Regierung dargestellt. 2tes Band. Land- und Forstwirtschaft, Industrie und Handel. Leipzig: Engelmann, 1886. [Presented by the Author.]

The readers of the first volume of Dr. Rein's very careful study of Japan in its various aspects will welcome the conclusion of the work. The illustrations to the present volume are specially noteworthy for their truth and beauty. Upwards of 300 pages of this volume are devoted to forestry and agriculture,

and the information thus collected, carefully arranged and brought up to date, will be found of great service to students desirous of studying man and his environment in Japan. A chapter is devoted to the mineral industry of the country, in which Dr. Rein dispels some erroneous conceptions as to the mineral wealth of Japan. Some 200 pages deal with the art manufactures of Japan and the industries connected therewith, and it is to this section that we find the numerous remarkable illustrations referred to. The leading industries treated of are those in wood, in lacquer, in textiles, paper, metals, ceramic, and enamel. The fourth chapter deals with trade and commerce, and appended is a series of eight extremely useful statistical tables. The whole work does Dr. Rein the highest credit, and it is to be hoped that the second volume, like its predecessor, will be translated into English.

**Siberien.** Geographische, ethnographische und historische Studien von N. Iadrinzew. Mit Bewilligung des Verfassers nach dem Russischen bearbeitet und vervollständigt von Dr. Ed. Petri. Jena, 1886: pp. xviii. and 589, with twelve plates.

Siberia, says Dr. Petri in his preface, is a land of the future. Prejudices which have hitherto misled people concerning it must disappear before the light which science can throw over this great north land, destined to fill a great part in the world—the border land of European Russia, Central Asia, China, Corea, and Japan. To the worthy object of removing some of the ignorance prevailing in Western Europe about Siberia, M. Nicholai Yadrintseff, a native of Siberia, fired with a noble ambition and a real love of his country, has devoted himself. The present writer remembers with pleasure an evening spent in his society at Omsk, in 1880, when the subjects discussed were those contained in the work before us.

Our author begins with a study of the Siberian of the present day and the changes produced in the original Slav type, by different conditions of life in the new country beyond the Urals (chaps. 1 and 2); this is followed by a treatise on the sad fate and present position of the natives (Chaps. 3 and 4). From these weighty ethnographical problems, the author turns to the consideration of actual questions of the day: emigration (chap. 5), deportation (Chap. 6), and the general economic status of Siberia (Chaps. 7 and 8). The section on the administration of Siberia (Chap. 9), and the longing of the Siberian for a higher culture (Chap. 10), besides supplying valuable historical material, enables us to form some idea of the future of the country, to which a special chapter (11) is devoted. Some statistical tables conclude M. Yadrintseff's work. The original work appeared in Russian in 1882, and Dr. Petri, professor of geography and anthropology at the University of Bern, has translated and brought it up to date by interpolating the text and adding notes, besides an entirely new chapter (12). He has also, out of regard for his European reader, abridged parts of the text, and omitted details, especially in Chapter 10, where the history of the University question has been compressed into a few pages, and the whole section on modern culture has been recast. With reference to these and other alterations Dr. Petri has availed himself of the opportunity afforded of close, friendly intercourse with M. Yadrintseff, during a visit paid by him to Switzerland.

M. Yadrintseff has not only given the results of his own observations, but has strengthened his case for the urgent need of reforms in the administration of Siberia, by numerous quotations from other authorities both past and present, whose works, owing to their being written in Russian, are more or less inaccessible to the European public. It is impossible, within the limited space allotted to these notices, to give more than a bare outline of M. Yadrintseff's book, which must take its place among standard works on Siberia, or to do justice to the sound judgment shown by Dr. Petri in his notes and additions. It would be impossible to give extracts where so much calls for notice.—[E. D. M.]

**Wills, C. J.**—*Persia As It Is.* Being Sketches of Modern Persian Life and Character. London, Sampson Low & Co., 1886: 8vo., pp. xix. and 326. Price 8s. 6d. [Presented by the Publishers.]

This volume may be regarded as a supplement to the Author's previous work, 'The Land of the Lion and Sun; or Modern Persia,' published in 1883.



Dr. Wills went out to Persia as a medical officer of H.M.'s Telegraph Department in Persia, and resided for fifteen years, 1866-1881, in various parts of the country, during which time he had exceptional opportunities afforded him for studying Persian life and character. The present volume abounds with interesting sketches of the people in their various phases of life, some of which have already appeared in *The World*, the *St. James's Gazette*, and *The Globe*, &c. The following chapter-headings will indicate a few of the subjects treated of:—The Shah of Persia; the Magistrate in Persia; Marriage; Dervishes; Persian Art and Artists; Judicial Punishments; the Great Fast of Ramazan; the Annual Persian Religious Drama; the Taziyah; in a Bazaar; the Jews in Persia; Persian Horses; the Englishman in Persia; Progress in Persia in 1886.

*Zapiski Vostochno-Sibirskago Otdiela Imperatorskago Russkago Geographicheskago Obshchestva.* Tom. xii. Irkutsk, 1886: pp. xxix. and 405, five plates of geological sections.

The whole of this volume of the *Zapiski* of the East Siberian section of the Russian Geographical Society is devoted to the first part of a detailed geological study of Lake Baikal, by J. D. Chersky. Lake Baikal, the "Holy Sea" of the local Russian inhabitants, the *Dalai* or *Dalai-nor* of the Buriats, is the largest alpine lake in the world, and the largest sweet-water basin of Asia. Its area, 12,441 English square miles, may be compared with the great lakes of North America and Africa, while its maximum depth, 4504 feet, exceeds that of Lake Superior, the deepest of the enclosed lacustrine basins of the New World. Besides these claims to be treated as a special subject of study, Lake Baikal presents phenomena of recent active vulcanicity; earthquakes are to this day of frequent occurrence on its shores, and a stream of lava which has issued from one of the extinct craters situated in the neighbourhood, has a length of not less than twelve miles (Reclus, 'Nouvelle Géographie Universelle—Asie Russe,' p. 732). The first results of M. Chersky's surveys, continued from 1877 to 1881, were published in the *Izvestiya* of the East Siberian section. His collections were mostly destroyed by the great fire of Irkutsk, in 1878, but his observations now appearing in detail cannot fail to be of interest. They show that the whole of the Trans-Baikalian and Maritime ranges are mainly composed of Laurentian rocks; while the Onotsk range, raised in the period immediately preceding the Jurassic, is formed of Palæozoic deposits, which also fill the rifts in the Maritime range, and dip below the level of the lake. The author was further able to found a theory of the formation of Lake Baikal, and present in more or less detail, and with some degree of probability, certain phases of the gradual development of this basin and its severance from a northern Silurian ocean.—[E. D. M.]

#### AFRICA.

**Dennett, R. E.**—Seven Years among the Fjort; being an English Trader's Experiences in the Congo District. London, Sampson Low & Co., 1887: cr. 8vo., pp. xvi. and 240. Price 7s. 6d. [Presented by the Publishers.]

This little volume is the result of seven years' careful observation and experience among the natives of the South-west Coast of Africa. Its object is to better acquaint those interested in the negro, with his home-life, habits, and customs. The author visited Cabenda, Kinsembo, Ambrizette, and Chiloango. There are twenty-three full-page illustrations from photographs and the author's own sketches, and a map of trade routes never before published.

**Felkin, Robert W.**—Notes on the Waganda Tribe of Central Africa. (Reprinted from the Proceedings of the Royal Society of Edinburgh, Vol. XIII.) Edinburgh, printed by Neill & Co., 1886: 8vo., plates. [Presented by the Author.]

**Sims, A.**—A Vocabulary of Kibangi as spoken by the Babangi (commonly called Bayansi) on the Upper Congo, from Kwa Mouth (Kasai) to Liboko (Bangala). English-Kibangi. London, East London Institute for Home and Foreign Missions, 1886: 12mo., pp. xi. and 111. [Presented by R. N. Cust, Esq.]

#### AMERICA.

[**America, United States.**]—[Tenth Census of the United States, 1880.] Vol. XVIII. Report on the Social Statistics of Cities, compiled by George E. Waring, Jun., Expert and Special Agent. Part I. The New England and the Middle States. Part II. The Southern and the Western States. Part I. Washington, Government Printing Office, 1886: 4to., pp. 915, plans.

**Elliott, Henry W.**—An Arctic Province: Alaska and the Seal Islands. Illustrated by many drawings from nature, and maps. London, Sampson Low & Co., 1886: 8vo., pp. xv. and 473. Price 16s. [Presented by the Publishers.]

This is one of the most complete and scientific of the numerous works which have been recently published on Alaska. The interest of the book centres round the tiny Pribyloff group, on the 170th meridian west, and some 200 miles north of the Aleutian island Nikolsky. Here, mainly on the islands of St. Paul and St. George, every summer assemble hundreds of thousands of the fur-seal (*Callorhinus ursinus*) for breeding purposes, and Mr. Elliott's account of the life of the animals, their battles and domestic arrangements, from his own observations some twelve years ago, forms a fascinating contribution to natural history. He also tells us much about the other animal life of these regions, and especially of the Aleutian Islands, and of the results which have followed the advent of the white hunter both on these and on the native population. But around this as a nucleus we have a valuable account of the physical conditions of Alaska and its islands, and much useful information on the ethnology of the region. The author gives a sketch of the history of the country from its discovery down to the present time, bringing together into handy form a great deal of information concerning the doings of the Russians until, about twenty years ago, they sold the country to the United States. Mr. Elliott's account of Alaska takes the form of a voyage around its coasts and islands, with a series of pictures or descriptions of the different regions, as well as of the interior so far as is known. A chapter is devoted to the special features of the Sitkan region and another to the aboriginal life of the Sitkans. The alpine region around Mount St. Elias is dealt with in another chapter, and there is a long and instructive chapter on Kadiak Island, and a shorter one on Cook's Inlet and its people. The great Aleutian group is treated in considerable detail, each leading island, its people, their settlements, and their life, receiving special notice. Another long chapter is devoted to the Yukon, "the Mississippi of Alaska," from its source to the sea; all this in addition to the chapters which deal with animal life. Mr. Elliott speaks to a large extent from his own personal investigations, but has also taken the trouble to digest and bring together the work of others who have explored a land of great geographical interest. There are numerous good illustrations, maps of St. Paul and St. George's islands, and a fair map of Alaska on the scale of 75 miles to an inch.

**Kappler, August.**—Surinam, sein Land, seine Natur, Bevölkerung und seine Kultur-Verhältnisse, mir Bezug auf Kolonisation. Stuttgart, Cotta, 1887: 8vo., pp. 384. Price 5s. [Presented by the author.]

Mr. Kappler, who was formerly an official in Dutch Guiana, presents in this little volume a succinct and well-arranged account of its geographical and industrial conditions. He deals first with the country and its configuration then follow chapters on its plant and animal life, its climatic condition, the various inhabitants and the social condition of the colony, the town of Para-  
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maribo, on European colonisation, and on colonial agriculture. The author has some useful pages on the subject of colonisation of tropical countries by Europeans, and on this subject he takes a more than usually hopeful view, and at the same time gives some useful practical advice. There is a small sketch-map which shows how little we really know of the country.

**Ober, Frederick A.**—Camps in the Carribbees: The Adventures of a Naturalist in the Lesser Antilles. Edinburgh, Douglas, 1886: 8vo., pp. xviii. and 366. Price 12s.

This is one of the best authorities we have on the geography and natural history of the group of islands which stretch between Porto Rico and Trinidad.

**Rosny, Lucien de.**—Les Antilles. Étude d'ethnographie et d'archéologie Américaines. [Mémoires de la Société d'Ethnographie. Nouvelle Série.—Tome Second.] Paris, Maisonneuve Frères & Charles Leclerc, 1886: 4to., pp. 152. Price 8s. 6d.

#### GENERAL.

**Fortescue, G. K.**—A Subject Index of the Modern Works added to the Library of the British Museum in the years 1880–85. Printed by order of the Trustees. Sold at the British Museum; and by Longmans & Co., Quaritch, Asher & Co., and Trübner & Co. London, 1886: imp. 8vo., pp. [4] and 1044. Price 42s.

This index is mainly designed to assist those who use the reading room of the British Museum, but it is well calculated to fulfil a wider purpose. The index is arranged alphabetically according to subjects, and contains works in all literary languages except Slavonic, Hungarian, and the Oriental languages. The compiler would have found it useful in some cases to have had the assistance of specialists, though so far as the geographical subjects are concerned they seem to us satisfactory, and in this respect the Index will be found of much service.

**Hauser, [Capt.] Paul.**—Die Aeqator-Durchgänge des Mondes. Eine Untersuchung-Probe des Mond-Einflusses auf die Witterung. Buccari bei Fiume, Druck von Rudolf Desselbrunner, 1886: sm. 8vo., pp. 15, tables.

**Lawrence, Edwin.**—The Progress of a Century; or, the Age of Iron and Steam. London, H. Vickers & John Heywood, 1886: square 8vo., pp. 30. [Presented by the Author.]

**Petherick, Edwin Augustus.**—Catalogue of the York Gate Library formed by Mr. S. William Silver, an Index to the Literature of Geography, Maritime and Inland Discovery, Commerce, and Colonisation. 2nd edition. London, John Murray: imp. 8vo., pp. cxxxii. and 333. Price 42s. [Presented by S. W. Silver, Esq.]

The new edition of the catalogue of Mr. Silver's well known York Gate Library is at least four times the size of the first edition published in 1882. Mr. Petherick has performed his arduous and difficult task very creditably, and the result is a catalogue which will be of great service for reference. In some respects Mr. Silver's library is unique as a private collection, especially his rare and valuable "Collections." In colonial literature it is particularly strong. Mr. Petherick has taken great pains in the arrangement of the catalogue. We have first a catalogue of subjects, and then a long catalogue of authors, followed by the general catalogue. The first two sections of this last are devoted to general geography, and Transactions and Collections, followed by general voyages and travels arranged geographically. The two concluding sections are devoted to Christian missions, and to bibliography and catalogues. An attractive feature is the reproduction of the illustrated title-pages and other illustrations from the old collections and other classical works, beautifully and faithfully executed. As a collection of standard and rare geographical works, Mr. Silver's collection is a valuable one, and it should be known that he places it freely at the service of any one desirous of making serious use of it.

**Reiter, [Dr.] Hanns.**—Die Südpolarfrage und ihre Bedeutung für die genetische Gliederung der Erdoberfläche. Weimar, Geographisches Institut, 1886: imp. 8vo., pp. 34. [Presented by the author.]

Dr. Reiter's dissertation is of special importance at the present time, seeing that the question of the renewal of Antarctic exploration is in the air. The author not only gives a *résumé* of all that has been done, but very forcibly shows the value of the knowledge to be acquired for the solution of certain questions in physical geography.

**Scherzer, [Dr.] Karl [von].**—Die Wirthschaftliche Leben der Völker. Ein Handbuch über Production und Consum. Leipzig, Alpbons Dürr, 1885: 8vo., pp. xi. and 756. Price 18s. 6d. [Presented by the Author.]

The name of our Honorary Fellow, Dr. von Scherzer, is well known, among other things, in connection with the publications on the *Novara* voyage, the statistico-commercial results of which were issued by him twenty years ago. The present work was originally intended to be an expansion of the former; but Dr. von Scherzer soon found that progress had been so great, and the additional data so abundant, that an entirely new book was necessary if the field were to be adequately covered. We have thus a large and valuable collection of facts and figures illustrating the industrial results of man's action on his geographical surroundings, results which may be of service to those who are cultivating the new geography. The Author deals in successive chapters with materials from the vegetable, animal, and mineral kingdoms, in their various applications by humanity. A separate chapter deals with chemical industries, and another with mechanical inventions. A specially interesting chapter is that which deals with the share taken by different races in the trade of the world. Other chapters deal with money and credit, and means of communication, and his final chapters with "industry as an organism," tariffs, consulates, exhibitions, and what the author calls "international exchange of ideas," and with emigration and colonisation.

**Schück, [Capt.] A.**—Beobachtungen der Missweisung, Inklination und Schwingungszeit der Magnetnadel auf der Elbe und der Nordsee zwischen Hamburg und Rouen 1884 und 1885, London und Hamburg 1886. Separat-Abdruck aus den Abhandlungen des Naturwissenschaftlichen Vereins von Hamburg, Band ix. Heft 2, 1886: 4to., pp. 40, tables. [Presented by the Author.]

**Stephen, Leslie.**—Dictionary of National Biography. Vol. IX. Canute—Chaloner London, Smith, Elder & Co., 1887: 8vo., pp. vi. and 460. Price 12s. 6d.

**Woeikoff, [Dr.] A.**—Die Klimate der Erde. Nach dem Russischen. Vom Verfasser besorgte, bedeutend veränderte deutsche Bearbeitung. Jena, Costenoble: 2 vols. 8vo.; vol. i. pp. 396, vol. ii. pp. xxiii. and 422. Price 20s.

The name of Dr. Woeikoff must be known to most meteorologists as that of one who in recent years has done much good work in his own department of science. He has travelled over most of the world, with a special view to the collection of meteorological data. The results of his own observations and of those of other writers in the same department, he has embodied in these two volumes, which we are sure will be found of great service to the physical geographer; and it should be remembered that Dr. Woeikoff is Professor of Physical Geography in St. Petersburg University. It covers a wider field than the works of either Hann or Scott, and we regret to say that the long-promised new edition of Buchan's Meteorology has not yet made its appearance. The German edition is not a mere translation of the Russian edition published four years ago; there have been many improvements and additions. The first part of the work deals with general meteorology, discussing temperatures and air-currents; moisture, clouds, and deposition; rivers and lakes as the results of climate; the influence of a snow-covering on climate, and the climatic conditions of permanent snow and glaciers; water-temperatures; variations in the distribution of temperature on land and water, and their influence on the temperature of the earth; daily and yearly variations in the temperature of

the air, of moisture, of atmospheric pressure and winds; variation of temperature with altitude in mountainous countries, and in the free atmosphere; influence of climate on vegetation, and of vegetation on climate; non-periodical variations of temperature and rainfall; daily variations of temperature; general remarks on the distribution of temperature, pressure, winds, and moisture. The second volume deals in a series of chapters with the special meteorology of different regions and countries, and the whole is illustrated by a series of carefully executed diagrams. The work will certainly become a standard reference work on an important subject, though probably some of Dr. Woeikoff's theories will not command universal assent among meteorologists. We should have liked an alphabetical index in addition to the full table of contents which is given.

The following works have also been added to the Library:—

- Cape Colony.** Correspondence respecting the Affairs of Pondoland. London, printed by Eyre & Spottiswoode, 1885: folio, pp. iv. and 25. Price 4*d.* [Presented by Lord Arthur Russell.]
- Central Asia.** No. 4 (1885).—Further Correspondence concerning Central Asia. [In continuation of "Central Asia No. 2: 1885."] London, printed by Harrison & Sons: folio, pp. vi. and 76, maps. Price 3*s.* 2*d.* [Presented by Lord Arthur Russell.]
- Green, John Richard, and Alice Stopford.**—A Short Geography of the British Islands. With maps. London, Macmillan & Co., 1884: 12mo., pp. xix. and 416.
- New Guinea and the Western Pacific Islands.** Further Correspondence respecting New Guinea and other Islands in the Western Pacific Ocean. (In continuation of [C.—4217] October 1884.) London, printed by Eyre and Spottiswoode, 1885: folio, pp. xx. and 166. Price 2*s.* [Presented by Lord Arthur Russell.]
- Ditto. (In continuation of [C.—4273] February 1885.) London, printed by Eyre and Spottiswoode, 1885: folio, pp. xv. and 206. Price 2*s.* 4*d.* [Presented by Lord Arthur Russell.]
- Transvaal.** Further Correspondence respecting the Affairs of the Transvaal and Adjacent Territories. (In continuation of [C.—4432] of May 1885.) London, printed by Eyre & Spottiswoode, 1885: folio, pp. vii. and 120. Price 2*s.* 4*d.* [Presented by Lord Arthur Russell.]

## NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

### EUROPE.

- Attika.**—Karten von —, Auf Veranlassung des Kaiserlich Deutschen Archäologischen Instituts und mit Unterstützung des Königlich Preussischen Ministeriums der Geistlichen, Unterrichts- und Medicinal-Angelegenheiten. Aufgenommen durch Offiziere und Beamte des k. Preussischen Grossen Generalstabes, mit erläuterndem Text herausgegeben von E. Curtius und J. A. Kaupert. Heft IV. Vier Blätter. Scale 1: 25,000 or 2.9 inches to a geographical mile.
- Bl. XII.—Pentelikon. Aufgenommen und gezeichnet von R. Wolff.
- Bl. XIII.—Markopulo. Aufgenommen und gezeichnet von R. Wolff.
- Bl. XIV.—Cap Sunion (West). Aufgenommen und gezeichnet von v. Bernhardt.
- Bl. XV.—Cap Sunion (Ost). Aufgenommen und gezeichnet von v. Bernhardt.
- Berlin 1886. Dietrich Reimer. (*Dulau.*)

These are most beautifully executed maps; the hill-work, which is shown

by a combination of hatching and contour lines, is coloured in sepia. Ancient names and positions are marked in red, and the heights of the mountains are given in metres, the contours of the hills being for differences of 20 metres in level. This issue, as also the previous one (III.), is not accompanied by explanatory letterpress, but a notice is printed on the cover informing the public that these will be published when the map is complete.

**Frankreich.**—Uebersichts-Karte von Nordöstlichen, nebst Grenzländern mit Befestigungen der I. französ. Vertheidigungslinie. A. Front der Maaslinie.—B. Front der Mosellinie.—C. Front von Belfort. Scale 1:1,000,000 or 13·6 geographical miles to an inch. G. O'Grady. Kassell, Theodor Fischer. Price 2s. (*Dulau.*)

**Italiane.**—Carta delle Strade Ferrate — in esercizio, in costruzione, in progetto ed allo studio tramways a vapore, scali marittimi e stazioni lacuali corredata delle distanze chilometriche, indici alfabetici delle stazioni, zone di vigilanza doganale ed altre indicazioni e compilata in base al nuovo ordinamento sulla scorta di documenti ufficiali da Enrico Gambillo e Cesare Piattoli, applicati all' Ufficio Controllo Veicoli delle Strade Ferrate Meridionali. Bologna, 1886. Four sheets. Price 4s. 6d. (*Dulau.*)

**Medjerda.**—Das Deltaland des —, und die Landschaft von Tunis, Karthago, Utica und Biserta. Gez. von Th. Fischer. Scale 1:400,000 or 5·5 geographical miles to an inch. With sections. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 1. Justus Perthes, Gotha. (*Dulau.*)

**Oesterreich.**—Sprachen-Karte der Westlichen Kronländer von —. Nach dem Zensus von 1880, entworfen von F. Held auf C. Vogel's Karte von Oesterreich-Ungarn. Scale 1:1,500,000 or 20·4 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 2. Justus Perthes, Gotha. (*Dulau.*)

**Polen.**—Handkarten von Russisch —, und den angrenzenden Gouvernements von O'Grady. Scale 1:1,750,000 or 23·9 geographical miles to an inch. Price 1s. (*Dulau.*)

**Tübingen.**—Umgebungs-Karte für die Garnisonstadt. 1:25,000 or 2·9 inches to a geographical mile. Tübingen, Fues. Price 3s. (*Dulau.*)

#### ORDNANCE SURVEY MAPS.

Publications issued during the month of December 1886.

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LXXXVIII. 3, 4s.; LXXXVIII. 5, 3s.; LXXXVIII. 8, 4s.; LXXXIX. 1, 3s.; CX. 1, 6, 4s. each. Area Books: Babingley, Chesgrave (detached Nos. 1 and 2) Dickleburgh, Filby, Garboldisham, Gooderstone, Scoulton, Shouldham, Shouldham Thorpe, South Pickenham, South Runcton, Stanford, Tunstall, Wallington cum Thorpland, 1s. each. **Northamptonshire:** I. 12, 3s.; I. 15, 16, 4s. each; VIII. 1, 2, 5, 6, 10, 13, XV. 9, 10, 3s. each; XV. 13, 4s.; XV. 14, XXII. 13, XXVII. 3, 4, 7, 8, 9, 11, 13, 14, XXXIX. 6, XLVIII. 4, 8, 3s. each. 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**Malay, or East Indian Archipelago**, with Burmah, Siam, &c., by Wm. Shawe, F.R.G.S. Scale 1 : 8,760,000 or 120 geographical miles to an inch. G. Philip & Son, London and Liverpool, 1887. Price 1s., or mounted on cloth and in case, 2s.

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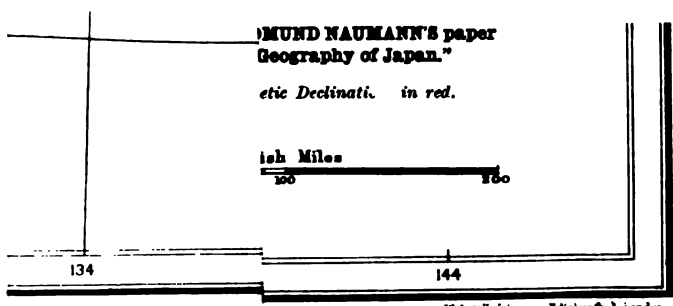
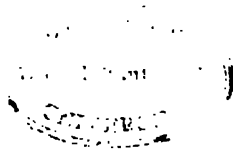
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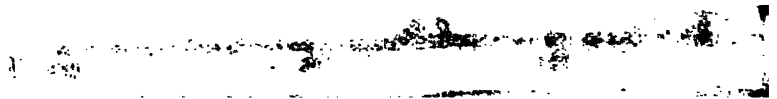






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PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*On the Scope and Methods of Geography.*

By H. J. MACKINDER, B.A.

(An Address delivered at the Evening Meeting, January 31st, 1887.)

WHAT is geography? This seems a strange question to address to a Geographical Society, yet there are at least two reasons why it should be answered, and answered now. In the first place geographers have been active of late in pressing the claims of their science to a more honoured position in the curriculum of our schools and Universities. The world, and especially the teaching world, replies with the question, "What is geography?" There is a touch of irony in the tone. The educational battle now being fought will turn on the answer which can be given to this question, Can geography be rendered a discipline instead of a mere body of information? This is but a rider on the larger question of the scope and methods of our science.

The other reason for now pressing this matter on your notice comes from within. For half a century several societies, and most of all our own, have been active in promoting the exploration of the world. The natural result is that we are now near the end of the roll of great discoveries. The Polar regions are the only large blanks remaining on our maps. A Stanley can never again reveal a Congo to the delighted world. For a time good work will be done in New Guinea, in Africa, in Central Asia, and along the boundaries of the frozen regions. For a time a Greely will now and again receive the old ringing welcome, and will prove that it is not heroes that are wanting. But as tales of adventure grow fewer and fewer, as their place is more and more taken by the details of Ordnance Surveys, even Fellows of Geographical Societies will despondently ask, "What is geography?"

It is needless to say that this paper would not be written were it my belief that the Royal Geographical Society must shortly close its history—a corporate Alexander weeping because it has no more worlds to conquer. Our future work is foreshadowed by papers such as those

by Mr. Wells on Brazil, Mr. Buchanan on the Oceans, and Mr. Bryce on the Relation of History and Geography. Nevertheless, there will be great advantages in guiding our way into the new groove with our eyes to some extent, at any rate, open. A discussion of the question at the present moment will probably have the further incidental advantage of giving us new weapons in our educational struggle.

The first inquiry to which we must turn our attention is this: Is geography one, or is it several subjects? More precisely, Are physical and political geography two stages of one investigation, or are they separate subjects to be studied by different methods, the one an appendix of geology, the other of history? Great prominence has recently been given to this question by the President of the Geographical Section of the British Association. In his address at Birmingham he took up a very definite position. He said,—

“It is difficult to reconcile the amalgamation of what may be considered ‘scientific’ geography with history. One is as thoroughly apart from the other as geology is from astronomy.”

It is with great reluctance and diffidence that I venture to oppose so justly esteemed an authority as Sir Frederic Goldsmid. I do so only because it is my firm conviction that the position taken up at Birmingham is fatal to the best prospects of geography. I take notice, moreover, of Sir Frederic Goldsmid’s declaration that he is quite ready to abandon the conclusion at which he has arrived, before the arguments of sounder reason. In so difficult a discussion it would be extremely presumptuous, were I to assume that *mine* are arguments of sounder reason. I put them forward only because so far as I can see, they have not been met and overthrown in the address in question. Perhaps Sir Frederic Goldsmid has but expressed the vague views of the subject current in most men’s minds. This is the more probable, because in his own statement he has used arguments going to support a view opposed to that which he himself formulates.\*

On the same page as that from which our quotation is taken will be found a paragraph expressing the highest approval of Mr. Bryce’s “Geography in its relation to History.” The central proposition of Mr. Bryce’s lecture is that man is largely “the creature of his environment.” The function of political geography is to trace the interaction between man and his environment. Sir Frederic Goldsmid requires of political geography that it shall impart to our future statesmen a “full grasp” of “geographical conditions.” So far no exception can be taken to his views. But he seems to imagine that the “full grasp” of which

\* Sir Frederic Goldsmid has written a very courteous answer to this paragraph. From it I gather that I have not attached the meaning to his words which he intended. For that I am sorry. I leave the paragraph standing, however, as I believe that mine is not an unnatural meaning to attach to the words. They might easily be quoted against the geographers, and with the more weight because they come from a known friend of geography.

he speaks may be obtained from what remains after "physical and scientific" geography have been eliminated.

Before proceeding further, it will be well to see whether we cannot refine on our definition with advantage. Physiology would answer to the definition of the science which traces the interaction of man and his environment. It is the function of physiology, of physics, and of chemistry to trace the action of forces irrespective for the most part of precise locality. It is especially characteristic of geography that it traces the influence of locality, that is, of environment varying locally. So far as it does not do this it is merely physiography, and the essential topographical element has been omitted. I propose therefore to define geography as the science whose main function is to trace the interaction of man in society and so much of his environment as varies locally.\*

Before the interaction can be considered, the elements which are to interact must be analysed. One of these elements † is the varying environment, and the analysis of this is, I hold, the function of physical geography. Thus we are driven to a position in direct antagonism to current notions. We hold that no *rational* political geography can exist which is not built upon and subsequent to physical geography. At the present moment we are suffering under the effects of an irrational political geography, one, that is, whose main function is not to trace causal relations, and which must therefore remain a body of isolated data to be committed to memory. Such a geography can never be a discipline, can never, therefore, be honoured by the teacher, and must always fail to attract minds of an amplitude fitting them to be rulers of men.

But it may be retorted—For the purposes of political geography cannot you rest satisfied with a more superficial and more easily learned analysis than that furnished by physical geography? In reply, we take up our lowest position. Such analyses have been tried, and have been found wanting. It is practically easier to learn the profound analysis of science, raising and satisfying as it does at every point the instincts which drive us for ever to ask the question "why?" than to acquire a sufficient amount of information from the name-lists of the old school-books or the descriptions of so-called descriptive geography. Topography, which is geography with the "reasons why" eliminated, is almost unanimously rejected both by masters and pupils.

There are other reasons for our position of even higher importance than practical convenience in teaching. I will mention three. The

\* For another definition from a rather different standpoint see my speech in opening the discussion, *infra*, p. 160.

† The other element is, of course, man in society. The analysis of this will be shorter than that of the environment. It may best be considered on the lines of Bagehot's 'Physics and Politics.' The communities of men should be looked on as units in the struggle for existence, more or less favoured by their several environments. See p. 11 for definition of "community" and "environment."

first is this. If you learn what the old geographers term "the physical features" in their causal relations, advance becomes ever easier and easier. New facts fit in an orderly way into the general scheme. They throw a new light on to all previously obtained knowledge, and that knowledge in turn illuminates them from many points. When, however, the method of description has been adopted, and still more that of enumeration, each additional fact adds an ever-increasing amount to the burden to be borne by the memory. It is like throwing another pebble on to a heap of gravel. It is like learning mathematics by trying to remember formulæ instead of grasping principles.

Our second reason is shortly this. A superficial analysis is likely to lead into error: on the one hand by failing to go beneath the superficial similarity of things essentially differing; on the other hand by failing to detect the essential similarity of things superficially unlike.

The third reason is this. The mind which has vividly grasped in their true relations the factors of the environment is likely to be fertile in the suggestion of new relations between the environment and man. Even if there be no design of advancing the science, the same conditions will lead to a rapid, a vivid, and therefore a lasting appreciation of the relations which have been detected by others.

It will be well here to pause and to sum up our position in a series of propositions.

1. It is agreed that the function of political geography is to detect and demonstrate the relations subsisting between man in society and so much of his environment as varies locally.

2. As a preliminary to this the two factors must be analysed.

3. It is the function of physical geography to analyse one of these factors, the varying environment.

4. Nothing else can adequately perform this function.

Because—

No other analysis can exhibit the facts in their causal relations and in their true perspective.

Therefore—

No other analysis will—

Firstly, Serve the teacher as a discipline;

Secondly, Attract the higher minds among the pupils;

Thirdly, Economise the limited power of memory;

Fourthly, Be equally trustworthy; and

Fifthly, Be equally suggestive.

Here we must expect the observation that, granting the desirability of what we ask, we are none the less asking what is impossible. Our reply will be that it has not been tried. Physical geography has usually been undertaken by those already burdened with geology, political geography by those laden with history. We have yet to see the man who taking up the central, the geographical position, shall look

equally on such parts of science and such parts of history as are pertinent to his inquiry. Knowledge is, after all, one, but the extreme specialism of the present day seems to hide the fact from a certain class of minds. The more we specialise the more room and the more necessity is there for students whose constant aim it shall be to bring out the relations of the special subjects. One of the greatest of all gaps lies between the natural sciences and the study of humanity. It is the duty of the geographer to build one bridge over an abyss which in the opinion of many is upsetting the equilibrium of our culture. Lop off either limb of geography and you maim it in its noblest part.

In speaking thus we are not blind to the necessity of specialism within geography itself. If you would do original work in the science you must specialise. But for this purpose either physical or political geography would be as unwieldy as the entire subject. Moreover, your special subject need not fall entirely within the realm of one or other branch; it may lie across the frontier. Geography is like a tree which early divides into two great branches, whose twigs may none the less be inextricably interwoven. You select a few adjacent twigs, but they may spring from different branches. As a subject of education, however, and as a basis for all fruitful specialism within the subject, we insist on the teaching and the grasping of geography as a whole.

This question of possibility leads us naturally into an inquiry as to the relations of geography to its neighbour sciences. We cannot do better than adopt Mr. Bryce's rough classification of the environment. First, we have the influences due to the configuration of the earth's surface; secondly, those belonging to meteorology and climate; and thirdly, the products which a country offers to human industry.

First, then, as to the configuration of the earth's surface. We have here a bone of contention between the geographers and the geologists. The latter hold that the causes which have determined the form of the lithosphere are dealt with by their science, and that there is neither room nor necessity for the physical geographer. The geographer has in consequence damaged his science by refusing to include among his data any but the barest results of geology. The rivalry must be well known to all here present. It has been productive of nothing but evil to geography. Two sciences may have data in part identical, yet there ought to be no bickering in consequence, for the data, though identical, are looked at from different points of view. They are grouped differently. Least of all should the geologist exhibit such weakness. At every step in his own department he is dependent on his scientific brethren. Palæontology is the key to the relative age of strata, but it is irrational apart from biology. Some of the most difficult problems of physics and chemistry lie within the realm of mineralogy, especially, for instance, the causes and effects of earthquakes. It is a common attempt to find a common measure between the sciences, but it is



in Dr. Croll's astronomical interpretation of recurrent glacial epochs. But enough of this. The true distinction between geology and geography seems to me to lie in this: the geologist looks at the present that he may interpret the past; the geographer looks at the past that he may interpret the present. This line has already been traced for us by one of the greatest of the geologists.

In his 'Text-book of Geology,' Dr. Archibald Geikie gives the following lucid determination of it:\*

"An investigation of the geological history of a country involves two distinct lines of inquiry. We may first consider the nature and arrangement of the rocks that underlie the surface, with a view to ascertaining from them the successive changes in physical geography and in plant and animal life which they chronicle. But besides the story of the rocks, we may try to trace that of the surface itself, the origin and vicissitudes of the mountains and plains, valleys and ravines, peaks, passes, and lake basins, which have been formed out of the rocks. The two inquiries traced backwards merge into each other, but they become more and more distinct as they are pursued towards later times. It is obvious, for instance, that a mass of marine limestone which rises into groups of hills, trenched by river gorges and traversed by valleys, presents two sharply contrasted pictures to the mind. Looked at from the side of its origin, the rock brings before us a sea-bottom over which the relics of generations of a luxuriant marine calcareous fauna accumulated. We may be able to trace every bed, to mark with precision its organic contents, and to establish the zoological succession of which these superimposed sea-bottoms are the records. But we may be quite unable to explain how such sea-formed limestone came to stand as it now does, here towering into hills, and there sinking into valleys. The rocks and their contents form one subject of study, the history of their present scenery another."

The same idea is indorsed by Professor Moseley in his lecture on "The Scientific Aspects of Geographical Education." We quote the following passage from among many others in the same strain:†—

"Regarding physical geography as a part of geology to be separated from it:—The reason why such a separation should be effected is that there is thus formed and brought together for special treatment a subject which is far more necessary and suitable for general educational purposes than the whole of geology itself, which will attract far more students and act as a lever for promoting the study of other branches of science as special studies, and certainly of geology itself.

"The principal argument that is always brought against the establishment of professorships of physical geography at the Universities is that the subject is already covered by the professors of geology; but

\* Archibald Geikie, 'Text-book of Geology,' 1882, p. 910.

† 'R. G. S. Educational Reports,' 1886, p. 228, Professor Moseley.

Prof. Geikie evidently does not take that view, and points out in his letter already referred to, 'Geology is every day increasing in its scope; which is already too vast for the physical powers of even the most indefatigable teacher.'

In this passage Prof. Moseley advocates the establishment of a chair of physical geography. It must not be concluded from this that he is opposed to the unity of geography. This is made clear by other portions of his lecture.

"Possibly, although at the present moment it may not be possible to secure the representation of geography as a whole, because of the apparent vagueness of its bounds and the attacks on all sides to which it is in consequence liable, there may be a chance of success if the attempt be made to press the claims of physical geography."

And again:—

"Ought not physical geography to form part of every liberal education as being a subject specially adapted for purposes of general learning, and as the only true basis on which can be founded a knowledge of what is termed political geography?"

Perhaps nowhere is the damage done to geography by the theory which denies its unity better seen than in the case of physical geography. The subject has been abandoned to the geologists, and has in consequence a geological bias. Phenomena such as volcanoes, hot springs, and glaciers, have been grouped into chapters, irrespective of the regions in which they occur. From the geologist's point of view this is sufficient—he is looking at his Rosetta stone; the understanding of the individual hieroglyphics is of great importance, but the meaning of the entire passage, the account of the events recorded, is for the purpose of interpreting other records, unimportant. But such a science is not really physical geography, and Dr. Archibald Geikie tells us plainly in his 'Elements of Physical Geography' \* that he is using the words as equivalent to physiography. True physical geography aims at giving us a general description of the distribution of the features of the earth's surface. The facts must be registered in a systematic order. It may venture to put the matter somewhat differently—Physiography asks:—if a given feature, + What is it? + Where is it? + Political geography, + What is it there? + How does it use or use it socially, and how does it react on it? + Geology asks:—What made it the past does it help or hurt? Physiography is common ground to the geologist and the geographer. The first four subjects are the realm of the geographer. The questions come in sequence. You may not object if any one of them, but it is my contention that you cannot with advantage answer a larger one unless you have answered those which precede it. Geology comes in the strict sense in consequence of the sequence of the argument.

\* New edition, 1864, p. 12.

We will give two illustrations of the inadequacy for geographical purposes of the present (geological) physical geographies even when considered as physiographies.

The first is the undue prominence given to such subjects as volcanoes and glaciers. To this my attention has been several times drawn by your Assistant-Secretary, Mr. Bates. It is perfectly natural in books written by geologists. Volcanoes and glaciers are phenomena which leave most marked and characteristic traces behind them. Therefore, from a geological point of view they are most important, and are worthy of special study. But the result resembles a book on biology written by a palæontologist. In it we should expect to find the snail's shell, for instance, described in the greatest detail, but to the comparative neglect of the far more important soft parts within.

My other illustration is a practical one, which must appeal to the experience of all thoughtful travellers. Let us say that you go for a trip up the Rhine; you must be strangely wanting in curiosity if you do not ask yourself such questions as the following:—Why is it that after passing over many miles of flat land through which the Rhine meanders almost on a level with the surrounding country, we come suddenly to a part of its course in which it passes through a gorge? Why, when we reach Bingen, does that gorge still more suddenly cease, its place taken by a lake-like valley bounded by parallel ranges of mountains? No ordinary physical geography that I have seen adequately answers such questions as these. If you happen to have a special knowledge of the subject, you may know that if you look into the 'Journal of the Geological Society \*' you will find a delightful paper on this subject by Sir Andrew Ramsay. But this implies the time and opportunity for research among original authorities, and even then your reward will be slight. It is only a few isolated regions which have been so treated.

I will close this portion of the subject with a constructive attempt. I shall select a region familiar to all, that your attention may be concentrated on the method rather than the matter. Let us take the south-east of England. The usual method of treating the geography of such a region would be to describe from a physical point of view first the coast and then the surface. The capes and inlets of the one and the hills and valleys of the other would be enumerated in order. You would then have a list of the political divisions, and a further list of the chief towns, stating the rivers on whose banks they stand. In some cases a few interesting but isolated facts would be added, mental pegs on which to hang the names. The political portion of such a work even at best rises no higher than to the rank of a good system of mnemonics. As for the physical portion, all the text-books agree in committing what is, from my point of view, a fundamental error. They separate the descriptions of the coast and the surface. This is fatal to

\* 1874.

the demonstration in due perspective of the chain of causes and effects. The accidents of the surface and of the coast are alike the results of the interaction of two forces, the varying resistance of the rock strata and the varying erosive powers of atmosphere and sea. The erosive powers, whether superficial or marginal, act on one and the same set of rocks. Why should there be a Flamborough Head? Why should there be a Yorkshire Wold? They are but two edges of the rim of one and the same mass of uptilted chalk-strata.

Let us try to construct a geography of South-eastern England which shall exhibit a continuous series of causal relations. Imagine thrown over the land like a white tablecloth over a table, a great sheet of chalk. Let the sheet be creased with a few simple folds, like a tablecloth laid by a careless hand. A line of furrow\* runs down the Kennet to Reading, and then follows the Thames out to sea. A line of ridge passes eastward through Salisbury Plain and then down the centre of the Weald. A second line of furrow follows the valley of the Frome and its submarine continuations, the Solent and Spithead. Finally, yet a second line of ridge is carried through the Isle of Purbeck and its now detached member the Isle of Wight. Imagine these ridges and furrows untouched by the erosive forces. The curves of the strata would be parallel with the curves of the surface. The ridges would be flat-topped and broad. The furrows would be flat-bottomed and broad. The Kennet-Thames furrow would be characterised by increasing width as it advanced eastward. The slopes joining the furrow-bottom to the ridge-top would vary in steepness. It is not pretended that the land ever exhibited such a picture. The upheaving and the erosive forces have always acted simultaneously. As with the Houses of Parliament, the process of ruin commenced before the building was complete. The elimination of erosion is merely an expedient to show the simple arrangement of the rocks, which simplicity is masked by the apparent confusion of the ruin. Add one more fact, that above and below the hard chalk lie strata of soft clay, and we have drawn on geology for all that we require.

The moulder's work is complete; the chisel must now be applied. The powers of air and sea tear our cloth to tatters. But as though the cloth had been stiffened with starch as it lay creased on the table, the furrows and ridges we have described have not fallen in. Their ruined edges and ends project stiffly as hill ranges and capes. The furrow-bottoms, buried beneath the superincumbent clay, produce lines of valley along the London and Hampshire basins. Into the soft clay the sea has cut, producing the great inlet of the Thames mouth, and the narrower but more intricate sea-channels which extend from *Porte Haris* through

\* Furrow and ridge are here used in the sense of syncline and anticline. They must be carefully distinguished from valley and hill. The two are often casually selected, as I point out in this paper, but they are far from identical.

the Solent to Spithead, and which ramify into Southampton Water and Portsmouth, Langstone, and Chichester Harbours. The upturned edge of the chalk-sheet produces the long range of hills, which, under the various names of Berkshire Downs, Chiltern, and Gogmagog Hills, and East Anglian Heights, bounds the Kennet-Thames basin to the north-west. The North and South Downs stand up facing each other, the springs of an arch from which the key-stone has been removed. The same arch forms Salisbury Plain, and its eastward prolongation in the chalk uplands of Hampshire; but here the key-stone, though damaged, has not been completely worn through. Beachy Head and the North and South Forelands are but the seaward projections of the Down ranges. The fact that the North Downs end not in a single promontory, like Beachy Head, but in a long line of cliff, the two ends of which are marked by the North and South Forelands, may serve to draw attention to a relation which frequently exists between the slope of the surface and the dip of the strata. A few sentences back, we mentioned the fact, that if our simple ridge and furrow system really obtained, the slopes connecting the ridge-tops and the furrow bottoms would vary in steepness. By remembering the position of a hill-range in the "restored" ruin, we shall remember not merely its direction, but also the relative steepness of its two faces. One will be produced by the dipping strata, the other will be the escarpment where the strata have been cut short. On the dip of the strata will depend very much whether when we have climbed the escarpment, we see in front of us a sharp descent or an undulating upland. Contrast in this respect the two chalk uplands which form the broad projections of East Anglia and Kent with the narrow ridges, the Chilterns and the Hog's Back. The north-west escarpment of the Chilterns is continuous with the western scarped face of East Anglia. The south-eastern dip-slope of the Chilterns is continuous with the dip-slope which forms the broad uplands of Norfolk. The dip is steep in the case of the Chilterns, slight in that of Norfolk. Similarly the Kentish uplands are a prolongation of the Hog's Back. The southern scarped faces differ but little, whereas the northern dip-slope of the Hog's Back is steep, though its continuation in Kent is only gently inclined. This terminal expansion of the hill-ranges has been of great importance in English history, as will be seen presently. The expansions may be considered as dependent on the eastward widening of the Kennet-Thames basin. It will be noticed that the shores of the Thames estuary are on the whole parallel with the hill-ranges which mark the lips of the basin, the northern shore parallel with the curve traced by the hills from Hunstanton Point to the Chilterns, the southern parallel with the straighter range of the North Downs.

The rivers of the district fall naturally into three classes. First, we have those which flow down the dip-slope of East Anglia. As a consequence, they are numerous and roughly parallel. They do not combine

to form one large stream presenting a tree-like appearance on the map. Secondly, we have those which flow down the great furrows, the Kennet and the Thames below Reading on the one hand, the Frome with its submarine prolongation by the Solent and Spithead on the other. The many tributaries of the Thames are obvious, but the tree-like character of the Frome is not obvious unless its submarine continuation be taken into account. Then the Frome, the Stour, the Avon, the Test, the Itchen, and the Medina, would combine to form one great stream, having its mouth east of the Isle of Wight. Such a river may very probably have actually existed. Lastly, there are the streams which pass by ravines right through the chalk ranges, the Thames above Reading, and the various small rivers of the Weald. This circumstance is incomprehensible, unless we suppose that the strata arches were formerly complete. Then these streams would flow down the even slope of the ridge, following the ordinary hydrostatic laws. The only prominent feature of our area which would require a special explanation apart from the flexure of the rocks is the shingle bank which forms Dungeness.\*

This being the general anatomy of the land, what has been its influence on man? In the midst of forest and marsh three broad uplands stood out in early days, great openings in which man could establish himself with the least resistance from nature. In the language of the Celts they were known as "Gwents," a name corrupted by the Latin conquerors into "Venta." They were the chalk uplands with which we were familiar, the arch-top of Salisbury Plain and Hampshire, and the terminal expansions of the chalk ranges in East Anglia and Kent. In East Anglia was Venta Icenorum; in Kent and Canterbury † we still have relics of another Gwent. The first syllable of Winchester ‡ completes the triplet. In later, but still early times, they were the first nests of the three races which composed the German host. The Angles settled in Norfolk and Suffolk, the Jutes in Kent, the Saxons in Hampshire. In still later England, Winchester, Canterbury, and Norwich were among the chief of mediæval cities. To this day the isolation of two of these regions at least has left its traces in the marked characteristics of their populations. The Fens cut off Norfolk, the Weald forests shut in Kent. Their people have taken distinct positions in our history. The "men of Norfolk" and the "men of Kent" have been of a remarkably rebellious disposition.

\* I have omitted in this sketch to account for Leith Hill and Sussex. They, too, depend on the flexure of the rocks; but to would take up too much space in a paper which purports only to not to exhaust its topic.

† So J. R. Green would have it, 'Making of Eng' Taylor derives Kent from *Cenn*, a Gadhelic form of the C section—'Words and Places,' 1885, p. 148.

‡ Venta Belgarum.

There were four great cities in the east and south; we have mentioned three. The fourth was London. Geographical conditions have determined the greatness of the metropolis. The map will make it clear at once, that the Fens and the Weald would compel the lines of communication from Norfolk and Kent on the one hand, and the rest of England on the other to pass in the general direction of London. Kent lies nearest to the Continent, and hence Watling Street was not merely the Kentish road, but also the road to Flanders. Where the hills narrow the Thames marshes most there is the natural crossing of Watling Street, first a ferry, then a bridge. This point lies between Tower Hill and the heights of Dulwich and Sydenham. Bermondsey, the isle of Bermond, was a dry spot, rising like a stepping-stone from among the surrounding marshes. The existence of solid ground on the immediate banks of the deep water, which is necessary, as the "take-off" for a bridge or ferry, is also necessary for a landing-place. Here then we have a crossing of natural ways on a spot which is a natural halting-place for both, hence a point at which a city is certain to rise. That city will be the more important if one way is by land and the other by water, for it is then a place of transshipment. It will be still more important if it is the necessary meeting-point of river and sea traffic. Even more pregnant with meaning is the position of the Thames mouth relatively to that of the Scheldt. It determines the linked greatness of London and Antwerp, and also much of the Continental policy of England. Thus many causes conspire to maintain the greatness of London. This is a fact to be marked. It is the secret of its persistent growth from the earliest times. The importance of a given geographical feature varies with the degree of man's civilisation. A city which depends on one physical advantage may fall at any moment. A single mechanical discovery may effect the change.\*

So much for the cities. Lastly as to the political divisions. There are two types of political divisions, natural and arbitrary. The contrast presented by the old division of France into provinces and the revolutionary division into departments will serve to indicate the distinction. The one is the result of an unconscious process, such as the accretion of smaller states to a larger state. The other is the product of conscious legislation. In England we have the two kinds side by side. In the midlands we have arbitrary divisions, counties named after their chief towns, and supposed to have originated from the partition of Mercia.† In the east and south, on the other hand, the counties are of natural growth, and bear names indicating their distinct origin. In the case of

\* In this account of the "greatness" of London I have not indicated the full significance of Tower Hill. The "dun" or hill-fort no doubt decided the precise locality of London; but other causes, as given above, have determined its greatness.

† Consider J. R. Green, 'Conquest of England,' 1883, p. 141, note. But compare Isaac Taylor, 'Words and Places,' 1885, p. 179.

arbitrary divisions the frontiers are also likely to be arbitrary. The frontiers of natural divisions will usually be natural, and may be of two kinds. Immigrants spread from a centre, either until they meet physical obstacles or until they meet with the opposition of other emigrating settlements. In the region we are dealing with we see some excellent examples of this sort. The immigrants of Surrey, Kent, and Sussex would maintain themselves in the chalk hills and tracts, and then push slowly into the forest until their advanced parties met in the centre. The frontier-lines of these counties are exactly what we should expect under these circumstances. With this we may compare the frontier dividing Berkshire and Hampshire from Surrey and Sussex. It crosses a region of common lying largely in the Redoubt sands. Such sands had would be incapacity of occupation until the water had had been filled up. Thus again the region of the Fens. Five counties and perhaps more these methods.

Thus furnish our going further into this subject. The total results are these. From a consideration of the finding of the chalk and of the heathens as compared with the sands above and below it, may be demonstrated the causes of the two great immigrations, the two great rivers, and the three great inland openings which have determined the positions, the number, and the importance of the chief cities and divisions of South-eastern England. The same processes of reasoning might be continued to any required degree of detail. The geography of any other region might be treated in a similar way. Further, having once mastered the few simple geological ideas involved, a graphic and concise description of a land may be constructed in a few sentences. The effort required to grasp the first application of the method may be greater than that called for by the other methods. Its beauty lies in the fact that every fresh conquest gives increased ease of acquisition.

We will sum up our results bearing on the relation of geology to geography in the form of propositions:—

1. It is essential to know the facts of the lithosphere.
2. This can only be accurately and vividly remembered by grasping the causes which have determined it.
3. One of these causes is the relative positions and arrangement of the rocks.
4. But in geological facts or reasoning none to be admitted unless it be pertinent to the geographical argument. It must help to answer the question, "Why is a given feature where it is?"

It. In view of two remaining classes of environmental factors call for the remark. The distinction between meteorology and geography now is a practical one. In most of meteorology, and it is most as dealt with weather-forecasting cannot be required by the geographer. Average or recurrent climatic conditions alone come within his scope. Even here it may be correct very often to adopt the results of meteorology as



data, just as meteorology itself accepts the results of physics. It is a mistake, especially of the Germans, that they include too much in geography. Geography has bearings on many subjects, but it does not bodily include those subjects. Even the great Peschel includes in his 'Physische Erdkunde'\* a discussion on the barometer and a demonstration of the formulæ needed in barometric corrections. Such digressions are the cause of the often repeated charge that geographers are merely dabblers in all the sciences. It is our contention that geography has a separate sphere of work. Its data may overlap those of other sciences, but its function is to point out certain new relations between those data. Geography must be a continuous argument, and the test of whether a given point is to be included or not must be this—Is it pertinent to the main line of argument? How far digressions with the view of proving data are allowable must of course be a practical question. As a rule they should be excluded if it is the function of any other science to prove them.

Mr. Bryce's last category includes the productions of a region. The distribution of minerals is obviously incidental to the rock-structure, and we need refer to it only to give another tap to the nail at which we have been hammering previously. As regards the distribution of animals and plants, we must apply the test to which we referred in the last paragraph—How far is it pertinent to the main line of geographical argument? So far as the animals and plants in question form an appreciable factor in man's environment, so far their distribution is very pertinent. So far also as that distribution gives evidence of geographical changes, such as the separation of islands from continents or a retirement of the snow-line, so far it is also pertinent. But the study of the distribution of animals and plants in detail and as an aid to the understanding of the evolution of those beings, is in no sense a part of geography. It is a part of zoology or botany, for the proper study of which a preliminary study of geography is necessary.

The truth of the matter is that the bounds of all the sciences must naturally be compromises. Knowledge, as we have said before, is one. Its division into subjects is a concession to human weakness. As a final example of this we will deal with the relation of geography to history. In their elementary stages they must obviously go hand in hand. In their higher stages they diverge. The historian finds full occupation in the critical and comparative study of original documents. He has neither the time nor usually the turn of mind to scan science for himself with a view to selecting the facts and ideas which he requires. It is the function of the geographer to do this for him. On the other hand, the geographer must go to history for the verification of the relations which he suggests. The body of laws governing those relations, which might in time be evolved, would render possible the writing of much

\* Vol. ii. pp. 118-127, 2nd edit.

"prehistoric" history. John Richard Green's 'Making of England' is largely a deduction from geographical conditions of what must have been the course of history.

It remains that I should set out what I conceive to be the main line of geographical argument. I will do this in two stages. The first will be general, such as might be gathered from the syllabus of a university course of lectures or from the table of contents at the beginning of a text-book. The second will be a special application of this to the solution of a definite problem—the reasons why Delhi and Calcutta should have been respectively the old and the new capitals of India.

We presuppose a knowledge of physiography. We would then start from the idea of a landless globe, and build up a conception of the earth on the analogy of mechanics. First, the laws of Newton are demonstrated in their ideal simplicity on the hypothesis of absolute rigidity. It is not until these are fixed in the mind that the counteracting tendencies of elasticity and friction are introduced. So would we attack the study of geography. Imagine our globe in a landless condition, composed that is of three concentric spheroids—atmosphere, hydrosphere, and lithosphere. Two great world-wide forces would be in action—the sun's heat and the earth's rotation on its axis. Obviously the trade-wind system would have unimpeded sway. Next introduce the third set of world-wide forces—the inclination of the earth's axis to the plane of its orbit and the revolution of the earth round the sun. The result would be an annual march from tropic to tropic of the calm zone separating the trades. The fourth and last of the causes which we have termed world-wide would be the secular variation in the ellipticity of the earth's orbit and in the obliquity of its axis. This would produce similar variations in the annual march and in the intensity of the trade-wind system.

Thus far we have steered clear of longitudinal variations. Given the latitude, the altitude, the season of year, and the year in the secular period, and the climatic conditions are deducible from very few data. Now we abandon our primary hypothesis. Conceive the world as it is, as heated, as cooling, as shrinking, as wrinkling. It was heated, it is cooling, therefore it is shrinking, and the outer more chilled crust is in consequence wrinkling. The lithosphere is no longer concentric with the atmosphere and the hydrosphere. The bed of the ocean is thrown into ridges and furrows. The ridges project into the hydrosphere, and through the hydrosphere into the atmosphere. They act as obstacles in the way of the world-currents. They may be compared to the stones in the bed of a rapid stream on which the currents impinge and are diverted. They either leap over them or are split upon them. This purely mechanical action is well seen in the splitting of the Southern Equatorial Drift on Cape San Roque. Cape San Roque has a distinct influence on the climate of England. The "leaping-over" action is visible i

case of winds rising over mountain-chains, and as a consequence covering their slopes with moisture. But, in addition to the mechanical, there are thermal causes of variation, due mainly to the different specific heats of land and water—hence the monsoons. The lie of the great wrinkles has a special meaning. Were the continents extended east and west instead of in three great bands across the Equator, climate would be approximately indexed by latitude.

Thus may we steadily progress in the analysis of the world's surface. Conceive the world as landless, and you will see the motor-powers of air- and water-circulation. Replace your conception by one of a wrinkled world, and you will grasp how by mechanical obstruction and thermal irregularity your simple currents are differentiated into currents of almost infinite but still orderly complexity.

But we must advance a stage further. The form of the lithosphere is not fixed. The shrinkage is still in progress. Old wrinkles are raised and new wrinkles come into existence. As they rise their destruction commences. The currents ever work at the removal of the obstacles which obstruct their course. They tend to achieve the ideal simplicity of circulation. Thus the features of the earth's surface are constantly changing. Their precise form is determined by their past history as well as by their present conditions. Recent changes are the subject of one of the most fascinating chapters in geography. Plains are built by the accumulation of *débris*. Continents give birth to islands. The evidence is drawn from a hundred sources—from the lines of migration of birds, the distribution of animals, or the depths of the neighbouring seas.

Each successive chapter postulates what has gone before. The sequence of argument is unbroken. From the position of the obstacles and the course of the winds may be deduced the distribution of rain. From the form and distribution of the wrinkle-slopes and from the distribution of the rainfall follows the explanation of the drainage-system. The distribution of soils is mainly dependent on the rock-structure, and on a consideration of soil and climate follows the division of the world into natural regions based on vegetation. I am not here referring to the distribution of botanical species, but to that of the broad types of what may be called the vegetable clothing of the world—the polar and tropical deserts, the temperate and tropical forests, and the regions which may be grouped together as grass-plains.

Passing now to the second stage of the investigation, it will be well to make use of two technical terms. "An environment" is a natural region. The smaller the area included the greater tends to be the number of conditions uniform or nearly uniform throughout the area. Thus we have environments of different orders, whose extension and intension, to borrow a logical phrase, vary inversely. So with communities. "A community" is a group of men having certain characteristics

in common. The smaller the community, the greater tends to be the number of common characteristics. Communities are of different orders—races, nations, provinces, towns—the last two expressions used in the sense of corporate groups of men. By the use of these two terms precision can be given to such discussions as the effects of exposing two communities to one environment, and one community to two environments. For instance, this—How have geographical conditions differentiated the English race in the three environments, Britain, America, and Australia?

Everywhere political questions will depend on the results of the physical inquiry. Certain conditions of climate and soil are needed for the aggregation of dense populations. A certain density of population seems necessary to the development of civilisation. In the light of such principles would be discussed such problems as the contrast between the ancient upland civilisations of the New World, Peru and Mexico, and the ancient lowland civilisations of the Old World, Egypt and Babylon. Again, comparatively undisturbed strata usually underlie wide plains, and wide plains seem specially favourable to the development of homogeneous races, like the Russians and the Chinese. Yet again, the distribution of animal, vegetable, and mineral products has done much to determine the local characteristics of civilisation. Consider in this respect the series presented by the Old World, the New World, and Australia in the matter of comparative wealth in cereals and beasts of burden.

One of the most interesting chapters would deal with the reaction of man on nature. Man alters his environment, and the action of that environment on his posterity is changed in consequence. The relative importance of physical features varies from age to age according to the state of knowledge and of material civilisation. The improvement of artificial lighting has rendered possible the existence of a great community at St. Petersburg. The discovery of the Cape route to India and of the New World led to the fall of Venice. The invention of the steam engine and the electric telegraph have rendered possible the great size of modern States. We might multiply such instances greatly. We might group them into categories, but our object to-day is merely to indicate the possibilities of the subject. One thing, however, must always be borne in mind. The course of history at a given moment, whether in politics, society, or any other sphere of human activity, is the product not only of environment but also of the momentum acquired in the past. The fact that man is mainly a creature of habit must be recognised. The Englishman, for instance, will put up with many anomalies until they become nuisances of a certain degree of virulence. The influence of this tendency must always be kept in mind in geography. Milford Haven, in the present state of things, offers far greater physical advantages than Liverpool for the

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American trade; yet it is improbable that Liverpool will have to give way to Milford Haven, at any rate in the immediate future. It is a case of *vis inertiae*.

We propose passing now to the special illustration which we have promised. We will start from the fountain-head. From the sun's heat and the earth's rotation we demonstrate the trade-wind system. From the influence of that heat on the vast mass of Asia we deduce the monsoon variation of the system. Within the monsoon area are collected some seven hundred out of the eight hundred millions of Asia. Right athwart the south-west monsoon extends the Himalaya. The moisture of the Indian Ocean in consequence deluges its southern face. Thus the full importance of the direction of the mountain-chain is brought out. The rains have washed down from the mountains the débris which forms the fertile plain at their base. Hence, along the southern foot of the Himalaya we have a belt of country possessing the conditions of climate and soil needed to sustain a large population. In effect we find two-fifths of the population of the entire peninsula concentrated in the provinces of Bengal, the North-west, and the Punjab, although these three provinces have but little more than one-sixth the area. Moreover, the abundant moisture of the monsoon coupled with the height of the Himalaya (the height is a consequence of the comparative newness of the wrinkle) produce an abundant glacial system from above the snowline. One result of this is that the rivers of the plain are perennial, and constantly navigable. Thus we have two conditions favourable to the development of civilisation, density of population, and ease of communication.

A wealthy civilised community is a region tempting to the conqueror. Now conquerors are of two kinds—land-wolves and sea-wolves. How would these respectively gain access to their prey in the Ganges valley? Consider first the landward frontier of India. On the north-east the Himalaya is practically impassable to a host.\* On the north-west is the Sulaiman range, pierced by many passes. From the Iranian uplands of which this range is the boundary wall have swept down successive waves of conquerors. But within the mountain line is a far more effective obstacle, the Thar or great Indian desert, with its continuation the Rann of Katch. This barrier extends parallel to the Sulaiman Mountains from the sea almost to the Himalaya. Between the desert and the foot of the Himalaya the fertile belt is narrowest. Through that gate must pass whoever would gain access to the Ganges valley. Alexander advanced to its entrance. When he swerved to the right and followed the Indus, India was saved. Close to the eastern end of the pass is Delhi. It stands at the head of the Jumna-Ganges navigation, the place of transhipment from land to water carriage. It is therefore a

\* Only one exception is recorded by history. A Chinese army once succeeded in reaching Nepal.

natural centre of commerce. It is also the natural base of operations for the Asiatic conqueror, his left flanked by the mountains, his right by the desert, his line of communications secure to the rear. The strategic importance of the region has not escaped the British. Here is Simla, the summer capital of India. Here also the army cantonments are most thickly sown. Here are the fields of many battles. So much for Delhi. Now for Calcutta. From the sea India is singularly inaccessible. The eastern shore is beaten by a heavy surf. We have had to construct a harbour at Madras at great expense. The western coast has many good harbours, but in its rear rises the steep slope of the Western Ghats. Drenched by the monsoon, they are densely clothed with forests, which to this day are the abode of some of the most savage races of the world. Behind Bombay railways have now been carried over the mountains, but until recently they must have been a most effectual barrier to communication. The Portuguese settled at Goa, and could not advance. The English possession at Bombay was our earliest in India,\* yet the Presidency of Bombay was the last to grow. The one great natural water-gate is by the mouth of the Ganges. Here, on the Hoogly, the British established themselves at Calcutta. It is the place of junction of river and sea shipping, and therefore a commercial centre. It is also the natural basis of operations for the conquerors from over the sea. From it they have extended their influence far and wide. The old presidencies of Bombay and Madras have each been succeeded by a single province, but the Presidency of Bengal has begotten Bengal, the North-west, the Punjab, and the Central Provinces; we might almost add Assam and Burma. Thus, to sum up, at the two ends of the fertile belt are the two gates of India—the Khaibar Pass and the Hoogly. Along that belt the great highway is the Jumna-Ganges. At either end of the river navigation stands a strategical and commercial capital, Delhi on the one hand, Calcutta † on the other.

Thus we complete our survey of the methods and scope of geography. I believe that on lines such as I have sketched a geography may be worked out which shall satisfy at once the practical requirements of the statesman and the merchant, the theoretical requirements of the historian and the scientist, and the intellectual requirements of the teacher. Its inherent breadth and manysidedness should be claimed as its chief merit. At the same time we have to recognise that these are the very qualities which will render it "suspect" to an age of specialists. It would be a standing protest against the disintegration of culture with

\* Our earliest possession. We had factories at Surat and at Fort St. George somewhat earlier.

† Calcutta=Kali Katta—the village of the goddess Kali. This suggests the question, Why should this particular village have risen to be a metropolis rather than any other village? I would propose the term "geographical selection" for the process on the analogy of "natural selection."

which we are threatened. In the days of our fathers the ancient classics were the common element in the culture of all men, a ground on which the specialists could meet. The world is changing, and it would seem that the classics are also becoming a speciality. Whether we regret the turn which things have taken or whether we rejoice at it, it is equally our duty to find a substitute. To me it seems that geography combines some of the requisite qualities. To the practical man, whether he aim at distinction in the State or at the amassing of wealth, it is a store of invaluable information; to the student it is a stimulating basis from which to set out along a hundred special lines; to the teacher it would be an implement for the calling out of the powers of the intellect, unless indeed to that old-world class of schoolmaster who measure the disciplinary value of a subject by the repugnance with which it inspires the pupil. All this we say on the assumption of the unity of the subject. The alternative is to divide the scientific from the practical. The result of its adoption will be the ruin of both. The practical will be rejected by the teacher, and will be found indigestible in after life. The scientific will be neglected by most men, because it lacks the element of utility in every-day life. The man of the world and the student, the scientist and the historian, will lose their common platform. The world will be the poorer.

The discussion on the foregoing paper was adjourned to the next following meeting, February 14th.

On that evening (General R. STRACHEY, Vice-President, in the chair) the discussion was opened by Mr. MACKINDER as follows:—

Mr. Chairman, I am asked to say a few words to you by way of analysis of the paper which I laid before you on the last occasion. It is obviously impossible for me to give you an exhaustive analysis, because the paper itself, in spite of its length, was necessarily more or less of the nature of an epitome. I think, however, it will be possible for me by grouping the ideas, such as they are, in a somewhat different way, to place the salient points almost in a nutshell. If I were asked to describe geography roughly I should venture on the assertion that it is the science of distribution, the science, that is, which traces the arrangement of things in general on the earth's surface. Since it is a science it is not sufficient to rest content with recording, however accurately and skilfully, the places of things on the earth's surface. After using our various observing instruments, after making maps as carefully as ever you will, it is necessary that we should pass on to consider what relations hold between the distributions of various sets of features on the earth's surface, and what are the causes of those distributions. Let me give a comparison with some other science. Take that of astronomy. I will ask you to remember that the astronomer spends a very large portion of his time in using the telescope, in minutely observing and recording facts with regard to the heavenly bodies, but you would not say that a science of the heavenly bodies existed unless you showed that there were laws governing their movements and great forces holding the solar systems together. If we apply these ideas to geography I think we shall see how the various chapters may be strung together in natural sequence. I do not pretend that these suggestions are new. My aim is simply to show a method which some little experience in teaching has proved to be available—such as will be fitted to

the higher classes in Universities and sufficiently dignified for men to make the subject their life study.

We start with the conception of the world as a landless globe. I believe that a useful expedient for this reason—that there are some phenomena, such as the trade winds, which are more or less independent of the distribution of land and water. On the principle that a person who has an untrained ear for music would prefer hearing "Home, Sweet Home" on a flute, to hearing it with full orchestral accompaniment, so we prefer clearing away many sets of causes when we first approach the consideration of the earth. Then we go on to consider the land and sea distributed as they are. Just as, in the case of a stone standing in the way of a stream going down a hill, the stream has to split upon it, go round it, or go over it, so in the same way the great currents impinging on the land, either swerve to right or to left, or split upon it, or in the case of winds have to leap over it, and therefore we get a complex state of affairs out of a simple set of causes. Therefore we see that precise topography is a necessary thing if we are to have a proper explanation of the actually observed distributions of currents both in the air and water.

Passing from that, if I look at a headland projecting into the sea, I cannot help feeling that there must be some cause for the place which that headland holds, and for its shape, and I cannot help feeling, from the analogy of other sciences, that if I knew that cause and compared it with the causes of other things, I should be able to see that they were related, and so should be able to work out a law of considerable simplicity where apparently we have great irregularity of distribution. Geologists seem to be agreed on this, that the shape of the earth's surface is due to the interaction of two sets of causes—upheaval and ruin. The forces of upheaval, even so conservative a geologist as Sir William Dawson agrees, are the result of the gradual shrinking of this earth, producing what I call wrinkling, and others folding or corrugation in the earth's surface. Then we have the forces of ruin—frost, wind, rain and so forth, brought to bear upon it, chiselling it. When you look at a ruin it is at first sight exceedingly disorderly, and until you have seen what were the relations of its parts in the past, that disorder continues. So with this earth. If you understand the arrangement of the rock-folds you are in a position to understand the actual distribution of the present features. There is in this month's 'Proceedings' (February No.) a most excellent application of this method of describing the features of a country by means of the wrinkles. The paper by Dr. Naumann, on Japan, which has been so generally praised, contains a passage which runs as follows: "The study of geology is just as indispensable to the orographer as the study of anatomy is to the sculptor. No clever artist would think of representing the beauties of the human form as those of a hollow figure. The physical features of Japan present a fine example for the verification of the intimate and mutual dependence of those sciences whose object is our globe. After having made ourselves acquainted with the general laws of geological structure we shall be better enabled to understand the language of the external features of that part of the surface we are at present dealing with." He practically applies his idea and gives a map on which he shows the "Line of folds." Having got the distribution of the earth's surface we come to work out the distribution of other things. The rainfall obviously depends on the profile of the earth's surface, the soils on the distribution of climates and rainfall. Then the general vegetable clothing of the earth—forests, grass lands, and such like—all follow on what we have previously studied. So with regard to man, the same laws apply, only the applications are more complicated, because we have to study the distribution not only of races, but also of numerous attributes of man, languages, religions, political organisations and forms of civilisation. Again, since man is a moving creature we have to study physical features, not only as



determining whether the region in which he dwells shall be favourable or not, but also as impediments in his way, whether he passes as an army, in migration, or as a nomad.

From all this it will be seen that it is necessary to do two things—to base our physical geography to a great extent on geology, and to combine physical and political geography together. I have defined geography in the way which I have for the following reasons. I believe that nine out of ten students who approach geography will necessarily approach it from the human standpoint. They wish to study the world as man's environment. I use the word environment, because Mr. Bryce has made that term a received one in geography. In order to understand the distribution of man it is necessary to understand that of the physical features. We have thus a science in which essentially the same methods are applied from beginning to end. But it is the culminating stage which postulates all that has gone before that has a general interest. I do not mean to say that for purposes of original investigation some people will not choose to confine themselves to inanimate nature, but I say that for a general basis it is necessary to study the physical features in order chiefly to understand the distribution of man. I believe that a considerable number of those who will take part in the discussion this evening have seen my ideas set out in print in a more connected form than it was possible for me to show them on the last occasion or would be on the present. I will therefore only say in reply to a criticism which has been current, to the effect that whatever value my ideas may have from a theoretical point of view, they are impracticable for teaching purposes, that since last October, I have had an opportunity of lecturing to 1200 people, and I find that even elementary lectures, set out on the plan I have suggested, have been more or less successful in interesting people. In conclusion, if the ideas I have put forward, however much criticised (and I hope they will be criticised), result in our arriving at a more or less general opinion as to what the scope of geography is, I shall be amply gratified for any trouble I have taken.

Sir FREDERIC GOLDSMID wished to explain in a few words the reason of his coming before the meeting. Hearing that a paper about to be read in these rooms contained something in the form of onslaught on a position taken up by himself in an address to the Geographical Section of the British Association at Birmingham in September last—and finding that other engagements would prevent his attendance at the meeting—he procured a copy of the paper aforesaid, and wrote down some hurried remarks to be read on the occasion by a kind substitute. It so happened that when the lecturer's task was completed, no time for discussion was available, and his notes were returned. Now that they were met to discuss the last meeting's paper, and that the reading of these notes would spare the audience perhaps a more rambling statement and economise time, he ventured to recur to them in fulfilment of the object for which they were originally designed.

The passage quoted in proof of his (Sir Frederic's) tripping was this: "It is difficult to reconcile the amalgamation of what may be considered 'scientific geography' with history. One is as thoroughly apart from the other as geology is from astronomy." Presently he would quote another passage in which the offence is even greater, and defined with like precision. But he (Sir Frederic) was speaking of geography in the sense of what may be called its mathematical treatment, and his critic took him as referring to scientific theory and deduction. He (Sir Frederic) was in the material world with the practical surveyor and his outdoor apparatus. His critic pictured him in the world of speculation in which historian and geographer find a common ground. It was a misconception of meaning, a confusion of terms—in fact, of theories with theodolites.

Setting aside the actual charge of making proposals "fatal to the best prospects

of geography," it might seem unwarrantable on his (Sir Frederic's) part, after the able and exhaustive discourse delivered a fortnight ago, to take up the time of the meeting with an answer to a personal allusion expressed in the briefest of terms. But as the discourse itself bears, as it were, almost wholly upon that personal allusion, and is in fact one expansive comment on an individual utterance for which he was held responsible, a reply of some kind would be admitted to be necessary.

He was not going to disavow the words which had been quoted from his address to the Geographical Section at Birmingham, though he could not help regretting that the passage selected for objection was not one more expressive of the general tendency and manifest object of that address. Indeed, had it been considered in reference to the remainder, it would have been evident that his meaning in showing a complete separation between history and "scientific geography," was to indicate what he might call the comprehensive "unity" of the latter branch of study, and to suggest the incorporation into history of a newly constituted "political geography" containing, he might add, very much the kind of teaching which has been aptly illustrated by the present lecturer. Questions such as density or sparseness of population, and contrast between upland and lowland civilisations—all these matters naturally appertain to history. Nor would he pronounce as foreign to the same sphere of teaching that eloquent paragraph of theoretical topography which, in the paper read at the last meeting, accounts for the growth and greatness of London. In fact, when speaking of "political geography stripped of its purely scientific belongings," he (Sir Frederic) made no reference to those broad lines of "science," the value of which in historical research no true student of history can deny, nor to that light of "science" which gives a reality to the historical page—but to those belongings which imply rather practice than theory, and the presence of the surveyor and engineer than of the geographer *en grand*. Let his words be analysed:—"The meaning of the verbal combination 'political geography' requires some kind of analysis. Conventionally, and in an educational sense, it is the description of the political or arbitrary divisions and limits of empires, kingdoms, and states; their inhabitants, towns, natural productions, agriculture, manufactures, and commerce, as well as laws, modes of government and social organisation—everything being viewed with reference to the artificial divisions and works made by man. Accepting this interpretation of its objects, who can hesitate to admit its palpable and immediate relation to history? The mathematical science which investigates the physical character of territory and territorial boundaries is in this case but a secondary requirement and can be always fairly disposed of in the recognition of results." Need he add that the question of "man's environment," on Mr. Bryce's conception of which he had occasion to speak a little later, was not for a moment contemplated as one of the "secondary requirements" here noted. He was told by those who had taken the trouble to consider his address in its entirety, that, in the view taken, he dwelt too much on the "fieldwork of geography," the results of which are seldom, if ever, questioned by the reading public and are accepted by the writer of history as he accepts the journeys and researches in libraries. If, indeed, his argument be weak, he admitted that it is in this particular aspect it shows its most vulnerable point; but he was prepared to defend the position by the teaching of his own experience. This, however, was not the point on which he was now assailed; he was supposed to apply the word "scientific" to that which comprehends the physical causes and connections of the earth's features, and such was not in this instance his intention. He referred to that branch of geography which, to be duly apprehended, demands in the student a mathematical rather than a theoretical turn of mind. To this head belong much that comes within the purport of topography, physiography, cartography, trigonometrical survey, and the mechanism which necessitates acquaintance with the instruments and appliances of geography,

and their respective uses. Physical geography, and the thousand and one theories involved in its consideration, belong undoubtedly to history, and cannot be excluded from the programme of study prepared for the use of advanced historical classes.

But the gist of his argument was this. To popularise geography, the method of study must be such as to suit the mental bias of the pupil. Call the principle advocated "a concession to human weakness" if you will; but so long as human nature *is* weak, the fact must be acknowledged, and treatment regulated accordingly. There may be present at the ordinary meetings of the Royal Geographical Society those who appreciate and enjoy "travellers' tales" more than "travellers' geography." They may be weak, but their weakness must be admitted as a factor in the matter of providing the public with popular papers.

A story had been related to him which illustrates the case. Some years past, a gentleman well known to the Society was about to read a paper, with one of our most esteemed Presidents in the chair. The latter remarked on its length. "What shall I leave out?" asked the reader: "the adventures?" "No," was the ready reply: "the geography; you can print *that* afterwards." So is it with the outside world, and those classes whom it is wished to attract towards a neglected study.

It is not, then, the "division of the scientific from the practical" which he ventured to recommend; but the creation of a chair for geography in its most comprehensive form, combining the scientific and the practical, or what is theoretical with what is material, matter-of-fact, or perhaps mechanical. On the other hand, he would combine with history—for which chairs exist—certain elements of this "scientific" or universal geography, such as are rather included in the term "political" than under any other now recognised head,—"irrational," he granted, in failing "to trace causal relations," but subject, in this as in other respects, to re-cast and revision. This, it will be found, was precisely the course which he before proposed—not as the result of any intricate investigation, but the natural outcome of personal observation.

He submitted, with all deference, that scientific geography, as taught from the chair, should make the accomplished geographer, historian, and man of science combined: history, with its geographical supplement, the diplomatist. There is no clashing here, and no danger that I can see to the cause of science. To those who did him the honour of reading, or listening to the Birmingham address, his object will be evident. It is set forth in the following paragraph:—

"It must be borne in mind that our governments or geographical societies, our boards or our Universities—whichever distinguished body takes the matter in hand, separately, it may be, or in concert—will have to cater for a multitude of pupils, and that, whatever change eventually takes place in the programmes of study, the division of school teaching into two great representative branches, classics and mathematics, is a practice which has hitherto, at most public schools, resisted the shock of innovation. The maintenance of this time-honoured custom is not so much, to my mind, an illustration of conservative principle—*that*, we all know, is powerless against national progress—as the assertion of a profound truth, similar to that which in the region of language separates the Semitic from the Aryan category of tongues. It is a recognition of the distinction which exists in the human organisation between mind and mind—a distinction apparent in the boy as in the man, at school as at college—in the battle of life itself, as in the period of preparation for battle. I do not mean to imply that all school studies fall essentially under one or other of these divisions; but I do believe that the student's progress will be in accordance with his idiosyncrasies; that the student's taste should be considered in the master's system; and that, in dealing with geography, we ought not to throw it wholesale into the hands of the professor or reader, but separate it to suit

the capacity of the classical as of the mathematical intelligence, so that the one part come within the province of history and art, the other within the limits of unadulterated science. Attention to both sections should be imperative, so far as attention to classics and mathematics is imperative, but the standard of competence attained in either must depend on the mind and bent of the pupil who might readily excel in one but fall short in the other, not being even distinguished if the subject of study were undivided."

Plainly and finally. Establish a chair for geography, *pur et simple*. The professor occupying it may be left to impart to his teaching as much history as he pleases: there is no rule or compulsion here. On the other hand, history is more or less dependent on geography, and it were well to define precisely what and how much of the science it should borrow from the geographical chair. His own impression had been that "political geography" should meet all its possible requirements; but, unfortunately, political geography, as now understood, would have to be reconsidered and recast. Here, then, is the separation—or one separation—he would especially advocate, and for this reason. There are many pupils whose minds are so constituted that, while content to study both sciences with ardour, they are likely to attain excellence in one only, and where that one is history, the supplement of geography included in it, if carefully chosen, might impart that very essential qualification for the higher services of State, which is the real cause of political usefulness and undying reputation.

Mr. FRANCIS GALTON said the word "geography," like many others, was used in different senses, so they ought to be grateful to Mr. Mackinder for the effort he had made to frame a definition that should combine the suffrages of most people. For his own part he thought that an even simpler definition was possible, namely, that the art of geography was to give a vivid and connected account of the more interesting characteristics of specified districts. The art of giving a vivid account was an extremely rare one. He was sure they must have heard in that room many eminent travellers who read accounts of their journeys, and yet the meeting obtained from them but a very slight idea of the country they had visited. It was extraordinary how weak ordinary language was in expressing visual objects. Who could describe a face in that room in such a way that another person who had never seen it before, should recognise it when seen? The same remark applied to countries. They read books about a country and then they went there, and found it to be entirely different from what they expected. Now one of the arts of the geographical teacher was to bring vividly before the mind of the learner what he wished to convey, so as to put the learner as far as possible in the position of one who had actually been to the country. That art was somewhat developed, but needed to be developed a great deal more by illustrations, photographs, &c. Another art of the geographical teacher was to give a connected or rational account. He did not himself think so much as others of the possibilities of geography as a science; it was well to have a high project, but when they endeavoured to reason out the conditions of a country, they found that at the present time they knew very little about the interaction of the various forces of nature. They could go a certain distance; they could easily follow as far as a shrewd intelligent man could go, who had at the same time a little more than a smattering of the principal sciences; but to suppose that any one could really reason out a geographical problem in all its completeness in the same way that he could a mechanical or a mathematical one, seemed to him to be supposing a great deal too much. To recur to the definition, what were the interesting characteristics of a country? There were different people to be interested; that which interested the strategist did not interest the artist or the merchant; so the geographical teacher had to consider the main wants and wishes of

mankind, and to frame his book or teaching accordingly. At the present time the hopes for the better teaching of geography seemed to be in a critical stage. Last week a deputation of three members of the council met the committee appointed by the governing body of the University of Oxford, consisting of the present Vice-Chancellor, the late Vice-Chancellor, and three other distinguished members of the University, and that committee manifested, so far as they were individually concerned, a sympathy and a desire to help the objects of the deputation. During the present week another deputation would go down to Cambridge to have an interview with the authorities there. Both Universities were at length clearly waking up, and beginning to practically throw themselves into the cause of geography. At this critical time it was a great thing to have a gentleman like Mr. Mackinder, of University distinction, who knew his own mind, who had attracted large audiences in the provinces, who was enthusiastic in geography, a believer in his cause, and who, he was sure, would leave no stone unturned to further the interests of geography—it was a great thing to have such a man taking so prominent a part, and he had very little doubt that however much Mr. Mackinder's theories might be criticised, or whatever mistakes he might make, he was destined to leave his mark on geographical education.

Mr. T. W. DUNN (Head Master, Bath College) said his presence at the meeting was accounted for by a very paradoxical reason, namely, that he was very ignorant of the science of geography, and wanted to say that the very fact of his ignorance was some reproach against the present state of geographical teaching in the land. It had failed to attract him throughout a life devoted to many branches of learning. It had not commended itself to him in its present form as an instrument of instruction. He had observed that both teachers and learners of the better order of mind found the subject of geography uninviting, and would have as little of it as they possibly could. He found also that those minds to whom it did recommend itself were of the order of those who were content to rest in facts without rising into principles. He must demur to the view that Sir Frederic Goldsmid set forth that the subjects taught to the young should humour their weaknesses and idiosyncrasies. It seemed to him that if a boy had an imperfect organisation, and a faulty physical development, it became gymnastic not to let him move in those modes which were easy to him, but to adopt those modes which were most helpful for him when he had overcome the preliminary difficulties of being set right. Among his own boys, some few years ago, two, in almost successive years, obtained the Society's medal, but they were boys of singular inaptitude for studies of a nobler sort, and he could not but think, from what he saw of them, that he had been indulging them in their devotion to a catalogue of topographical facts—in a weakness that he ought to have corrected. It was his fortune to have the conduct of a school which was distributed under two heads, the classical and the modern side. The modern side, where geography was chiefly taught, laboured under the great difficulty, that there was no centre, no backbone to the studies that the boys pursued; consequently they were disintegrated. Their minds were in no way instructed and built up, and it occurred to him that this science of geography, if it were established on some such basis as his friend Mr. Mackinder had sketched, would serve schools in excellent stead. It was not his purpose to start a new definition of geography, but it seemed to him that geography was very well defined in Mr. Mackinder's language as the science of distributions. It would occur to every one that there was nothing which was not distributed on the earth's surface, and, therefore, if geography was a science of things distributed there was nothing which did not come under the science. It was a science primarily of the distribution of the air, which was meteorology; it was a science of the distribution of land and water; it was a science of the distribution of

animals, which was zoology—of plants, which was botany—of minerals, which was mineralogy—moreover, it was a science of military posts, and then it was military geography; and, indeed, a German of curious inquiry had been mapping out the locality of genius of different kinds, so that it was also the science of human faculties. It was past hope that any man could be found to combine all those various elements. But if so defined, geography helped to teach the interdependence of knowledge, and in all schools there was great danger of breaking up the minds of the boys in special subjects; but geography, founded on its new basis, would afford a common meeting ground, on which all the sciences were heard, and a boy who read his history by the light of geography would be tempted to take to geography in the form of history with delight. A boy who learnt the distribution of plants, learnt much geography incidentally; a boy who learnt zoology would take interest in the geographical aspect of the distribution of animals; and so geography was fitted to bring all these sciences face to face, and to teach much of their interdependence, and give the boy that unity of knowledge which was so much required. It appeared to him to be much as though a man should profess general medicine and not be a specialist in practice. They might go to the general practitioner for advice with regard to any common ailment, and so they could go to a geographer for general information with regard to any part of the face of the globe. Geography, taught on the principle which Mr. Mackinder advocated, would tend to induce in the minds of the boys in the modern sides of schools a disposition to regard knowledge as a whole. He would be extremely grateful to any professor at either or both of the Universities who would put into the hands of schoolmasters some text-book which would combine so much of all these sciences as might be taught to schoolboys under the head of geography. It would be useful to the botanist, to the military student, and to every student, but they must look for such generalisation to somebody who would make a departure on the lines advocated by Mr. Mackinder.

Rev. Canon DANIEL (Principal, Battersea Training College) said that he had not had the pleasure of hearing Mr. Mackinder read his paper, but he had perused it with very much delight, finding it eminently suggestive and full of practical value. He would venture to differ from Mr. Mackinder with regard to some of the conclusions that had been arrived at. He would not stop to discuss the definition of geography, for that was a mere matter of words. The province of geography would depend very much upon the curriculum of which it formed a part. If geology was already very well provided for, it would be a great mistake to include geology as part of a geographical course. If on the other hand geology had no independent place in the curriculum, so much of it should be taught as had a practical bearing on geography. He agreed with several of the speakers that geography was mainly a science of distribution; it aimed at accounting for the distribution of man, pre-eminently by the conditions under which he lived, and anybody who looked at the maps exhibited on the wall would see how very close the connection was. There were three maps of Hindostan exhibited. One gave the population, another the rainfall, and the third the mountain and river system. Clearly there was a very close interdependence between the three, for the density of population corresponded very closely with the amount of rainfall. Any one who noticed the density of population in the valley of the Ganges and the rainfall there, would see that there was more or less a correspondence between the two, and also a correspondence between the rainfall and the mountain and river system of the peninsula. He did not say that, given the physical facts, they could in all cases reason out the political facts, but he did say that when they had the political facts they might find physical facts to account for them. There was an interdependence between the facts of physical geography in the first place and

a closer connection between political and physical facts in the second. It was only when Mr. Mackinder came to the methods of teaching that he was disposed to disagree with him. He was astonished that Mr. Mackinder should place geography in a category by itself. Why should it be treated differently from any other inductive science? Surely the reasonable probability was that, so far as it was an inductive science, it should be treated like any other. What was the method of any inductive science? Was it to start with an hypothesis, with a succession of hypotheses, and then to account for the facts? Or was it not rather to start with the facts themselves, to collect them, to classify them, then to form hypotheses that would account for them, and then to verify the hypotheses? That was just what Mr. Mackinder had not done. He had very graphically and forcibly illustrated his position with regard to the south-eastern portion of England, and as he spoke to an audience already familiar with the facts of political and physical geography, no doubt his argument was very much enjoyed. But if he had been speaking to a class ignorant of physical geography, and of the political facts which he constantly assumed, then his theories and hypotheses would have been absolutely meaningless. To those who were already familiar with the details, such a generalisation was helpful, but to those who were not familiar with the details, the generalisation, instead of being a help, was a hindrance. He could not but think that, although many of Mr. Mackinder's audiences had followed him with very much interest, yet it was doubtful whether, if they had been examined at the end of his lectures, the results would have been eminently satisfactory. If they had been, then his audiences must have differed from the rest of mankind, for inductive science was much the same to an adult as to a child. They all began with facts rather than with generalisations, and in proportion as geography was a science of generalisations it must start with the accumulation and classification of facts. He did not distinctly understand from Mr. Mackinder to what class and what age and state of development his method of teaching was applicable. Was it to be followed in the teaching of children, or in the teaching of adults? It might be an admirable method for University men, assuming that when they were children they had been thoroughly grounded in the elementary facts of physical and political geography, but if they did not know where the Thames rose, or the Kennet ran, or where Dungeness was, or what relation the Isle of Wight bore to the mainland, then all his generalisations would fall meaninglessly on the ear. His contention was that the proper course of teaching geography was to begin, not where Mr. Mackinder began, but at the other end, not build the facts on theory, but the theory on facts. The great mistake that had been made was not that they had begun with the accumulation of facts, but had stopped there. They had done very little indeed towards classifying the facts and showing their interdependence, and whatever improvements were likely to be made in the teaching of geography, would mainly consist in bringing out very clearly the interdependence of the physical facts in the first place, and the connection between the political facts and the physical facts on which they were dependent in the next place.

Prof. H. G. SEELEY (Professor of Geography, King's College) said it was somewhat reluctantly that he rose to speak upon the subject of geography, because it was extremely difficult to say anything wisely in the ten or fifteen minutes at his disposal, which should afterwards bear fruit. It was only because he wished to express his agreement in the main with the views which Mr. Mackinder had put forward that he rose at all. For eleven years in King's College he had publicly taught geography, and delivered regular courses of lectures in the morning and evening classes; but it required many years of study before he ventured to undertake that chair. The results at which he had arrived had enabled him to treat geography as a science, and to meet most of the difficulties which speakers

had raised at that meeting, because they were not familiar with the methods which were followed in teaching. He objected altogether to the idea that geography was a meeting ground for the sciences. Any one who attempted to comprehend the phenomena of geography must look at man as in nature; and therefore looking backward the vista carried them into a remote past, in which they found that the phenomena were in no way to be separated from those with which the geologist dealt. Very many of the familiar features of our own country were originated in remote geological periods, or dependent upon the geological structure of the country. On the other hand, when they conceived of man as placed in a world in which these varied physical phenomena influenced him, they must discover what those influences were. Granted that it was not an easy matter to disentangle them, yet they could be taken one by one and examined by various methods. He had thus disentangled them and tested the effects produced by comparison with the peoples of the various countries of Europe; and he had found that the same laws which held true for the determination of the main moral and mental characteristics of the inhabitants of the various districts of England, operated also in France, Germany, and the main portions of the world in which laws could be determined on the basis of similar facts. It would be readily comprehended that when a subject reached over such a wide field it was extremely difficult to say in a few minutes anything of a general nature which would make its scope clear. He would limit himself to the remark that he entirely agreed with Canon Daniel, that if geography was to be taught to young people the condition must be considered that the reasoning powers, which were necessary to deal with such aspects of the subject as he had referred to, were not developed until the age of somewhere about fourteen was reached; and therefore, in the earlier period of life, although a few of the larger aspects in which law manifested itself in connection with geography might be taught, teachers must limit themselves to teaching the larger order of facts rather than their explanation. The thing which had retarded the scientific teaching of geography was the examination system with which it was clogged. The examiners were not themselves educated into an appreciation of the large philosophical bearings of the subject, and they had been so saturated with the facts that they had prevented the students from acquiring a philosophical conception of the reasons for the collocation of those facts, by insisting mainly upon the obvious facts being stated in examination papers. So long as this prevailed, so long would it be perfectly hopeless to expect geography to be taught in the schools in a scientific way. He would, however, take exception to Canon Daniel's remark that geography was to be defined by the curriculum of which it formed a part. It was perfectly independent of all curricula; it was a beginning and an end; and although its foundation was based on geology, its end became the philosophy of history. It was true that a broad glance and grasp might be taken which would include the whole world; or they might limit themselves to the geography of a region such as Europe, or to the geography of England, each of those subjects being complete in itself; but whether they took the largest or the smallest view, they found man influenced by nature in various ways, and the teaching of this relation required varied knowledge and varied power in proportion to the field which it included. But there was a definite beginning, and that beginning was most certainly a geological one. He ventured to say that there was not a contour of coast-line which was not determined by law, and which the geologist did not easily and perfectly explain the existence of. He referred not merely to the main general directions of land, but also to the existence of the inlets into the land. They were all in positions which could not be varied, and until a man or a boy was familiarised with the principles which governed these things it was perfectly gratuitous to rest content with



the idea that he knew the position of the Wash, when he did not know why it was there. He (Professor Seeley) would therefore not be content with any description, no matter how vivid it might be. A description of geographical phenomena was necessarily vivid when it carried with it the reasons for the existence of the phenomena; and the moment it was realised that the various features of nature, whether they referred to the earth or to man, admitted of being explained, and that it was the duty of the geographer to explain them, then they were placed on a special ground. At present they must be content, so far as schools were concerned, to teach facts mainly. It would probably be a long time before teachers were sufficiently educated to teach geography wisely, so that the student was taught to think on every subject, and would get in his training the same mental development as he would get from the more severe mathematical and other technical studies. The training, however, was to be got, and it depended entirely on the teacher whether it was obtained or not.

Mr. J. BRYCE, M.P., said he felt a great deal of difficulty in venturing to make any observations, because he had not the advantage of having been present when the paper was read, though he had seen it since, and he did not know what were the issues raised in the discussion and which the members of the Society had chiefly before their minds. The speeches just delivered had, however, given him some indication as to what these points were. He heartily agreed with the view which had been presented by Mr. Mackinder, and greatly admired the singular clearness, logical cogency, and width of philosophical view by which the paper had been marked. Mr. Mackinder succeeded very well, not only in defining his general position and point of view, but in showing by happy illustrations the way in which that point of view was capable of being worked out and applied to different minor departments of geographical investigation. He had been a little surprised to hear Mr. Galton speak of geographical teaching as if it were mainly a matter of description. It was also with some surprise that he had heard the view expressed that geography was concerned chiefly with distribution, and that the main business of the geographical teacher was to give facts. The study would become infinite if they were to occupy themselves chiefly with giving the facts on which generalisation must be based. He understood that they were considering geography from the point of view of a University professor, and that they were to assume that the students would be reasonably supplied with the main facts. A knowledge of the facts should be assumed, and if necessary the teacher should issue a statement telling what subjects he was going to lecture upon, and suggesting to students that they should come prepared with a reasonable amount of preliminary knowledge. That being assumed, was it not the case that geography was not a science of description nor of distribution, but of causality, that its function was to exhibit the way in which a variety of physical causes played, firstly upon one another, and secondly upon man, and that the duty of a University professor of geography would be best discharged when he dealt with the elementary causes, and showed the students by successive stages how each cause passed into a secondary or subsidiary cause, until the world as it is now was arrived at. A geographer would naturally begin with the distribution of land and sea, and with the distribution of the great centres of formative force which had made the earth's surface what it is. He would therefore show how it was that the world had been made to consist of continents, islands, oceans, and would explain the directions of mountain chains. He would then pass on to consider the distribution of winds and rain, which depended on the distribution of land and sea, and upon the degree of elevation of parts of the dry surface. Thus there would be introduced another set of causes which were themselves originally due to the distribution of land and sea. Next he would

explain the working of these meteorological causes, showing how they affected the distribution of vegetation (since the quantity and nature of vegetation depended mainly on rainfall and temperature), and would examine the resulting fertility and productive power of different districts. The whole theory of botany and zoology must be worked out with reference to rainfall, and the rainfall itself is of course conditioned by the distribution of sea, the influence of the sun's heat, and other cosmic causes. The teacher would then pass on to consider how all these causes operated upon man, and determined the course of human history. In that way it seemed to him that geography was really the tracing out of various causes, some of which continued to operate directly, and some set in motion other causes, and the condition of the earth at present and human history as it had gone on on the earth were the complex result of the joint operation of all these causes. To show how these causes operated one upon another was the main function of a professor of geography. While, therefore, the study of geography developed a philosophical habit of mind it also cultivated the imagination, because there was nothing that excited the imagination more than the consideration of large forces operating over large periods of time and in different ways. It also developed the faculties of observation, and it seemed to him that it would have a very important function at the Universities in fitting men to become travellers. Nothing was more remarkable in our modern world than the rapid development of cheap means of communication, and the extent to which they were used. Let them compare the interest with which ordinary people travelled over the earth's surface now, with the opportunities they had to acquire knowledge of other countries 100 years ago, and they would see the progress the world had made was as remarkable in that respect as in any other. How differently a man profited by his travel if he had been taught to observe, wherever he went, the nature and direction of the mountain ranges, the kind of rocks, and the influence they had on the direction of streams and lakes, and how the meteorology of a country influenced it, and how all these causes played upon the flora and fauna. If a man travelled with knowledge of that kind he found a constant delight and interest in visiting different parts of the world which was entirely absent if those lines of inquiry were closed to him, and he believed in these matters it was not so much the mere facts that it was the duty of a professor to teach as the method. Let them give their students a clear comprehension of the true method of study. Let them take one particular country or one particular branch of the subject, such as the meteorology or the geology, or the distribution of agricultural products, and deal with it in a philosophical way, showing how the action of various causes is mingled, and then a mind of reasonable intelligence would find it easy to apply that method in other matters and other spheres. He would like to add one word to the effect that in these matters we must look for good results mainly from influencing and training highly a comparatively small number of persons. He did not feel very hopeful at present about the study of geography in schools, for it was hard to find time there for a new study like geography, which had been hitherto taught in such a way that it could scarcely be said to have been taught at all. The direction in which they might look for improvement was in implanting just ideas of philosophic method in a comparatively small number. If a class of twenty men who were to become teachers in the great schools were to receive a training in geography such as Mr. Mackinder recommended, it would fascinate their minds, and not only geography but every subject which came into connection with geography would be vivified and permeated with it, and the same ideas and methods would by degrees filter through and spread among the colleges and schools of the country, until an intelligent comprehension of the earth's surface would come to be a part of common knowledge. They must therefore not be dis-

contented if they were not able at first to operate on a very large sphere. It was of much more importance that a small number of superior minds should be imbued with good methods, and be able to practise them, than that methods of a more mechanical kind should be taught to a larger number of persons.

Mr. DELMAR MORGAN said that as he was present at Birmingham when Sir Frederic Goldsmid delivered his address, he was very pleased to have heard his defence. The result of the address was that the British Association appointed a Committee to exercise their influence on the Universities of Oxford and Cambridge in order to interest them in the cause of geographical education. He hoped that Mr. Mackinder would give two or three words of explanation with regard to a few points in his paper. How did the discovery of America cause the fall of Venice? How did artificial lighting render possible the existence of a great community in St. Petersburg?

Mr. DOUGLAS FRESHFIELD said that on the whole the speakers had stuck very well to the subject of discussion, namely on what general lines geography should be taught. Mr. Markham, to whom Mr. Mackinder's paper had been referred, had in his Report to the Council of the Society summarised excellently its main points. He would read extracts from Mr. Markham's report which, coming from one who had been Secretary of the Society for twenty-five years, would carry more weight than any words of his own. Mr. Markham wrote, "The question which Mr. Mackinder discusses is whether the science of geography is one investigation, or whether physical and political geography are separate subjects to be studied by different methods, the one as an appendix of geology, the other of history. He contends for the former view, and that no rational political geography can exist which is not built upon, and subsequent to, physical geography. The present system, he maintains, is an irrational political geography, a body of isolated data to be committed to memory. It is like learning mathematics by trying to remember formulæ instead of grasping principles. A true geographer, taking up the central geographical position, should look equally on such parts of science and such facts of history as are pertinent to his inquiry. His work is to bring out the relations of special subjects. The more scientific investigation tends to specialism, the more necessity is there for students whose aim it shall be to bring out the relations of the special subjects. One of the greatest gaps lies between the natural sciences and the study of humanity; it is the duty of the geographer to build a bridge over this abyss, which is upsetting the equilibrium of our culture." Mr. Markham continued, "I am inclined to anticipate that the reading and consideration of this paper will form an era in the history of our Society." On some points he (Mr. Freshfield) might be disposed to differ from Mr. Mackinder. Mr. Mackinder's definition of geography appeared to him a summary of his scholastic method rather than a final definition of the science itself. He should perhaps define it as the science which examined the face of the earth, the causes and connections of its features, and the relations between them and its denizens. But he should be sorry to see time spent in endeavours to frame rigid definitions. What was wanted was a clear and liberal view of the functions of geography as the main meeting-point between the sciences of nature and of man, and its thorough adoption of this point of view, which the speaker had himself urged at Birmingham, was one great merit of Mr. Mackinder's address. He thought that Canon Daniel had rather confused geography as a scientific pursuit with geography as a scholastic discipline. In scientific research the true method was, no doubt, to collect facts in order to deduce principles and laws from them. But in teaching, the laws laid down by research must be enforced and illustrated by individual facts. "The general truths," as Mr. John Morley has said, "are the means of lighting up the particulars." It had been objected also to the method advocated by Mr. Mackinder that it was not practical, that it would not affect schools, and was not

suited for examinations. As a fact, the attendants at Mr. Mackinder's lectures had been examined in them. He wished to read an account of their success, sent by the Secretary of the Oxford University Extension, the lectures of which were given to working and middle-class audiences in the north and west by graduates of Oxford. "Since the above was written I have received reports from Salisbury and Manchester as to the success of Mr. Mackinder's lectures. On Tuesday, February 8th, a meeting was held of all the elementary school teachers attending Mr. Mackinder's lectures on geography at Manchester. They numbered 105. The teachers themselves pointed out that the fact that the fifth lecture of the course was attended by so large a number was an indication of the way in which the lectures were appreciated. The head masters and mistresses calculated that the geographical teaching of 6000 pupils was affected by the delivery of one course on the subject in Manchester." That showed that the prospect of teaching geography as a branch of education which would call into play the reasoning powers, was likely to be realised in the immediate future, and that by encouraging teaching of that sort the Geographical Society, both at the Universities and in elementary schools, might do a great deal of good. Mr. Mackinder had suggested that the supply of papers of discovery and adventure was likely to become exhausted because the world was being used up. He did not at all agree with that. The world was not used up yet. For instance, there was New Guinea, in which "Captain Lawson" some years ago ventured to invent the story of the discovery of Mount Hercules, 32,000 feet high; the South Pole, large tracts of Asia and South America, many remote and remarkable islands. There was still room for tales of adventure; but he would put his objection on different grounds. He did not consider that any region had been explored until it had been described by a person of some perception. Mr. Galton said there were very few people who could find words to describe what they saw. It was perhaps not so much the words as the power of observation that was wanting. The number of good narratives of travel was comparatively small, because the perception of English travellers was so often limited and untrained. In this connection he would read to the meeting some sentences from an article by his friend, Mr. Conway (Professor of Art at Liverpool), in the last number of the 'Alpine Journal.' Mr. Conway was discussing the exhaustion of the Alps as a literary subject, but it seemed to him that what he said might, *mutatis mutandis*, be applied to the larger literature of general travel. "The credit due to explorers can only be measured by the utility of their work to others. The first visit is therefore the first recorded visit—the first visit so recorded that others are enabled to follow where the first man forced his way in doubt and perplexity. An unrecorded journey is nothing; one badly recorded is worth little more. The man who only visits a remote region, and contents himself with stating the fact, can only be regarded as swaggering. If he records his route in plain language, he deserves thanks. If he so records it that readers can discover its interest and beauty compared with the interest and beauty of other routes, he deserves much more credit." He would like to ask any Fellow who had been accustomed to attend the meetings of the Society, how many countries they had heard described which they did not wish to hear described again by somebody with vivid perceptions. One means of training the power of perception in travellers was to give better geographical education in English schools and Universities; they had been told over and over again that the only way to secure that was to get capable teachers, and to make teachers they must secure geography its proper position at the Universities which trained the teachers. He hoped that in this way brilliant papers of adventure, discovery, and research would be obtained by the Society for its Journal and its meetings, so that every taste might be satisfied.

Mr. MACKINDER said that he was surprised at the general unanimity which had characterised the proceedings, and he felt gratified that any paper of his should have been the cause of bringing out from what he might call the authority on geography so unanimous an opinion as to what geography was. In the world outside there was an opinion that geographers did not know their own minds, and were not certain as to the limits of their own science. He therefore felt that the opinions which had been expressed by the different speakers would have a considerable effect, and he was gratified that his paper had been the means of eliciting that opinion. Part of the discussion that had taken place had been on words rather than on things. Sir Frederic Goldsmid had contrasted theodolites with theories. He (Mr. Mackinder) did not undervalue the work done by explorers and by those who had to undertake the, perhaps, more difficult and drier work of Ordnance Surveying, but he submitted that until the reason of the facts observed by the instrument was given, they had not reached a scientific stage, however skilfully the instruments were manipulated. In reply to Canon Daniel he would say that his experience tended to show that, when teaching elementary geography, the best way was not to teach the facts first and then the principles, but to combine the two, and teach the facts incidentally while explaining the principles. He could not help feeling that that was the way in which all but the ABC of geography should be taught. Obviously, in his paper he was not referring to the most elementary pupils, but he believed that his system, properly diluted, would be applicable to them also. With regard to geography as the science of distribution, he thought that Professor Bryce had clearly mistaken the sense that he attached to the expression. What he (Mr. Mackinder) meant by it was not merely the enumeration of the distributions, but the causation and the connection of the distributions.

The CHAIRMAN (General R. Strachey) said he thought that many of the observations which had been made might, with due respect, be termed rather academical in their character, still they had all no doubt been useful. A certain amount of misconception seemed however to have arisen amongst some of the speakers as to what the others meant, and there had perhaps been a little want of precision as to the distinction between what geography was as a science and what was its practical utility, and what the best method of teaching it. Mr. Galton had also spoken of geography as involving the art of geographical description. The fact of the matter was that geography, like all mixed sciences, might be viewed in ten thousand ways, but all those ways were useful and valuable. The same might be said with regard to the methods of teaching, whether it was Mr. Mackinder's particular way, or Canon Daniel's, or Prof. Seeley's, or Mr. Dunn's, they were, he had no doubt, all very good. All the speakers had shown that they really appreciated the proper manner in which geography should be taught, and he would say to them all, "Go on your own way." Why should they make a Procrustean bed and compel people to deal with the subject in any particular manner? That was not the way in which science grew or would grow. Let everybody exercise his ingenuity in the manner which to him was apparently the most conducive to the object he had in view. If any one wanted to know what his own opinions on the subject were, he would mention that ten years ago he read a discourse before the Society, on the subject of Scientific Geography, and he would refer them to this paper which was printed in the 'Proceedings' of the Society. He did not find, on reconsidering the subject recently, that he had very much to change in what he then said.

A vote of thanks to Mr. Mackinder concluded the proceedings.

*Mr. A. D. Carey's Travels in Turkistan and Tibet.*

THE attention of geographers has been so much occupied of late by the proceedings of General Prejevalsky in Chinese Turkistan and Northern Tibet, that the explorations of Mr. Carey in those regions have been scarcely noticed. Yet Mr. Carey's journey has been as important and interesting as that of the Russian officer. Mr. Carey is a member of the Bombay Civil Service, who is devoting two years' furlough to travelling, at his own expense, over what may be fairly described as almost the last of the unexplored regions of Asia. He is accompanied by Mr. Andrew Dalgleish, whose name is known as the pioneer British trader in Chinese Turkistan, and who joined Mr. Carey as Turki interpreter and general assistant; the remainder of the party is made up of pony drivers and two or three personal attendants. Mr. Carey left India in May 1885, and marched through the hills to Ladak, where he adopted the plan of travelling eastward into Northern Tibet (Chángtán) as far as the Mángtsa Lake, and thence striking northward till he should descend on the plains of Turkistan, near Kiria. This plan was successfully carried out during August and September 1885, and resulted in more than 300 miles of country being traversed which had never before been visited by a European of any nationality. The altitudes on this section of the journey were always very great, the track running usually at about 16,000 feet above the sea, while one, at least, of the passes crossed was calculated to reach 19,000 feet. In descending from the Tibetan highlands towards Kiria, an extremely difficult defile had to be passed, where five days were taken up in making good a distance of 28 miles. A short stay was made at Kiria, and a somewhat longer one at Khotan, where General Prejevalsky's party was camped on Mr. Carey's arrival. The two explorers, however, did not meet, the former being then just on the point of starting for Aksu and Russian territory, while the latter had to fit himself out with a new caravan of camels for crossing the desert to Kuchár. In this way it happened that for a portion of the journey towards Kuchár, Mr. Carey had to follow the Russian explorer, but for the remainder—the greater part—he can claim to be the first European ever to traverse these dismal plains. The route lay down the Khotan river to its junction with the Tarim; then along the latter river to Sarik, and thence across another stretch of desert to Sháh-Yár and Kuchár. From the latter place, after a halt to renew the caravan, a fresh start was made, when the Tarim was followed down to a point where it turns southward towards Lake Lob. But the Kuchár pack animals were in bad condition, and Mr. Carey found it expedient to leave the river for a time, and visit the towns of Kurla and Káráshahr, with the object of replacing them. All arrangements being finally completed by

about the end of the year, the Tarim was struck again, immediately south of Kurla, and tracked to Lake Lob.

Thus the whole length of the Tarim has been explored. The country along its course is described as flat and reedy, and the people extremely poor and miserable; at the villages near Lob, fodder was so deficient that Mr. Carey had to pitch his standing camp for the latter part of the winter (about February to April) at a village called Cháklik, some distance south of the lake, and close to the foot of the great range of mountains which forms the northern scarp of the Tibetan highlands. This long halt was utilised in preparing for a journey southward into Tibet as soon as the season should permit; and it happened eventually that a new departure was made on the 30th April, 1886. The route was then to have been over a pass in the great range (the Altyn Tágh, or "gold mountains," according to Prejevalsky), and onward by a track occasionally used by the Kálmaks in their expeditions to Tibet, and indicated by them to Mr. Carey. Since this final start from the lowlands of Lob, nothing has been heard of the gallant explorer, but it is presumed that after spending the summer and early autumn in travelling over the elevated region, and among the lakes of Chángtán, he has returned to Turkistan for the winter. If this should have been the case, Mr. Carey's return to Ladak and India may be looked for late in the coming spring, though news of his whereabouts and the safety of his party may perhaps arrive before that time. It may be noticed that Mr. Carey speaks everywhere, in his correspondence, of the good treatment he received from the inhabitants of the countries visited. The nomad tribes of Northern Tibet and the Mussulman inhabitants of Turkistan showed him nothing but civility, while all the Chinese officials acted loyally up to the terms of the passport with which Mr. Carey had been provided by the Peking Government before he set out from India. Mr. Carey has no escort, or armed following of any kind, and it is worthy of remark that he has been able to make his way (up to May 1886, at any rate) quietly and unmolested among people with whom the Russian explorer came into collision, and with mandarins of whom he has complained so bitterly since his return to Russia. The story Mr. Carey will have to tell on his return cannot fail to be of importance, and may be looked forward to with great interest by geographers.

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*A Journey from Blantyre to Angoni-land and back.*

By J. T. LAST, Commander of the Society's Expedition to the  
Namuli Hills, East Central Africa.

Map, p. 212.

IN May last (1886), being retained at Blantyre, waiting for the favourable season to start for the Namuli Hills, I made a journey, in company with Consul Hawes, to the Angoni country, on the highlands to the south-west of Lake Nyassa. I now submit to the Society the following account of this expedition:—

The course of the journey was from Blantyre to Zomba, thence by way of Malemya's, on the west side of Lake Shirwa, to the river Shiré, on to Mponda's at the south end of Lake Nyassa, up the east side of the promontory jutting into the south end of Nyassa to Livingstonia. From Livingstonia we traversed the west side of the promontory, and then travelling west we went viâ Mount Chirobwe to Chikusi's in Angoni-land. On leaving Angoni-land, we travelled E.S.E., striking the river Shiré at a village called Mpimbi. Here we passed over and went on to Zomba, returning to Blantyre from Zomba by the way we had come.

We started on May 3rd from Blantyre. Our way took us past the Scotch Mission Station at Blantyre, and then, after leaving the small hill of Nyambadwe on our left, we went round the western spurs of Ndilandi Hill, and down to the river Lunzu. The bed of this river is some 20 feet wide, and its banks 10 feet high; during the dry season there is but little water here, but the dried grass and debris on the trees on its banks show that during the rains there is frequently a rush of water 10 or 12 feet deep. The Lunzu rises about Bangwe and the adjacent hills, some eight miles to the east of Blantyre, and empties itself into the river Shiré, south of the African Lakes Company's trading station at Matope. We crossed to the right bank of the Lunzu at 6 P.M., and camped on the rising ground close by. The next morning we started at 7 A.M., and in the evening reached the river Mnamazi. Here we found the camp of the Portuguese traveller, Lieut. Cardozo, still standing. This our men were glad to make use of. During the day we crossed several rivers and streams, of which the Chipandi is the chief. This river, which is somewhat larger than the Lunzu, rises on the west side of Mount Kiladzulu, and rushes west between rocky defiles into the Shiré, a short distance south of Matope. Several long pieces of bog and marsh had to be crossed during the day. The marshy surface was hid by a coarse grass, about 18 inches high, which grows in the water, but the paths were only too distinguishable by the long line of black mud and slime. On leaving the Mnamazi the next morning, we passed over gently undulating ground covered with long grass, from five to eight or more feet high, which renders travelling very unpleasant, both on account of the heavy dew with which the grass is surcharged during the early morning, and also from the stifling atmosphere during the greater heat of the day. We crossed a number of marshes and small rivers on the way, of which the Likangala is the principal. This rises in some hills on the left bank of the Shiré, passes along the foot of Zomba, and enters Lake Shirwa. It is the largest river between Blantyre and Zomba, having a bed 50 feet or more wide. It rises and falls in the wet season after the manner of the Lunzu and other rivers. At 2 P.M. we reached the site of the British Consulate, which stands on the right bank of the river Mlunguzi. The Consulate is being built by Messrs. Buchanan Bros. on one of the spurs which jut out from the south side of Mount Zomba. The Mlunguzi river, which rises on the top of Zomba, and separates the Consular estate from that of Messrs. Buchanan, rushes down over rocks and boulders, forming pretty cascades



and waterfalls with its bright sparkling waters, and thence goes on to join the Likangala.

Mount Zomba, which is nearly 5000 feet above sea-level, has extensive spurs from 300 to 600 feet high jutting out from its sides. These are all fertile, well watered, and apparently very healthy. They are but sparsely inhabited at present, but this is probably owing to the continual feuds the natives have amongst themselves, and the extensive raids which have of late years been made by the Mangoni tribe. I think the spurs round Zomba are more healthy than Blantyre or any district for a great distance. The district about the south of Zomba proves to be very fertile, by the fine crop of coffee which Messrs. Buchanan have on their plantations this year. Sugar-cane grows equally well. Tea, cocoa, cinchona, arrowroot, and other products are being tried, and they promise to do well.

Whilst detained at Zomba I made the ascent of the mountain twice, and ascertained its height by boiling-point thermometer. The top of the mountain is an undulating flat, covered with grass about two feet high, and having here and there small patches of thick forest. The most interesting plants, to me, were heaths, ferns, and ground-orchids. Of the ferns, some of which are arboreal, and orchids, there are several varieties.

On Monday, May 17th, shortly after noon, we started for the village of Kumjali, where Malemya, a chief of considerable influence, resides, on the spurs at the north-east of Mount Zomba. We reached our destination about 7.30 P.M. Near to Malemya's is a small missionary station, an offshoot of the Scotch Church Mission at Blantyre, under the charge of a native teacher named "Bismarck." This man kindly invited us into his house while we were waiting for the caravan to come up, and we remained talking for about an hour, during which he showed himself to be a very intelligent man, as also on the following day, by his manner and conversation with the chief Malemya, which took place in our presence.

As soon as we reached Malemya's the chief invited us to camp in the inclosure at the back of his house. He was very noisy, being somewhat under the effects of native beer; still he wished to make us as comfortable as possible. He has a number of villages scattered about on the eastern spurs of Mounts Zomba and Malosa, from which one may look over the whole of Lake Shirwa and the north-west side of the Milanji mountains. The next morning the chief was sober, and came early to pay his respects to the Consul; he then made himself very agreeable, and through his influence the men were able to get plenty of food. He also promised to do all in his power to help the caravan on.

On the 19th we started again, Malemya having given some men to carry some extra loads belonging to the Consul. These men were ordered to take us on to the river Shiré and then return. Our path took us over the undulating spurs of the east side of Malosa Hill. We reached Machinjila's village after an hour and a half's walk, and stayed there to lunch. In the distance to the north were the districts under the two chiefs Che Mchamba and Che Kawinga, the former at the foot of Mount Chikala on the south side, and Kawinga on the spurs extending from the north side of the same. The Consul was very desirous of visiting these chiefs, but as there had lately been fighting between the people at Machinjila's and those of Che Mchamba the men from Malemya would not go. From Machinjila's we went on over the same kind of undulating ground till we reached the villages of Mpasu, a relation of Malemya's. Here we found plenty of food, flour, potatoes, bananas, fowls, with other common products of the country.

We went on next day to the villages of Mangulu, on Kumbanga Hill. The country is of the same undulating character as that hitherto traversed. Several rivers and streams were crossed on the way, of which the most important were the

Lafani, Nyambanyisa, Likweni, and the Mbelezi. There are no people between Mpasu's and Mangulu's, the people who formerly inhabited the country having been removed by the Mangoni. Mangulu's village is built in a very peculiar position. The north-east end of Kumbanga Hill is covered with huge boulders and rocks, having spaces between them which are utilised by the natives as sites for their houses; seldom more than five or six houses can be seen from one point of view, though there are a good number. In the evening the chief came to the Consul's tent, and we had a long talk together.

In the morning we desired to start early for the river Shiré, but the men from Malemya's refused to go any farther, saying that Malemya had told them not to go any farther than Mangulu's village. This we knew was contrary to what Malemya had told us, and as they persisted in saying that they would not go on, they were told that they would be paid, according to their agreement, on the bank of the river Shiré, and not before. They, however, refused to go on, and other men had to be hired from Mangulu.

We managed to get away at 8 A.M. The road lay over rough barren ground for some six miles, till we again approached somewhat near the Likweni river. Onward from this place the ground was level, and covered with long grass. The country abounds with game—elephants, buffaloes, and various kinds of antelopes. These were known to be in the district by the many tracks and marks about; we did not see any, however, it being about the time such animals go to water, which was several miles to the south-west. At 5 P.M. we reached a small lake near a clump of trees, and camped for the night.

The country is very flat on to the banks of the Shiré. Here we met with some large euphorbias, and also the big awkward-looking baobab (*Adansonia*). Trees are in patches, with intervals of grass. In other places there are trees very much like elms in appearance standing scattered about. They grow from 60 to 70 feet high, with good straight trunks from one to two feet in diameter, and would make good timber for building purposes.

On Saturday, May 22nd, we reached the river Shiré about noon. There is a long stretch of low-lying ground all along the left bank some  $1\frac{1}{2}$  mile wide. This in the close vicinity of the river must make the country unhealthy at all times of the year. The chief of the place was Che Liwonde. At Mangulu's village we were told that Liwonde had died a few days previously, but was not yet buried. The custom here is to keep the dead for some days after death, the idea being that if the bodies are kept till they are well advanced in decomposition, the so-called wizards are not so likely to dig them up and eat them. There is a strong belief amongst these people that wizards eat the dead as opportunity occurs, and by that means get a supernatural power over their fellow-creatures. As we arrived at the river we heard the beating of drums and people singing. Soon afterwards three canoes came in sight filled with people. The home of Liwonde was on an island in the river, and men were bringing his body thence, in order to bury it on the mainland. On landing, a sort of procession was formed, two or three men in front carrying beer and flour, then the body, which had been bound up in a kind of mat made from the stalks of the long matete grass, and suspended horizontally to a pole, was brought on by two men. After these came a number of men and women bearing beer and other things, some had small drums and rattles, which they were beating and shaking, and others were singing the funeral dirge. The stench arising from the body as it was carried past showed that we had not been wrongly informed as to the time the natives keep their dead before burial.

Soon after we appeared on the left bank of the Shiré, people living on the right bank saw us and came over in their canoes. Among them was Litete, the head-man

of the village, with whom an arrangement was made to take us over. This he did for eight yards of blue calico and four yards of white. We were quickly ferried across, and soon had our tents pitched in the inclosure of one of the houses of the head-man. There is a marked difference between the right and left banks of the river. The left is quite uninhabited, and very unhealthy. The right bank is fairly healthy, well-peopled and very fertile—large quantities of good rice are grown, and an abundance of Indian corn, millet of three kinds, a variety of beans, and other leguminous plants; pumpkins, potatoes, and cassava are also cultivated. Most of the natives have patches of tobacco, and some indulge in Indian hemp. Fowls are abundant and cheap; but goats and sheep scarce. Only bush-buck and other small antelopes are found in the vicinity. The people in all these districts are Nyassas and Yaos (Ajawas). Between this place and Livingstonia many of the natives are in the habit of going down to Quillimane, or to the more northern coast towns of Kilwa and Lindi, so that several can speak Swahili, and understand coast customs.

From Litete's we went on to Che Mlelemba's village, on the way crossing the rivers Mnangona and Mkasi. The chief here has been to the coast several times to barter his goods and bring up coast stuff. Our visit gave him an opportunity of showing off his knowledge of the coast language and customs, which he did not fail to make use of. He was very anxious that I should come and live with him at his new village, which he is building in a group of hills some ten miles away to the west. The country here is very fertile, immense fields of millet are grown, and Indian corn is planted all the year round.

The next day we went on to Mwasama's, passing through Che Pita's district at midday. During the day we passed several large villages belonging to the Nyassa tribe. Mponda, who is the head chief or Sultan of all these districts on the right bank of the Shiré, has made some terms of friendship with Chikusi, the Mangoni king, and now his people live in peace and safety. The path lay through the same fertile kind of country all the next day. In the afternoon we crossed the Nasenga river and camped in the forest some distance further on. Thence a messenger was sent on to the Sultan Mponda, to obtain his permission to visit him. Near the spot where we camped there had lately stood a large village, but the chief of it, refusing to obey some command of Mponda's, was attacked by his order, killed, his village destroyed, and his people scattered. The messenger returned the next morning with favourable answers, and we moved on. We could not but notice the barren appearance of the flat district in which Mponda lives. The soil consists chiefly of dry-washed sand, which has probably been drifted up at some time. It seems that large portions of the country, forming the east side of the promontory, were formerly covered with water, the hills and rocks then forming little islands. Since then, drift sand, or sand and mud, has filled the spaces between the hills. This is indicated both by the surface of the flats and also by breaks in the ground, which shows that it is simply made up ground. When there is simply sand on the surface little else but grass will grow; but with a mixture of sand and mud, the ground is very fertile.

The next morning we went on to Mponda's. On reaching the town we were conducted to one of the chief's houses, where we remained for about a quarter of an hour, and then proceeded to the houses which he had placed at our disposal. About two hours afterwards Mponda came, bringing a fine goat and two baskets of rice as a present. The Sultan remained talking for about two hours, and then retired with the present the Consul had given him. The present Mponda is a young man who has only lately succeeded to the sultanship. The custom is that when a sultan or chief dies, his sons cannot inherit, but the sultan's brother or brother's sons. The present Mponda is a younger brother of the late sultan. A great difficulty against

a son inheriting is the custom that on the death of a sultan or chief, all his wives and women become the property of the person succeeding.

There is now a general feeling among the sons of great chiefs in these territories that they ought to succeed to the position and property of their fathers. The two sons of the late Mponda, who live in the great town of their father, are much discontented with their position, and are intriguing to turn out the present Mponda. Also at the great chief Makanjila's, on the south-east shore of Lake Nyassa, the same feeling is shown. The son of Makanjila is at war with his father, because the latter will not consent to make him his heir. All the chief young men are well acquainted with the coast towards Zanzibar, and have become Mahommedans. They are surrounded by a number of Warima, or Coast-men, who exert great influence over them. It is probably owing to the increased knowledge they have gained by their journeys to the coast, and also the influence of the coast-men who live with them, that these young chiefs are desirous of altering the present customs of their country.

On the evening of the day of our arrival at Mponda's, the African Lakes Company's steamer *Itala* came in, bringing down from the north end of Nyassa Mr. Nicoll and Mr. Stephenson, employés of the company. They, with Mr. Morrison, who is in charge of the steamer, came ashore, and we spent a pleasant evening together. In the morning they were off again on their way to Matope, the company's station at the upper end of the Falls on the river Shiré.

We remained at Mponda's the following day, and on the next, May 29th, resumed our journey. Our way led through the large town where the former Mponda had lived. Here we were met by his two sons, who were very anxious that we should stay the night with them, but time would not allow us to do so. The grave of the late Mponda is built just in front of the house where he resided. It is the largest building of the kind I have seen in all East Africa. Its large size is chiefly owing to coast influence—but the style and custom are purely native. The building is about 40 feet long by 30 wide, with a verandah 5 feet wide all round. The roof, the ridge of which is some 25 feet from the ground, is thatched with grass, the thatch being covered all over with white calico from the ridge to the eaves. The building stands nearly east and west, with the door at the east end. The roof inside is of bamboo, and hung with numberless pendants of white calico, about 1 foot long and 1 inch broad. The position of the grave shows the coast influence exercised at the burial. The grave was dug nearly north and south, looking towards Mecca, and when the body was buried, it was placed with its head towards the north. I was told that the burial was performed with the customary Mahommedan rites. Over the grave a tomb has been erected on a raised platform or dais, which is ascended by two steps. The tomb is formed by a turreted wall about four feet high, which surrounds the grave. The square enclosed by this wall is left open at the top, and inside is a mound raised like that of an ordinary grave. On either side of the tomb outside there is a large square box, said to contain rupees, the offerings of people who have come to pay their respects to the dead. The wall of the tomb facing the door is inlaid with round earthenware plates, basins, looking-glasses, a copper plate, and other things of European make, and hung with numerous strings of beads, the offerings of friends and visitors. In front of this wall a rail is put up, about six feet from the ground, from which are suspended a number of good Muscat cloths, and some coloured cloths of European manufacture. These form a screen to the tomb, and are always kept down except when people come to visit the grave. The door is always kept locked, and a man is appointed, whose sole duty is to keep charge of the place.

After a small present had been made to the two sons of the late Mponda we moved on, and passing the villages of Kumlomba on the way, reached Malunga's in the evening. The country passed over was low and sandy, with numerous patches

covered with salt. These patches are covered with water during the wet season, and, as the water is evaporated, the salt deposit is left. We saw several parties of women engaged in gathering up the salt, which they mix with water, and strain; it is then evaporated by boiling, after which it is ready for the market. A large quantity of salt is thus collected about Mponda's district, and it finds a ready market with the Yaos to the south, and among the Mangoni to the west. At Malunga's we were told that hippopotami were plentiful; they must have been very shy, for we only saw one at a distance. In an endeavour to shoot it we were not successful. We had heard much talk about these animals in the river Shiré. They must be few in number, however, for we did not see more than half a dozen all the way up the Shiré, and along the shores of the lake.

From Malunga's we went on the next day past the villages of Ngumbi, Makopola, and Chipoka, to the village of Abdulla. We camped outside the village, at which the chief was rather surprised, the general practice being for travellers to camp inside. Abdulla's village is strongly situated on a neck of land on the lake coast, surrounded by hills. At the foot of one of these hills is a little lake of salt water, in which there is a variety of fish.

From Abdulla's we made a long journey, and at night reached the broken-down village of Pampamba, of which the chief is named Kizura. The country we passed through varies considerably; some of it is most fertile, while other parts are simply clean sand, and useless for gardens. In other places there are large swamps, shut off from the lake by low banks, upon which some of the natives have built their small villages. The chief of these are Mlela and Walo. Beyond these villages we passed over the Nguzi Hills, and came to a deserted village. There we had to retrace our steps for a short distance, till we entered a broken track, which took us sometimes along the shore, sometimes over rugged rocks, and ultimately brought us to Kizura's village, at which we arrived about 6.30 p.m. This is a most desolate, broken-down, and unhealthy place, and we were glad to be off again the next morning. On leaving, we went for some distance along a scrubby forest, and then came upon the shore of the beautiful bay of Mazinzi, where we stopped for breakfast. At 11.30 we reached another beautiful bay, called Lusumbwe. This bay is about half a mile in width, and a mile in length. The sides of the bay are formed by the hills Sanu and Dimwe on the right, and Punzi and Tumbwe on the left. These two rows of hills are parallel to each other, and a strip of low bank at right angles to these forms the head of the bay. There is a good-sized village just over this bank, the inhabitants of which pass a good deal of their time in catching fish in the bay, where they are plentiful and in great variety. A large seine or net is taken to the mouth of the bay in canoes, where it is dropped into the water, and stretched from side to side. Ropes are attached to each end of the net, and the men with these draw the net to the head of the bay, and land the fish. We stayed at this place for about two hours, and left at 2 p.m., thinking we had ample time to reach Livingstonia before dark. We had to cross over a high pass in the Kunguni Hills, and night came on before we were at the foot on the other side, so when we arrived at the gardens we had to camp, and go on the next morning. We reached Livingstonia in less than an hour's march from the last camping place, on June 2nd.

The mission station of Livingstonia is built on the shores of a little bay at the foot of the Kunguni Hills. An elevated bank of shingle and sand is thrown up all along the shore of the bay, and inside this bank is a low flat, extending up to the hill-side. Many parts of this flat are lower than the lake level, and consequently very damp and unhealthy. In the rains all this must be an extensive swamp, as is shown by the elevated roadway which the missionaries have had to make in order to get over it at that season of the year. At first sight the place

has the appearance of being unhealthy and unsuited as a mission station, and for the first two days of the time we were obliged to stay here the excessive humidity of the place made both the Consul and myself quite ill, and incapable of doing anything. The missionaries have lately retired from the place on account of its unhealthiness and gone to Bandawe, a place more north on the west side of the lake. A number of good houses have been built here, but they are now rapidly falling into decay. At present a young native named Albert has charge of the scholastic and religious work of the station. Teaching in reading, writing, and arithmetic is carried on every morning for about two hours, and on Sundays a religious service is conducted by the schoolmaster Albert, at which, it is said, all the people of the place attend. The station itself is in charge of a man named Mlolo, who acts as chief of the district. The people living at or near the station are Nyassas and Yaos. The Yaos were brought here by the missionaries, and the Nyassas have come to live near the station, feeling that they get some kind of protection by living near the Europeans. They still retain their old superstitious customs. Only a short time ago a woman accused two men of being wizards, stating that she had seen them take the body of a child, who had lately died, into a house, and that there they had eaten it. On the charge being made the men protested their innocence, but to no avail; they had to submit to the ordeal of mwavi-drinking. The mwavi is a mixture made from certain plants, which varies in its action, probably from the manner in which it is prepared. If the person who is made to drink it is sick and recovers, it is taken as a proof that he is innocent, but if he dies he must have been guilty according to native ideas. The men above mentioned were made to drink the mwavi, and both died. Some short time afterwards the *Ilala* steamer of the African Lakes Company came down and anchored off the station. On hearing of the affair the Europeans on board protested against the use of mwavi, and after some persuasion induced the people to dig open the grave to see whether the body was really buried or not. They did this, feeling sure that the body had not been eaten, and hoping thereby to convince the natives that the use of mwavi was entirely wrong, and not a test in any way of a person's guilt or innocence. The grave was dug open, and at a depth of 12 feet the child's body was there found. Many of the people were astonished, and admitted that in this case the mwavi had failed. But it did not convince the people that though the mwavi had failed in this case that it was a wrong thing to use, or that it would fail in other cases. The old chief Mlolo told me that though the Yaos and those connected with the mission were obliged to give up such customs, still the Nyassas who lived near would not think of doing so. It is hardly to be expected that natives will give up such customs quickly. If the practice was simply for the purpose of determining the guilt or innocence of a person, then it might easily be given up; but as it is one of the safest and most powerful means the natives have of removing obnoxious persons, it is not to be expected that it will be quickly abolished.

On June 4th we left Livingstonia at 4 p.m., and proceeded south over a spur of the Kunguni Hills along the west shore of the promontory. At 5.30 we reached the village of Mpamba, and camped for the night. The village consists of a string of huts built along the coast-line at the foot of the hill. Nearly all the people were away in their gardens driving away the monkeys which live in the hills. The damage they do to the garden crops is very great, and this the natives here feel all the more because they have only the rocky sides of the hill where they can grow anything.

The next morning we went on past the villages of Mpangu, Nyamkumba, Marungano, Mpande, and the border village of Mbapi at 2 p.m. At Marungano's we found a blacksmith busy forging hatchets. These are made from iron picked up

in the swamps and bogs of the district. The iron was apparently of a poor quality, being very scaly. There was one hatchet which the smith seemed to value, the iron of which came from the hills on the west side of the lake. The smith's anvil was a great stone, for a sledge-hammer he used a large stone, and for finishing his work he has small hammers, probably of his own make. With these rough tools he turns out hatchets, axes, arrow and spear heads, hoes, and other implements of such good quality and finish, that a European smith would hardly believe that the work was accomplished with such tools. Most of the country from Marungano's is very fertile, covered with fine crops of Indian corn and millet. Between Mpande's and Mbapi's we crossed the dry bed of the river Lusangadzi. This is a considerable river in the wet season, its bed being some 30 yards wide with banks 12 feet high. The marks on the banks show that the river is full during the rains. The strata of mud and sand seen in the banks show that all the adjacent flat country has been gradually made up, or rather that it was formerly part of the bed of the lake from which the waters have now receded. Mbapi's village is extensive, and surrounded by a high fence of trees. The people all along the shores of the lake in these districts are chiefly Nyassas. Whilst walking about the village of Mbapi, I saw a little hand-loom for making cloth from cotton yarn. The cloth produced was in pieces about 7 feet by 6, and very strong, very much like stout canvas, but softer. At Mbapi's we laid in a supply of food, and proceeded the next morning to cross the plain which separates this district from that held by the Mangoni. It is nearly all a continuous long flat, large portions of which are swamped during the wet season. We camped near a little stream of water, and next morning went on to the village of Mpulusa. This is the frontier village of the Mangoni in this direction, and is held by a sub-chief named Chakuawa. On our way from Mbapi's we passed several sites where villages had once stood. We learnt that the late Mponda, several years ago, had attacked and destroyed these villages. He was driven out of his own country on the west side of Nyassa by the Mangoni, and he in his turn attacked the Nyassa villages at the south-west end of the lake. Taking the people thus captured with him, he went and established the villages now ruled over by the present Mponda. About this forest and flat there were the marks of plenty of large game, but we did not see any, owing to the size of the caravan, and probably also to the long grass with which the country was covered. We breakfasted at Chakuawa's village under a large Mtondo tree, the shade of which covers the baraza, or gossip-place of the village. From Chakuawa's we went on to Mben's, where we saw some more cloth being made, thence to the river Bwanji, where, after crossing, we camped on the left bank. The whole of the country is very fertile, corn is grown in abundance, and also large quantities of the cotton plant. The village of Mtenganjila is opposite, on the right bank, and a little in advance of where we camped are the villages of Mafua. The inhabitants are Nyassas and Yaos, ruled over by Mangoni head-men.

On starting the next morning we passed a number of villages with extensive gardens, and in two hours reached the village of Chifisi Kwipa, the chief head-man of the villages in this part of Chikusi's country. We stayed here to breakfast, and were informed by Chifisi that we must not go alone to Chikusi's; that he would undertake to guide us there, and arrange the meetings, as that was part of his duty. At 10.30 A.M. we resumed the march; Chifisi, who was accompanied by some of his men, leading the way. During the day we crossed and recrossed the Tuta, a small stream which runs into the Bwanji. On our way we passed over a rather steep hill. On the top we found large heaps of stones, which reminded me of similar heaps I had seen on the road from Zanzibar to Unyamwezi. On inquiry I found they had been raised in a similar manner. Probably the spot is regarded with some idea of sanctity,

for any one passing this way on business throws a stone on the heap to secure success to his undertaking. At the foot of the hill we crossed the Tuta again, and camped on its left bank. Here there are no villages, but the country has the appearance of being very fertile. The next morning we ascended the hilly district of Nyandi, with the rocks Ondwe on the right, and Funi on the left. At 9 A.M. we reached the banks of the Liveze. This river rises, one day's journey to the south, out of a small lake near the villages of Banda, of which Kamkodo is the head-man. After resting on the Liveze we moved on to the village of Malimba, situated at the foot of the high hill Chirobwe.

From this place we sent two men to acquaint the king of our approach to his town, and to ask his permission to visit him. They returned with the message that we were to move on the next morning, and that the king's nephew Ziengea would meet and take us to the king.

The next day we ascended the hill Kamtanda at the south of Chirobwe. On descending a little on the other side we came to a small stream which runs south and enters the Liveze. Here we breakfasted, and then ascended to the top of the ridge, which opens out into an extensive plateau. We stopped here to make some observations, and towards evening reached Geagea's village, where we camped for the night. There are but few villages in this part of Chikusi's country, and the land is very poor. When we were about to start the next morning, two messengers came from Ziengea, saying that we were to go on to Mavunji's village, and await him there. This we did, and about 11.0 A.M. Ziengea came up, and we had to go with him to his village of Maiwe. On our way we crossed the river Lifobwe, which rises in the Deza mountains and empties itself into the Zambeze.

We remained at Maiwe for two days waiting for a message from the king. He ultimately sent word that we were to move on to his chief town Luisini, where we stayed two days more waiting for the king's arrival. Finally we had to move on to Kujipori village to meet him.

The next morning we started again, our course lying along the left bank of the Msunguzi. Leaving the hill Mang'ani on our right we went on for 1½ hours, and then crossed the streams Chigaga and Chikubwe in close succession. About a mile further on we arrived near the village of Kujipori. Messengers were then sent to the king to announce our arrival, and after waiting for an hour he came out to receive us. A seat was prepared for him on some bales of cloth, to which he was conducted when he arrived. The Consul and I then went out of the tent to him. He was very cordial in his manner, and expressed himself as pleased that we had come to see him. Afterwards when the camp was arranged, the men of our caravan were drawn up in line, and three volleys were fired as a mark of respect to the king. This seemed to please him much. After some conversation, the king moved to go away; the natives, of whom there were some 200 or 300 sitting about, at once set up a low bleating sound, as a mark of respect to him.

The king Chikusi is of middle height, but of extraordinary stoutness, so much so that he can only walk for a short distance at a time, and that very slowly. Except this obesity, there is but little to distinguish him from any of his subjects. His dress is no better, and not so good as that of some of his head-men. The following morning the king paid an official visit to the Consul, and remained with him upwards of two hours, discussing matters of business.

The whole of Chikusi's home district is a large plateau, which begins at the ridge of the hills of which Chirobwe forms an elevated part, and extends away towards the west far beyond the hill ranges of Samang'ombe and Kandunda. Over all this district there is scarcely a tree to be seen, the fuel commonly used by the people being corn stalks and ox-dung. The land near the east is very poor, but as



one proceeds towards the west it greatly improves in appearance, and all the country around Luisini and Kujipori is very fertile and extensively cultivated. There are a number of small streams traversing the whole country. These have their sources in the hill ranges dotted all over the plateau. These keep the land somewhat damp, and then the plateau being at an elevation of nearly 5000 feet, the land does not become so scorched and dried up here as in the plains below. We found it very cold on the plateau; the minimum thermometer one night was as low as 37° F. This may not seem much to Europeans, but by Africans and travellers in Africa so low a temperature is felt very much. From a sanitary point of view, I think the plateau in many places is very healthy, and several suitable spots could easily be selected for European residences, but it loses much by its want of good scenery and by its bleak and treeless appearance. Food is generally cheap and plentiful, fowls being bought at the rate of six for two yards of calico, value 11*d*. The people, most of whom have been taken prisoners from the various Nyassa and Yao tribes, are in many respects different and superior to the people of the same tribes living in the plains. These latter are generally intrusive, boisterous, and often without any show of respect, whilst the people who have been brought up under the Mangoni rule are most respectful and quiet. When they come with their articles for sale, they first sit some 15 or 20 yards away; on being invited to approach, they do so. There are but few of the true Mangoni stock, the bulk of the people called Mangoni being men who have been taken in war, and then trained up to the Mangoni customs. There are probably more true Mangoni women than men. They are nearly all the wives of the king. They are easily distinguished from other women by their light colour, and by being generally taller and stouter than the ordinary women. The common dress of the women is a loin cloth. Some may be seen with another cloth in addition to this, with which they wrap themselves up. Others have neither the one nor the other, but simply fasten a string round the waist, to which in front they attach a piece of cloth about two inches wide; this is drawn tightly between the legs, and the end fastened behind to the string round the waist. They are very fond of bead ornaments, which consist of necklaces, bangles, earrings or plugs, snuff-boxes, and other articles. The women also wear a great variety of brass bangles. With the exception of the chiefs and head-men the dress of the men is very meagre, like that of most African tribes, consisting as it does of a loin cloth or piece of skin as a substitute; in addition the Mangoni wear a private covering peculiar to all the Zulu tribes. The arms used are chiefly clubs and spears, in addition to which they all carry the large oval-shaped shield. Bows and arrows may sometimes be seen. Unlike the Masai it is said they do not throw the club, but on coming to close quarters, they strike their opponents' legs, and when they have brought them down, then spear them. The king has a few guns, but it appears they are never used in the raids upon the neighbouring tribes, but for elephant hunting, or occasionally when parties are sent on duty to a neighbouring territory, in which case a gun or two is taken, probably for the purpose of firing a friendly salute on arrival. King Chikusi seems to have complete control over all his country, and there is the greatest respect shown by the ordinary people both to him and his head-men. This is owing probably to his despotic and tyrannical rule, for he has the credit of removing at once any person who is unfortunate enough to make himself obnoxious to him. It was said that only a short time ago the head-man of Luisini village, being on a visit to the king on business, he requested permission, as night drew on, to retire, and at this the king took great offence, and ordered him to be taken out and speared, which was done. The houses of the Mangoni, excepting those of the king at Luisini and Kujipori, are most miserable buildings. They are like the Nyassa round huts, but much smaller, and almost all in a dilapidated state. This undoubtedly is owing to the fact that there

is no wood in the neighbourhood. The king's houses at Luisini, which are the best we saw in Angoni-land, are large, being some 30 feet in diameter, with bell-shaped tops. Each wife at Luisini has an inclosure to herself, in which is included the royal hut, with two or three smaller ones, in which the lady's attendants live, and space sufficient to conduct the general household work of grinding corn and brewing beer being carried on. All these are kept very clean, and well swept, which is quite in contrast to the general appearance of the other villages.

We remained at Kujipori till the 19th June, the king being unwilling that we should leave before. On our departure we were given an escort of ten men, and an official was sent in charge. They accompanied us to Mpimbi on the river Shiré, where the Angoni territory in that direction terminates.

We started about 10.40 A.M., and passing under Mpulu hill, reached the village of Kamtawila on the right bank of the Lifobwe at 2.20. We stayed here to lunch, and then crossing the Lifobwe reached the village of Kasungwe and camped at 5.20.

On June 20th we left Kasungwe's and reached the villages of Goma at 11.45. On our way we crossed several streams of good water all making their way to the Lifobwe. From Goma's the path lies between the hill Mbidzi to the north, and some spurs of the Lipepeta range on the south. On issuing from the pass we traversed some undulating ground and descended into the district of Kamkodo. Thence we went on to the Lisipi, and camped on its right bank. This river rises on Kitungwe hill. The next morning we descended into the Ncheu district, head-man Kadole. After a rest we went on to Bangala village, where Lunduka is chief. At 4.50 P.M. we crossed the Msipi, which rises on Mount Ncheu, and marched on to the villages of Sakapi, in the district of the Msipi. The whole of the country between the Lifobwe and the villages of Ziwandea is poor, the soil is dry and little cultivated.

On the 22nd June, at 8.0 A.M., we crossed the Luvelevi river, which has its source in the Mvai Hills, in the district of Kama, head-man Njala. At 5.40 we reached the stream Kapeni, which flows into the Luvelevi; this we crossed and camped on the right bank. The journey was for the last two days over gently undulating ground, except at one place, where there is a rapid descent from the central plateau to this lower one. The next day we made a short journey over a fairly level country, and reached the village of Ziwandea. This is a collection of broken-down villages on both banks of the dry bed of the Mulunguzi. During the rains its water flows into the Luvelevi. Here the land is very good, and large crops are raised. Judging from the present young Indian corn, it is possible that the natives have fresh corn all the year round. Rice is grown plentifully here, and sold at Matope to the Europeans on board the steamers which call there. The next day we had a very rough walk through long coarse grass, which renders travelling very tedious, when beaten down over the path. At noon we crossed the dry bed of the Nazipili river. It had cut its way through a deep stratum of white limestone, which, by report, lies under the soil of all the country about Mpimbi. At 1.0 P.M. we reached the villages of chief Kumtali on the right bank of the Luvelevi. After stopping to lunch, we moved on to the village of the head-man Nyozero. Next day we reached Mpimbi, on the river Shiré, about 11.0 A.M. After a little delay we bade farewell to the Angoni escort, and were taken over to the left bank by Mpimbi's people. We then moved on and camped in the forest. The next morning we started early and reached the top of Che Mlumbi's hill at 12.15. We rested in his village to lunch, and in the afternoon went on to Zomba, where we arrived at 5.30, and pitched our tents in the Consulate grounds.

On Monday we started for Blantyre, arriving there on Wednesday, July 1st.

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## GEOGRAPHICAL NOTES.

**Geographical Education.**—As stated by Mr. F. Galton in the discussion on Mr. Mackinder's address (*ante*, p. 166), three delegates of our Council (Mr. Galton, Hon. G. C. Brodrick, and Mr. Freshfield), met (on the 10th February) delegates of the Hebdomadal Council of Oxford, to confer on the subject of the proposed establishment of a Readership of geography at that University. On the 18th February, another deputation, consisting of Mr. Galton, Sir Thomas Wade, General J. T. Walker, and Mr. Freshfield, met for a similar purpose a Committee of the Senate of the University of Cambridge. The results of both these conferences, though of course not final, were most encouraging to the prospects of the recognition of geography at both Universities.

**Mr. Last's Exploration of the Namuli Hills.**—We have received a brief preliminary account of the results of Mr. Last's visit to the Namuli Hills, in a letter sent by the traveller from Quillimane on the 6th December last. He devoted three months to the task of exploring this region, which it will be recollected was the main object of his expedition. During this time he went almost completely round the hills, but found it impossible to reach the summit of the principal peak or double peak; in fact, he came to the conclusion that it was inaccessible. Spurs, to the height of 2000 feet or more, extend from it on all sides, above which the two cones rise precipitously. There is a clump of trees near the top of one of the cones, near which are probably the sources of a small but perennial stream, which flows down the eastern side. Before leaving the district, Mr. Last, with a party of twenty men, ascended the banks of the Lukugu river to its source, which lies west of Namuli, at the north foot of Mount Pilani. He found the whole country well watered and fertile, though very sparsely inhabited. Unfortunately, the Lukugu river, the main watercourse of this promising region, owing to its long series of rapids and waterfalls, is unnavigable even by canoes, and its mouth is closed to coasting vessels by a formidable bar.

**England and Germany in East Africa.**—The principal provisions of the recent treaty between the two Governments regarding the boundaries of their respective territorial interests in East Africa, and also defining the possessions of the Sultan of Zanzibar, may be summarised as follows:—Both powers recognise the sovereignty of the Sultan over the islands of Zanzibar, Pemba, Lamu, and Mafia, and also over all the small islands within 12 nautical miles of Zanzibar. Germany assents to the agreement between England and France regarding the independence of Zanzibar. The two Powers also recognise as the possessions of the Sultan on the continent an uninterrupted stretch of coast from the mouth of the Miningani river on the south (near Cape Delgado) to Kipini on the north, but extending only 10 nautical miles inland. Both Powers

recognise the coast from Kipini to the north end of Manda Bay as belonging to Witu. Great Britain agrees to support the negotiations of Germany with the Sultan by which the latter is to grant a lease of the harbour dues of Dar-es-Salam and Pangani to the German East African Society, in consideration of an annual payment on the part of the Society, and also to use its influence to promote a friendly arrangement with reference to the opposing claims of the same Society and the Sultan on the Kilima-Njaro territory. With regard to the respective spheres of interest of the two Powers, that of Germany extends from the Rovuma in the south to the river Wanga, Kilima-Njaro and the south end of Victoria Nyanza in the north, while that of Great Britain is confined to the country between Kilima-Njaro and the Tana river. The actual line of demarcation runs from the mouth of the Wanga in a straight line to Lake Jipe, along the east and north shore of the lake across the river Lumi, dividing equally the districts of Taveta and Chaga, and then along the northern slope of the Kilima-Njaro range in a direct line to a point in 1° S. lat., on the eastern shore of Lake Victoria Nyanza. Each Power agrees to make no acquisition and establish no protectorate within the limits of the other's territory. The German Protectorate had formerly only been declared over Useguha, Ukami, Nguru, and Usagara. We hope to be able to give a map showing these new political boundaries in the April number of the 'Proceedings.'

**Rouvier's Astronomical Observations to fix Positions on the Congo.**—The report of Captain Rouvier on his recent journey to the Congo, when, jointly with Lieut. Liebrechts and Captain Massari he acted as one of the Commissioners for laying down the boundary between the Congo State and the French possessions, promises to become most valuable to geographers. It is to be accompanied by an atlas of 38 maps, showing the regions explored on various scales. The astronomical observations upon which these maps will be based have just been published in the 'Annales hydrographiques.' They include 79 latitudes, one longitude determined absolutely, and 70 longitudes determined chronometrically and adjusted to Libreville on the Gabun, as laid down on the French Admiralty chart (9° 26' 33" E. of Greenwich), and to N'Ganchu, which was determined, by thirteen sets of lunars, to be in 16° 12' E. It is satisfactory to find that Captain Rouvier's longitudes agree very nearly with those of Lieut. Mizon.

The principal positions are:—

	°	'	"	S.	°	'	"	E.
Loango .. ..	4	38	25	S.	11	49	10	E.
Kitabi .. ..	4	1	0	"	12	11	0	"
Makabana ..	3	25	10	"	12	37	50	"
Ludima-Niadi	4	6	40	"	13	4	40	"
Manyanga ..	4	53	30	"	14	22	50	"
Brazzaville ..	4	16	55	"	15	17	10	"
N'Ganchu ..	3	17	3	"	16	12	0	"
Bonga .. ..	1	6	40	"	16	52	10	"
N'Kunja .. ..	0	8	40	"	17	41	30	"
Equator Station	0	2	0	N.	18	13	10	E.
M'Pombo	1	20	30	S.	16	15	20	"
(Alima) ..								
Leketi .. ..	1	35	50	"	14	54	50	"
Diele .. ..	1	41	30	"	14	42	40	"
Franceville ..	1	36	50	"	13	34	30	"
Boue .. ..	0	5	20	"	11	54	40	"
Libreville ..	0	23	25	N.	9	26	33	"

The true longitude of Leopoldville on Stanley Pool appears thus to be  $15^{\circ} 15' E.$  (instead of  $15^{\circ} 8'$ , as determined by Herr Baumann from two sets of lunars).

**Dr. Lenz's Expedition.**—In a communication to the new number of the 'Mittheilungen' of the Vienna Geographical Society, Dr. Franz Ritter v. Le Monnier refers to the delay which has taken place in Dr. Lenz's leaving Zanzibar. From a *Times* telegram we learn that he was expected to leave about ten days ago. It is stated that two interesting letters (to be published in the next number) have been received from Dr. Lenz, one dated from Lake Tanganyika in September, and the other from the river Shiré, in December 1886. Meanwhile we are told that the expedition left Kasonge on June 20th, greatly hindered by the loss of several of its men through small-pox. On July 11th Kibonde was reached, a park-like plateau passed, and a mountain crossed. On August 7th the expedition reached the Mtowa country, on the west shore of Lake Tanganyika, and was received by Captain Hore on Kavala Island. Ujiji was entered on August 15th. Here Dr. Lenz discovered that on account of the warlike raids of the Arabs and the excitement in Uganda, it would be impossible for him to push northwards to Emin Pasha, as was his original intention. He resolved, therefore, instead of proceeding by Tabora to Zanzibar, to go southwards to the south end of Lake Tanganyika, and onwards to Lake Nyassa. He reached the latter at Karonga's town, proceeded, apparently by land, to the south end, along the Shiré, and so down to Quillimane. Dr. von Le Monnier points out that this is the ninth time in which Africa has been crossed by white travellers, so far as known. Dr. Lenz has crossed the continent from the mouth of the Congo to the mouth of the Zambesi in less than 17 months. The previous expeditions have been those of Livingstone, 1854-6 (Loanda to Quillimane), 20 months; Cameron (Bagamoyo to Catembela), 2 years and 8 months, 1873-5; Stanley, 1874-7 (Bagamoyo to Banana), 2 years and 9 months; Serpa Pinto, 1877-9 (Benguela to Durban), 16 months; Wissmann, 1881-2 (Loanda to Sadani), 1 year 10 months; Arnot, 1881-4 (Durban to Benguela), 3 years 3 months; Capello and Ivens, 1884-5 (Mossamedes to Quillimane), 14 months; Glerup, 1884-6 (Banana to Zanzibar), 3 years.

**Guinea.**—The unknown country lying to the north of Togo Land which, it will be remembered, was partly traversed by Herr Zöller, some two years ago, has been further explored by a French missionary, named Baudin. Another missionary, M. Ménager, had in 1885 penetrated beyond Agome, Zöller's farthest point, to Adangbe. In the bulletin (No. 5, 1886), of the Geographical Society of Lyons will be found a short account of M. Baudin's journey. He started in January 1886, from Ague on the coast, and pushed into the interior as far as the town of Atakpame, which at the time of his visit was beginning to recover itself

after its destruction by Dahomey. The traveller intended to proceed still further north, but was prevented by the opposition of the natives. He accordingly turned eastwards and reached Togodo, whence he effected his return journey down the river Mono to the coast. A map of the traveller's itinerary is published with the paper.

**The Monsoons.**—In Mr. H. F. Blanford's report on the Administration of the Meteorological Department of India for 1885-6, there is a statement of considerable geographical interest with reference to the monsoons, which tends greatly to modify the prevailing conception as to the origin and real character of these winds. Briefly, the summer monsoon is regarded as an anomalous diversion of the south-east trade-wind of the South Indian Ocean, caused by the high temperature developed on the continent of Asia in the early summer months. But Mr. Blanford points out, the wind-charts of the North Indian Ocean, now in course of preparation, show that the south-east trade does not, as a rule, blow across the Equator, and changing its course from south-east to south and finally to south-west, pass gradually into a south-west monsoon. A rainy belt in the neighbourhood of the Equator exists throughout the year, which is fed by the south-east trades. In this belt the winds are very variable, blowing from all quarters; and it is only some 6° N. of the Equator that the monsoon is established as a comparatively steady current of wind. The monsoon, therefore (in so far as it is a *south-west* monsoon), is drawn from a reservoir of air over the equatorial zone, fed by the south-east trades, but it is not the south-east trade wind simply diverted from its former course. Moreover, Mr. Blanford maintains that the Indian summer monsoon is not simply a *south-west* monsoon. On the Arabian Sea, and especially beyond the tropic, the winds are as frequently west as south-west, and not unfrequently north-west; and this is also the case on the west coast of India. The less southerly or the more northerly the wind, the finer is the weather and the smaller is the rainfall of the Bombay Presidency. According to Mr. Blanford, the explanation of these facts is that, at certain times, a considerable portion of the air which enters into the western branch of the monsoon is not drawn from equatorial regions at all, but from the dry coasts and still drier plains and mountains to the north. In all years, in the summer season, this dry air furnishes the greater part of the winds of the lower Indus Valley and Western Rajputana, and hence the rainlessness of this portion of Western India. As Mr. Blanford points out, these conclusions have a very practical bearing, and are certainly of much interest in connection with the physical geography of India and of Central Asia.

**Influence of Forests on Climate.**—In the same report Mr. Blanford describes the steps which have been taken in India to discover to what extent forests influence the rainfall. A few observatories have been

established in the Ajmere forests, and the results so far have been to show slightly but appreciably higher rainfall in the forest than without. However, it is admitted that more careful inquiry must be made before any definite conclusions can be drawn. Mr. Blanford points out that M. Woeikoff, in a paper on the subject, with special reference to India, essentially supports the view which he himself regards as probable.

**Journey to the Sources of the Finke River.**—Mr. Charles Chewings has recently published in the *Adelaide Observer* an account of his journey to the sources of the Finke river, which has now been issued in pamphlet form, accompanied by a valuable map. The Finke river is the largest of all the Central Australian watercourses; it drains the whole of the country on either side for scores, and even hundreds of miles in some directions. It is sinuous in its windings, and is fringed with a wide belt of gum trees on either side the whole of its course. The journey was made in 1885, and the distance travelled was considerably over 5000 miles. The author holds that the far inland tract of Central Australian pastoral land is by no means, as it has been termed, a desert; on the contrary, much of the country traversed was found to be excellently watered and well grassed. Although at times the expedition followed on the tracks of other travellers, a great deal of new country has been explored, for a description of which we must refer our readers to the author's full and interesting account.

**Former Vegetation of Iceland.**—The question of the former vegetation of Iceland was dealt with at some length by M. Feddersen, in a paper recently read by him before the Geographical Society at Copenhagen, on his explorations in the southern part of the island. His discoveries in the valley of the geysers appear to falsify Dr. Labonne's \* conclusions as to the character of the ancient vegetation of the country. M. Feddersen found there great trunks of trees which had been dug up from the sandy soil, showing that at one time this district was covered with large forests of gigantic birch trees. His theory, it will be remembered, is supported by the "Sagas" or hymns of the ancient Icelanders. He has also been able to prove that an immense arm of the sea penetrated formerly into the south part of Iceland, but has disappeared in consequence of an upheaval of the soil. A curious fact noted by the traveller was that salmon ascend the river Elve with the warm water of the geysers. M. Feddersen confirms Dr. Labonne's observations regarding the still active character of the geysers.

**Journey across Labrador.**—'The Church Missionary Intelligencer' for June of last year, publishes an account of a journey across Labrador, from Little Whale river to Ungava Bay, undertaken by the Rev. E. J.

\* Proc. R.G.S., 1887, p. 52.

Peck, one of the Church Society's missionaries. Mr. Peck, with four Indians, left Little Whale river on July 17th, 1884, and after crossing the southern part of Richmond Gulf, which is about thirty miles wide, reached a small river, and entered a small chain of lakes lying about east by north. The country here was hilly, and in some places mountainous. After passing through another chain of lakes, lying about east by north-half-north, the party reached "Clear Water Lake." This lake is about forty miles long, and about fifty in breadth. On leaving its northern shore they passed into a small river. The country here was much lower than that hitherto seen. After making a few portages, the party entered "Seal Lake," which is about seventy miles long, and which varies much in breadth, being about its middle quite narrow, in other places measuring perhaps from thirty to fifty miles broad, and studded with islands. On leaving its south-eastern boundary, they entered a small river, and passed into a rather large lake. The country hereabouts was very mountainous. The remainder of the journey was accomplished by following the course of the river to Fort Chimo, one of the Hudson's Bay Company's posts, Ungava Bay, where they arrived on the 11th of August.

**Xingu River, Brazil.**—The Xingu river and its sources are to be the scene of further explorations by Dr. Karl von den Steinen, the enterprising traveller whose valuable journey in 1884, in the same region, we noticed at some length in the number of our 'Proceedings' for August last. The present expedition includes Herr W. v. d. Steinen, who accompanied the former party, Dr. P. Ehrenreich, known to geographers by his travels on the Rio Doce (Brazil), and Dr. P. Vogel, who with Dr. K. v. d. Steinen formed part of the German mission to South Georgia. The expedition left Germany on 25th January last *en route* for Cuyabá, which will again be the starting-point. The efforts of the party will be directed to the more complete survey of the three important river sources of the Xingu, especially of the eastern arm, the Kuliseii. Another important feature of the work of the expedition will be the study of those Indian tribes which still remain untouched by civilisation; among these Dr. von Steinen intends to make a long stay.

**Brazilian Frontier Surveys.**—An extract from a report presented to the Brazilian Government on the work of the Commission (1879-1884) appointed to determine the boundaries between Brazil and Venezuela on the Upper Negro and Rio Branco, is published in the 'Zeitschrift' (No. 4) of the Geographical Society of Berlin. The report, which was drawn up by Lieut.-Colonel F. de Araujo, not only gives the results of the survey as regards the boundary line, but contains geographical and topographical information of the highest importance, which has led to the rectification of the courses of the numerous tributaries of the Rio Negro and Rio Branco. A map on the scale 1 : 1,200,000 accompanies the report.



Another boundary survey is commencing operations at the opposite extremity of the Empire. The Governments of Brazil and the Argentine Republic agreed some time ago to the appointment of a united commission to explore and thoroughly survey the boundary territory between the two countries, with the view to a friendly settlement of the line of frontier. After a long delay the Commission has got to work. It includes M. J. L. Garmendia, Dr. A. Seelstrang, the well-known cartographer, M. V. Virasoro, surveyor, and M. G. Niederlein, who has charge of the geographical and natural history part of the work. The operations of this commission are expected to extend over nearly two years, and will doubtless add much to our knowledge of the geography of South America.

### Obituary.

**Sir Charles M. MacGregor.**\*—Sir Charles MacGregor was the son of Major Robert Guthrie MacGregor, Bengal Artillery, and grandson of Major-General James MacGregor, Bengal Cavalry, of the MacGregors of Glengyle, his mother being a daughter of General Archibald Watson, c.b., Bengal Cavalry. He was born at Agra on the 12th August, 1840, so that at the date of his death he was in his forty-seventh year. He was educated at Marlborough, and entered the Bengal Army at the very early age of sixteen. He reached India just in time to take his share in the events of the Mutiny, and exhibited his soldierly qualities early in his career. He was present in no less than fifteen actions, besides the siege and capture of Lucknow, and was twice wounded. His distinguished courage marked him even then, and many feats of pluck and endurance are recorded of him. His next campaign was in China, where he was twice wounded in the action at Sin-ho. He was then serving with the 19th Bengal Cavalry (Fane's Horse), and there was not, in that distinguished regiment, a better specimen of the "beau sabreur" than Charles MacGregor. His chivalrous nature, which always prompted him to take the part of the weak against the strong, and his outspoken plainness of speech were a little apt to place him occasionally in a position antagonistic to the interests of military discipline, and, it may be added, to his own interests also. It is said (but with what truth I cannot tell) that his gallantry in action during the China campaign would have won for him the Victoria Cross, a distinction which he coveted above all others, but for his outspoken profession of faith in the innocence of a trooper whom he considered to be unjustly punished.

It was as Brigade-Major and Deputy-Assistant Quartermaster-General in Bhutan (1864-66) that I first made his acquaintance, when he had an excellent opportunity for indulging his passion for acquiring new geographical information, and filling up blank spaces in maps. The two columns which advanced into the Bhutan Hills were widely separated by a strip of intervening hill-country, densely covered with jungle, and skirted by the plains and forests of the "Doars," about which very little was then known. It was thought possible that between the two bases of operations at Buxa and Dewangiri, a third route might be found leading more directly to

\* By Lieut.-Colonel T. H. Holdich, R.E.

L'unakha, the capital of Bhutan. MacGregor accompanied the survey parties in exploring for it, and acquired much valuable information about this remote region. He was again wounded in Bhutan, at the actions of Dalimkote and Bala, and obtained a brevet for his gallantry.

We next met in Abyssinia, where he was actively employed on the Staff, and was one of the lucky few who were present at the action of Arogi and the capture of Magdala. Although Abyssinia offered an exceptionally fine field for geographical research, from the fact that the line of route followed during the advance to Magdala was practically the main line of watershed between the Nile basin and the Red Sea, it was not possible to carry out explorations very far, partly owing to the rapidity with which the expedition progressed, and partly to our somewhat insecure relations with the various tribes through whose territory we passed. MacGregor's hands were too full of work just then for him to have much leisure for his favourite pursuit. He continued on Staff employ after the Abyssinian expedition till 1874, and was appointed Director of Military Transport during the Tuhut famine.

In 1869 Colonel MacGregor married Fanny, daughter of Sir Henry Durand, the Lieutenant-Governor of the Punjab. It was her death that prompted his first wanderings in Persia in 1875, which resulted in his book called 'Journey through Khorassan.'

At the time when he undertook this journey our geographical knowledge of Khorassan was exceedingly limited, whilst the interest that was attached to this portion of Persia and to the north-western districts of Afghanistan was daily becoming intensified owing to the gradual encroachments of Russia towards the Persian and Afghan border. The book appeared just when it was wanted, and for several years Macgregor was undoubtedly our best authority on the geography of the vague regions of the Afghan boundary. He travelled right across Persia, passing through Shiraz, Yezd, and Birjand, to the Afghan border, at that time infested with Turcoman raiders; and it was not without considerable risk, and many amusing adventures, that he made his way over the border to Pahlawan, from which place he purposed to pay Herat a visit. In this, however, he was disappointed, for, although he reached a village within a few miles only of the city, he was allowed to proceed no further. It was reserved to the Engineer officers of the Boundary Commission twelve years later to be the first to enter Herat since the days of Pottinger. MacGregor was shown out of Afghan territory with more decision than politeness, but he acquired a great deal of most important information ere he left, and we owe it to him that the question of the strategical value of the Herat valley and of Sarakhs (which he afterwards visited) was discussed with something approaching to accurate knowledge of the existing state of those positions. This is no place to discuss the soundness or otherwise of his views. The strong point about the man's character was that he always determined to form his opinions at first hand, to see for himself and to speak plainly of what he saw, without much thought of delicate susceptibilities; and it follows that his opinions will always command the respect of those who wish to learn the truth from the most authentic sources.

A year's rest after this most adventurous journey was enough to prepare him for yet another series of explorations in the uninviting deserts of Baluchistan. In company with Captain Lockwood he started from Gwadar, on the Mekran coast, on the 1st January, 1877, and the two together contrived, by occasionally following divergent routes, to explore a most uninviting waste of mostly desert country between the sea-coast and the Helmand. MacGregor followed the Pasni route via the Kej valley to Panjgur, where he joined Lockwood, who had taken a more direct line from Gwadar. They then made their way across the Baluchistan desert to Zirreh, during which part of their journey they encountered terrible hardships from want

of water, only twice finding a drinkable supply during a fortnight of their journey. They separated again at Lal Khan Chah, Lockwood returning to India by the now well-known route passing through Chageh, Nashki, and Mastang; and MacGregor making his way through the Brahui country to Sohrab and the Mula Pass.

In 1878-79-80, Colonel MacGregor found congenial employment in Afghanistan. He was appointed Deputy-Quartermaster-General on the line of the Khaibar communication during the first phase of the Afghan campaign, and took his share in the operations in the Bazar and Jellalabad valleys. After the massacre of Cavagnari and his escort at Kabul, when Sir F. Roberts again took the field, MacGregor was with him, and shared in the success of Charasia and the rapid advance on Kabul. There was a day in December 1879 when his distinguished courage again brought him to the front. There had been an action near Kila Kazi in the Chardeh plain to the west of Kabul, the result of which had been to leave some British guns hard and fast, well wedged into certain inconvenient irrigation channels, which barred their progress as they were withdrawn towards Sherpur after the action was over. It was MacGregor who undertook to extricate them in face of the enemy, and he accomplished his purpose with his usual resolution. Soon after this, Sherpur was besieged, and never did MacGregor appear happier in all his life than during those ten uncertain days when we were awaiting the beacon to be lit on the Asmai Hills, which was to be the signal for the attack on Sherpur. At such times as those a confident soldier like MacGregor was indeed a tower of strength. When Sir F. Roberts made his march from Kabul to Kandahar, MacGregor obtained command of the 3rd Infantry brigade, and assisted at the action of the 18th September, when Ayub Khan's forces were finally dispersed. Subsequently he commanded the Mari field force and conducted a most successful little campaign of his own against the Maris. For his distinguished services as Chief of the Staff to Sir F. Roberts and Sir D. Stewart he was made C.B. in 1879 and K.C.B. in 1881, having been nominated C.S.I. in 1874 and C.I.E. in 1878. He was Quartermaster-General with the rank of Major-General in the East Indies from 1880 to 1885, when he was appointed to the command of the Punjab Frontier Force. He was the author of several works of a military character, besides his books on Khorassan and Baluchistan. To the end of his life he never ceased to preach the doctrine of "preparation," and his notes of warning will not soon die away. By his death England has lost one of her foremost soldiers, a leader whose name was as greatly respected as that of Sir Herbert Macpherson, his countryman, who passed away so shortly before him. The loss of two such men at such a time is indeed a bitter blow for India.

**Colonel Sir J. U. Bateman Champain, R.E.\***—Colonel Sir John Underwood Bateman Champain, who died at San Remo on the 1st February, was an officer of the Royal Engineers (Bengal), and son of Colonel Agnew Champain of the 9th (Norfolk) Regiment. At the period of his decease, he had been for some seventeen years Director-in-Chief of the Government Indo-European Telegraph. Born in London on the 22nd July, 1835, he received his early education at Cheltenham School, where he remained a pupil from 1846 to 1849. Entering subsequently the Military College at Addiscombe, he soon became one of its most distinguished cadets, and eventually passed out head of his term—a position he had held uninterruptedly from the day of entrance. His commission dates from the 11th June, 1853. Within four years after his arrival in India, the Mutiny broke out, and Champain's services at that critical epoch are such as to warrant recapitulation.

Early on the 12th May, 1857, a sowar rode into Rurki bringing the news of the

\* By Major-General Sir Frederic Goldsmid, K.C.S.I.

outbreak at Meerut. Captain Fraser, commanding the Sappers and Miners there, that very day marched his regiment to the scene of disturbance; and Lieutenant Champain, then acting for Lieutenant Chesney as Assistant Principal of the Thomason College, with his Principal's approval, volunteered, and was permitted to accompany.

On the 16th May, at Meerut, a large proportion of these very Sappers mutinied, and Captain Fraser was shot dead at his own encampment. Champain assisted in carrying him to hospital, and the next day was appointed adjutant of the corps, *vice* Lieutenant Maunsell, who assumed command. Most of the men present in the lines when the mutiny took place ran off to Delhi; but from working parties absent at the time, and a few individuals who remained faithful in the midst of temptation, a body of some 300 sepoys was formed, which nucleus was afterwards reinforced from Rurki. The carbines of these men were taken from them; but when ten days afterwards General Wilson determined to march on Delhi, the native sappers were re-armed, and Lieutenant Champain testified that during his adjutancy their conduct was most exemplary, nor was there one deserter among them throughout the campaign.

Lieutenant Champain was present at both actions on the Hindun river under General Wilson, and at Badli-ke-Sarai and the capture of the heights before Delhi under General Barnard. Regimental adjutant during the whole siege, he further undertook the duties of field and assistant-field engineer, not having had probably, for three months, one whole night in bed. He was specially thanked in orders by General Barnard for rapidly constructing an urgently required battery, afterwards designated "Champain's," by written instructions of Colonel Baird Smith. Never absent for one hour from duty through sickness or any other cause, he was employed either to superintend or assist in the construction of, without exception, every single battery thrown up during the whole siege. On the 13th September he was wounded, but while on the sick-list, owing to the number of Engineer officers incapacitated, he volunteered for duty, and was present at the capture of the Palace.

Lieutenant Maunsell's wounds having necessitated his departure to the hills, Lieutenant Champain succeeded to the command of the Sappers, and was in that position on the march to Agra and seven or eight minor expeditions in the vicinity, including the capture of Fathpur Sikri. He further commanded a small force of nearly 2000 men, including Sappers, 21st Panjab Infantry, two guns, and a detachment of Hodson's Horse and 9th Lancers, on the march from Agra to Fathgarh, where he joined the Commander-in-Chief in November or December 1857. He continued to command the Sappers, numbering some 500, on the march to Cawnpore and the Alambagh, returning to his post of adjutant on the return of Lieutenant Maunsell in March 1858. He was present at the final capture of Lucknow, twice acting as Sir Robert Napier's orderly officer, with Lieutenant Elliot Brownlow, who was killed when associated with him in this duty.

Major Champain was thanked specially in orders by Sir Robert Napier for having, with Captain Medley and 100 sappers, held for a night the Shah Najif, an advanced post of great strength, abandoned by eight companies of the 53rd on account of its remoteness from the army. Assisting to prepare the plan of the siege for submission to the Commander-in-Chief, he was ordered by Sir Colin Campbell, after the capture of Lucknow, to erect fortified posts for outlying detachments of police and regular infantry. Of these he completed about twenty. He was present at fourteen or fifteen minor engagements under Colonel Walter and others, and was thanked in a despatch by Captain MacMullin for services rendered in a rather severe affair near Balia. He was the only Engineer officer employed at the capture of Jagdispur, where probably more than 10,000 troops were engaged under Sir John

Douglas; and he was particularly recommended by that officer in his final despatch. He joined in pursuit of the rebels to the Kaimur hills, and when matters looked more quiet, he was appointed Executive Engineer of Gondah. Hence he was transferred to Lucknow, of which station he was Executive Engineer till ordered to Persia with Major Patrick Stewart in 1862 on special duty connected with the proposed telegraph to connect India with England.\*

The story of the Indo-European Telegraph, divested of its "blue-bookishness" and official belongings, is full of interest and adventure, and in it are no two *dramatis personæ* more prominent than Stewart and Champain. Of their many brother-officers and friends, there are doubtless some living who remember them when associated in the preliminary organisation of this great enterprise: first in India, taking instructions in Calcutta and making inquiries at Karachi—then in Persia, travelling upward from Bushahr through the whole length of the country to certify the status—then in London, at home, but not at rest. Here indeed, now more than twenty-three years ago, in a small room on the ground-floor of a house in Lower Belgrave Street, the two young Engineers might have been found at a table covered with papers, deep in the consideration of contracts and estimates, charts and charter-parties, plans and specifications, together with the numerous and various questions involved in the vast undertaking committed to Stewart's charge by the Indian Government and Secretary of State for India. After some busy months in London, Lieutenant Champain left England again for Persia in September 1863, travelling via the Danube and Tiflis, and reaching Tehran on the 20th October. Quitting the Shah's capital on the 3rd November, he was at Bushahr on the 17th of the same month. At this place he met Captain Murdoch Smith and the non-commissioned officers of the Royal Engineers, with whom he returned to Tehran. Those acquainted with the local geography will admit the distances traversed to be considerable, to say nothing of the character of the country; and it is to be taken into account that Champain had before, in the previous year, performed the journey from Tehran to London, by Baghdad, Aleppo, and Alexandretta. While his assistant was engaged in constructing the coast-lines in Persia [and to the Turco-Persian frontier, Stewart had returned to Bombay and Karachi, and embarked from the latter port to lay down the line of submarine telegraph westward.

In January 1865, when the cable connecting Karachi with the little station at the head of the Persian Gulf had been for some months at work, and when the Turco-Persian link with the European system was within an ace of completion—Stewart, worn out with sickness and anxiety, died at Constantinople. For the next five years Champain remained the true and loyal colleague of the present writer, appointed to succeed his former chief; and it would be no easy matter to render justice to the zeal and ability which he displayed in seeking to remove the obstacles which daily and hourly presented themselves to successful organisation of Indo-European traffic. Not only was it necessary to set in working order the materials given over to the hands of British officers, but also to remedy the gross defects apparent in the many sections of the long overland line outside their control. To accomplish both these ends he stoutly and heartily laboured. He was an earnest advocate for securing the co-operation of the late Sir William Siemens, a satisfactory understanding with whose Company (the Indo-European) was brought about mainly by the exercise of his good common-sense and judgment. In 1870 he himself became the sole director of the whole Government section, comprising the Persian Land, and the Persian Gulf Submarine Line; and to his careful and energetic superintendence,

\* The above outline of Sir John Champain's Indian services is obtained from the present writer's own volume of 'Telegraph and Travel' (Macmillan, 1874).

and the admirable arrangements of "the Indo-European Company," may be attributed the marked success which the combined Overland Telegraph to India has since achieved, and for which it has long been distinguished. Now that the inter-communication of East and West by electric wire is an accomplished fact of old date, and that the Overland Line has been supplemented by a Red Sea route, the widely-uttered complaint at the lack of such advantages—which naturally became a "bitter cry" during the Indian Mutinies—is a comparatively forgotten incident, and the labour which effected the desired object is regarded by the multitude as a mere mechanical operation, or at best confounded with the deposition of an ordinary ocean cable, and setting up posts and wires in the lands of civilised Europe. But the work was really one of the highest importance and magnitude, and the names of John Champain,\* Murdoch Smith, Oliver St. John, William Henry Pierson, and others, will be honourably and lastingly connected with its record.

The deceased officer's last important outdoor duty was the submersion of a new guttapercha cable, more than 500 miles in length, from Jask to Bushahr—an operation which he personally superintended in 1885, proceeding to India on its completion, and returning to England in 1886, to receive the well-deserved honour of knighthood by admission into the order of St. Michael and St. George. Sixteen years before, he had performed a similar service in laying an indiarubber cable between the same two points, and under signally difficult circumstances. The steamer bearing him to India was wrecked in the Red Sea (the cable ship had already suffered from a serious collision in the Channel); and wind and weather offered strong but, happily, ineffectual opposition to the accomplishment of the work itself. There is no saying to what extent the many vicissitudes he underwent "by flood and field" contributed to break his originally fine constitution and physique, and to cause that fatal asthmatic affection which painfully characterised his later days.

Colonel Bateman Champain has been enrolled among the Fellows of the Royal Geographical Society since 1874, and was elected a member of its Council in 1883. His paper on the "Various means of communication between Central Persia and the Sea," read at the Evening Meeting of the 15th January, 1883, provoked an interesting discussion, and is a valuable contribution to vol. v. of the 'Proceedings' (New Series). Later in the same year, another paper of his, on "Trade Routes of Persia," was read before the Society of Arts and published in its Journal. In 1879 he filled the Presidential Chair of the Society of Telegraph Engineers, and delivered the opening address of the session. His official reports, as well as all his writings, are lucid and well expressed, and had he been less chary of anything like display, he might have become distinguished for literary power. Let it be added that he was an artist of no mean capacity, as many of his well-executed sketches and paintings would testify.

His many and long journeys, his interesting adventures, his diplomatic negotiations in Europe and Asia, his experience of men and nationalities, would alone have sufficed to make him socially popular; but his genial disposition, his keen appreciation of right and wrong, his kindliness of heart and warmth of attachment, his sense of humour, but extreme consideration—these were Nature's qualities—qualities which he possessed in an eminent degree, and which, wherever exercised, could not fail to impart brightness and inspire affection. With a central figure such as this, it seems hard, in a worldly sense, to associate the gloom of sickness and death. But the picture has no uncommon features. Man's wishes are not the laws of Providence. "Work well done" is a conclusion in arriving at which human testimony has a certain value, and such has been readily and richly tendered in the present instance. How

\* The name of "Bateman" was a prefix of recent years.

general has been the consensus in this respect may be inferred from the fact that the Shah of Persia, who had but two or three years ago left the path of stern Oriental precedent to confer a sword of honour on Champain, has now further deviated from that path by the despatch of a personal telegram of condolence to his family.

His remains were interred at San Remo, in the English cemetery, on the hill-side—a beautiful spot overhanging the Mediterranean shore, such as his fine taste would have once delighted to sketch on paper. Beloved in his domestic relations, and estimated by others as just described, what more may now be said regarding him in a brief obituary notice? Beyond the threshold reached, all else is too sacred for the pen of the writer.

**A. W. Moore, C.B.\***—Mr. Adolphus W. Moore, c.b., recently appointed Political and Secret Secretary at the India Office, died on February 2nd, aged forty-seven, at Monaco, where he had gone to recruit his health. Mr. Moore was the son of Major John Arthur Moore, some time a Director of the East India Company. He was brought up at Harrow, and went straight from school into the India Office when about seventeen. In 1874, he joined the Political Department. In 1875, he was appointed Assistant Secretary, and during the absence in India of his chief, Sir Owen Burne, from 1876 to 1878, acted as Political Secretary. In 1885 he retired from the office, but the Conservatives coming into power almost on the same day, he was invited simultaneously to become secretary to Lord Salisbury and to Lord Randolph Churchill. Lord Randolph Churchill was then Secretary of State for India, and Mr. Moore preferred the post which kept him in connection with his old work. He remained that statesman's official or private secretary, in or out of office, until Lord Randolph's recent resignation of the Chancellorship of the Exchequer, when Mr. Moore received the appointment which, so far as he had any personal ambition except for opportunities of useful work, had no doubt been the object of his life.

Mr. A. W. Moore had a vast store of departmental experience and information. But these are ordinary official qualities; and he was much more than an ordinary official. He had a rare faculty of marshalling facts, recognising their relative importance, and drawing from them statesmanlike conclusions. These conclusions he expressed in terms of admirable lucidity. His mind had something of a judicial quality, and his compositions had on the reader rather the effect of an exhaustive and impartial summing-up, than of an advocate's argument in favour of the line of policy they set out. His premature death may, without any exaggeration, be said to be a loss to the nation, as well as to his office and the Indian Council, the members of which fully appreciated his services.

But it is chiefly as a traveller that we have here to speak of Mr. Moore, and it was as a traveller that I first made his acquaintance. In 1867, I went to him with my plans for a journey in the heart of the Caucasian chain, and easily persuaded him to be one of my companions. In the following year we spent three months together, making the first ascents of Kazbek and Elbruz. In 1874, Mr. Moore returned to the Caucasus with three other members of the Alpine Club. In these two journeys, both sides of 120 miles of the snowy chain were visited, the chain itself crossed by many passes previously unknown to Englishmen, and, as a consequence, intelligible descriptions of its peaks, passes, and glaciers laid for the first time before English readers. Mr. Moore was an admirable travelling companion. His energy was equal to his endurance. He developed under difficulties a quaint

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\* By Mr. Douglas W. Freshfield.

and inspiring humour. He combined a boyish and playful egotism in small things with a readiness for serious self-sacrifice when he thought it called for.

His official duties naturally stood in the way of his indulgence in distant travel. But twenty years ago his name was familiar as one of the leaders of the Alpine Club in the exploration of the part of Europe above the snow-level. He was one of the first climbers of the Pointe des Écrins, the highest peak of the Dauphiné Alps, of Piz Roseg in the Ober Engadin, of the Gabelhorn near Zermatt. He had a share in opening many of the now famous glacier passes of the High Alps, the Sesia Joch, the Moming Pass, the Jungfrau Joch, the Brèche de la Meije. He paid a great deal of court to Mont Blanc. He forced a new way up it by the Brenva Glacier, he walked up it with only one guide, he walked over it from Courmayeur to Chamonix within the twenty-four hours. There was frequently something original and audacious about his Alpine feats. With his constant companion Mr. Horace Walker, he invented winter mountaineering, a recreation which has led to the discovery of some curious and unlooked for meteorological facts. He would go off for Christmas to the Dolomites or to Dauphiné. Of late years his favourite holiday was a fortnight's walk over Alpine passes and through Italian valleys in October, a season he rightly maintained to be far more beautiful than midsummer. He loved scenery as much as climbing, and would descant with equal emphasis on the glories of Mont Blanc or of Val Onsernone, one of the exquisite glens that open on Lago Maggiore near Locarno.

Mr. Moore never published any volume. Scattered papers by him, all remarkable for clear and forcible description, may be found in the earlier volumes of the 'Alpine Journal.' For various reasons he left his Caucasian journeys to others to describe.\* But his friends possess, and value highly, a privately printed volume, 'The Alps in 1864,' which contains a spirited and entertaining narrative of his most successful and adventurous alpine campaign, carried out in company with Messrs. Whymper and Walker. For three years he acted as Hon. Secretary of the Alpine Club, and had only a few weeks ago declined its Presidency. One of the old mottoes of that body was

"Jucundum vertice montis  
Vesci aurâ ætheræâ et dextram conjungero dextræ."

There are many who will miss, both in the mountains and at home, the hearty grasp of the old friend and comrade who has so suddenly and so prematurely been taken from us.

## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Fifth Meeting, January 31st, 1887.*—General R. STRACHEY, R.E., F.R.S.,  
Vice-President, in the Chair.

ELECTIONS.—*Frederic Gorell Barnes, Esq.; Rev. Canon Walter Beck; B. Bicknell, Esq.; Charles Ernest Clarke, Esq.; Thomas Cecil Curwen, Esq.; Lieut. Arthur Mostyn Field, R.N.; Walter Bernard Hamilton, Esq., B.A.; John Henderson, Esq.; Major-General H. Hyde, R.E.; George Harvey Johnston, Esq.; James Wilson Johnston, Esq.; Frank J. Leslie, Esq.; Rev. Daniel Grenville Lewis; Professor Ralph Waldo Emerson MacIvor; Capt. Henry St. Patrick Maxwell, (Beng. Staff Corps); Charles Griffith Nuttall, Esq.; Nelson Prower, Esq., M.A.;*

\* See Freshfield's 'Central Caucasus,' 1869, and Grove's 'Frosty Caucasus,' 1875.



*Rev. William Jos. Smith; Capt. the Hon. M. G. Talbot, R.E.; Edwd. Wallace, Esq., M.D.; Robert Augustus Warren, Esq.; J. Beauchamp Watson, Esq.*

PRESENTATIONS.—*William Martin, Esq.; A. H. Burton, Esq.; D. M. Robertson Macdonald, Esq.*

THE EMIN PASHA RELIEF EXPEDITION.

At the commencement of the meeting the Chairman announced that a letter had been received from Mr. W. Mackinnon, President of the Managing Committee of the Emin Pasha Relief Expedition, thanking the Council of the Society for the contribution of 1000*l.* they had made to the funds of the Expedition, and saying how greatly the Committee appreciated the courtesy and liberality of the Society in this matter. He added that it was understood that all new geographical information which might be obtained by Mr. Stanley during the progress of the expedition towards Emin Pasha's headquarters, and on the journey back, should be communicated to the Society immediately on receipt, for publication by them.

The subject of the evening was an address by H. J. Mackinder, Esq., B.A. (Oxford), on the Scope and Methods of Geography.

The address was illustrated by diagrams and typical geographical views projected on a screen by means of the dioptric lantern and lime light. At its close the Chairman announced that the discussion on the address was adjourned to the next meeting, February 14th.

*Vide, ante, address and discussion, p. 141.*

*Sixth Meeting, February 14th, 1887.*—General R. STRACHEY, R.E., F.R.S., Vice-President, in the Chair.

ELECTIONS.—*George R. Askwith, Esq.; William Alpheus Higgs, Esq.; David Lindsay, Esq.; J. W. Lindt, Esq.; James Pankhurst, Esq.; Capt. W. C. Speeding; Whitworth Wallis, Esq.; Henry Milner White, Esq., M.A.; Frederick Wm. Willcocks, Esq., J.P.; Samuel Williamson, Esq.*

PRESENTATIONS.—*T. C. Curwen, Esq.; Rev. Wm. J. Smith.*

The evening was occupied by the adjourned discussion on Mr. H. J. Mackinder's address on "The Scope and Methods of Geography." *Ante, p. 160.*

PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris.**—January 7th, 1887: M. A. GERMAIN in the Chair.—The Minister of Public Instruction informed the Society that the Government had decided to contribute the sum of 24*l.* (600 francs) towards defraying the cost of the publication of the maps accompanying M. Dutreuil de Rhins' work on Thibet. The General Secretary alluded to the great geographical importance of this work.—M. R. du Caillaud forwarded a copy of the 'Missions Catholiques' (12th Nov. 1886), containing an excellent map, by the late M. Lombard, of the Foreign Missions, of the course of the Lower Mekong.—A communication from M. Hangsen Blangsted was read, giving some notes from a paper read by M. Feddersen before the Geographical Society of Copenhagen upon his journey to Iceland.—The Secretary read a letter from MM. Capus and Bonvalot, dated 6th Sept. from Samarcand.—Dr. Vaume sent a report of his journey from Reshd to

**Hamadan.**—The series of photographic views of the region of Lake Kelbiah (Tunis) presented at a recent meeting, was the subject of a communication by Dr. Rouire, whose explorations they illustrated. He gave some explanatory notes of interest on this little known district. With reference to the exact *locale* of the ancient Lake Triton, M. A. du Paty de Clam transmitted an extract from a work to be published shortly, in which he opposes Dr. Rouire's theory.—M. R. Allain took occasion to refer at some length to the journey accomplished some time ago by M. Foureau from Uargla (Algerian Sahara) to the district of El Erg, by a route not previously traversed by any European. The traveller reached a point situated in 31° 10' N. lat. and 3° 15' long. E. Everywhere along the route he came across vestiges of an ancient civilisation and former human habitations. At intervals natural springs were discovered and artificial wells. In the opinion of M. Foureau the route was well adapted for a railway.—The Minister of Foreign Affairs had received from the French Consul at Buenos Ayres, a letter announcing the despatch by the Argentine Government of a mission to explore the territory of Patagonia.—The Society received from M. Comejo a memoir by Dr. J. F. Velarde, giving the substance of a paper read by him before the Geographical Society of Rio Janeiro, on the hydrography of some of the least known parts of Bolivia.—The Chairman announced that M. J. Martin, a French traveller who has spent five years in traversing Eastern Siberia, was present at the meeting. Having conducted some investigations for a large Russian Mining Company, M. Martin had proceeded to visit some of the unexplored portions of Siberia. Skirting the south-west corner of Lake Baikal, he travelled northwards to the 60th parallel; then turning south, he descended the Amur and traversed Mongolia and Manchuria. He crossed the Trans-Baikal region twice. The Chairman stated that the topographical service of the Russian staff were about to publish the traveller's admirable itineraries. M. Martin, at the invitation of M. Germain, briefly addressed the meeting and promised to give an account of his journey at an early meeting of the Society.—In conclusion M. W. Huber read a paper on the piercing of the Simplon. M. Huber was one of the committee of experts charged to report upon this enterprise, and was able therefore to give very precise and interesting information. The Committee had pronounced in favour of a tunnel with double lines, which, with a length of about 11½ miles, would take six years to bore, working at the rate of about twelve feet a day. The advantages of the Simplon route, as compared with that of the St. Gothard and Mont Cenis, were then dwelt on by M. Huber. A discussion followed the paper, in which the Chairman and others took part.

— January 21st, 1887: M. Janssen, of the Institute, in the Chair.—The Chairman announced that the Bureau of the Central Commission had been reconstructed for the year 1887, as follows:—President, M. Janssen, of the Institute (Academy of Sciences); Vice-Presidents, MM. Dr. Hamy and W. Huber; General Secretary, M. Maunoir; Assistant-Secretary, M. J. Giraud.—M. G. Marcel called attention to several ancient maps in the library of Arcachon, and suggested that the Society should ask the Minister of Public Instruction to have a general inventory prepared of all documents of this description in the possession of the various public libraries of the kingdom.—The Secretary read a letter received by the Commercial Geographical Society of Madrid from M. Julio C. Baviera, an officer in the Spanish navy, giving an account of his explorations in Western Sahara in connection with the mission with which he was charged by that Society. He started from Madrid on 1st April, 1886, accompanied by Don Francisco Quiroga, professor of Natural History, and Don Felipe Rizzo, as interpreter. In the course of his travels he traversed the territories of Ed-Dajla, Guerguer, Aatf, Ar-Rak, An-Hanfrif, Tisnik, the plateau of Tivis, Sriyik, Teninlek, Iyil, and Ansert. He explored several hundred miles of hitherto unknown country, a large portion of which he surveyed,

Dr. Quiroga was able to make valuable notes on the meteorology, geology, flora, &c., of the region. The rigour of the climate, the hostility and fanaticism of the natives, made travelling extremely hazardous. The expedition returned to Spain on 16th August.—The Minister for Foreign Affairs communicated a report from M. Raffray, French Consul at Zanzibar, on the explorations of Dr. Junker. According to this report, which does not enter into details, the most important discovery made by the traveller in his seven years' travels is in connection with the Welle or Makua. Dr. Junker believes that the opinion hitherto generally accepted that the Welle, under the name of the Aruwimi, is a tributary of the Congo, is erroneous. After the bend which the Welle makes in Monbuttu-land in about 4° N. lat. and 27° E. long., the river, instead of descending to the south to rejoin the Congo in 21° E. long. and 1° N. lat., turns again to the north. The traveller encountered the river between 5° and 6° north and 20° and 22° east, and conjectures that it runs north into Lake Chad, possibly under the name of the Shari. He is of opinion that the Nepoko, lying much more south, which takes its rise among the mountains west of Albert Nyanza, is really an affluent of the Congo. The Bokomandi in the south, and the Uerre in the north, are tributaries of the Welle. The former rises among the same mountains as the Nepoko. The result of Dr. Junker's discoveries and hypotheses would be to fix the limit of the Congo basin much more to the south. With regard to the navigability of the Welle, the traveller states that in Monbuttu-land, the river is navigable for a long distance, but in the vicinity of its confluence with the Uerre he found some rapids, and is led to the conclusion that there are others. He devoted three years to the exploration of this region.—A letter was read from M. Vossion, French Vice-Consul at Philadelphia, giving an account of his acquaintanceship with Emin Bey at Khartum in 1882, where the latter was staying on a visit. M. Vossion offered in his letter (dated 5th January, 1887) to lead a relief party from the east coast, if Stanley did not take the initiative.—M. Chaffanjon, in a letter dated 20th Oct., 1886, from San Fernando de Atabapo, stated that he was organising his expedition for immediate departure to explore the sources of the Orinoco. He had received great assistance from the Governor *pro tem.*, and also from M. Mirabel. He had discovered some very curious funeral urns, differing from those found by Dr. Crevaux. He hoped to return to San Fernando about the 1st January, 1887.—M. Gasassut, the inventor of an apparatus called the "Cosmographe," for facilitating the teaching of cosmography, gave a description of his ingenious invention.—The growth of the population of France, as compared with that of European countries, was the subject of a paper by Dr. A. Chirvin. The first proper census was in 1801, when the population was 27,349,003. The census of May last shows 38,218,903 inhabitants. The annual increase of population shown by the chief countries of Europe was stated to be as follows:—Greece, 12 per 1000 inhabitants; Holland and Denmark, 10; England, 9; Germany and Belgium, 8; Austria, Sweden, Norway, Portugal, and Italy, 7; Spain, 3, and France only 2 per 1000. The author also reviewed the various movements of the population. In conclusion he stated that, although the mortality of France was one of the lowest in Europe, yet its record of births was the lowest of all, notwithstanding numerous marriages.

## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

## EUROPE.

**Bartholomew, John.**—Gazetteer of the British Isles, Statistical and Topographical. Edinburgh, A. & C. Black, 1887: imp. 8vo., pp. [viii.] and 912. Price 36s. [Presented by Mr. Bartholomew.]

A leading feature of this well-printed gazetteer is the number of places which it contains. It answers with brevity the questions "Where is it?" and "What of it?" with regard to most places that have names in these islands, and will therefore be useful as a handy reference-book; those who require further information must go to more detailed works. So far as we have tested it the work is wonderfully accurate, and as full as it professes to be; but it is difficult, unless by revision on the spot, to obtain the latest trustworthy information. Thus the leading industry in Gainsborough, the manufacture of agricultural implements, is not mentioned, and the canals connecting it with the Trent are now of very little importance. The newly-printed maps which are appended, embody a variety of statistical information, though here, as elsewhere when distinct tints of colour are used to indicate gradations of one phenomenon, it is difficult to find a method that is not liable to mislead the unwary.

**Egli, [Dr.] J. J.**—Die Schweiz. Leipzig, Freytag, 1886: 8vo., pp. viii. and 210. (*Dulau.*)

This is a useful and well-arranged summary of geographical and statistical information on Switzerland, by the well-known Swiss geographer, Professor Egli. It has a number of illustrations, but no map.

**Kettle, W. R.**—A few Notes on the Island of St. Michael, Azores. [1887.] 12mo., pp. 16, map and plan. [Presented by the Author.]

— A Report on the Artificial Harbour of Ponta Delgada, St. Michael's, Azores Islands, from Observations made during a visit to the same, November–December, 1886. London, R. H. Laurie, 1887: 8vo., pp. 12, maps and plans. [Presented by the Author.]

**Peacock, D. R.**—Original Vocabularies of Five West Caucasian Languages. [From the 'Journal of the Royal Asiatic Society of Great Britain and Ireland,' vol. xix., Part 1.] [1887]: 8vo., pp. 18. [Presented by R. N. Cust, Esq.]

**White, [Lieut.-Col.] T. Pilkington [R.E.]**—The Ordnance Survey of the United Kingdom. Edinburgh, Blackwood, 1886: 8vo., pp. x. and 174. Price 5s. [Presented by the Publishers.]

Colonel White's object in this instructive little volume has been to convey to the general reader an intelligible idea of the National Survey, without entering more than is necessary into technical details. The book is intended to be a short popular account of what might at first seem a dry scientific subject. Colonel White has succeeded in writing an account of a great undertaking that any ordinary reader should find it easy to understand. Beginning with the early attempts of General Watson and Roy in the middle of last century in the Highlands of Scotland, Colonel White traces the progress of the great work down to the present day, describing the various methods used, the various improvements introduced, the present position, and the future of the Survey.

## ASIA.

**Benjamin, S. G. W.**—Persia and the Persians. London, Murray, 1887: 8vo., pp. xvii. and 507. Price 24s.

Mr. Benjamin was the first representative of the United States sent to Persia, where he resided from 1883 to 1885. He had many opportunities of

seeing court life, and the country around the capital and in the north of Persia. His description of the region between the Caspian and Teheran is clear and detailed, and even more so his account of Teheran. So far as his own observations went, they are of original value. Mr. Benjamin has, moreover, taken the trouble to bring together a good deal of trustworthy information about the country generally. He has chapters on the physical aspects of Persia, on its races, on arts and religion, on its resources, products, and trade, and on the political situation. The book is interestingly written and richly illustrated, and will be found useful to any one desirous of acquiring some general information on Persia, in short space. There is no map in the book.

**Smeaton, Donald Mackenzie.**—The Loyal Karens of Burma. London, Kegan Paul & Co., 1887: cr. 8vo., pp. 264. Price 4s. 6d. [Presented by the Publishers.]

An interesting sketch of the Karens, embracing their Origin, Language, Customs, Agriculture, Folk-lore, &c.; compiled from the Author's observations during his five years' residence in Burma, from 1879 to 1884.

**Yate, [Lieutenant] A. C.**—England and Russia Face to Face in Asia. Travels with the Afghan Boundary Commission. Edinburgh, Blackwood, 1887: 8vo., pp. viii. and 481. Price 21s.

Lieutenant Yate acted as correspondent to an English and an Indian paper with the Afghan Boundary Commission of 1884-5. His communications, with additions, he has reproduced in the present volume. He has wisely allowed these to remain essentially as they were originally written; had they been recast, they would almost certainly have lost the freshness and vividness which form one of their most attractive features. The book may be taken as a provisional and unofficial narrative of the doings of the Commission, and the events connected therewith. Most of the route of the Commission in Afghanistan, as we know, was through territories, almost, if not altogether unknown, and therefore Lieutenant Yate's notes of the country through which he passed are of some value, such, for example, as the considerable section describing the journey from the Helmund to Herat. Among the illustrations is a fine one of the Zulfikar Pass. The rough sketch-map on the scale of 32 miles to an inch will prove useful.

#### AFRICA.

[**Cape of Good Hope.**]—Blue-Book for the Colony of the Cape of Good Hope. 1885. Cape Town, W. A. Richards & Sons, 1886: folio, pp. 516.

**Feilden, Eliza Whigham.**—My African Home; or, Bush Life in Natal when a Young Colony [1852-7]. London, Sampson Low & Co., 1887: cr. 8vo., pp. 364, illustrations. Price 7s. 6d. [Presented by the Publishers.]

Consists of a series of letters, together with selections from the author's journal, written thirty years ago during five years of active bush life in Natal.

**Playfair, [Sir] R. Lambert [K.C.M.G.]**—Handbook for Travellers in Algeria and Tunis. Third edition, revised and greatly augmented. London, Murray, 1887: 8vo., pp. viii. and 344. Price 10s.

It is eight years since the previous edition of Sir Lambert Playfair's well-known handbook was published, and great changes have taken place since then both in Algeria and Tunis. Both countries are much better known now than then, Sir Lambert himself having done much for their exploration. The size of the volume has been increased by some forty pages, and throughout important changes and additions have been made, bringing the guide up to the latest date. The map of Algeria has been much improved, and a map of Tunis and other maps and plans added; though we venture to think more might have been given with advantage. As the Consulates of Algeria and Tunis were among the first established by England, Sir Lambert has added an interesting list of the incumbents of these important posts from John Typton, 1580, down to the present day.

AMERICA.

[*America*.]—Narrative and Critical History of America. Edited by Justin Winsor. Vol. IV. French Explorations and Settlements in North America, and those of the Portuguese, Dutch, and Swedes, 1500-1700. London, Sampson Low & Co. 1888: imp. 8vo., pp. ix. and xxx. and 516. Price 30s.

It will be seen that this new volume of this important undertaking deals with one of the most interesting periods of North American exploration, and does so with as great wealth of critical essays, maps, and illustrations as in the case of the previous volumes. Cortereal, Verrazano, Gomez, and Thvet are dealt with by Mr. George Dexter, while the editor adds a long section on Maps of the Eastern Coast of North America, 1500-1536, very amply illustrated with reproductions. Of course considerable space is devoted both to Jacques Cartier (Rev. Dr. R. F. Da Costa) and Champlain (Rev. E. P. Shaffer), another long section on Cartography, by the editor, being appended to Dr. Da Costa's chapter. Acadia is treated at some length by Mr. Charles C. Smith, and the discovery of the Great Lakes by the Rev. E. D. Neill. The editor himself in this chapter deals with Juet, Massette, La Salle, Pacher Hennepin, and La Harpe. Chapter VI is devoted to the Jesuits, Recollets, and the Indians, by Dr. J. G. Shea, and the editor has a special section on the Jesuit relations. In Chapter VII Mr. George Stewart deals with Frontenac and his times, and the editor with general sketches and charts of the 16th and 17th centuries, and with maps of the 17th century showing Canada. Chapter VIII, by Mr. Bernhard Fernow, deals of the Dutch in North America, and Chapter IX, by Mr. J. E. Kern, of the Swedes on the Delaware. One feature of this volume of special interest at the present time is an Introduction of 35 pages by Professor N. S. Sauer, the eminent geologist, on the physiography of North America, in which he shows with much skill and knowledge the important bearings which the geographical characteristics of the North American continent have had on its historical development. The general features of continents, he maintains, "are not only of scientific interest: they are of the highest importance in the history of man's development upon their several lands. It is not without meaning that, while man has existed for a great length of time upon all the continents, the only original civilisations that have been developed have been on the lands of the Indo-European Continent. Working in several different lines of advance several diverse races—Aryan, Semitic, Chinese, and perhaps others—have risen from the common point of barbarism, and have created complicated social systems, languages, literatures, and arts: while in the four other continents, despite their great size, greater facilities, and wider range of physical conditions, in that has ever had a native development to be compared with that undergone by the several successful races of Asia and Europe." Professor Sauer then goes on to account for this by showing that in "the great Old World continent there are nearly ninety independent areas, each separated from the rest of the continent by some geographical barrier. It has a border of or of great peninsulas on its sea-coast, many great islands off its shores, and the interior of the land is divided into many separate regions of mountain ranges or rivers. It is a land which has necessarily had rich variety, because of the mountain and geographical power." Professor Sauer then points out that the other continents are necessarily deficient in such variety-determining features. "These continents are comparatively so simple in the basic continent is varied. Their seas is individual, and their systems of inland waters are necessarily less diversified than in such a land-mass as Asia. At the same time Professor Sauer points out that the continent of North America is, of all the "youngest" continents, that nearest man in its structure to the great Old World land. He then goes on to show, in detail, how the settlement of the land by Europeans, and its subsequent development, have been markedly determined by its geographical structure, very carefully maintaining that in a very large section of the continent there is little more in the nature of its being than in a series of indentations to the great border of the Rocky Mountains. It is evident that the "New Geography" has begun to take root in America.

[**Buenos Ayres.**]—Ministère de Gouvernement, Bureau de Statistique générale. *Annuaire Statistique de la Province de Buénos-Ayres.* Publié sous la direction du Docteur Émile R. Coni, Directeur du Bureau de Statistique Générale. Cinquième Année—1885. Buénos-Ayres, 1886: large 8vo., pp. xlv. and 460, maps, plate, plan. [Presented by Dr. Emilio R. Coni.]

**Canada.**—Geological and Natural History Survey of Canada. Alfred R. C. Selwyn, LL.D., F.E.S., Director. *Annual Report (new series), vol. i., 1885.* Maps to accompany report, in separate cover. Montreal, Dawson Brothers, 1886. [Presented by the Director.]

This volume deals with the surveys of 1884 and 1885, chiefly in British Columbia and the North-west Territory, Ontario, Quebec, Hudson's Bay and Strait, New Brunswick, and Nova Scotia. Besides the specially geological work, the volume contains a good deal which will be found of value to the geographer. We may specially mention Mr. G. M. Dawson's preliminary report on the physical and geological features of that portion of the Rocky Mountains between latitudes 49° and 50° 30'; a paper on the Cypress Hills, Wood Mountain, and adjacent country, by Mr. E. G. McConnell; on the Lake of the Woods Region, by Mr. A. C. Lawson; on the Lake Mistassini Expedition, by Mr. A. P. Low; on Hudson Strait and Bay, by Mr. R. Bell. The account of Lake Mistassini is of special interest. Throughout the volume are a number of illustrations, photographs, and well executed engravings, which are of some geographical value; and so also are the maps, which combine topography with geology.

**Steinen, Karl [von den].**—Durch Central-Brasilien. Expedition zur Erforschung des Schingu im Jahre 1884. Leipzig, Brockhaus, 1886: imp. 8vo., pp. xii. and 372. Price 22s. 6d. (*Dulau.*)

Herr von den Steinen's work may be taken as a typical example of what a scientific exploration of a great tract of comparatively unknown country ought to be. He, his cousin W. von den Steinen, and Dr. Clauss, were members of the German South Georgia expedition, on the return of which they remained behind at Monte Video for the purpose of carrying out an exploration of a section of the South American interior. In various departments of science they were well qualified for making the most of their opportunities, and the volume containing the record of their work is rich in results. Their main object was to explore the course of the great river Xingu, which flowing north through 14 degrees of latitude, joins the Amazon near the head of its delta. Starting from the La Plata and proceeding northwards by the Parana to Cuyaba, much good work was done before the source of the Xingu was reached. Several chapters are devoted to Cuyaba and its inhabitants, and two chapters to the great province of Matto Grosso. The ethnology of South America receives special attention, and the volume contains a map showing the distribution of the various races. The survey of the Xingu was carried out with great care, and the detailed large-scale map, as well as the narrative, abounds with new information. The chief results, so far as the river is concerned, have already been described in the 'Proceedings' (vol. viii., 1886, p. 517). Several appendices, mainly ethnological, are added, and the work contains many admirable illustrations. There are some useful hints as to the kind of words which travellers should select for which to obtain native equivalents.

#### AUSTRALASIA.

**Hager, Carl.**—Kaiser Wilhelms-Land und der Bismarck-Archipel. Leipzig, Gressner und Schramm [1886]: 8vo., pp. 144. Price 3s. (*Dulau.*)

Herr Hager has brought together in this volume a summary of what we know concerning the recently acquired possessions of Germany in the South Seas. There are several illustrations, reproduced from books of travel, and a sketch-map of the German coast of New Guinea.

**Lendenfeld, R. von.**—The Glacial Period in Australia. [Extracted from vol. x., Part 1, of the 'Proceedings of the Linnean Society of New South Wales.'] 8vo., pp. 10, map and plates.

## NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

## EUROPE.

**Croatien und Slavonien.**—Karte von —, entworfen und Sr. Excellenz Herrn Grafen Josef Jellačić von Bužim, in tiefster Ehrfurcht gewidmet vom k.k. Ingenieur Assistenten der Staatseisenbahn Michael Katzenschläger. Scale 1:504,000 or 6·9 geographical miles to an inch. Eigenthum und Verlag von Artaria & Co., Wien, 1887. Price 5s. (*Dulau.*)

**Elbe.**—Stromkarte der —. Scale 694·5 yards to an inch. L. Friedrichsen & Co., Hamburg. 56 sheets in case. Price 2l. 18s. (*Dulau.*)

This map consists of fifty-six sheets, each of which would contain an area of forty square miles, but as in many of them a considerable portion is left blank, the fact is only mentioned in order to convey some idea of the extent of country shown on either bank of the river. In that portion of the map which shows the course of the Elbe through the German Empire, the distance from the Austrian frontier to the sea is given in kilometres, the numeration increasing with the river's downward course, and the opposite is the case in the Austrian Empire where the kilometres are numbered up-stream as far as Prague, which is the limit of the map. The heights are shown by contour lines, and cultivated ground, means of communication, &c., by the symbols usually employed in surveys drawn on a large scale. In addition to the principal map, a sheet, on a reduced scale, is given, on which the whole area drained by the Elbe and its affluents is laid down, together with statistical tables having reference to the same subject.

**Oesterreichisch-Ungarischen Monarchie.**—Specialkarte der —. Scale 1:75,000, or 1 geographical mile to an inch. K.k. militär-geografisches Institut, Wien, 1886. Sheets: Zone 11, Col. XXII. Nagy-Röce und Rima-Bánya; 12—XXIV. Gönc und Csobád; 13—XXVII. Beregszász und Mezö-Tarpa; 14—XXVII. Jánk; 14—XXII. Gyöngyös und Bakba; 16—XXVI. Szalacs und Er-Diöszeg; 18—XXVII. Bucsa und Rossia; 32—XV. Almisa und S. Pietro della Brazza; 32—XVII. Kočerin und Mostar; 33—XVII. Ljubuški und Metković; 34—XIX. Bilek; 35—XIX. Trebinje und Risano. Price 1s. 4d. each sheet. (*Dulau.*)

**Oesterreich-Ungarischen Eisenbahnen.**—Die — der Gegenwart und Zukunft. Karte zur Reise, so wie zur Uebersicht der befahrenen, im Bau befindlichen, concessionirten und projectirten Eisenbahnen, nebst deren eigenthümlichen Benennungen. Erneute Ausgabe mit 3 Beikartken: Das nordböhmische Eisenbahnnetz.—Umgebung Wiens.—Die Orient-Anschlüsse. Artaria & Co., Wien, 1887. Price 2s. (*Dulau.*)

**Oesterreich-Ungarn.**—Eisenbahn- und Post- Communications-Karte von —, enthaltend fertige und in Bau befindliche Eisenbahnen mit allen Stationen, die Posttrouten für Personen-Beförderung und Dampfschiff-Stationen. Mit den Distanzen in Tarif-Kilometern. Scale 1:1,700,000 or 23·2 geographical miles to an inch. Beikarten: Umgebungen von Wien und Budapest sowie das nördliche Böhmen. Artaria & Co., Wien, 1887. Price 2s. 6d. (*Dulau.*)

**Norway.**—Generalkart over det sydlige Norge i 18 Blade. Scale 1:400,000 or 5·5 geographical miles to an inch. Sheet VII. Udgivet af den geografiske Opmaaling. Kristiania, 1885. Topografisk kart over kongeriget Norge. Scale 1:100,000 or 1·3 geographical miles to an inch. Udgivet af Norges geografiske Opmaaling, 1886. Sheets: 9c, Skien; 15A, Eidsberg; 20c, Eidsvold; 26c, Aamot; 42c, Troldhetta; 43c, Holtaalen; 42d, Rennebu; 43d, Stuesjø; 49A, Örlandet; 50d, Snaasen; 53b, Overhalden; 53d, Høilandet; 54A, Sanddöla.—Den Geologiske Undersögelse.



Scale 1:100,000 or 1·3 geographical mile to an inch. Udgivet af Norges geografiske Opmaaling. Sheets: 15c, Fet; 20A, Nannestad.—Kristiania Omegn (in 6 sheets). Scale 1:25,000 or 2·9 inches to a geographical mile. Sheets: II. and V. Udgivet af Norges geografiske Opmaaling, 1885.—Romsdals Amt, IV. Scale 1:200,000 or 2·7 geographical miles to an inch. (*Dulau*.)

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(*Stanford, Agent*.)

## AFRICA.

**Africa Meridional Portuguesa**.—Carta da ——. Scale 1:6,000,000 or 82·1 geographical miles to an inch. Comissão de Cartographia, 1886. Coordenada por A. A. d'Oliveira. Gravado e impresso por Erhard, Paris. (*Dulau*.)

- Algérie.**—Carte Topographique de l'—. Scale 1:50,000 or 1·4 inches to a geographical mile. Dépôt de la Guerre, Paris. Sheets:—No. 8, Dellys; 9, Azefoun; 15, Djebel Filfila; 17, Bône; 18, Oued Guergour; 22, Ménerville; 65, Ben Haroun; 79, Sidi el Baroudi; 85, Vesoul Beniane; 86, Médéa; 88, Aïne Beasem; 102, Aïne Bou Dinar; 127, Arzeu; 128, Mostaganem; 155, Debrousseville; 179, Rio Salado; 181, Arbal. (*Dulau.*)
- Cabinda, Molemo, e Massabi.**—Carta dos Territorios de ——. Scale 1:750,000 or 10·3 geographical miles to an inch. Comissão de Cartographia, 1886. Coordenada por A. A. d'Oliveira. Gravado e impresso por Erhard, Paris. (*Dulau.*)
- Guinée.**—Carte de la délimitation Franco-Portugaise en ——, par E. Desbuissons, 1886. Scale 1:940,000 or 12·8 geographical miles to an inch. Gravé et imprimé par Erhard, Paris. (*Dulau.*)
- Kabylie.**—Carte de la Grande — (Algérie) et d'une partie de la Medjana. D'après les reconnaissances des Officiers d'État-major et autres documents. Publiée par le Dépôt de la Guerre, Paris, 1855. Tirage de Décembre 1886. Scale 1:200,000 or 2·7 geographical miles to an inch. Price 2s. 6d. (*Dulau.*)
- Principe.**—Carta da Ilha do ——. 1886. Scale 1:100,000 or 1·3 geographical mile to an inch. Comissão de Cartographia. Coordenada por Ernesto de Vasconcellos. (*Dulau.*)
- S. Thiago.**—Ilha de ——. Plano hydrographico do Porto da Praia, Archipelago de Cabo Verde. Scale 1:8000 or 9 inches to a geographical mile. Comissão de Cartographia. (*Dulau.*)
- Südafrika.**—Die Portugiesische Expedition quer durch ——, 1884 und 1885. Nach den Originalkarten von Capello und Ivens im Massstab 1:1,000,000 reduziert auf Justus Perthes' Spezialkarte von Afrika. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 3. Justus Perthes, Gotha. (*Dulau.*)
- West Central Africa.**—Route von Paul Staudinger und Ernst Hartert von Loko am Benué nach Kano, Sokoto, und Gandu. August 1885—April 1886. Nach den Tagebüchern der Reisenden, construiert und gezeichnet von Wilhelm Erman. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Mittheilungen der Afrikanischen Gesellschaft in Deutschland, Bd. v. Taf. 4.
- Zoutpansberg (Transvaal).**—Carte des Districts du ——, et de Lorenzo Marquez (Possessions Portugaises) dressée par Henri Berthoud, Missionnaire, d'après ses voyages en 1881, 1883, et 1885. Scale 1:925,000 or 12·6 geographical miles to an inch. F. Noverraz et Fils, Genève. (*Dulau.*)

## AMERICA.

**Mississippi River.**—Map illustrative of Captain Willard Glazier's Voyage of Exploration to the Source of the ——. Drawn from delineations by his Indian guide Che-No-Wa-Ge-Sic. Approximate scale 1:255,000 or 3·5 geographical miles to an inch. Rand, McNally & Co., Chicago. (*Dulau.*)

In a note which is inserted on this map beneath Lake Glazier it is stated to be the source of the Mississippi river, and that it was reached July 22nd, 1884. It would, however, appear that this lake was first visited and surveyed by Lieut. Allen in 1832, and afterwards by Mr. Featherstonehaugh in 1835, who describes it in his book 'A Canoe Voyage on the Minnay Soter.' In the other portions of the map there is little worthy of special notice, and for farther particulars with regard to Captain Glazier's claim to be the discoverer of the sources of the Mississippi river, see R.G.S. 'Proceedings' for January, pp. 58 and 59, where a note on Mr. Harrower's pamphlet will be found; and also in the February number, p. 119, where Captain Glazier's claim is briefly discussed.

## ATLASES.

**Andree, Richard.**—Supplement zur ersten Auflage von Richard Andrees Handatlas, enthaltend die 33 Seiten neuer Karten der zweiten Auflage von 1886. Apart für die Besitzer der ersten Auflage. Herausgegeben von der Geographischen Anstalt von Velhagen & Klasing in Leipzig. Lief. 1 & 2. Price 2s. each. (*Dulau.*)

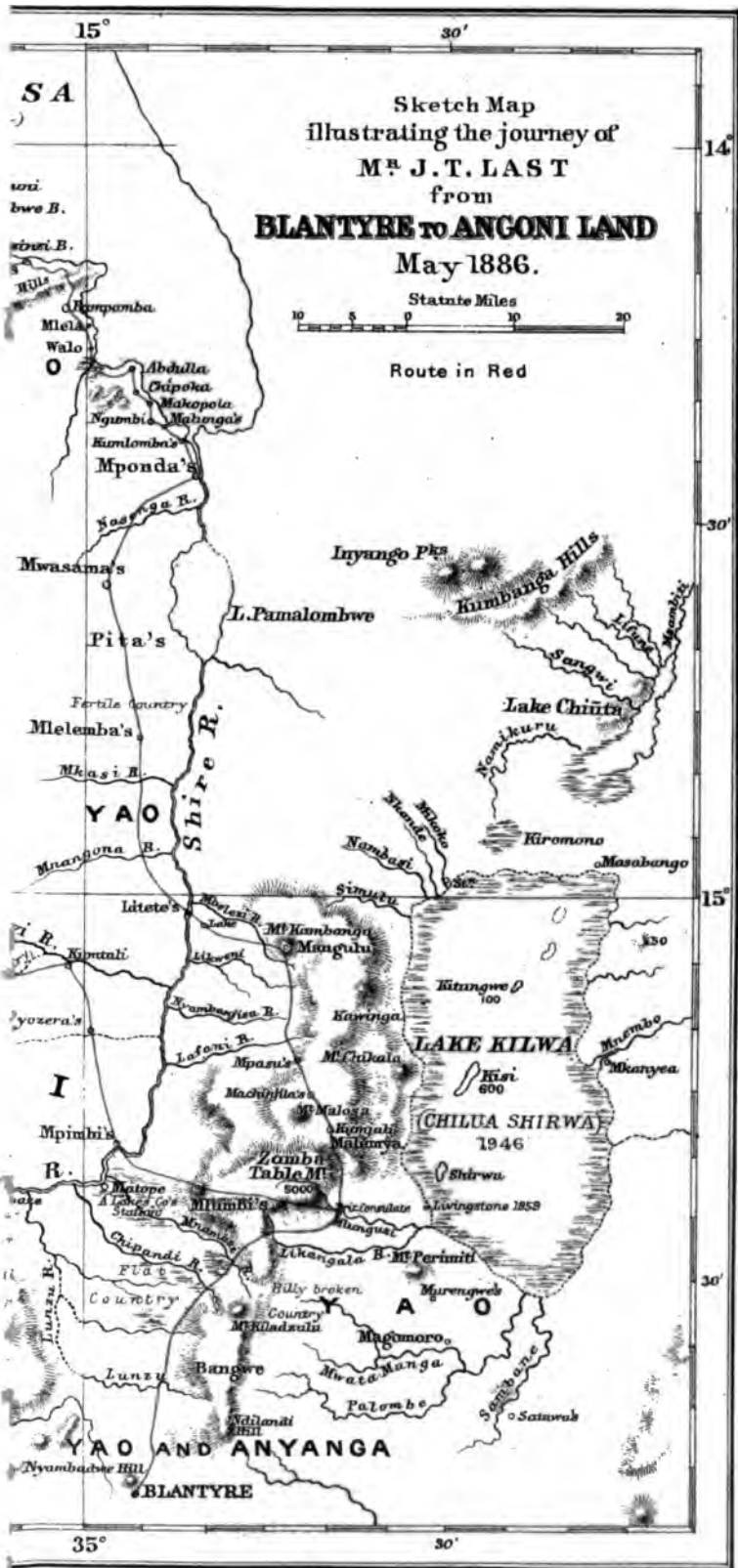
In consequence of discoveries and surveys that have been made since the original issue of this atlas, some of the maps which it contained required correction, and it was also desirable that others which had appeared in the original issue should be given on larger scales. With these objects in view, the author is now issuing a supplement in three parts, which will contain 33 sheets of maps. On a previous occasion, attention has been called to this excellent atlas, which, for the price at which it is sold, is equal to any published. These two parts contain the following maps:—Lief. 1: Seite 3, Ireland; 4 u. 5, England und Wales; 6, Schottland; 7, Das südliche Skandinavien; 8, Nordwestliches Frankreich; 9, Nordöstliches Frankreich; 10, Südwestliches Frankreich; 23, Die Antillen; 24 u. 25, Nordwestliches Afrika; 26, Westafrikanische Kolonial-karten.—Lief. 2: Seite 11, Südöstliches Frankreich; 12, Französisch-italienische Alpen; 13, Übersichtskarte der Alpen; 14, Sizilien und Sardinien; 15, Griechenland; 16, Westrussland; 17, Kaukasusländer; 18, Japan; 27, Algerien und Tunis; 28 u. 29, Nordöstliches Afrika; 30, Ägypten.

**Berghaus' Physikalischer Atlas** (begründet 1836 von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere Hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerlaud, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Berghaus. Siebente Lieferung. Inhalt: Nr. 31, Isothermen von Nord-Amerika. Nr. 48, Florenkarte von Asien. Nr. 56, Verbreitung der Reptilien. Gotha, Justus Perthes, 1886. Price 3s. each part. (*Dulau.*)

This is the seventh issue of this atlas, and contains sheets No. 31, 48, and 56. Sheet 31 exhibits isothermal lines on the Continent of North America for the months of January and July, and the mean temperature of the year. Another map shows the isotherms of the eastern portion of the United States for January. Sheet 48 is a map illustrating the distribution of flowering plants in Asia and Europe. The region embraced is so large, and the consequent system of colouring is so elaborate, that there is some little difficulty in distinguishing the meaning of the different shades employed, as, for instance, the colour used to distinguish the region of the *Dryobalanops* from that of the *Dipterocarpus* is so nearly the same as that employed in the latter case that it would be extremely difficult to decide as to which it was intended to represent. Sheet 56 exhibits the distribution of reptiles. This is done by means of six small maps of the world, the different regions where each class is found being enclosed in a band of colour. These sheets are beautiful specimens of cartography, the registering of the colours employed being perfect.

**British Empire.**—Atlas of the — throughout the World, by John Bartholomew, F.R.G.S., with Explanatory and Statistical Notes. Enlarged Jubilee Edition. London, G. Philip & Son, 1887. Price 3s. 6d.

This little atlas contains twenty-nine sheets of maps which have been specially prepared to illustrate the various colonies and dependencies of the British Empire. The first map gives, with the aid of colour, a general view of the distribution of the British possessions. Care appears to have been taken to use the best materials in the work of compilation, and the result, as a whole, is satisfactory. Under the title of "Notes to Maps" some very useful explanatory and statistical information is given.



S A

Sketch Map  
 illustrating the journey of  
 M<sup>r</sup> J. T. LAST  
 from  
**BLANTYRE TO ANGONI LAND**  
 May 1886.

Statute Miles  
 10 5 0 5 10 20

Route in Red



PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*Prejevalsky's Journeys and Discoveries in Central Asia.\**

By E. DELMAR MORGAN.

(Read at the Evening Meeting, February 28th, 1887.)

Map, p. 268.

BEFORE calling your attention this evening to the travels of Prejevalsky, let me give a few personal reminiscences which may help to bring his individuality before you.

I first met him at an evening meeting of the Imperial Geographical Society at St. Petersburg, when, with a flow of language and eloquence very striking, he gave an account of his first expedition into Central Asia, whence he had just returned. Calling at his lodging a few days afterwards I found him busily engaged in unpacking his collections which were in an admirable state of preservation, notwithstanding the many thousand miles they had come and the variety of climates to which they had been exposed. Among his chief prizes he showed me skins of the *Ovis Poli* and other rare animals shot by him in Northern Tibet. Ever since then our acquaintance has been renewed as opportunity offered between his long absences from Europe, and from time to time he has sent me particulars of his discoveries which I have communicated to this Society. As to his personal history, I may mention that his earlier years were passed in inuring himself to all kinds of physical privations and hardships to prepare for the career of an explorer, and soon after entering the military service, he asked for and obtained an appointment in Eastern Siberia, where he could indulge his passion for sport and adventure. In the dense virgin forests on the Ussuri, that remote part of the Russian empire acquired in 1860, he passed two summers, continually moving from place to place, and when not occupied with his official duties taking meteorological observations, collecting and drying plants, shooting and stuffing birds, keeping a diary, &c.

In 1871-73 he made his first great expedition in Mongolia and

\* Compiled from the Russian originals.

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B

Tibet. After crossing the Gobi Desert between Kiachta and Kalgan he turned westward and followed nearly in the footsteps of Abbé Huc to the province of Kansu in Western China, visiting Lake Koko-nor, a magnificent water-spread 10,800 feet above the sea. He then entered Tsaidam,\* a saline marshy tract some 500 miles long from east to west, which in his opinion has recently been covered by the sea. Hence he passed into Northern Tibet, but owing to the want of resources he was unable to prosecute his journey to Lhása, and was obliged to turn back when but 27 days' march or about 500 miles from that city. Among the results of this expedition, besides rich collections of the flora and fauna of the countries visited and a detailed route survey, was the discovery of a moist mountainous region in Kansu, to the north of the upper Hoang-ho and east of Lake Koko-nor, well wooded and abundantly supplied with rainfall though isolated by arid tracts. On his return journey he crossed the Gobi in its widest part between Din-yuan-ing and Urga, in the height of summer, by a route never before attempted by European travellers.

In 1876 Prejevalsky advanced from Kulja, then held by Russia, crossed the Thian Shan and turning southwards from the oasis of Kara-shahr, struck the Tarim and followed this river down to its outflow in Lake Lob, the first European to visit this lake in modern times. His description of it, differing widely from the accounts given by old travellers and by Chinese writers, took geographers by surprise, particularly as regards the sweetness of its waters at its western end where the discharge of the Tarim takes place. But his most important discovery was that a high range of mountains, the Altyn-tagh, rises almost precipitously from its southern shore to the limit of perpetual snow, and apparently buttresses the northern Tibetan plateau. We can now understand, says Baron Richthofen, why the old silk traders passed so close to the south of Lob-nor, and encountered the terrors of the desert between it and Sha-chau rather than attempt a passage over huge mountains where the difficulties of transport were so great. We shall see, however, when we come to Prejevalsky's fourth and last journey that the trade route did in all probability cross these mountains by an easy pass from Cherchen, while an alternative route to China lay through Lob-nor and Sha-chau.

By these two journeys Prejevalsky had acquired a reputation as a traveller and observer, and when he started on his third expedition he was well supplied with funds and with every requisite. In 1879 he undertook what he himself prefers styling his third "scientific reconnaissance" into the heart of Asia. Fort Zaisan, now a town in the government of Semipalatinsk, was his point of departure. Here he obtained the supplies necessary, and transport animals for his party numbering thirteen all told, ten being Cossacks, picked men, and well

\* 10,000 feet above sea-level.

practised in the use of firearms, upon which Prejevalsky's experience had taught him to place his chief reliance in dealing with the natives of Central Asia.

Their route at first led them by Lake Uliunghur, visited in 1253 by the Franciscan monk Rubruquis, who was sent on a mission by Louis IX. of France to the Mongol Khan at Karakorum. The lake has a circumference of 87 miles, an elevation above the sea of about 1600 feet, and receives on the east the discharge of a large river, the Urungu. A peculiar feature about this lake is that a narrow ridge of highland separates its north-eastern extremity from the Black Irtish, and therefore from the basin of the Obi and the Frozen Ocean.

Prejevalsky and his party passed along its western and southern shores to the Chinese fort of Bulan-tohoi, situated at the mouth of the Urungu. They then followed this river, which has a course of about 300 miles, and derives its source from the Altai Mountains, cutting a deep channel through the plain lying between them and the Thian Shan range. Not long before the expedition passed this way a large body of Kirghizes, numbering about 9000, had wintered on the Urungu, having escaped from the control of the Russian authorities in Semipalatinsk. They had suffered terribly from want of fodder for their cattle, and Prejevalsky saw numerous traces of their encampments along a tract extending over 100 miles up the Urungu, where everything edible had been devoured, even to the bark of the poplar trees, which had been felled and stripped, while the ground was strewn with the carcasses of their dead sheep. This incident serves to illustrate the great change that has come over Central Asia since the days when Jinghis Khan and other great conquerors found sufficient sustenance for their vast armies.

The natives of the upper valley of the Urungu or its chief tributary, the Bulugun, are Turgute-Kalmuks, whose kinsmen, inhabiting north-western Dzungaria at the foot of the Tarbogotai range, are the descendants of those Kalmuks who, driven out of their camping grounds by the Dzungars, migrated to the banks of the Volga and Ural at the end of the 17th century, and in 1770 suddenly departed, to the number of 460,000 families, into the depths of Asia under the leadership of their Khan Ubashi, and arrived, though in greatly diminished numbers, on Lake Balkash, and afterwards at Ili, where lands were given them by the Chinese Emperor. The Turgutes are subjects of the Emperor of China, and remnants of them who escaped the Dungan insurrection now occupy the lands about Yulduz and Kara-shahr.

After ascending the Urungu and Bulugun, Prejevalsky crossed a sand waste to the foot of the Thian Shan, called by him the desert of Dzungaria, after the country of which it forms part. It is bounded on three sides by mountains, while on the east, where the Altai and Thian Shan ranges approach one another, an isthmus of sand unites it with



the Gobi.\* This connection existed in distant ages, when the whole area of what is now known as the Gobi was covered by a sea mentioned in Chinese annals as *Kan-hai*.† The Dzungarian desert formed a great gulf of this sea communicating with another vast water-spread, the Aralo-Caspian.

Prejevalsky describes at some length its climate, soil, flora, and fauna; we have only space here, however, for a few of his remarks. First, the most characteristic of the flora of this, and indeed the whole of the Central Asian plains and deserts, is the Saxaul (*Haloxylon ammodendron*), called by the Mongols *zak*, a tree or shrub growing to a height of fourteen feet, and a thickness near the root of half to three-quarters of a foot. It is most commonly met with in the drift sands, particularly in Ala-shan and in Russian Turkistan. It is by no means attractive in appearance, it gives no shade, and the sand round it is devoid of all other vegetation. But its usefulness to the nomad is beyond description; it supplies him with fuel, and his camels with food; its wood, though heavy and hard, is exceedingly brittle, so much so, that a large log of it when struck with the axe will fall to pieces. Hence it is of no use for building purposes, but it burns splendidly, almost like coal, and retains its heat a long time. Its geographical distribution is very wide in Inner Asia. It is met with throughout the vast tract extending from the Caspian Sea on the west, to the limits of China Proper on the east, and through nearly 12° of latitude from the parallel of Lake Uliunghur on the north to Tsaidam on the south, where it grows at a height of 10,000 feet above the sea; but its chief habitat is the Gobi and Northern Ala-shan, Dzungaria, and Russian Turkistan. Of the fauna of Dzungaria, we must mention the wild horse—Prejevalsky's wild horse—a stuffed specimen of which is preserved at the Academy of Sciences at St. Petersburg, and the wild camel, the Bactrian two-humped species. Both these animals inhabit the wildest and least accessible parts of the desert. The wild horse, which palæontologists have shown was once widely distributed over Europe and Asia, is now only met with in a corner of the desert of Dzungaria; but the wild camel was also observed by Prejevalsky in the desert of Lob, where he was the first European to see it since the Venetian traveller Marco Polo, six centuries ago, passed this way.

On turning southward from the valley of the Bulugun he soon left behind him the Altai and approached the Thian Shan, visible in the clear atmosphere of the desert 130 miles off, while its highest peak, Bogdo-ula, could be seen before leaving the Urungu, 160 miles distant. Among its spurs he found a few Chinese settlers, but they were not so numerous as they had been before the Dungan insurrection, and they had entirely driven away the nomads.

\* Some chains of mountains between the Tarbogotai and Thian Shan border it on the west.

† Or "the dry sea."

Passing the salt lake and plain of Barkul,\* Prejevalsky crossed the main axis of the Thian Shan by a pass 8700 feet high,† and descended to the oasis of Hami on the south side.

This oasis, supplied with moisture by the streams which descend from the snowy mountains, though of no great extent, is remarkably productive. Corn, vegetables, grapes and melons are grown here, the last of such exceptionally fine flavour as to be considered worthy of being sent to the court of Peking. But Hami in its present state shows unmistakable evidence of the ravages committed by the Mahomedan rebels. Its trees have all been felled, its gardens destroyed, its homesteads laid in ruins. Only within the last few years have the Chinese begun restoring their houses and cultivating the land. Prejevalsky considers it an over-rated place, not to be compared with Kulja, that "pearl of Central Asia."

The natives of Hami are descended from the ancient Uighurs, and are called Taranchi.‡ They wear a national dress, consisting of an ample flowered *khalat* or robe, and a cap of a peculiar shape, worn at the back of the head. The women are good-looking, black-eyed and black-haired, with splendid white teeth, but unfortunately they follow the Chinese custom of painting their faces. They walk out unveiled, and are generally free and easy in their manners, just as they were in Marco Polo's time.

Hami is a strategical place of the highest importance, as it commands the chief roads from China Proper to Eastern Turkistan and Dzungaria. It is the key to all the cities situated along the Thian Shan, for here a road passable for wheeled vehicles crosses the narrowest part of the desert to An-si-chau. By this route, 250 miles long, Prejevalsky passed, resting his caravan, much exhausted by the fiery ordeal they had gone through, in the environs of Sha-chau.

Sha-chau is one of the best oases of Central Asia. It is situated at the foot of the Nan-shan range, at a height of 3700 feet above the sea, and occupies an area of about 200 square miles, the whole of which is thickly inhabited by Chinese.§ Sha-chau || is interesting as the meeting-place of three expeditions started independently from Russia, India, and China. Just two months before Prejevalsky reached this town it was

\* The town of Barkul, founded by the Chinese in 1731, remained on one side of Prejevalsky's route, and was not visited by him.

† On either side of this range there is a cart-road leading from Western China. The northern road, Peh-lu, leads to Barkul, Guchen, Urumtsi, Manas, Shi-ho, Jinho and beyond via the Talki pass to Kulja. The southern route, Nan-lu, passes through Pichan-Turfan, Kara-shahr, Korla, Kuchá, Bai, Aksu to Kashgar.

‡ Hami is composed of three parts, two Chinese (an old and a new) and one Taranchi.

§ Prejevalsky estimates the population at 10,000, of whom 2000 were soldiers. Szechényi gives 12,000 as the total.

Also known by its Chinese name Tung-lwan-hsien.

visited by Count Szechényi,\* and eighteen months afterwards Pundit A—k, whose report of it agrees fairly well with that of our traveller, also stayed here. Both Prejevalsky and Szechényi remark on some curious caves in a valley near Sha-chau containing Buddhistic clay idols. These caves were in Marco Polo's time the resort of numerous worshippers, and are said to date back to the Han dynasty.†

Undeterred by the suspicious and unfriendly attitude of the Chinese, who thwarted him in every way, Prejevalsky pushed on towards Tibet, now seeking the road by scouting, now pressing into his service occasional Mongols with whom he chanced to meet. He crossed the Nan-shan, whose glittering snowy summits stood forth in startling contrast with the dark blue canopy of the heavens, those mountains which extend on the east to the sources of the Hoang-ho and on the west to Lob-nor, Khoten, and the Pamir, forming a gigantic northern barrier to the whole of the Tibetan uplands.

By his discovery in 1876 of the Altyn-tagh, Prejevalsky defined the till then unknown connection between the Nan-shan and Kuen-lún, at all events in a general way, and the position of the northern barrier of the Tibetan plateau, advancing this in the meridian of Lob-nor 3° farther to the north than had hitherto been supposed. Tsaidam proved to be enclosed on all sides by mountains, while the Kuen-lún, extending under various names from the sources of the Yarkand river far into the interior of China Proper, margined the lofty uplands of Tibet only in its western part on the side facing the low Tarim desert. The farther margin of that Tibetan plateau is formed by the newly discovered Altyn-tagh, uniting on the one side by means of the Toguz-daban with the Kuen-lún, and on the other, as may be now confidently asserted, with the Nan-shan, stretching from Sha-chau to the Yellow river.

In this way an uninterrupted gigantic mountain wall stretches from the Upper Hoang-ho to the Pamir, dividing the great intumescence of Central Asia into two parts, the Mongolian desert on the north, and the Tibetan plateau on the south.

Nowhere in this world is there to be met with on such a scale so marked a difference between two countries lying side by side. The chain of mountains separating them is often not wider than about 30 miles, and yet on either side of it lie tracts completely distinct in their geological formation and topographical relief, in their elevation and climate, their flora and fauna, and lastly, in the origin and the fortunes of the peoples inhabiting them.

But let us return to the Nan-shan. This range, as we have stated, extends westward from the Upper Hoang-ho, and is divided into several parallel chains forming a mountainous alpine country, widest to the north and north-west of Koko-nor, where parts of it rise above the

\* In April 1879.

† Whether to the first or second dynasty of that name is unknown.

snow-line. In the meridian of Sha-chau the Nan-shan narrows to a belt of 27 miles, and even less near the snowy group of Anembar-ula. But before this contraction, 60 miles to the east of the group just mentioned, it stands as a gigantic range crowned with perpetual snow for a distance of over 70 miles in a direction W.N.W. to E.S.E.\*

In the Nan-shan mountains, Prejevalsky pitched his camp in a charming spot by the side of a brook, which he called "Bounteous," a name it richly deserved for its life-giving properties. The Nan-shan, in the meridian of Sha-chau, is a sterile, treeless range, differing widely from its eastern part, the so-called mountains of Kansu. In the last-named, dense forests of every kind of tree and shrub clothe the slopes, particularly on the north. The alpine zone abounds in rhododendrons and rich pasturage; the treeless Sha-chau mountains, on the other hand, have only about a dozen kinds of bushes, and but little variety in their herbaceous flora,† while their avifauna is proportionately deficient.

Instead of grassy slopes, there are beds of rocky detritus, or bare clay, giving an aspect of dreariness and monotony to the scene. Yet the higher belts possess a savage grandeur, with their summits towering above the main axis, their precipices, and white-capped peaks.

In these wild mountains, Prejevalsky and his Cossacks remained several weeks hunting and exploring. Among the additions to their zoological collection, was a new species of deer,‡ and the large Tibetan partridge§ inhabiting the highest alpine belts. They visited a glacier, 17,100 feet by barometrical measurement, and gaining the crest of the range had a magnificent view of its whole extent.

But here a disaster nearly overtook them. Their mutton and dried venison being all consumed, they sent out hunters every day to try and obtain deer or yak. Owing, however, to the scarcity of these animals, they often returned empty handed. One day, a Cossack reported that he had fired at and wounded a yak, but approaching darkness had

\* At its eastern extremity this range is joined almost at right angles by another range coming from the W.S.W., equally snowy, though perhaps less continued. In its southern part this range is contiguous with the desert of Northern Tsaidam, near Lake Ike-Tsaidamin-nor. Neither of these snowy ranges having any general name among the local inhabitants, who only distinguish certain parts of the mountains and their chief peaks, Prejevalsky claiming the rights of a first discoverer, christened one—that extending along the main axis of the Nan-shan—Humboldt range, and the other, perpendicular with it, Ritter range. Distinct peaks of Humboldt range attain an elevation of 19,000 feet, and perhaps more in its central and eastern parts.

† The limit of vegetation on Humboldt range lies at an elevation of 13,700 feet on the northern, and 15,000 feet on the southern side. The snow-line is 700 feet higher on either side.

‡ *Cervus albirostris* n. sp.

§ *Megaloperdix thibetanus*. Its general name in Asia is *ullar*, a word of Kirghiz or Turkish origin; the Mongols call it *hailik*, and the Tibetans *kung-mo*. There are two other varieties of this bird found in the Himalya and Altai Mountains, but the habits of life and call-note of all three are the same.

obliged him to abandon the pursuit. The next day, he and a companion Yegoroff, set out to renew the search; they came upon the track of the wounded yak, showing that it had climbed a mountain ridge and descended the southern slope. The hunters, excited with the chase, followed. A mile or two beyond the pass they came across a herd of wild sheep, into which they fired a volley, and while Kalminin went to ascertain if any had fallen, Yegoroff continued his pursuit of the yak. In the meantime, Kalminin unexpectedly shot a *kulan* or wild donkey, and having done this, he returned to the spot where he had parted with Yegoroff and shouted. Receiving no answer, and thinking it possible his companion had gone straight back to camp, Kalminin retraced his steps and joined his party at ten that night. The next morning, the prolonged absence of Yegoroff caused much anxiety, and a search party was organised. For some miles they followed the tracks of the hunter, but at last lost all trace of him in the maze of crags and defiles. For five days they continued their search, Prejevalsky himself assisting. They climbed the rocks in all directions, they fired off their guns, and then concluding Yegoroff had perished from exhaustion, with heavy hearts they broke up their encampment and resumed their march.

They had gone about 17 miles, when the leading Cossack discerned, by the aid of a field-glass, a man coming down the mountains towards their caravan; two of the party set out at a gallop to meet him, and within half an hour they had brought back with them the unfortunate Yegoroff. He could hardly stand; his face was sunken and nearly black, his eyes bloodshot, his lips and nose swollen; he wore nothing but a shirt, and his feet were bound in rags. When he had sufficiently recovered, he related how he had come upon the yak; how he had wounded him a second time, how he had again pursued him till dark, and how, when he had turned his steps homeward, he had taken the wrong direction, and when morning dawned he had found himself on the Syrten plain. He told too how he had made his way again to the mountains, but instead of going north had gone west, and how he had kept himself alive by chewing rhubarb leaves and drinking water; he had also shot partridges, and eaten them raw. On the fifth day he came upon a herd of Mongol cows, but there were no herdsmen to be seen, they having fled probably at the sight of a stranger; he wanted milk, but alas, the cows were all dry; his strength was sensibly diminishing, and he knew that in a day or two he must die from sheer exhaustion; he determined therefore to walk to the very last, and then by the side of a spring wash his shirt and die. Thus ended Yegoroff's tale.

The expedition now entered the Tsaidam plains, an expanse of salt-marsh and clay flats, dotted with lakes, and elevated about 10,000 feet above the sea. Its Mongol inhabitants\* received the Russians well,

\* The Mongols of Tsaidam cultivate patches of the soil and obtain good crops where there is irrigation.

but feared to show them the direct road to Tibet, lest they should incur punishment from the Chinese authorities. The expedition had therefore to take a circuitous route along northern Tsaidam, which led them into the track followed by Prejevalsky in 1872-3. The native princes, acting doubtless by orders from Peking, refused Prejevalsky both guides and provisions, and it cost him no little trouble, and he had even to resort to threats to obtain these. At length he reformed his caravan, and prepared to enter the promised land, the mysterious realm of Tibet.

Northern Tibet\* offers no exception to the well-known grandeur of Asiatic scenery. No other part of the world has anything to compare with its gigantic tablelands, 13,000 to 15,000 feet above the sea, its stupendous mountain ranges, not lofty compared with the general elevation of the country, yet bordered by the wildest alps.

But few Europeans have crossed its solitudes and these have followed the routes taken by the Buddhist pilgrims from Sining to Lhása.† Unfortunately none of them left a detailed geographical description of his journey through Northern Tibet. Far more important in this respect were the services rendered by Pundit Nain Singh in 1873, when he accomplished his remarkable journey from Ladakh to Lhása via Tengrinor, took 497 altitudes, and determined the latitudes of 276 points.‡ Another pundit proceeded from Eastern Nepal to Tengrinor, skirted its northern shore, and returned by way of Lhása to India.

Prejevalsky himself on his first expedition penetrated 200 miles into Northern Tibet by the same pilgrims' road, as far as the confluence of the Napchitai-ulan-murren with the Mur-ussu, the head-waters of the Yang-tse-kiang.

In 1879-80 he again made his way to the upper Yang-tse-kiang, crossed this river and the Tang-la range, besides exploring the upper Hoang-ho to the south of Koko-nor.§

\* Prejevalsky includes within Tibet, viewed in its widest physico-geographical aspect, the region to the north bounded by the Altyn-tagh, the basin of Koko-nor and the Tangutan country, all of which lie outside Tibet proper, but from the similarity of their physical conditions may be included in it.

† In 1624 the Jesuit Antonio Andrada set out from Agra and reached the sacred shores of Lake Mansarowar; thence he made his way to Rudok, and eventually by way of Tangut to China (Markham's 'Tibet,' p. lvi.). In 1661 the missionaries Grueber and D'Orville passed through Lhása to Agra on the Ganges. Between 1723-1736 the Dutchman Samuel van der Putte travelled from India to Peking through Lhása and back again to India; and lastly, in 1845, the missionaries Huc and Gabet reached the capital of the Tale Lama from Northern China, and returned through Southern China to Canton.

‡ See 'Journal R.G.S.,' vol. xlvii. pp. 86-136.

§ Eastern Tibet was also visited in 1862 by the Abbé Desgodins, who went from Bathang to Cha-mou-to (Chiamto) (See 'Proc. R.G.S.,' 1885 and 1886. 'La Thibet d'après la correspondance des Missions'); and Pundit A—k, during his four years' travels, succeeded in making his way from Lhása to Tyngali (Tengelik) in 36° N. lat. and 96° E. long., and thence through North-western Tsaidam to Sha-chau.

Meagre as our geographical information is concerning Northern Tibet, its general features may be roughly sketched, more especially as nature has fashioned it on a large scale. The limits of our plateau are the Kuen-lún on the north, and the northern Himálya on the south; from east to west it extends from the Karakorum, and its south-eastern continuations, to the borders of Sze-chuen and Kan-su. The eastern, smaller half of this region differs widely from the western. A line drawn diagonally from Lake Tengri-nor to the sources of the Yellow river would serve to mark the division. West of such a line lies a continuous table land almost without relief, and having no waters flowing towards the ocean except in its eastern part. East of this line all the streams belong to the oceanic watershed, the country loses its tableland aspect, and now and again presents grandiose alpine scenery.

The whole of Tibet may from the diversity of its topographical features be divided into three parts:—a *southern*, comprising the upper valleys of the Indus, the head-waters of the Sutlej and the Brahmaputra; a *northern*, presenting a continuous tableland;\* and an *eastern*, containing an alpine country reaching far into China Proper.† The Kuen-lún on the north and the Northern Himálya on the south are its representative chains, but neither of these has been yet fully explored, though their main features have been revealed to us by the Pundits Nain Sing ‡ and D. in the case of the Northern Himálya, and by Prejevalsky in the central parts of the Kuen-lún.

The climate of Tibet is characterised by (1) a low temperature at all seasons of the year, notwithstanding its southern position; (2) a prevalence of violent storms, especially in spring; and (3) by excessive dryness of atmosphere in autumn, winter, and spring—on the other hand, by an abundance of humidity in summer.§

Turning to the flora and fauna of Northern Tibet, we again meet with a strange phenomenon, a poor vegetation contrasting with large numbers of herbivorous animals. Of trees there are none, and Prejevalsky only found three kinds of bushes, one of which—the willow—grew half a foot in height; the others lie on the ground. There are three or four kinds of grasses along the banks of the Mur-ussu and some other valleys, but the soil is for the most part bare, or only occasionally covered with plants about an inch in growth. But its fauna places

\* I am informed by Mr. Ney Elias that this country may prove to be mountainous, just as parts of North-east Tibet actually visited by Prejevalsky. In the same way the Pamir was thought to be a continuous tableland before exploration proved it to be a succession of ranges.

† It is not proposed in this paper to enter into the orographical details communicated by Prejevalsky. These might form the subject of an appendix in a separate paper.

‡ Nain Singh measured a peak, Gandizri (?), 25,000 feet high, and Pundit D. saw equally lofty summits south of Tengri-nor.—Journal R.G.S., vol. xlvii. p. 105.

§ I am informed by Mr. Ney Elias that the humidity noticed in Eastern Tibet and Kan-su does not extend to Western Tibet.

Tibet in a separate zoological category, not from the variety of species,\* but from their number and size. Probably there is hardly any part of the world, except perhaps Inner Africa, where there are such numbers of wild animals as are met with on the solitudes of Northern Tibet. Here in one day the traveller may see hundreds of herds of yaks, wild asses, and antelope, and these show no signs of alarm at the approach of man. Their numbers may be estimated, not by tens or hundreds of thousands, but by millions.

The first place among them is taken by the wild yak, which may be distinguished from the domestic species by many, though comparatively minor, zoological marks, and may be called, as Prejevalsky suggests, *Poëphagus mutus*, owing to the fact that this animal never utters a sound, while its domestic congener grunts like a pig, and is therefore named by Pallas *Bos grunniens*.

Then there are two beautiful kinds of antelope,† two kinds of mountain sheep,‡ frequenting the wildest crags; lastly, a deer, only found in small numbers on some of the mountains, but not on the plateau itself.

On advancing into Tibet, rumours reached the expedition that the Tibetans had assembled troops to prevent their approaching the capital. Nevertheless they advanced, full of hope and scorning every inauspicious omen and report. In order to avoid the high pass over the Burhan Buddha they turned into the defile of the Nomokhun-gol, passing along one of those barren, stony plains so common in Central Asia,§ margining with a wide and slightly inclined belt the foot of the Burhan Buddha. Here, in the midst of tamarisk bushes, they came upon patches of cultivated land, sown with barley, a rare sight in a country inhabited by Mongols, who hate and despise agriculture. Having passed the Burhan Buddha and Shuga || ranges, the last-named by a pass of 15,200 feet, they entered a remarkable valley, only three miles wide, but 70 miles long, forming a natural causeway between two huge ranges. At either end of it, passes ¶ lead southwards across the range named by Prejevalsky

\* All the mammals found by Prejevalsky in Northern Tibet belong to four orders, distributed as follows:—Carnivora, 5; Glires, 6; Solidungula, 2; Ruminantia, 9.

† The orongo (*Pantholops Hodgsoni*) and ada (*Procapra picticauda*).

‡ The white-breasted argali (*Ovis Hodgsoni*?) and Koko-yaman (*Pseudovis Naheer*).

§ The occurrence of similar plains in Afghanistan has been explained by C. L. Griesbach, the geologist on the Afghan Boundary Commission, in the following way: "Nearly all the great valleys of Southern Afghanistan are covered with post-Pliocene deposits in great thickness; amongst them is conspicuous a deposit of gravel and irregular fragments of rock from the surrounding hills, more or less firmly cemented together by a calcareous or argillaceous matrix forming a breccia. After disintegration has taken place on the surface of this deposit, the prevailing sand-charged storms remove such decomposed material, leaving the larger particles, namely, the pebbles and angular rock fragments, behind, producing wide spreads of those stone-strewn plains, characteristic of this part of Asia, and commonly termed *dasht* by the natives."

|| Described in Prejevalsky's book, 'Mongolia, &c.' vol. ii. chap. 6.

¶ Chium-Chium is the name of the eastern pass, 16,300 feet, Anghir-dakchin (A—k's



"Marco Polo." Their outward track lay by the eastern pass, their return journey by the western. They were now fairly on the plateau of Northern Tibet, and for the remainder of their journey in that country never descended below 14,000 feet. Here their difficulties were great. The guide refused to show them the way, or probably did not know it; the weather turned cold, with continued snowfalls, though it was only the middle of October, and their camels and horses could find nothing to eat; the *argols* became damp and refused to burn, and there was every prospect of an early winter. It required some resolution on the part of the leader of the expedition and his men to persevere. Difficulties, however, could not daunt them, and they all as one man said, "Come what may, we will go forward."

They still advanced in the same south-westerly direction towards the Koko-shili or Blue range,\* visible as a long wall on the horizon. After two days more of bad weather, the sun shone out brilliantly, but the glare from the snow caused ophthalmia to men as well as animals, and one of their sheep became totally blind. But there were symptoms of a change for the better, and the severe cold they had so recently experienced had been exceptional. After they had extricated themselves—not without difficulty, for they had no guide—from the Koko-shili Mountains, the weather became warmer, and the snow melted off the southern slopes.

Before reaching the next parallel range, the Dumbure,† they crossed a plain 15,000 feet above the sea, studded with lakelets fed by springs, where the sandy soil supports a scanty vegetation consisting of mingled alpine and steppe forms. Their next march was most difficult, for they had not only to cross the main axis of the Dumbure and two of its ramifications, but to traverse intermediate tracts of half-frozen marsh land. Having at last extricated themselves from these mountains, they arrived on the banks of the Mur-ussu. Here they halted for two days, before ascending its valley, by a well-worn track taken by the Lhása pilgrims. But this disappeared altogether after about twenty miles, and they had again to resort to scouting in order to find the road. Fortunately, they were by this time so experienced in local land-

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Anghirtákshia) that on the west. A—k also gives this name Anghir-takshia to a long range lying east and west, probably identical with Prejevalsky's "Marco Polo" range. He derives this name from a medicinal herb used for burning as incense. Cf. 'Report on the Explorations in Great Tibet and Mongolia,' p. 42.

\* The Koko-shili is a westerly continuation of the Baian-kara-ula. It stretches from the point at which the expedition crossed it for 400 miles due west. Its height above the plain is only between 1000 and 2000 feet, but the plain itself is 16,000 feet above sea-level. A—k's "Khokhosili," at the point where he crossed it, in 35° 10' 37" N. lat. The height of the pass, as measured by boiling water, was 13,430 feet. Cf. Report, p. 41. His "Khokhosili" lies to the south of the Ma-chu river (Prejevalsky's Napchitai-ulan-murren).

† A—k's "Dung-bura."

marks, that they had no difficulty in hitting off the right line. But the severe marching had told on the camels and horses; four of the former and one of the latter were disabled, and it was necessary to reduce the number of loads. A cache was therefore made in a natural valley in the mountains, where some of their heavier baggage, including the skins of animals, was left to be called for on their return. This was satisfactorily accomplished, and the expedition again pushed forward. But toils and hardships began to tell on all the men, who not only felt the usual effects of travel at great heights, loss of strength, giddiness, shortness of breath, sometimes palpitations of the heart and general lassitude, but one or other of the Cossacks was always ailing with cold or headache. Happening upon the tracks of a caravan that had recently passed and trodden down the snow, they were able to cross the Tang-la Plateau, which lay like a mighty swelling in front of them, crowned in the far distance with a long chain of snowy summits. But first they forded the Mur-ussu, the water only two and a half feet deep, being at its lowest, and the ice, though strong enough to bear a man, would not support an animal.

The pass over the Tang-la is 16,700 feet of absolute height, yet only 2100 feet above the valley of the Mur-ussu, and 2000 feet above that of the Sang-chu flowing at the foot of its southern slope. Yet the ascent of this plateau from the north is 80 miles long and the descent 50 miles.\* Towards the west of the caravan road, the Tang-la is still loftier, and its snowy peaks † stand closer together than towards the east.

In this direction too, i. e. towards the east, the range runs, according to hearsay reports, for 130 miles as a snowy ridge, and possibly the Tang-la itself, together with its accompanying plateau, continue eastwards, though on a smaller scale, to the Kin-sha-kiang, or Upper Yang-tse-kiang, where this river has a due southerly course. And if such be the case, the Tang-la range, like the Baian-kara-ula, divides the sources of the greatest rivers of Eastern Asia, the Yang-tse-kiang on one side, the Camboja and Salwin on the other.‡

\* Equal to a rise of one foot in 26 miles on the north, and one foot in 40 miles on the south. The Tang-la might, therefore, be easily crossed by a railroad.

† The snowy peaks seen by Prejevalsky on the Tang-la were at least 19,000 to 20,000 feet above the sea, and the snow-line is at 17,000 feet on the northern side and about 17,500 feet on the southern side.

‡ All the rivers of the northern slope of the Tang-la certainly join the Mur-ussu, which has its source here. From the southern slope of the western Tang-la, according to the information collected by Prejevalsky, flows the river Zacha-Sanpo falling into Lake Mitik-jansu (probably the Chargut-cho of Nain Singh). This lake is also the reservoir of other streams, which are themselves fed by lakes lying south and west along the northern slope of the Northern Himalya range. Lake Mityk-jansu or Chargut-cho, sends its surplus drainage to the east by a river entering Lake Amdo-tonak, and from this again issues another river called Nap-chu by Tibetans and Kara-ussu by Mongols. This river, known in its lower course as the Lu-tse-kiang (Tibetan Nge-kio) and other names, appears in Indo-China as the Salwin.

In this way, if there really be this connection between Lake Mityk-jansu and the

The inhabitants of these plateaux were Yegrais,\* the first seen since the expedition left Tsaidam, and Goliki,† two Tangutan tribes known under the general name of *Sok-pa*. The Yegrais nomadise in the Tang-la, moving from place to place according to the supply of food for their cattle; the camping grounds of the Goliki are on the Blue river, much below its confluence with the Napchitai-ulan-murren. Prejevalsky saw nothing of the Goliki, but came across the Yegrais while ascending the Tang-la, and afterwards fought them when they attempted to close the pass to his caravan. Their appearance closely resembles that of all the tribes of Northern Tibet, though there are probably slight differences between them, but not enough to be distinguished by a passing traveller. Their long, matted, black locks fall on their shoulders, their whiskers and beard are scanty, their face and head angular, their complexion dark, their dress dirty. They carry a sword thrust into their belt, a gun of the old matchlock type over their shoulders, a lance in their hands, and are always on horseback. They are spoilt by the submissiveness of the Mongol pilgrims whom they plunder as well as every caravan coming from and going to Lhása. They live in black tents made of the hair of the yak. Their occupations, besides those of a predatory kind, are hunting and cattle-breeding. Their domesticated animals are the yak, sheep, and a few horses. They number 400 tents or 2000 souls of both sexes. After his engagement with the Yegrais Prejevalsky came to some warm springs on the south side of the Tang-la. One of these, surrounded by silicious crags at a height of 15,600 feet above the sea, had a temperature of 90° Fahr.‡ Within the rock a dull sound is heard continually and the noise made by the water is like the blows of a hammer; by their side is a funnel in the rock sending forth suffocating steam.

On the fifth day of their descent from the Tang-la the expedition left its plateau and arrived at [the Sang-chu river (14,700 feet),§ where

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more westerly lakes as shown in Nain Singh's route map (see Journal R.G.S., vol. xlvii. pp. 87 and 110), the sources of the Salwin [or perhaps the Irawadi] should be placed on the tableland of Northern Tibet in 83½° E. long. and about 32½° N. lat., or a little east of the meridian of the sources of the Yaru-Sanpo, i. e. Upper Brahmaputra. If this should prove to be the case, both these rivers, the Salwin [? Irawadi] for an immense extent of their upper course along the plateau of Tibet, flow from west to east parallel with, and at no great distance from, one another, parted, however, by the mighty Northern Himálya chain.

\* Cf. 'Mongolia,' vol. ii. p. 151.

† The Goliki are probably the *Kotos* of Abbé Huc.

‡ The lower springs are nine miles from the upper one on the banks and in the bed of a brook, the Tang-chu, which also receives the drainage of the upper spring. Two of them throw up fountains 3 and 4 feet high, the others issue in small streams with a hissing or bubbling sound. The maximum temperature observed at the lower springs was 122° Fahr.

§ The Sang-chu flows into the Tang-chu, called by the Mongols, Bagyn-gol, and this latter has a south-easterly course into the Nap-chu or Kara-ussu. The valley of

they met with the first encampments of Tibetans, whose black tents were scattered about the valley, among herds of yak and flocks of sheep.

On their second march from this valley they learnt that the Tibetans had decided not to allow them to pass, and that great excitement prevailed at Lhása, where reports were circulated that the Russians were coming to steal the Tále Lama and destroy their faith. Pickets had been stationed from the village of Napchu on the frontier to the pass over the Tang-la, but these had been withdrawn on the approach of winter, as it was thought that the expedition had been deferred. Now, on its sudden appearance, soldiers and militia were at once assembled on the frontier, and the inhabitants were forbidden on pain of death to sell the Russians anything or enter into relations with them. Two officials with an escort of ten soldiers were sent from Napchu to inquire who they were, in order that the authorities at Lhása might be at once informed on all points.

Having advanced to within a short distance of the village of Napchu \* and met the Tibetan officials, Prejevalsky halted, and here he was obliged to wait until an answer had been received from Lhása. On the sixteenth day the answer came, positively refusing to allow them to proceed. And thus they were compelled to return when they were within 170 miles of the capital of Tibet.

I must now say something of Prejevalsky's fourth journey to Tibet, 1883-1885. Having left St. Petersburg in August 1883, he travelled to Kiachta, where he finally equipped his party, numbering altogether twenty men, well practised in the use of firearms.

From Urga he again crossed the widest part of the Gobi to Ala-shan, and marched thence to the Chinese city of Si-ning. Early in May 1884 he arrived at the foot of the Burhan-Buddha, having left a depôt in Eastern Tsaidam of all his superfluous baggage and spare camels under the charge of seven Cossacks, while he and his companions, a party of fourteen, started to explore the sources of the Hoang-ho or Yellow river. After about 70 miles of marching over a barren plateau, 14,000 to 15,000 feet high, they reached their goal. The Hoang-ho is formed by two streams flowing from the south and west out of mountains scattered

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the Sang-chu is bordered on the south by a low ridge, the Jugulun, which forms the northern margin of another upland extending some distance to the south, probably to the Samtyn-Kansyr (Sanden-Khansa of A—k's map), which stands on the south bank of the Nap-chu. This snow chain (i. e. Samtyn-Kansyr) is, in Prejevalsky's opinion, the easternmost spur of the Nien-chen-tang-la, and therefore of the Northern Hímálya. Samtyn-Khansyr divides the waters flowing down its northern slope to the Kara-ussu and down its southern slope to the Yaru-Sangpo, i. e. Upper Brahmaputra.

\* Hue's Napchu, A—k's Nag-chu, situate on the river of the same name. Abbé Hue was fifteen days going from Napchu to Lhása.

over a wide marshy plain (40 miles long by 12 wide), known under the name of Odon-tala (thousand springs). Here the Hoang-ho appears as a very modest river, divided into two or three channels, each from 70 to 90 feet wide and two feet deep at the fords. After flowing in this way for 12 miles it passes through two great lakes, the Jarin and the Orin, 13,500 feet above the sea; then it makes a sharp elbow to avoid the snowy Amneh-machin range, bursts through the chains of the Kuen-lún, and hurries on to China Proper.

From the sources of the Hoang-ho, Prejevalsky continued southwards to the Blue river, the Di-chu of the Tangutans, passing over a hilly plain, for the most part covered with tussocky marshes overgrown with stiff wiry grass. He crossed the waterparting between the two great rivers of China at a height of 14,500 feet, and on entering the basin of the Di-chu came to a very different country, alpine in its character, but without forests, possessing, however, a rich and varied herbaceous flora. Here he met with a tribe of nomads called *Kam*,\* who received him in an unfriendly, though not actually hostile way. After 67 miles of difficult marching, he reached the banks of the Blue river, flowing at a height of 12,700 feet, hemmed in by mountains, with a muddy, rapid stream of great depth. Finding it impossible to cross with his camels, he retraced his steps to the lakes at the sources of the Hoang-ho, which he explored and named.† Near this he was attacked by a band of 300 mounted Tangutan robbers, but succeeded in dispersing them, and made good his retreat down to Tsaidam, which in spite of its unattractive appearance, seemed a well-favoured land after his experiences in Northern Tibet. Hence he marched to the west along a wide valley stretching for 150 miles between the Chamen-tagh on the north and the Kuen-lún on the south, and rising gradually from 9000 feet at Gaz to 14,000 feet at its western extremity, where it is closed by a range, connecting the Kuen-lún with the Altyn-tagh. This valley is situate in the direction of the prevailing westerly winds, and is constantly swept by them. Hence Prejevalsky gave it the appropriate name of "Valley of the Winds." The descent from it to Cherchen in the Tarim basin is very easy, so that in all probability it was the highway in ancient times between Khoten and China. The Kuen-lún was found to culminate in the snowy group of Jing-ri, in meridian 90°, with 20,000 feet of absolute elevation, forming the centre of chains to the east and west, to which Prejevalsky gave the following names:—"Marco Polo," "Columbus," "Mosco," with its peak "Kremlin," 20,000 feet, and "Conjectural," with its rounded summit "Shapka Monomakh" (Cap of

\* *Kam*, or *Kham*, is the name of the province of Eastern Tibet. Nain Singh came across a predatory tribe named "Khampa," who had originally come from the country north-east of Lhása. Cf. *Journal R.G.S.*, vol. xlvii. pp. 95 *seqq.*, 102.

† "Russian" and "Expedition" lake, but see *ante*, where the native names are taken from his own map.

Monomachus). Between the Mosco and Conjectural ranges lies an excessively salt lake, free from ice in the coldest weather, and named by Prejevalsky "The Unfrozen," having a circumference of about 36 miles, with a width of only seven.

Having returned to his depôt at Gaz, Prejevalsky started for Lob-nor, distant 168 miles, across an absolutely unexplored plateau. In revisiting Lob-nor, he verified his previous observations, clearing up doubts expressed by geographers as to whether the waterspread seen by him were the true Lob-nor or only an expansion of the Tarim before reaching its final discharge. He concluded that Lob-nor is a reedy lake of no great depth surrounded by flat shores, the haunt of prodigious numbers of waterfowl, and inhabited by a few hundred human beings, whose habits, tenements, and mode of life resemble those of the primitive lake dwellers.

Prejevalsky's farther journey lay along the southern border of Eastern Turkistan. He visited the oases of Cherchen, Kiria, Nia, and Khoten, heard of the buried cities which flourished 3000 years ago and are now almost obliterated by the moving sands, saw more snowy peaks, and made a short incursion into the Kuen-lún, but being opposed by the Chinese, could not proceed to any great distance.

#### NOTE.

With reference to the last part of his journey General Prejevalsky has been good enough to communicate the following particulars to me by letter.

##### 1. *Changes in existing maps.*

(a) The Khoten river makes no bend to the west but has a nearly meridional course from south to north (our itinerary from Khoten to the confluence of the Khoten-daria with the Tarim measures 327 miles).

(b) There is no such lake as Yashil-kul, nor any lakes along the course of the Khoten-daria.

(c) Thirty miles below the fork of the Kara-kash and Khoten rivers, a low, narrow, and absolutely barren ridge, having an apparent elevation of only 500 feet, stretches from fort Maral-bashi in this direction (i. e. towards the Khoten-daria).

##### 2. *More Details.*

Forty-three miles below Khoten, following the Khoten-daria, otherwise known as the Yurun-kaah, lies the oasis of Tavek-kéhl, inhabited by about 500 families, not marked on any map. According to native information the population of the Khoten oasis (including Khoten, Kara-kash and Sam-pul) numbers 600,000.

In September the Khoten river is an insignificant stream, 70 to 100 feet wide and 6 inches to a foot in depth. After a devious course of 17 miles below Mazar-tagh ridge it dries up, only leaving pools here and there along its sandy bed. In summer, however, there is an abundance of water and the river then reaches the Tarim.

On either side of the Khoten river are drift sands the whole way from Khoten to the Tarim. The valley of the former river is about three miles wide and indistinctly defined; on the lower river there are no inhabitants.

The flora and fauna here are extremely poor; Khoten has an elevation of 4100 feet, and the confluence of the Khoten river with the Tarim 2800 feet, 12 miles below the junction of the Yarkand and Aksu daris. Here the Tarim has a width of about 200 yards at low water, and a depth of not less than five feet. The whole of the Tarim is navigable for small river steamers from the confluence of its upper waters to Lob-nor. The first inhabited parts of the Aksu oasis occur on the left bank of its river, 18 miles from the ford across the Tarim coming from Khoten. And it is exactly 66 miles farther to the town of Aksu. The Aksu oasis has a population of 56,000 families, according to native information, and is the most fertile part of Kashgaria.

After the paper,

Mr. H. H. HOWORTH, M.P., said he had spent many years in wandering over the terribly dry and arid history of the districts described in the paper. It was early in the thirteenth century when Jinghis Khan, the greatest of all Asiatic conquerors, and probably the greatest man the Asiatic world ever produced, set out to conquer the country described in the paper, then known as Tangut, and spent four summers in laying it waste. His victims were numbered by millions, and it is difficult to understand how it could have been so populous, unless its physical conditions have greatly altered. Jinghis Khan made himself master of all the Turkish tribes which then occupied Central Asia, and then made his famous expedition to the west, making the valley of the Black Irtish, so graphically described in the paper, the rendezvous of his troops. At the other end of the district described in the paper is the great bend of the Yellow river enclosing the country of the Mongol tribe called Ortus or Ordu, so called from their having been the guards and guardians of the Ordu, or special encampment and household of Jinghis Khan. On his death they were entrusted with the care of his tent and his body. Only three or four years ago the great French naturalist Père David made an expedition into their country, and found that they were in possession of a silver box in which they said they had the bones of Jinghis Khan. When Jinghis Khan had conquered the whole of Asia he performed one of the greatest feats in connection with the movement of human races that was ever known: he shifted the whole of the tribes of Central Asia very far to the west. When he died he left the Mongols in charge of the district still called Mongolia, which had previously been largely occupied by Turks, and it was very singular that one of these Turkish tribes with which he was specially in contact, called Kirais, was still found north of the Thian Shan. This was the same tribe that was ruled by Prester John. Some of the Kirais were transplanted into the Usbeg country, at the same time the Turkish people who occupied the whole district south of the Thian Shan was pushed very much to the south, so that along the borders of Tibet there were still the descendants of the Buddhist Turks who lived in that district when the Chinese pilgrims passed that way, and who were mentioned by Marco Polo. The Tibetans call them Horpa. When in 1368 the Chinese drove the Mongols out of China a certain number took refuge in the valleys of Tsaidam, &c. Another migration took place in the beginning of the seventeenth century when a large number of the Kalmuks were induced to migrate down to Lob-nor. In the last century, when the great struggle took place between the civil and religious powers in Tibet, the Dalai Lama was so hard pressed that he sent for these Kalmuks to help him, and it was with their assistance that he drove out the civil authorities. He had been much struck with one of the pictures shown to the meeting of a most desolate part of the desert which was known among the Mongols in the fourteenth century as the "Field of White Bones," which was an

extremely expressive description of the terrible waste. With regard to the other end of the district, to which Prejevalsky had referred, he might mention that in the Swiss lakes and also in some of the early megalithic remains in Brittany were found some little axes made of jade, and German geologists were convinced that they could only have come from the valley of Khoten. No jade was found in Switzerland, and if it were, there was nothing there to triturate and grind it down so as to make polished axes with. It was exceedingly likely that these small jade axes were brought from Central Asia. All through medieval times those small axes were in use among the Turkish tribes.

The CHAIRMAN (General R. Strachey) said he was probably one of the very few persons present who had actually been in Tibet, though he had not been very far into it. It was now thirty years since he was there, but he saw enough of it to get a more vivid idea of the nature of the country than it was possible to obtain without an actual visit to it. He looked forward with great interest to the full narration by General Prejevalsky of his latest journeys in the northern part of Tibet. The account that Mr. Morgan had given, combined with what had been learned from the native Indian explorers who went into the country under the Indian Survey Department, interested him greatly, and he was quite satisfied that what may be regarded as Tibet proper certainly extended as far as the great range, which was marked on the map as the Kuen-lún, and where travellers from the north first came upon very high mountains and an arid country. The region to the north of this range appeared to be altogether different in its character from Tibet proper. It had been visited by General Prejevalsky and was described by A—k, who was there for several months, and his description gave a fair impression of what the country was like. The people cultivated wheat, and A—k found there what he was pleased to call a forest, but what was in fact a thicket formed of bushes six or seven feet high, and that was altogether in excess of any arboreous vegetation to be found in Tibet proper. To some extent the climate also seemed to have changed. In Tibet there were commonly strong westerly winds, but A—k's account was that the prevailing winds of the district to the north of the Kuen-lún were easterly or north-easterly. The country, too, was generally speaking sandy with rounded hills, and without the steep rocky mountains found in Tibet. Although Mr. Morgan had spoken of luxuriant vegetation, he ventured to think it was very different from what was considered luxuriant vegetation in any other part of the world. Enormous crowds of animal life had been mentioned, but he entirely disbelieved anything of the sort. When a traveller was wandering over a stony desert the appearance of a comparatively few wild animals would no doubt engage attention, but he altogether doubted that there was any large amount of animal life there. Mr. Morgan had referred to the province of Kansu, and stated that there, there was really fine vegetation. No doubt the influence of the rain-bearing winds from the Pacific was felt there; but Tibet proper, so far as it had any rain or moisture at all, was under the influence of the winds that came up from the Bay of Bengal. Mr. Howorth's remarks regarding the transfer of the population in the time of Jenghis Khan were extremely interesting, but he doubted if any such change of climate had taken place since Jenghis Khan made his expeditions, as Mr. Howorth appeared to suggest. So far as India was concerned he did not think there had been any considerable change of climate within the historical period; but he quite admitted that there was evidence of great changes since the surface had taken its present form. He remembered Sir Henry Rawlinson and his brother Canon Rawlinson giving them most interesting statements regarding the changes of climate that must have taken place in the country about the lower part of the Oxus; but he did not think that similar changes had taken place in northern India. Whether they had occurred in the Mongolian plain was a matter



well worthy of investigation. It would be interesting to the Fellows present to be informed that at the present time an English traveller was still in those countries. Mr. Carey, a gentleman belonging to the Indian Civil Service, had been there for the last two years. He left India in May 1885, struck northward, and descended into the plains of Turkistan near Khoten. His plan was successfully carried out during August and September 1885, and resulted in more than 300 miles of country being traversed which had never before been visited by a European of any nationality. The altitudes on this section of the journey were always very great, the track being described as running usually at about 14,000 feet above the sea, while one, at least, of the passes crossed was calculated to reach 19,000 feet. In descending from the Tibetan highlands towards Kiria, an extremely difficult defile had to be passed, where five days were taken up in making good a distance of 28 miles. A short stay was made at Kiria, and a somewhat longer one at Khoten, where General Prejevalsky's party was camped on Mr. Carey's arrival. The two explorers, however, did not meet, the former being then just on the point of starting for Aksu and Russian territory, while the latter had to fit himself out with a new caravan of camels for crossing the desert of Kuchar. From Kuchar he made a fresh start, when the Tarim was followed down to a point where it turns southward towards Lake Lob. Thus the whole length of the Tarim had been explored. The country along its course was described as flat and reedy, and the people extremely poor and miserable; at the villages near Lob, fodder was so deficient that Mr. Carey had to pitch his standing camp for the latter part of the winter (about February to April) at a village called Chaklik, some distance south of the lake, and close to the foot of the great range of mountains which forms the northern scarp of the Tibetan highlands. This long halt was utilised in preparing for a journey southward into Tibet as soon as the season should permit; and it happened eventually that a new departure was made on the 30th April, 1886. The last that was heard of Mr. Carey appeared to have been in May last year, and it was to be hoped that before very long some more intelligence would be received from him. They were indebted to Mr. Ney Elias for this account of Mr. Carey's proceedings, and it was to be regretted that Mr. Elias was unable to be present at the meeting to throw some further light upon that country of which he probably knew more than any other Englishman.

Mr. E. DELMAR MORGAN, in reply, said that Prejevalsky had dealt at some length with the question of the violent winds, which he attributed partly to local causes. Prejevalsky gave full details of the extraordinary numbers of wild animals, stating that he saw them not only on his last but also on his previous journey. It was owing to the presence of these vast numbers of animals that travellers were able to cross the high plateaux of Northern Tibet, their dung being the only fuel to be found there, and he believed that A—k also referred to the subject. When winter commenced with its usual severity large herds were observed by the traveller migrating to lower and warmer regions in the south-east. The conditions of life in Northern Tibet are, moreover, exceptionally favourable to them: 1st, their immunity from persecution by man; 2nd, the unlimited range over which they are distributed; and lastly, the absence at these high altitudes of the insects that torment them in the plains below. In summer there was sufficient humidity to support such scanty vegetation as Tibet afforded; at other seasons it was quite dry.

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*Potanin's Journey in North-western China and Eastern Tibet.*

WE are indebted to M. Veniukoff for the following abstract\* of M. Potanin's lecture, delivered before the East Siberian Section of the Russian Geographical Society, on his travels in China, at Irkutsk, in December 1886.

Potanin's expedition started from Peking in 1884, with the intention of crossing the desert of Ordos (Ortus) to Lang-chau, capital of Kan-suh, and penetrating thence as far south as possible. The party started on the 13th May for Kuku-khoto (or Kwei-hwa-cheng), passing over the triple chain of mountains dividing the plain of Peking from that on which Kuku-khoto is situate. The southernmost of these three ridges bears the Chinese name of U-tai-shan, "the mountain of five sacrificial altars," after the group of five peaks, the highest of which is 10,000 feet above the sea, a height not exceeded by any mountain in Northern China. At its southern foot lies a valley remarkable for its Buddhist monasteries and shrines, one of which, "Shing-tung-tze," is entirely made of brass, whence its name.

Kuku-khoto is the depôt for the Mongolian trade with China. It contains 200 tea-shops, five theatres, 15 temples, and six Mongol monasteries. Among its sights are the Buddhist convent of Utassa with its five pinnacles and bas-reliefs, the convent of Fing-sung-si, and a temple containing a statue erected in honour of the Chinese general Pai-jin-jung, who avenged an insult offered to the Emperor of China.

Leaving Kuku-khoto the expedition crossed the Yellow river and entered the sand-wastes of Ordos.† The Mongols of Ordos are ranged under seven‡ *koshungs* or banners under seven princes, the chief authority being vested in one who has the longest family tree and bears the title of "Wang." Their holiest place is a collection of felt tents called "Edjen-joro," reputed to contain the bones of Jenghiz Khan. These sacred relics are entrusted to the care of a caste of Darhats numbering some fifty families. Every summer, on the twenty-first day of the sixth moon, sacrifices are offered up in his honour, when numbers of people congregate to join in the celebration, such gatherings being called *táilgan*.

On the southern border of Ordos are the ruins of Borobalgassun, said to date from Jenghiz Khan's time. From this place the expedition went to Lang-chau, in the valley of the Yellow river, surrounded by fruit gardens which continue along the river for about 40 miles. To the south lie hills covered with thick deposits of loess, and the river cuts its way through these, forming a narrow gorge. Many of the

\* Translated by Mr. E. D. Morgan.

† Fully described by Prejevalsky in his work 'Mongolia,' &c., vol. i. pp. 180-195 *et passim*.

‡ Prejevalsky says *six*, and gives their names. Cf. 'Mongolia,' &c., vol. i. p. 144.

inhabitants live in artificially constructed caves, probably since the Mahomedan insurrection which destroyed so many villages and towns, and laid waste the country.

M. Potanin, who was accompanied by his wife, visited the territory of the Salars,\* a Turkish tribe, which has preserved its written and spoken language almost unaltered. This tribe inhabits twenty-four villages near Siun-hwa-ting, on the south bank of the Yellow river. Another interesting people visited by the travellers were the Amdos Mongols, identical with the "Taldi" or "Daldes" of Prejevalsky,† scattered over a tract lying between the meridians of Lang-chau and Suh-chau, and partly engaged in agriculture and horticulture. Their language is a mixture of Mongolian, Turkish, and Chinese words; their houses, food, and dress are Chinese, while the costume of their women, especially their head-dress, is peculiar. The Amdos are governed by elders, whose office is hereditary, and who trace their descent from a half historical, half legendary prince, Li-ching-wang, whose tomb is shown on the bank of the Sining-gol near Shang-dang. Some of the Amdos profess Islam, others retain Lamaism.

Potanin and his travelling companion Skassi had an audience of the governor of Si-ning, who gave them a free pass for Eastern Tibet. During a part of their journey they had an escort of twenty Tangutan or Tibetan soldiers officered by a monk.

From Si-ning the travellers set out for Ming-chau, passed over so-called *tangs* or high plateaux (about 10,000 feet), thickly clothed with herbaceous vegetation. To the west of their road rose two snowy groups of mountains—Amni ʒ-jakar and Amni-tungling. The town of Gui-dui on the Yellow river, the fortress of Bóunan, and the monasteries of Labrang and Joni were successively visited. At Labrang they were received with much ceremony by the chief Lama or *gegen*, who, besides his spiritual functions, exercised temporal sway over the district and had a military force at his command. Joni is the residence of a Tangutan prince named Joni-bombu.

From Ming-chau the expedition turned southward, but were prevented from penetrating farther than Sung-pang-ting, their supplies having come to an end. The country between Ming-chau and Sung-pang-ting is described as a labyrinth of steep ranges of mountains and deep valleys, where the views, even from the summits of the passes, are too limited to enable the observer to form any clear idea of the general direction of the ridges and valleys. The scenery, however, offers many points of interest. River torrents, cascades, and natural terraces lend a charming variety to the landscape, while the roads, only passable for pack animals, here clinging to the rocky steeps, or cut into the rock itself, there

\* Cf. 'Mongolia,' &c., vol. ii. p. 149.

† Cf. 'Mongolia,' &c., vol. ii. pp. 69 *seq.* and 299 *seq.*

‡ Or "Amneh," i. e. "ancestors," held sacred by the Tangutans: cf. 'Mongolia,' &c., vol. ii. p. 76.

supported on wooden props, or carried across the stream on rickety suspension bridges which rock to and fro under the laden mule, remind the traveller of the wild alpine country he has entered. Rains too were frequent, for the Chinese monsoons deposit their moisture on these ranges and call into existence a luxuriant vegetation. The hills from top to bottom were densely forested with conifers in the upper zone, deciduous trees and bushes on the lower slopes. Here were observed three kinds of maple, the lime, the hazel, a prickly-leaved oak like the ilex with fruit branches like the strings of copper coins current in the country, whence the Chinese call it the "money-tree." Here too amidst the undergrowth were the tall stems of the bamboo and several sub-tropical ferns. Maize is cultivated in the deeper valleys, and round the villages a sheaf-like variety of bamboo, *Diospyros Kaki*,\* yielding a fruit, the *si-tai*; the soap-tree, the varnish-tree, palms (*Chamserops*), and bananas. The deciduous woods of the upper belts at a height of 9000 feet were fringed with bushes of rhododendron of two or three kinds, one of arborescent growth, with a trunk eight inches in diameter. In the alpine zone above the limit of the forests, four kinds of poppy were observed, one yellow (*Calthartia integrifolia*), two blue, and one red.

Sung-pang is an important trade centre, and lies on the road taken by the tea caravans, passing from Szechuen to Northern Tibet. This is one of the three main roads to Lhása followed by the pilgrims from China and Mongolia. The environs of Sung-pang are famous for their monasteries or "bonbo," the objects of veneration to the Tangutan population. Thirteen miles north-east of Sung-pang is the snowy Siue-shan, at whose foot flows a rivulet, the Kserntso, "golden lake," really a succession of small lakes divided by thin walls of tufa, one above the other.

From Sung-pang the expedition returned to Lang-chau viâ Lung-an-fu, Ven-hsien, Tse-chau, Hung-chang-fu, and Di-dao. They passed the winter at the monastery of Kumbum, south of Si-ning, where they saw the relics of the mother of Tsonkaba, the great Buddhist reformer, and the miraculous tree described by Abbé Huc.

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### *A Journey in Northern and Eastern Manchuria.*

THE 'Proceedings' for December last † contained an account of a journey undertaken by Messrs. James, Younghusband, and Fulford to the Pei-shan Mountain and the sources of the Sungari. Mr. James, one of the party, informs us that the three travellers have since continued their explorations in Northern and Eastern Manchuria, and visited parts

\* A species of date plum, sometimes called the "Keg-fig"; the French sweetmeats *figues-coques* are made from its fruit.

† 'Proceedings R.G.S.,' 1886, p. 779.

of the country which have not been previously described. After a detention of three weeks at Kirin, caused by the prolonged rains, they started on the 3rd September for Tsitsihar, the capital of North Manchuria. Passing through Petunia, they crossed the Sungari at its junction with the Nonni. The rivers were in flood, and the joint stream was 10 miles across. The prairies also beyond were so much under water that frequent diversions had to be made for the high road described by the Archimandrite Palladius.\* Tsitsihar was reached on the 20th September, and then the party turned to the south-east, passing for 175 miles over a high undulating and perfectly uncultivated steppe. Large flocks of geese, of which there were three varieties, the large bustard, and a species of black crane, too shy for a specimen to be secured, were common. The only other thing noticeable here was a rude but efficient system of manufacturing soda and a salt, called *mien-tzu*. The earth containing the salt is gathered from the edges of brackish lakes, mixed in large tanks with water, and then the impregnated liquid is drawn off and boiled in iron cauldrons, at the bottom of which the soda collects in a solid cup-shaped mass, 9 to 12 inches thick. The other salt is ladled out liquid, and pressed into bricks. The process is identical with that used for the production of saltpetre in Sind, and borax in Ladakh.

Near the edge of the steppe the flourishing town of Hulan, on the banks of the Hulan river, 8 or 10 miles from the Sungari was reached. The modern town of Pe-tun-lin-tzu, 55 miles to the north-east was the next visited, and then Pa-yen-shu-shu, 55 miles to the south-east of Pe-tun-lin-tzu. Each of these towns contains upwards of 25,000 inhabitants, and increases in size rapidly, as the country around, which is very fertile, is being widely cultivated, and colonists arrive every winter in large numbers from the south.

The whole of Manchuria is noted for brigands, but this neighbourhood literally swarms with them. One evening at dusk the party met with a party of five, armed with foreign guns. But it is considered unlucky to meddle with "foreign devils," particularly as these, for purposes of sport, always carried their guns ready, so the party was not molested. The banditti make their hiding-places in the hills to the north, and the officials are so corrupt and incompetent, and the Manchu soldiers are so cowardly, that in spite of constant and wholesale executions the pest still flourished. Anyone who makes a little money is liable to have his house plundered, or to be kidnapped and taken off to the hills, and then, if an exorbitant ransom is not paid, his head is sent back without fail to his friends, *pour encourager les autres*. Not much more than a year ago a large body attacked Pe-tun-lin-tzu, with the connivance of the local military Mandarin, and another flourishing village, called Hsian-shih-ho, was looted twice in the same year.

\* 'Journal R.G.S.,' vol. xlii. p. 142.

The Solon Tartars also, who live by hunting in the hills, are wild savages. While the party was at Hulan, four Chinese arrived, the last of a party of thirteen, who had gone to the hills to collect medicinal roots, and were massacred for the sake of their carts and baggage. No attempt at retribution would, it was said, be made by the officials.

The principal places of business in the tract are the distilleries, as, although the grain is very cheap, communications are so bad, that even when floods make almost a famine in Liao-tung, as is often the case, it does not pay to export it south, except in the form of liquor. These distilleries, and indeed all important places of business, whether inside towns or out, are strongly fortified with lofty walls, flanking towers, iron-plated gates, and sometimes even with small cannon; convoys of carts travel around with gingalls, matchlocks, and spears, unless they have first paid blackmail to the brigands, and even foot-passengers carry weapons of some kind. Three French missionaries reside in this out-of-the-way region. They have discovered that excellent claret and brandy may be made out of the wild grapes of the country.

From Pa-yen-shu-shu the road followed the left bank of the Sungari as far as San-seng, below which town the Chinese have built a fort, armed with Krupp guns, to guard the approach up the river. From San-seng, which is not a very flourishing place, the party turned south, up the valley of the Hurka or Mutan-chiang, along a tract constructed a few years back, and said to be passable for carts. It proved barely so. It crosses an everlasting series of very steep ridges running down to the edge of the right bank, with difficult swamps between, and though the worst parts had been roughly bridged or causewayed, so much is it out of repair that until the frost came it was very difficult to get the carts through, and the gradients of the hills were so severe that many accidents happened.

Along the Hurka and its tributaries, the capture was seen of entire shoals of salmon coming up to spawn, the fish being intercepted by weirs of wickerwork, and then pulled out of the water as fast as the gaff could be thrust into them, so that hundreds were collected at a time. San-seng was left on the 16th October, and after passing a cantonment called Yeh-ho, which guards the road leading to Lake Hinka and the settlement of Nikolak, Ninguta was reached on the 26th. This neighbourhood is very well cultivated. The road further south was found not to be so difficult, and Hunchun, a large cantonment in the south-east corner of Manchuria, was made on the 6th November. From there the travellers visited the Russian outpost on the frontier, as well as the station of Novaviyesk, in Possiet Harbour, meeting with a most cordial reception from the colonel in command and the other Russian officers. From San-seng onwards the country swarmed with pheasants in incredible numbers, and black-game was also met with in large flocks, very tame, packing together in willow trees, like hens in a barn. The

mountain deer or *fau-tzu* was also common. From Hunchun the party divided. One of the number went with a convoy of mules by a short cut across the hills to Kirin. This route follows a river variously called the *We-tzu-ho*, the *Yang-tzu-kang-ho*, and other names, from places on its banks, and it falls into the *Kaya-ho* shortly before the river joins the *Tumen*. The mule-track, which is also used by carts in winter, continues along this stream up to its very source, and then crosses the watershed between the *Tumen* and *Hurka* valleys by the *Hu-la-pa-ling* pass. It then follows the *Sha-ho*, a tributary of the *Hurka*, crosses the *Hurka* itself at a place called *San-chia-tzu*, not far from *Autun* (which is erroneously shown in the maps on the *Tumen* side of the watershed), and ascends another tributary, the *Chu-erk-tao-ho* as far as *Omoso*, on the Imperial high road from *Ninguta* to *Kirin*. After crossing the *Chang-tsai-ling*, it quits the main road again near a mountain called *La-bu-latzu*, and crosses a further range called *Hai-ching-ling*, south of the *Lau-yeh-ling*, one which the high road passes. *Kirin* was reached by this route on the 24th November, and the rest of the party travelling in *Ninguta* arrived on the 26th. The next place to be visited was the large commercial city of *Kwan-chang-tzu*, containing probably 100,000 inhabitants, and there the party turned south, travelling first to *Mukden* and then to *Yingtzu*, the port of *Newchwang* which they reached on the 20th December, just seven months from the day they started. Fortunately the weather was unusually mild and little snow fell. The greatest cold felt was  $-20^{\circ}$  Réaumur ( $-13^{\circ}$  Fahrenheit), while occasionally north of the *Sungari* it falls to  $-45^{\circ}$  Centigrade ( $-49^{\circ}$  Fahrenheit). Travelling was therefore easy. At *Yingtzu* the party separated. Mr. James went south, traversing the whole of the *Liao-tung* promontory as far as *Lu-shuan-kou* or *Port Arthur*. On the road he visited several interesting Korean remains, and about twenty miles from the port of *Ta-chiang-ho* he ascended to a picturesquely situated cave, near the top of a fine precipitous mountain, inhabited by Buddhist priests, who have built some temples inside. These ancient edifices offer a strong contrast to the forts, great Krupp guns, torpedoes, submarine mines, and other modern appliances for defence with which *Port Arthur* bristles. From there Mr. James passed by a transport to *Chefoo*, and he has since left China for America. Mr. Younghusband and Mr. Fulford took the Imperial high road *viâ Shan-hai-kuan* for *Tientsin*, to finish their vacation in *Peking*. The whole journey has extended over more than 3000 miles. Almost without exception the people were found civil and obliging; but excluding *Liao-tung* and the *Chang-pei-shan* hills, where strong guilds exist, brigandage certainly is the curse of the country; putting on one side the tract north of the *Sungari*, which has already been described. Twice, parties were met on their way to trial and execution; the first traveller was seen on the high road coming from

was sent to the coast for letters was stopped by a band which plundered some carts immediately behind him, and while the party were at Mukden the news arrived of the blockading of upwards of a hundred robbers in a cave on the road to Kirin. The Manchu military-civil administration is certainly effete, and it is time it gave place to Chinese. The Manchu Tartars themselves are fast losing their own language, spoken and written, for Chinese, and the substitution of extremely complicated hieroglyphics for a simple alphabet, forms a case of national retrogression without parallel in modern times. They are demoralised by petting and idleness; for every man belonging, as it would be called in India, to the Imperial caste, and who can draw the bow, receives two taels a month, and land rent-free, in return for a training in the militia twice a year. As the Emperors no longer visit the cradle of their dynasty, it is time a Chinese reformer were sent to the province with power to make a clean sweep of all existing Manchu officials and institutions. The country is extremely rich in gold, silver, iron, coal, furs, silk, and opium, the cultivation of which last has greatly increased, and the drug is now exported to all parts of China. All it requires is good government and security to life and property.

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#### GEOGRAPHICAL NOTES.

**Geography at Oxford.**—We call attention to the announcement made by General Strachey, at the Evening Meeting of the 28th February, to the effect that the Council had been officially informed that the University of Oxford had decided to establish a Readership of Geography for five years. Thus, as General Strachey stated, the aspirations of the Society, as regards Oxford, have been realised.

**Further Explorations of the Tributaries of the Congo by Mr. Grenfell.**—The indefatigable explorer, Mr. George Grenfell, has just added a successful ascent of the great Quango tributary of the Congo to his previous achievements of the like nature. In company with Mr. Bentley, in the Baptist Missionary steamer *Peace*, he succeeded in reaching the Kikunji Falls, the point at which Major von Mechow, descending the Quango from the south, was obliged to turn back in 1880. About six miles above the junction of the Kasai with the Quango they found another large tributary, the Djuma, entering the river from the east, which presented so large a volume of water, that it was a matter of uncertainty which was the larger stream. A little beyond this, the course of the Quango veered round, first S.S.W. and then west; at  $4^{\circ} 30'$  S. lat. it had come back to its usual southerly course, and maintained it for the remainder of the journey. The Kikunji Falls ( $5^{\circ} 8'$  S. lat.) are about three feet high, and though insurmountable to the *Peace*, are said by Mr. Grenfell to be no obstacle to communication



by canoes and small craft.—Mr. Grenfell expects to be in England in May.

**The Gambia and Sierra Leone.**—In a newly-issued Colonial Office Report on the Gambia, by Mr. G. T. Carter, the Acting Administrator, there are some fresh data on the climate of that colony, which tend greatly to modify previously accepted notions, based on imperfect observations. These tend to show that the temperatures hitherto accepted are much too high; the mean temperatures for 1885 were, in January, at 7 A.M.  $68\cdot5^{\circ}$ , and at noon  $73\cdot7^{\circ}$ ; in July, at 7 A.M.  $80^{\circ}$ , and at noon  $82\cdot5^{\circ}$ . There are also in the report a few notes on the ethnology of the colony. A Colonial Office Report on Sierra Leone, with map, contains much information regarding the different districts and tribes of that colony and its vicinity.

**Recent French Expeditions in the interior of Senegal.**—A communication, dated 17th December, 1886, from Senedubu, on the Upper Niger, has been received by the Geographical Society of Paris, which gives some account of the intended operations of the French, under Colonel Gallieni, in that region, which, it is believed, will lead to geographical results of great importance. In consequence of the threatening attitude of the Marabout Mahmadu Lamine, who was encamped in the neighbourhood of Diana, two columns had been formed to proceed against him; one, starting from the confluence of the Faleme and the Senegal, was to march direct upon Diana viâ Senedubu; the other, traversing the district of Bambuk, was to cross the Faleme near the village of Jabusire, and by this circuitous route approach the same objective from the south. One or two officers specially charged with topographical work, were attached to each column. The country to be traversed is not known, and the existing maps are all at fault regarding it. With the view of establishing more amicable relations with Albany Samory to the east, the Uassulu mission had been ordered to visit that sovereign, with instructions to survey all the country along the right bank of the Niger, and returning up the Tankisso, to connect its surveys with those of the other two detachments. Further, Dr. Tautain, the companion of Gallieni on his journey to Segou, and Lieutenant Quiquandou had been charged to explore the Great Beledugu country, and to push beyond Murdia and Segala to the north.

**Dr. Lenz.**—The new number of the 'Mittheilungen' of the Vienna Geographical Society contains the letters from Dr. Lenz, to which we referred in the last number of the 'Proceedings,' and which carry on the narrative of his journey from Kasonge on the Upper Congo to the river Shiré. These letters do not contain much geographical information, and no wonder, for Dr. Lenz had his hands full of trouble. Kasonge is an extremely unhealthy place; his companion Bohndorf was prostrated, and had to be carried nearly the whole way; small-pox broke out among

his caravan, many of his men died, and others had to be left behind, so that he had little leisure or energy left for geographical work. Still the letters contain some interesting information, and doubtless we may look for more in his complete narrative. He tells us that Tippoo Tip went to Zanzibar for the purpose of being invested by the Sultan with authority to act as his representative in the Tanganyika regions. Of course, we know now that this mission was useless, as the Sultan's authority extends only to 10 miles from the coast. Dr. Lenz left Kasonge on June 30th, and traversing the plateau between that and Lake Tanganyika, reached Mr. Hore's station on Kavala Island on August 7th. He found much of the route studded with recently founded Zanzibari villages established by the Arab traders, the natives having been compelled to retreat into the forests and remote mountains. All these villages are surrounded with fields of maize and durra, as well as with maniocas, bananas, and oil-palms; sheep, goats, and fowls are plentiful. On the latter part of the journey, over a plateau 3000 to 4000 feet high, were mountains rising to the same height, mainly composed of granite, with occasional crystalline slates. After being hospitably entertained by Mr. Hore, Dr. Lenz arrived in Ujiji on August 15th. Here, as already stated, he resolved to abandon the attempt to proceed to Emin Pasha, and, at considerable cost, hired a large boat, with which he proceeded to the south end of Lake Tanganyika. He left on September 8th, and took eleven days to reach Niomkolo, on the south shore, having called on the way at Karema, now a Roman Catholic mission station. With reference to the Lukuga river, which Mr. Stanley, in 1878, found had forced its way through obstructions and flowed into the Congo, Dr. Lenz has some interesting remarks. Mr. Hore informed him that the current is now exceedingly strong, and that during his residence of several years on the lake, he has observed the level of its water to have fallen 15 feet. Dr. Lenz himself observed at several places old shore-lines. Niomkolo is a most inhospitable district, and Dr. Lenz had to stay a fortnight before he could get enough of men to take him two days' journey towards Lake Nyassa. The villages, strongly fortified, are all at war with each other. At Famba's strongly fortified village (Thomson's Mfumbo) Dr. Lenz found himself on an important waterparting. The Seise goes north to Lake Hikwa, and close beside it rise two or three small streams, which uniting with others to form the Chambese, flow to Lake Bangweolo, and so may be regarded as the ultimate sources of the Congo. There was a four days' march through an uninhabited district, with many ruined villages. Further on, a large caravan of Arabs and Zanzibari was met with, who had been selling ivory to the African Lakes Company. The region consists mostly of granite and crystalline slates; the average height above sea-level 5000 feet, with mountains rising some thousands of feet higher. After passing the villages of Mpansa and Nimbo (? Vimbo) he came on Stevenson's traces, and on October 15th reached the mission station

near Minia Wando (? Maliwanda). Karonga's, on Lake Nyassa (a station of the Lakes Company), was reached on the 17th. Hence Dr. Lenz journeyed down the lake to the Shiré river, from which his last letter is dated, December 1886.

**Changes of the Coast-line in Northern Africa.**—Dr. Theobald Fischer contributes an interesting paper to Petermann's 'Mitteilungen' (Nos. 1 and 2, 1887), in which he gives a detailed account of the observations made by him at several points on the north coast of Africa. His previous examination of the coasts of the Mediterranean and Scandinavia led to his undertaking this journey in the spring of 1886, his special object being to study on the spot the action of the surf-wave upon the Algerian and Tunisian coasts. In the course of his expedition, however, he travelled over a considerable part of Algeria, visiting Bona, Biskra, and Constantine. He then traversed the "Shott" district eastwards to the Gulf of Gabes. The observations made during this part of his journey will add to the completion of our knowledge of the country. But it is to his study of the coast-line that we desire to draw attention. The coasts of Algeria and Tunis forcibly illustrate Richthofen's theory as to the formation of surfaces of abrasion and their important connection with changes of the shore-line. The information as to the strength and direction of the wind, necessary in dealing with the action of the sea upon the coast, Dr. Fischer obtained from the carefully prepared tables of Mr. O. M'Carthy, who has for some years made this subject his special study. From the tables for the two years ending April 1885 he found that the prevailing direction of the wind was north-east; in the summer months, when its strength was greatest, the wind was almost invariably from that quarter. The coast of Algeria is subject to storms of great violence from the north and north-east. The traveller gives an account of the damage done by one which occurred shortly before his arrival at Algiers. He confined his coast studies principally to four points:—

1. *The Algerian Coast near Tipaza.*—This bay, lying to the west of the town of Algiers, may be, he says, regarded as entirely the result of the action of the surf-wave. Its western boundary, the promontory of Chenua, formed of hard nummulitic limestone, and its eastern boundary, Cape Sidi Ferruch, a spur of the mountains of Algiers composed of granite and mica-slate, have withstood the onslaught of the waves, though the shores exposed to the north-east are strewn with large pieces of rock, testifying to the powers of the sea. The soft miocene limestone of Tipaza has given way rapidly before the sea, which has advanced to the limit of the hard nummulitic limestone. The action of the sea in forming the numerous small bays along this part of the coast has been facilitated by the torrents, at the mouths of which these bays are generally to be found.

2. *The Coast in the vicinity of Algiers.*—Here, on the western side of the bay, where the coast is of hard slate, the sea has formed an abrasion surface of about  $1\frac{1}{4}$  mile in breadth. Cape Matifu, bounding the bay on the east, is composed of slate rich in quartz. The ravages of the sea are very apparent at Rusgunia and Rusubbicarri, where the coast, consisting of clay and marl, has given way about 650 yards. These towns, of which now scarcely anything remains, were founded by Augustus, and in the middle ages were flourishing and possessed good harbours. At the innermost part of the bay, however, the land has gained on the sea, especially in the vicinity of the river Harrach, where, in front of the chalk ridges, a fertile plain half a mile broad extends some four miles each side of the mouth of the river. Dr. Fischer concludes that the surface of abrasion has here reached such a breadth that the surf-wave loses its power.

3. *The Bay of Bona.*—The physical features of the bay are described in detail

by the traveller, particularly the dunes surrounding it, which form a barrier to the rivers flowing into the sea, causing them in some instances to flow for several miles parallel with the low hills before finding their natural exit. New land is being formed here. The direction of the current from Cape Rosa on the one side to Cape de Garde on the other forces the mouths of all the rivers westward. This is very noticeable in the case of the Mafragh and Seybuse, both of which are rich in alluvial deposits. The effect of this on the shore-line is at once apparent, as the east coast of the bay has undergone practically no change, whereas to the west of the mouth of the Seybuse the land has gained very considerably on the sea. Dr. Fischer refers at some length to the ancient town of Hippo.

4. *The Gulf of Tunis*.—The traveller's principal work here was in the delta of the Medjerda, to which so many writers have drawn attention. He traces the physical changes which have taken place in the peninsula of Utica, and the rapid formation of land within historical time through the exceptionally rich deposits of the Medjerda. After careful examination, Dr. Fischer finds that the Medjerda does not flow into the Bay of Porto Farina, as indicated in the French topographical map of Tunis, recently published, but discharges directly into the sea. Occasionally in winter (when the French survey was made) the waters are very high, and an arm of the river flows into the above-mentioned bay. An excellent little map, showing the delta and ancient bed of the river, accompanies Dr. Fischer's paper. The Bay of Tunis is gradually being closed up by the action of the ocean current and the surf-wave. It is only kept from being completely landlocked by the periodical overflowing of the Medjerda. Its size and depth are also being diminished by the refuse of the city of Tunis. Dr. Fischer's description of the flora of all this district will be found of interest. He comments on the very general cultivation of the date-palm, which is planted close to the sea-shore.

**Dr. Hans Schinz in South-western Africa.**—In the 'Proceedings' for 1886, p. 650, we gave a brief account of the explorations of Dr. Schinz in South-western Africa. The following interesting details are taken from a private letter. Dr. Schinz went out to Nama Land in 1884, on behalf of Mr. Lüderitz. Having explored the territories acquired by this enterprising gentleman, and now passed into the possession of a company, he turned to the northward, exploring the country as far as the Kunene river, and to within a short distance of Lake Ngami. He resided and travelled in Ovambo from August 1885 to February 1886, when a misunderstanding with the family of King Kamonde of Ondonga, whose suspicions had been aroused by his scientific pursuits, compelled him to seek safety in flight. The journey from the king's residence to Groot Fontein (Otyavanda tyongue), the settlement of the Boers, near the Otavi copper-mines, can be accomplished in summer in a fortnight, but owing to the condition of the road Dr. Schinz spent fully six weeks over it. The soil was saturated with water, and the draught-oxen frequently sunk into it up to their bellies, the day's progress occasionally not exceeding a mile. Etosha Tan presented the appearance of a veritable lake. The Boers who have settled at Groot Fontein under the leadership of Mr. Jordan received the traveller most hospitably. They had left Humpata in Mossamedes, owing to a disagreement with the Portuguese authorities, and established themselves

within a territory purchased by their leader from the Chief of Ondonga, and constituted a Republic named "Upingtonia," in honour of the Prime Minister of Cape Colony. This territory is bounded on the west by the Etosha and Onandora Pans and stretches away eastward between  $18^{\circ}$  and  $20^{\circ}$  of south latitude. Dr. Schinz describes it as a region well adapted to agricultural pursuits. About one-fourth of it is hilly, and apparently rich in minerals, while the remainder consists of undulating limestone plains (an ancient lake-bed) of great fertility. Perennial springs are numerous, and the ample rains fall between November and April. Malarial fevers prevail during that season, but they are not of a virulent type. Horses and cattle, however, are subject to a lung disease as in other parts of South Africa. Mr. Jordan has divided his territory into farms of 6000 acres each, six of which, together with all mining rights, he reserved to himself, handing the rest of the country over to a "Bestuur," elected by the Boers. Settlers receive farms gratis on condition of their beginning to cultivate them within a year from their arrival.\* Having procured a fresh team of oxen, Dr. Schinz trekked to the eastward, following at first a spoor left by Mr. Erickson's waggon, and then the dry bed of the Omuramba wa Mataka as far as Karakobis, where that watercourse turns to the north-east and, assuming the name of Seshongo, joins the Okavango or Ombuengo. The country between Karakobis and the Tonke (Tiogo) forms part of the Kalahari, and presents a succession of dunes, covered with Bauhinias, Cassias, Combreti, and other dicotyledonous trees, the intervening depressions being occupied by acacias. Vleys are only met with at long intervals, and game is the reverse of abundant. The few inhabitants are bushmen, and speak a language distinct from that of the Nama, though apparently allied to it. In May, Dr. Schinz arrived at Nokana, the residence of the Batowana chief Moremi, who formerly lived on Lake Ngami, but who in consequence of an incursion of the Matabeli has removed to the swamps, three days' journey to the north-west of it. The immediate neighbourhood of the lake has been abandoned to the Bakoba, the old herdsmen of the Batowana. Dr. Schinz was not permitted to visit it. He heard, however, that the lake has not dried up, although much reduced in size. It is fed by numerous branches of the Okavango which meander through the extensive swamps lying to the north of it. The Batowana name of the lake is Ngabi or Nagabi. On his return to Damara Land, Dr. Schinz once more crossed the Kalahari. At Ghanze, where Mr. Robertson has built himself a stone house, he was able to collect materials for a grammatical sketch and a vocabulary of the Ai-San language. This journey through the Kalahari was attended with much hardship, and the traveller suffered greatly from fever and

\* In June 1886 Mr. Jordan was murdered, and the fifteen families who had settled in "Upingtonia" have since placed themselves under the protection of Germany.

dysentery. Embarking at Walvisch Bay on November 16th, 1886, Dr. Schinz reached Capetown after a voyage of twenty-six days, and then returned to Europe. Dr. Schinz has succeeded in making valuable botanical and ethnographical collections, and is at present engaged in preparing a full account of his explorations.

**New Guinea Exploration.**—We are informed by the Rev. W. G. Lawes, by letter from Port Moresby, January 20th, that an expedition is being equipped under the leadership of Mr. Vogan, the curator of the Auckland Museum, with the intention of attempting as soon as the rainy season was over, to cross South-eastern New Guinea from Freshwater Bay to Huon Gulf. A journey into the interior was made in August last by Dr. Clarkson and Mr. G. Hunter, from Kapakapa, along the depression between the Astrolabe and Macgillivray Coast Ranges. The Kemp-Welch river was crossed, but no addition of importance was made to our knowledge of the country.

**MM. Capus and Bonvalot in Central Asia.**—Some interesting details concerning the recent unsuccessful attempt of these French travellers to penetrate to Balkh across the Afghan frontier, have been received by the Geographical Society of Paris in two letters, the latest dated 13th January, 1887. They started on the 13th September from Samarkand for Bokhara, having rested at the former place since July.\* The route lay through the Takhta-Karacha pass to the village of Shahr-i-sabz. A few miles south of Samarkand the plantations of General Korolkoff commence. By utilising the waters of the Kara-tepe and other streams a considerable area of hitherto barren country has been within the space of seven years brought under cultivation and covered with acacias, mimosas, fruit-trees, &c. The pass of Takhta-Karacha, though not more than 5500 feet high, is very difficult, especially on the south side where the path is narrow and stony. Passing through Yakobag and Kalta-kul the travellers ascended to the Ahugah pass, known also under the name of Lahore Murda, the top of which is at an elevation of 15,586 feet. The descent into the valley of the Sanguirdak was toilsome, down a slope of 45°, the path running zigzag over stones and rubbish. The Sangardak, one of the affluents of the Surkhan, is a rapid torrent rushing through a wild narrow gorge. All this district was covered by the "Kishlaks" or winter villages of the Uzbegs, Tajiks, and other tribes. A magnificent cascade, a rare thing in Central Asia, was found at Baghcha. The valley gradually broadens as the mountains open out, until the plain of Hissar becomes visible in the far distance. Passing through Saridjui and Karatagh, situated on the banks of the Turpalan, the travellers reached Hissar on the 24th September. The plain is covered with fields of rice, which is of exceptionally good quality. Hissar itself is very unhealthy, and in summer is practically abandoned, the whole population retiring

\* *Vide* 'Proceedings R.G.S.,' 1886, p. 722.

to Karatagh. At the latter place the party was received by the Bey of Hissar. After a short stay at Hissar, the travellers descended the still unexplored valley of the Kafirnahan to the point where it discharges into the Amu-Daria. The valley, bordered with chains of hills, has an average breadth of about  $2\frac{1}{2}$  miles, and is everywhere covered with saline efflorescences. The Uzbegs, who are rarely met with in the upper part of the valley, are very numerous near Kabadian. They settle on the rich alluvial ground at the many bends of the river, or on the little islands with which it is studded. The hills are almost bare of vegetation. Kabadian, reached by the party on 1st October, is situated in a fertile oasis where the valley widens. The march was continued down the valley by Bish-Kent to Aivadj, on the Amu-Daria, and thence to Termez, where some excavations were made among the ruins. On the 14th October the travellers crossed the Amu-Daria, near Chushka Guzar, into Afghanistan, when they were made prisoners by the Afghans at Shur-tepe, near the frontiers, and detained for 25 days in a Turkoman *sarai*. On the 8th November, by order of the Emir, they were released, and conducted across the frontier. The reason assigned for not allowing them to travel in Afghanistan was that the country was not in a sufficiently settled state. They had thus got within about 50 miles of Balkh, their intended objective. After making some further excavations at Termez, the return journey was commenced up the Surkhan valley over the mountains of Baisun, to Derbend. Near the latter point they took up the route followed by them in 1881, in order to pass through the famous gorge of Chatchag. The ordinary route to Ghuzar was abandoned in favour of one more to the north by Kara-Koval, and through the valley of Katta-Uru-Daria. On the 8th December, after visiting Karabag and Ghirakchi, the travellers crossed the Russo-Turkistan frontier at Jam, and reached Samarkand, having been absent three months.

**Arctic Travel.**—Mr. Alexander McArthur, formerly in the service of the Hudson's Bay Company, left Winnipeg on February 13th, on an exploring expedition to the Polar regions. He intends to go from Winnipeg to Fort Churchill, and to continue his journey along the west coast of Hudson Bay. While Colonel Gilder proposed to push north by Fury and Hecla Strait, Mr. McArthur proposes to go north-west by way of King William's Land and Boothia Felix. He intends to spend a winter on King William's Land, and to go north in the ensuing winter, crossing Lancaster Sound, and following the west coast of North Devon. He then proposes to cross to the little-known islands of Jones Sound and thus reach the west coast of Grinnell Land, which, he hopes, will prove a safe route north. He expects to be absent some three or four years. We agree with *Science* in believing that this plan of reaching the North Pole will be as unsuccessful as Colonel Gilder's, and it is a pity that two men so energetic should waste their time in journeys that

can yield results of no value. There is at least no reason why a traveller who intends to explore the extreme north should not start from the nearest available point, instead of wasting his time and strength in a hazardous journey for which there is no necessity. As *Science* suggests, Colonel Gilder might do real service by devoting his energies to the exploration of Jones Sound, one of the most important remaining problems of Arctic geography. The latest news with regard to Colonel Gilder is that he has returned to Winnipeg from his journey to Hudson's Bay, and has for the present given up his plan to reach the North Pole by that route.

**The Rivers of New England.**—To the March number of the *American Journal of Science* Professor N. S. Shaler contributes an article of some geographical interest on the fluvial swamps of New England. He first notes the fact that the greater number of New England streams flow in a generally north to south direction. Except at the head-waters of these southward-flowing streams, where the brooks have too little volume to clear their beds of the glacial waste which encumbers them, the valleys of the group contain no swamps. All these southward-flowing streams show that they have, for a considerable time, been cutting their beds downwards through a deep layer of detrital material which was evidently deposited in their channels while the ice-sheet was disappearing from the district in which they lie. Above the alluvial plain are several terraces bearing the mark of river-action. The uppermost of these terraces, however, Professor Shaler points out, is of the peculiar form characteristic of the deposits which were made at the front of the ice-sheet when the base of the glacier lay below the level of the sea; these Kame-bearing terraces were, he believes, formed while the valleys in which they lie were depressed. Omitting the upper terrace, the other terraces prove that in the valleys of rivers flowing from north to south, the conditions have been such, that the streams have had no difficulty in constantly cutting deeper and deeper into the detrital deposits which hindered their flow at the close of the glacial period. Turning to the streams which flow from south to north, we find the conditions in marked contrast to those which are found in the rivers flowing in the opposite direction. The number of these northward-flowing streams is small, and none of them have drainage areas to be compared with those of the greater New England rivers. Professor Shaler's observation refers especially to the Nashua, the Concord, the Charles, and the Neponset, all situated in Eastern Massachusetts. He finds that along the streams which flow from south to north there are no river-terraces except those which are covered by the ordinary floods, and are at times swampy; while in the rivers flowing in the opposite direction, the lowest terrace is well drained in the dry season. The only benches or terraces are of the Kame character referred to above, and these are very conspicuous features in some



of the valleys, and by an unwary observer may be taken for ordinary river-terraces. A careful examination of their sections and surfaces proves distinctly their glacial origin. Below the level of the Kame terrace, the valleys of the rivers which flow from south to north show no other benches till we descend to the level of the present flood-plain, which is always covered with a very slight flood. The whole of this alluvial plain is swampy, and so far as Professor Shaler has seen, there is never any indication of down-cutting on the part of the stream-bed. It is, moreover, clear that the reverse process is now rapidly in action; none of these streams have sufficient currents to clear their beds of the detritus brought into them by floods. The result is that the process of deposition is constantly going on, both in the river-bed and over a wide field on either side. At the same time Professor Shaler produces evidence to indicate that at a former period these rivers had a much more powerful current than now, capable of doing considerable excavating work. It thus appears probable that after the streams which flow to the northward had in good part done their excavating work, a change came over them which led to a lowering of their slopes and a consequent diminution of their fall. Professor Shaler enters into considerable detail to show that after the removal of the ice-sheet, there was an elevation of the land in the district concerned, and that during the immediate post-glacial period these north-flowing rivers excavated their valleys. Then a change must have come about which led to the relative lowering of the southern part of New England, and a corresponding relative increase in the height of the northern part of this section; Professor Shaler is inclined to think there was a positive sinking of the southern section. The amount of tilting he estimates need not have exceeded two feet to the mile, and was most likely a change which involved a large part, if not the whole, of the glaciated district of the continent.

**The Valley of the Cachapual (Argentine Andes).**—The current number of Petermann's 'Mitteilungen' contains an article by Dr. A. Plagemann on his explorations, made last summer, in the valley of the Cachapual. The head-quarters of the traveller were the residence of Don Manuel Olegario Soto, well known for his hospitality to all travellers, situated in the centre of the Hacienda of Cauquenes. Dr. Plagemann's object was to make an exhaustive examination of this comparatively small but important district. The results of his work, while confirming mainly those of the celebrated Dr. Paul Güssfeldt\* and other travellers in the same region, will go to complete our knowledge of the details of the country, and in several instances rectify our maps. He explored the tributaries on both banks of the Cachapual, including the Rios de los Cipresses, del Cortaderal, Claro, de los Leñas, and the

\* *Vide* 'Proceedings R.G.S.,' 1884, pp. 658 *et seq.*

"cajon" de los Vegas, devoting much time to the glaciers at the head of the river valleys. The "cajon" del Cortaderal contains a fine glacier as large as the magnificent "Ada" glacier of the "cajon" de los Cipresses which Dr. Güssfeldt describes. The largest and most important glacier of the district, named the "Ventisquero de los Piuquenes," was thoroughly explored by the traveller. The head-waters of the Cachapual, he ascertained, consist of three streams, the Rio de Molina, Rio de los Piuquenes, and Rio de los Piuquencitos. The Rio Cauquenes, marked on some maps, has no existence. Dr. Plagemann found the "penitentes" or "penitents," those curious conical snow-formations in the same high zone of from 11,500 to 13,800 feet as mentioned by Dr. Güssfeldt. With regard to the effect of rarefied air on the body at high elevations, neither he nor his companions suffered at all; he believes the so-called "puna" to be connected in some way with the electrical condition of the atmosphere. He confirms the observation of preceding travellers as to the varying character of the snow-line, which he estimates, in agreement with Herr Pissis, at 10,500 feet. The author concludes his paper with some remarks upon the different passes of the Cordillera.

**Proposed Astronomical Observatories on High Mountains.**—The Harvard College Observatory being entrusted with the Boyden fund of 230,000 dollars bequeathed for the purpose of promoting astronomical research at elevations free from atmospheric impediments, has issued an invitation to travellers and others to furnish them with exact information regarding mountain elevations, especially in the southern hemisphere. Facility of access is a primary condition, and it is probable that a very great altitude will be eventually chosen for a permanent station. The points on which detailed information is required are as follows:—

1. Latitude and longitude. Distance and direction from some town, or other well-known point. Height, and how determined.
2. Peak, pass, or tableland. Character of surface: ledge, broken rock, gravel, or covered with trees, shrubs, or grass. Prevalence of snow in summer, and period during which the depth of snow in winter might obstruct the paths of access, or occasion other inconvenience or damage. Proximity of wood for fuel, and of water.
3. Means of access, distance from and height above the nearest railway station, waggon road, bridle-path, or foot-path. Time of ascent and descent. Nearest post-office and telegraph station, and their distances from the proposed station. Nearest point of road kept open in winter.
4. Observation of the rainfall at different seasons of the year. Proportion of the sky covered with clouds at different hours and seasons. These observations are desired at sunset, sunrise, and late in the evening. Such observations may also be made of a distant mountain peak, confining the evening observations to moonlight nights. Observations of the barometer and thermometer are also desired. Information is wanted regarding the prevalence of very high winds; the presence of dust, haze, or the smoke from forest fires, rendering distant points invisible; and all other meteorological phenomena affecting the value of the station for astronomical purposes. If there is a rainy or cloudy season, its duration; also the regular recurrence

of clouds, thunder-storms, or wind, at any given hour of the day. 5. Sketches or photographs of the proposed location, and of points on the road; also of the view.

Correspondence is invited with those residing near or in sight of suitable locations who are willing to undertake any of the observations just described above. Letters should be addressed to Mr. E. C. Pickering, Director of Harvard College Observatory, Cambridge, Mass., U.S.A.

**Geographical Education.**—There are several matters of interest in connection with the subject of geographical education which have come up during the past month. By a new ordinance of the German Education Department geography has been raised to the first rank ("ein selbständiges Fach") in the higher schools of Germany; that is, it may be taken as one of a teacher's two specialties along with either a scientific, a linguistic, or an historical subject. The subjects of examination for a teacher wishing to take the *Facultas Docendi* in geography are laid down. There are three grades—for lower, middle, and higher classes. For the lower classes the teacher must show that he has an elementary but precise knowledge of mathematical, physical (especially topical), and political geography; the candidate must also be in a position to demonstrate the leading facts of mathematical geography by means of simple apparatus. For a certificate of permission to teach in middle classes, the candidate must show a more intimate knowledge in the above-mentioned departments, as well as an acquaintance with the history of exploration, and with the most important trade-routes, past and present. For the upper classes the candidate must show that he has a thorough knowledge of the elementary mathematical principles on which mathematical geography is based, and be in a position to give an account of the more important geological conditions of the earth's surface. Moreover, the candidate must show that he possesses an intelligent knowledge of the political geography of the present and of the politico-historical geography of the most important civilised peoples, as also prove his familiarity with the leading facts of ethnography. For each stage, besides, the candidate must exhibit a readiness in the construction of maps. In Germany it is believed that this new ordinance will have a powerful influence in still further improving the position of geography in that country. In this connection we may state that a German teacher, Herr Anton Stauber, of the Real-gymnasium of Augsburg, has obtained the King of the Belgians' prize of 25,000 francs, for the best essay on the most effective means of popularising geography and improving its position in education of all degrees. It is worthy of note that no German was on the committee of judges. In our own country, in connection with the exhibition of the Society's Educational Collection at Bradford, a series of prizes was offered by the Bradford School Board for (1) Hand-made models of the physical features of the borough; (2) Hand-made maps of any country; (3) Hand-made maps of the neighbourhood of any school; (4) Hand-made model of the neighbourhood of

any school; (5) Hand-made apparatus for teaching physical geography; and (6) A sketch of the geography and associated ore of Yorkshire. Thirty-three maps and models were sent in for these prizes, which were decided on March 17th, the adjudicators being Professor Miall (of Yorkshire College), Mr. J. S. Keltie, Mr. T. G. Rooper, H.M. Inspector of Schools, and Mr. A. R. Binnie, the Borough Engineer. The best map was one of Yorkshire by Mr. F. D. King, of Holy Trinity National School, Bradford, while a model of the country around Skipton, by Mr. F. B. Sandland, of Christ Church National School, was of high merit. The physical map of the ancient parish of Kildwick, by Mr. J. F. Haswell, of Kildwick National School, also deserves mention. The general influence of such competitions in impressing upon teachers the importance of good apparatus in teaching geography must be good, and they therefore deserve encouragement. The public spirit of the Bradford Grammar School in instituting such a competition deserves a word of praise.

**Emin Pasha.**—The 'Deutsche Geographische Blätter' of Bremen publishes a biographical sketch of Emin Pasha by Dr. W. Wolkenhauer, from which we gather the following particulars. Edward Schnitzer, better known as Emin Pasha, was born on March 29th, 1840, at Oppeln, in Prussian Silesia, the son of a merchant. On the father's death in 1845, the mother removed to Neisse, and soon afterwards married a second time. Edward, who from his earliest childhood exhibited that love of natural history which has distinguished him down to the present time, received his first education at the Gymnasium of Neisse, and subsequently studied medicine at the Universities of Breslau, Berlin, and Königsberg. Having obtained his degree, he started for the East, obtained an appointment as Harbour-surgeon at Antivari, accompanied a military expedition into Syria and Arabia (1870), and subsequently became attached to the household of Ismail Pasha, whom he attended to Trebizond and Erzerum, Constantinople, and Tanina. His patron died towards the close of 1874, and Dr. Schnitzer accompanied his family to Constantinople. In the spring of 1875 he paid a visit to his friends at Neisse and Breslau. His interest in Africa having been excited by reading the works of Von der Decken and Fritsch, he started for Egypt, and succeeded in obtaining an appointment as surgeon in the army. How he subsequently served under Gordon Pasha, and rose to the position of Governor of the Equatorial Province, is matter of history.—The bulk of Dr. Schnitzer's ornithological collections, amounting to 2000 specimens, appears to have been sent to Dr. J. Hartlaub at Bremen, and Prof. A. von Reitzel at Vienna. Some of Dr. Hartlaub's papers on the collections have been published in the Proceedings of the Zoological Society of London, and in the *Blatt*, the organ of the British Ornithological Union. They include twenty-three species and a new genus, named 'Eminia' by Dr. Hartlaub in honour of the discoverer.

## CORRESPONDENCE.

*The Band-i-Amir Lakes and Moore's Bendemeer.*

IN the article on Captains Maitland and Talbot's journeys in Afghanistan, in the February number of the 'Proceedings' (p. 104), it is said that, "An excursion was made to the celebrated Band-i-Amir lakes, which are mentioned by the poet Moore," in the following passage:—

"There's a bower of roses by Bendemeer's stream,  
And the nightingale sings round it all the day long;  
In the time of my childhood 'twas like a sweet dream,  
To sit in the roses and hear the birds' song."

The writer of the article forgets that to reach Moore's "Bendemeer's stream," not "lakes," one must go to Persia, to the neighbourhood of Shíráz. Moore, in a footnote to the passage referred to, says it is "a river which flows near the ruins of Chilminar."

In fact, the Band-i-Amir referred to in the article in the 'Proceedings'—which also is known by another name, and will be described in my 'Notes on Afghánistán,' as soon as they are allowed to see the light—has nothing whatever to do with "that bower on the banks of the calm Bendemeer!" of Lalla Rookh. The "river," so-called, of Moore's poem, was a *band* or dyke, but not a *band* in the usual acceptance of that word as used in India, but a stone structure of considerable architectural beauty, "the like of which," the Muhammadan historians say, "the world did not contain," erected over the river Kur, near the city of Shíráz, for the purpose of irrigating the numerous gardens and vineyards in the plain north-west of the city, in which there literally were "bowers of roses," and also for drinking purposes.

It was the munificent work of the great Amír, 'Uzd-ud-Daulah, Abú-Shujá'-i-Kai-Khusrau, the Buwiah or Dílami, sovereign of Fars, and who caused many other works of public utility to be erected. He came to the throne in 338 H. (949-50 A.D.), and died in 372 H. (982-83 A.D.).

It is dangerous to jump at conclusions, in geographical and historical matters especially, from an apparent similarity in names.

H. G. RAVERTY,  
*Major.*

The Secretary, R.G.S.  
11th March, 1887.

*The Lengths of the Greatest Rivers.*

CAIUS COLLEGE, CAMBRIDGE,  
Feb. 17th, 1887.

IN connection with General Tillo's estimates of the lengths of great rivers, given in the 'Proceedings' for the present month, it may be interesting to notice the different results we obtain as to their relative lengths, when the minor windings of the streams are left out of consideration. Not only will the order of length of the eight rivers given be greatly altered, but the rivers themselves included in the list will be different. And, indeed, by so doing we obtain a more correct idea of their comparative importance, since the lengths obtained will correspond more nearly with the extent of country drained, or, at any rate, with the extent of their basins from source to mouth. It seems unsatisfactory that a river should take a high place on the list from mere accidental circumstances which cause it to take a tortuous course.

The proportion which the true length of a river bears to that of its general course

varies immensely according to such circumstances. As a general rule of course, the greater the slope of the country, the fewer windings will there be, except where the stream is constantly deflected, in passing through a hilly country. Again, a river of great volume will, owing to its width, gain less by the small curves which would not appear in an ordinary map. As examples of the two extremes in this respect we may take the Rio Purus, which along its general course measures only about half its true length, and the St. Lawrence, in which the difference is inconsiderable. In an imperfectly surveyed country the true length can be roughly computed, by ascertaining the average ratio between the two measurements in the case of two well-known rivers. Captain Blakiston, from his observations on the Yang-tsze, suggested 1·3 : 1 as this ratio; \* but owing to the extreme tortuosity of one part of the river, this difference seems slightly above the average. It may be observed that when a river flows through a nearly flat alluvial plain, the tendency is for the windings to be gradually increased, as the force of the current wears away the concave side of the curve, while the projecting points are lengthened.†

Of the eight rivers of General Tillo's list, those which owe their position in it mainly to the windings of their stream, are the Mississippi, Mackenzie, and Amur,‡ while the Congo takes a lower place than that to which the length of its general course would entitle it. In the case of the Amazon this latest estimate corresponds more nearly with the rougher measurement than that given in most lists a few years ago, in which, in spite of its great breadth, a proportion of over 1 in 2 was added on for windings not appearing in a small-scale map. The order in which the same eight will be put down on the other plan, and the approximate lengths of their general course, will be—(1) Nile, 3100 miles; (2) Yang-tsze-kiang, 2750; (3) Yenesei-Selenga, 2700; (4) Amazon, 2600; (5) Mississippi and Congo, 2500; (7) Amur, 2200; (8) Mackenzie, 1800. The Mackenzie now falls far short of, and the Amur is equalled by several rivers not included in the above list, viz. the Hoang-ho, Lena, Obi-Irtish, and Mekong, while the Niger and Parana are very little behind these. These measurements are to a certain extent proportional to the direct distances from source to mouth, in which respect the Nile far surpasses any other river.

It is often said that the rivers of Asia are inferior in length to those of America owing to the position of the mountain ranges near the centre in the former case, and near one side in the latter. But from the above figures we see that the Asiatic rivers, in spite of the conformation of the country, would quite equal those of America, were it not for the much greater tortuosity of the latter. Of course the reason mentioned, together with the fact of the vast area of inland drainage in Asia, accounts for the non-existence there of rivers far surpassing those of any other part of the world, which the immense size of the continent would lead us to expect. Such a river might have existed, even with the present disposition of the main ranges, if the depression of Lob Nor had not prevented the drainage of Eastern Turkestan from reaching the sea, or if the drainage into the Sea of Aral had been carried on into the Obi, which last some have conjectured to have been the case in ancient times.

I may notice that if, as is laid down in the map embodying the results of A—k's surveys, the Nak-chu-kha of Tibet flows into the Lan-tsang-kiang instead of the Lu-kiang, the Mekong ought probably to have a place among the eight longest rivers in the world.

EDWARD HEAWOOD.

\* 'The Yang-tse,' p. 296.

† Ibid., p. 97.

‡ At one part of the Upper Amur a voyage of 20 miles brings one back to a point half a mile from the starting-point (*vide* Bates' 'Illustrated Travels,' i. p. 247.

## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Seventh Meeting, February 28th, 1887.*—General R. STRACHEY, R.E., F.R.S.,  
Vice-President, in the Chair.

ELECTIONS.—*Rev. John F. Bramston*; *Capt. Archibald Drummond* (Scots Guards); *Geo. T. Ferneyhough, Esq.*; *Edward John Hales, Esq.*; *Rev. H. P. Higginson-Whyte-Melville*; *Lakshmi Nārāyanā, Esq.*; *Albert George Parrot, Esq.*; *Richard Adolf Ploetz, Esq., M.A.*; *W. P. Sinclair, Esq., M.P.*; *William Jas. Joseph Spry, Esq.*; *R. H. Thompson, Esq., B.A.*

PRESENTATION.—*W. B. Hamilton, Esq.*

## ESTABLISHMENT OF A READERSHIP OF GEOGRAPHY AT OXFORD.

On opening the business of the Meeting, the Chairman announced that in response to a proposal that was made to the University of Oxford last summer, the Council had received a communication to the effect that the University had determined to appoint a Lecturer of Geography for five years; so that as regards Oxford, the aspirations of the Society had been realised. He was sure that the Fellows would be glad to hear that the University of Oxford had taken this step. A similar application had been made to Cambridge, but the negotiations were not sufficiently advanced to enable him to make any definite statement with regard to it. He thought, however, there was every probability of Cambridge following in the direction in which Oxford was now leading.

The following paper was read:—"Prejevalsky's Journeys and Discoveries in Central Asia." By E. Delmar Morgan, Esq. *Ante*, p. 213.

*Eighth Meeting, March 14th, 1887.*—FRANCIS GALTON, ESQ., F.R.S.,  
Vice-President, in the Chair.

ELECTIONS.—*Major Patrick Geo. Craigie*; *Arthur Willis Danthwaite, Esq., M.D.*; *Stanley Edwards, Esq.*; *Rev. Michael Graves*; *Colonel Henry Lumsden* (Lond. Scot. R.V.); *Henry Mockford, Esq.*; *Gerald Stanley Philip, Esq.*; *F. Raymond, Esq.*; *Percy Charles Reid, Esq.*; *R. H. Wilson, Esq.*

PRESENTATIONS.—*N. Prower, Esq.*

The paper of the evening was "The Alpine Regions of Alaska." By Lieut. H. W. Seton-Karr (92nd Highlanders).

## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris.**—February 4th, 1887: M. JANSSEN in the Chair.—M. G. Rolland forwarded copy of a paper read by General Perrier before a recent meeting of the Academy of Sciences, on the artesian wells and oases created by the French in Ued Rir (South Algeria). The correspondent took the opportunity of pointing out the complete success of this system of irrigation. Already five oases had been formed and planted in this district; one company had made seven artesian wells and planted 50,000 date-palms.—A note was read from Dr. Labonne with reference to M. Feddersen's recent paper given at Copenhagen on the subject of the

ancient vegetation of Iceland. Dr. Labonne maintains that the trunks of great trees found there by M. Feddersen were carried up into the Valley of the Geysers by the sea, an arm of which formerly penetrated into the south part of the island, and that they were covered over by a volcanic eruption. He points out that all these tree trunks are found lying horizontally, and that their species differs from the present dwarf brushwood.—M. E. Hangsen-Blangsted informed the Society that the population of Sweden on the 31st December, 1886, numbered 4,720,000, according to the official report.—The Minister of Public Instruction forwarded a letter, dated 20th December, 1886, from MM. Capus and Bonvalot, now travelling in Central Asia.—An extract from the *Chinese Times*, on the opening of the first French railway in China, was sent by M. Decauville. The line runs from Tien-tsin to Ching-Yang, a distance of only two miles, but it is extremely popular among the natives, and will doubtless lead the way for more important undertakings.—Writing from Arecife de Lanzarote (Canary Islands), on the 8th January, M. Camille Douls announced that he was about to start on a journey across Uad-Draât and Suss, under the auspices of the Minister for Foreign Affairs. This country had been but partially explored, and he would inform the Society from time to time of the geographical results of his mission.—The operations of the French in 1886 in the western Sudan were set forth in report received from the Upper Niger.—Dr. Rouire presented a book on behalf of the author, M. Valéry-Mayet, which gives an account of the explorations of the latter in South Tunis. In commenting upon this work Dr. Rouire observed that M. Valéry-Mayet, who was professor of zoology at the School of Agriculture at Montpellier, was entrusted by the Minister of Public Instruction with this mission of scientific exploration in Tunis. Starting from Sfax, he had travelled over the country between that town and Gassa and then on to Gabes and Zarzis. His book was full of the most valuable information on the fauna and flora of Tunis; his observations on the gum-tree being very interesting. He confirms the ancient geographers in their description of the country.—The Minister of Public Instruction forwarded a letter from M. Ph. Pinelli, dated from Ciudad Bolivar, 15th December, 1886, according to which M. Chaffanjon, the traveller on the Orinoco, had started from San Fernando de Atabapo and was then exploring the country in the vicinity of the head-waters of the Orinoco.—M. William Huber, Vice-President of the Central Commission and General Secretary of the Commission on Prizes, announced the awards made by the Society for the year 1887:—Gold Medal to Captain Chas. Rouvier, of the Navy, for his geographical and topographical work in the French Congo region; Gold Medal to M. Fritsche, Director of the Russian Observatory at Peking, for his numerous journeys in the north of China during the last sixteen years; Gold Medal to M. Joseph Martin in consideration of his Siberian travels and particularly his itinerary in the still little-known country between the Lena and the Amur; Silver Medal to M. Alph. Aubrey, civil engineer, for the geographical results of his mission to Shoa; the "La Roquette" prize to Lieutenant A. W. Greely, of the American Army, for his expedition to Smith Sound and his meteorological and magnetic observations; the "Erhard" prize to M. Grenier, of the Naval Map Depôt; and the "Jomard" prize to M. Joret in recognition of his biography of M. Tavernier, the great French traveller.—M. Venukoff presented a memoir written by himself on the navigability of the rivers of Eastern Europe and also an excellent map of the environs of Lake Baikal, published by M. Tchersky, on scale 1:420,000, which shows the depths.—In conclusion, a paper was read by M. J. Renaud, hydrographical engineer, on the harbours of Tonking. The writer dwelt on the factitious development of Haiphong, which he said could never be a great port in consequence of two sandy bars at the mouth of the river. Hon-Gac, in the Bay of Halong, was



destined to become the harbour of the future, being in communication with the heart of the delta by means of canals; a railway connecting it with Hanoi could be made without much difficulty. The roadstead of Halong was accessible in all weather, at all times of the tide and to ships of the greatest tonnage. Though not unhealthy, its situation in this respect was inferior to that of Haiphong.—The report of the Society's Librarian for 1886 showed additions during the year of 1038 works, comprising 1249 volumes, 114 maps in 249 sheets, 42 atlases, and 2316 photographs, besides numerous periodicals.

— February 18th, 1887: M. W. Huber, Vice-President of the Central Commission, in the Chair.—Among the letters read at the commencement of the meeting was one from M. W. Martin on the place of Tavernier's death, a question which had been before the Society on several occasions. The writer quoted the statements of MM. Haag, who assert that the great traveller died at Copenhagen, and not at Moscow, as supposed. M. Joret, the biographer of Tavernier, upheld the latter view. The Chairman suggested that steps should be taken by the Society to clear up this point.—M. R. du Caillaud sent a *résumé* of recent articles in several religious papers which possessed geographical interest. The following facts may be mentioned. The Germans had established a station at a point two hours' march east of Mrogoro (Africa). A young Swedish officer had arrived at the latter place from the Congo. After a two years' engagement with the International African Association at Stanley Falls, he set out for the East Coast with a few men and hardly any provisions. Deducting the time of his residence at the Falls, he had crossed the continent by the Congo route in the very short time of from nine to ten months. At Benito, on the West Coast, the "Mission du Saint-Esprit" had established a station.—A letter was read from M. Fr. Schrader, Member of Central Commission, on the subject of M. de Saint Sand's paper on the Pyrenees, given at a recent meeting.—The Minister of Public Instruction communicated a letter from MM. Capus and Bonvalot, written from Samarkand, and giving the news of their expedition down to the 13th January last.—The Chairman alluded to the presence at the meeting of Lieut. O. Giraud, lately returned from Tongking, and MM. Dufourcq, Decazes, and Ponel, three of the most energetic colleagues of M. de Brazza on the Congo. He hoped that the Society would have the pleasure of listening to papers from these travellers at no distant date.—In conclusion, M. J. Thoulet gave on account of the voyage he had just made along the coasts of Newfoundland in the ship *La Clorinde*, with the object of studying several important questions relative to the hydrography and geology of these parts. With regard to the banks extending along the south of Newfoundland, he said that Maury had attributed their formation to the deposit of mineral matter brought down from Greenland by the icebergs, which here come under the influence of the warm waters of the Gulf Stream. M. Thoulet was of opinion that the icebergs had nothing to do with this formation, which he stated was due to the erosion by the frost, and the carrying away by the coasting ice, of the rocks on the west coast of Newfoundland and Labrador.

**Geographical Society of Berlin.**—February 5th, 1887: Professor SACHAU in the Chair.—A letter was read from Dr. Junker, dated from Cairo, January 24th, in which the traveller informed the President that he intended to remain some time in Cairo to recover his health, and avoid a too rapid change of climate. He would then proceed to St. Petersburg, where his relatives resided, and on his journey thither would give an account of his travels to the Berlin Geographical Society.—Herr Staudinger (Member of the Flegel expedition to the Niger) then addressed the meeting on his journey, in company with Herr Harbert, to Sokoto. From Loko on the Benué the expedition proceeded *viâ* Anassarawa, Keffi and Kashia to Saria

or Soso. As the chief of Saria would not permit the expedition to travel alone and without protection through the robber-infested forest district of Katoshena on the north-west of Saria, the travellers were obliged against their will to remain several months in this town, a delay which they profited by in making an excursion to Kano, six days' journey distant, whence it would have been easy to reach Kuka if time and money had been at their disposal. On the 9th December, 1885, the expedition was at last able to leave, in the retinue of the Saria chief, who had to take to the Sultan of Sokoto the customary tribute. At Gidan Goga the Sultan gave them a very friendly reception, and accepted the letter and presents from the Emperor of Germany, granting full liberty to Germans to reside and trade in his country. They had permission to visit Sokoto and Wurna as well as the province of Gandu which is governed by the Sultan's younger brother. The expedition returned from Sokoto on the 20th April, 1886, by the same route to Loko on the Benué, the slender means at their disposal not permitting them, as they originally intended, to vary their route by visiting the hitherto unexplored district extending from Bauchi and Muri to Jola.

— March 5th, 1887: Professor SACHAU in the Chair.—A paper was read by Dr. Snouck Hurgronje of Leyden, on his six months' residence in Mecca, where he remained in the disguise of a Mahomedan Effendi, from February to August 1885, with the object of studying, on a spot free from European influences, the real life of Islam and its power over other lands, especially the Dutch East Indies. Dr. Hurgronje was the fifth European who had visited Mecca; previously there have been a Spaniard under the name of Ali Bey el-Abbasi, F. L. Burckhardt, Capt. R. F. Burton, and J. F. Keane (de Maltzan's 'Pelerinage à la Mecque' contains only well-known facts and hearsay inaccuracies). Dr. Hurgronje, moreover, is the first traveller who has lived for a long time in the metropolis of Islam, and not merely as a pilgrim in the season of the pilgrimage. He made first a stay of five months in Jeddah, in order to get acquainted with people from Mecca. The inhabitants of Jeddah live chiefly on their trade with pilgrims; every Meccan leader and guide of pilgrims (Sheikh) has his agents (Vakil) who form an important class, and he deals with a definite class of pilgrims whose languages and customs he understands, leading them to the holy city and caring for their living until with lightened purses they start on their homeward journey. Many of these sheikhs have twenty to thirty subordinates, and 180 sheikhs deal only with the Malayan pilgrims. The road between Jeddah and Mecca is protected by eight small forts against robbers. The journey can be accomplished, on an ass, in fourteen hours. The appearance of the city has changed scarcely at all since Burckhardt's time. In the middle of the narrow, north and south-lying, valley stands the mosque, in an open court, surrounded with a colonnade, in the middle of which is seen the Ka'aba, the sanctuary of the ancient Arabians. The mosque covers a space of 2½ hectares. The surface of the city ground is rising gradually through the accumulation of detritus washed down into the valley by rains from the neighbouring heights, but around the mosque the soil is kept to the same level by artificial means. All rain from the eastward brings floods to the city. The "black stone," five feet high, is built into the eastern angle of the Ka'aba, and bound by a silver ring. There are many such black stones in Mecca, which are reverentially regarded by the faithful, though not officially sanctioned. On this account the stone cannot well be an aerolite. On Abu Gûbez, the holy mount to the east of Mecca, Dr. Hurgronje found a stone exactly similar. He brought home a sample of the water of the holy spring Zemzem, which on being analysed proved to contain a considerable quantity of bitter salt. A conduit 50 kilometres in length supplies Mecca with fresh water, and there are public fountains in each street which have been perfectly restored through the able Governor, Othman Pasha, the Wali Wilâyet

el-Hidjar. The population is very mixed. Hadramaut supplies chiefly traders, Egypt traders, handicraftsmen, professors of the healing art, and many marriageable girls. Yemen, Syria, the Magrib, Bokhara and Afghanistan, India and the Malay Archipelago are also numerous represented. This diversified assemblage, however, is quickly assimilated, and takes the peculiar character of the Koraishite nucleus of the population. Eastern and Central Africa contribute numerous negro slaves, who are here well treated, and after several years' service frequently received into society as free men. The Mecca people form numerous corporations, guilds, aristocracies of Seyyids and Sherifes; but their importance is nullified by the vigorous action of the Government. The city is divided into fifteen districts without visible boundaries, and feuds arising from trifling causes often break out between the inhabitants of different districts, which are sometimes fought out with abusive words or knives outside the city. The character of the people is generally humane, hospitable, and sociable; it is only during the pilgrim months, when each one has to care for himself and get all he can during the short time, that they appear greedy and avaricious. Through an indiscretion of the French Vice-Consul at Jedda in betraying him, Dr. Hurgronje was suddenly seized and ejected from Mecca, barely escaping with his life.

## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

### EUROPE.

**Forel, [Dr.] F. A.** — *Le Lac Lemán. Précis Scientifique.* 2<sup>me</sup> édition, revue et augmentée. Genève, H. Georg, 1886: 8vo., pp. 76. [Presented by the Author.]

This *brochure* originally appeared as a contribution to the volume on Montreux, published in 1877. Dr. Forel has done well to bring it down to date and publish it separately. It is really a succinct but complete account of the interesting lake in all its aspects, and embraces the results of Dr. Forel's own very valuable researches.

**Mahaffy, J. P.** — *Rambles and Studies in Greece.* Third edition. London, Macmillan & Co., 1887: 8vo., pp. xviii. and 465, map and illustrations. Price 10s. 6d. [Presented by the Publishers.]

**Minchin, James George Cotton.** — *The Growth of Freedom in the Balkan Peninsula. Notes of a Traveller in Montenegro, Bosnia, Servia, Bulgaria, and Greece. With Historical and Descriptive Sketches of the People.* London, John Murray, 1886: 8vo., pp. xvi. and 415. Price 10s. 6d.

Describes the general condition of things in the Balkan Peninsula, more particularly in their political aspect. Some of the matter has already appeared in the *Times* and the *Morning Advertiser*, but there is much that is new. The concluding chapters of the work deal with the social life of the Bulgarians. There is a map of the Balkan States.

[**Roumania.**]—*Annales de l'Institut Météorologique de Roumanie.* Par Stefan C. Hepites, Directeur. 1885. Tome I. Bucharest, 1886: 4to., pp. cxxxviii. and 367. [Presented by M. Hepites.]

Geographers as well as meteorologists will welcome this volume as a token of a serious effort to work out the climate of Roumania. The introduction contains a history of meteorological researches in Roumania.

*Temperatur-mittel aus der Periode 1851-1885: für die österreichischen Alpen und deren Grenzgebiete.* 4to., pp. 30.

## ASIA.

**Conder, Claude Reignier.**—Syrian Stone-Lore; or, The Monumental History of Palestine. Published for the Committee of the Palestine Exploration Fund. London, R. Bentley & Son, 1886: 8vo., pp. xiv. and 472, maps. Price 7s. 6d.

This is a treatise on the ancient condition of Palestine from the earliest recorded times down to the close of the Frank dominion. It discusses the social condition of the inhabitants of the country, their race—origins, languages, religions, social customs, government, art, literature, and trade. The author finds the present review of the results of exploration and research not on the Biblical narratives, but on monumental records; and endeavours in the early chapters to show what could be known of Syria and of its inhabitants, Hebrews, Hittites, Phœnicians, &c., were there nothing left to us of a Hebrew literature. There are three maps as follows:—1. Map of Syria in 1300 B.C.; 2. Map of Syria in 500 A.D.; 3. Map of Syria about 1180 A.D.

**Diener, [Dr.] Carl.**—Libanon. Grundlinien der Physischen Geographie und Geologie von Mittel-Syrien. Wien, Hölder, 1886: 8vo., pp. x. and 412. Price 15s. 6d. (*Dulau.*)

The guiding principle of Dr. Diener's work is the intimate relation which exists between the geology and geography of a limited region like that embraced in the volume. Dr. Diener has made a very thorough study of Central Syria, and the results are a useful contribution to scientific geography. In the first section he gives a general view of the stratigraphical condition of Central Syria; followed by sections on the littoral of Phœnicia and the Lebanon; the depression region of Cœlo-Syria; the Antilibanus and the system of Palmyra ridges; the leading lines of the Lebanon system and their relations to the structure of Western Asia and the Eastern Mediterranean basin. The volume contains a considerable number of fine photographs besides many woodcut illustrations, sections, and maps.

**Hull, Edward [LL.D., F.R.S.]**—Mount Seir, Sinai, and Western Palestine. Being a Narrative of a Scientific Expedition. Maps and illustrations. Published for the Committee of the Palestine Exploration Fund by Richard Bentley & Son, 1885: 8vo., pp. xvi. and 227. Price 10s. 6d.

The geological results of Dr. Hull's expedition to Palestine have already been noticed in the 'Proceedings' for 1886, p. 343. The present volume contains the narrative of the expedition, and therefore gives many geographical details unsuited to the geological treatise. The maps, sections, and illustrations are useful.

[**India.**—Memoirs of the Geological Survey of India. Palæontologia Indica . . . . Ser. XII. The Fossil Flora of the Gondwána System. Vol. IV. Part 2. The Fossil Flora of some of the Coalfields in Western Bengal. By Ottokar Feistmantel, M.D. Calcutta, Geological Survey Office, &c.; London, Trübner & Co., 1886: folio, pp. iv. and 71, plates.

— Ditto. Ser. XIII. Salt-Range Fossils. By William Waagen, PH.D., F.G.S. I. Productus-Limestone Fossils. 6. Coelenterata. Calcutta, ditto; London, ditto, 1886: folio, plates.

**Lydekker, Richard.**—Catalogue of the Remains of Siwalik Vertebrata contained in the Geological Department of the Indian Museum, Calcutta. Part I. Mammalia. Calcutta, printed by the Superintendent of Government Printing, India, 1885: 8vo., pp. x. and 116.

— Ditto. Part II. Aves, Reptilia, and Pisces. Calcutta, ditto, 1886: 8vo., pp. vii. and 26.

— Catalogue of the Remains of Pleistocene and Pre-historic Vertebrata contained in the Geological Department of the Indian Museum, Calcutta. Calcutta, ditto, 1886: 8vo., pp. vi. and 16.

Memorie van het Bestuur der Nederlandsch-Indische Maatschappij van Nijverheid en Landbouw te Batavia aan de Directeuren der Nederlandsche Maatschappij ter bevordering van Nijverheid te Haarlem over de Pakketvaart in Nederlandsch-Indië. Batavia, Ogilvie & Co., 1886: 8vo., pp. 111.

The Sacred Books of the East. Translated by various Oriental Scholars, and edited by F. Max Müller. Vols. XXV. and XXIX. Oxford, Clarendon Press, 1886: 8vo., pp. (xxv.) cxxxviii. and 620; (xxix.) 440. [Presented by the Secretary of State for India.]

**Van der Chijs, J. A.**—De Vestiging van het Nederlandsche Gezag over de Banda-Eilanden (1599-1621). Uitgegeven door het Bataviaasch Genootschap van Kunsten en Wetenschappen. Batavia, Albrecht & Co.; 's Hage, M. Nijhoff, 1886: large 8vo., pp. iii. and 184, map.

— Nederlandsch-Indisch Plakaatboek, 1602-1811. Derde Deel. 1678-1709. Uitgegeven door het Bataviaasch Genootschap van Kunsten en Wetenschappen met medewerking van de Nederlandsch-Indische Regering. Batavia, Landsdrukkerij; 's Hage, M. Nijhoff, 1886: 8vo., pp. 681.

#### AFRICA.

[**Cape of Good Hope.**]—The Cape of Good Hope Civil Service List, 1887: containing the Official Return of the Civil and Military Establishments of the Colony, Acts and Regulations, Services and Duties of Officers, etc. Also the Civil Service Calendar, 1887: containing all matters connected with the Examinations for entry into the Service, and the Civil Service Law Examinations. Edited by Ernest F. Kilpin. Cape Town, J. C. Juta & Co., 1887: 8vo., pp. xii. and 276, map. [Presented by the Colonial Secretary, Cape of Good Hope.]

**Colston, [Col.] R.E.**—Journal d'un voyage du Caire à Kéneh, Bérénice et Berber, et retour par le désert de Korosko. [Bulletin de la Société Khédiviale de Géographie, 11<sup>e</sup> Série, Numéro 9.] Le Caire, Imp. nationale, 1886: 8vo.

The journey was made in 1873-74.

**Horowitz, Victor J.**—Marokko. Das Wesentlichste und Interessanteste über Land und Leute. Leipzig, Friedrich, 1887: 8vo., pp. 215. Price 4s. (*Williams & Norgate.*)

This is a useful and careful summary of what we know concerning Morocco, by a member of the German Consulate at Tangier. It deals with the position and dimensions of the country; climate, mountains, rivers, and division of the land; products; inhabitants; mode of life; manners and customs; religion; industry and trade; government; history; most important towns. In a few concluding considerations the author maintains that the whole of the north coast of Africa ought to be occupied by European powers.

[**Madagascar.**]—The Antananarivo Annual and Madagascar Magazine, No. x., Christmas 1886. (Part ii. of vol. iii.) Edited by the Rev. J. Sibree, F.R.G.S., and Rev. R. Baron, F.L.S. Antananarivo, L.M.S. Press, 1886: 8vo., pp. iv. and 128-260. [Presented by Mr. Sibree.] (*Trübner.*)

The present number consists largely of papers on Malagasy folk-lore, philology, poetry, &c. It, however, contains a translation of M. Grandidier's paper on the channels and lagoons of the east coast of Madagascar, to which Mr. Sibree adds a supplementary note referring to Captain Rooke's boat-journey along these lagoons in 1864 (Proc. R.G.S., December 1885). Mr. Sibree states that with a comparatively small expenditure a continuous and commodious waterway might be made along 300 miles of coast, connecting the principal ports on the east side of the island, and giving a great impetus to trade. Less than 30 miles of canal would be sufficient for the purpose. More than fifty years ago, during the reign of the first Radàma, this great work was actually commenced; but the death of that sagacious sovereign put an end to the work.

[**Messedaglia, G. B.**—*Diario Storico Militare delle Rivolte al Sudan dal 1878 in poi.* Alessandria, V. Penasson, 1886: large 8vo., pp. 63, maps. [Presented by F. Bonola, General Secretary to the 'Société Khédiviale de Géographie.']]

[**Möller, P., Pagels, G., och Gleerup, E.**—*Tre År i Kongo.* Stockholm, Norstedt. [Presented by the Publishers.]]

This work is appearing in parts of 80 pages each, and will when complete form two volumes. It describes the experiences of the three authors during their residence on the Congo as employés of the Free State. Two parts have appeared, abundantly illustrated.

[**Rohlf, Gerhard.**—*Quid Novi Ex Africa?* Cassel, Fischer, 1886: 8vo., pp. 288. [Presented by the Author.]]

This volume, without contents or index, consists of a number of detached sketchy papers by Dr. Rohlf on a great variety of African subjects, such as Towns on the Red Sea; the Climate of the Red Sea and Abyssinia; Egypt; Coffee; Jews in Africa; Is there any reason for believing that the town populations of Morocco, Algeria, Tunis, and Tripoli are of a special character? France, Algeria, and Tunis; the Colonisation of East Africa: the Hygiene and Climatology of East Africa, &c. There is no indication that these papers have already appeared, though they have mostly the appearance of journalistic articles.

#### AMERICA.

[**Ball, John, F.R.S.**—*Notes of a Naturalist in South America.* London, Kegan Paul, Trench, & Co., 1887. Price 8s. 6d. [Presented by the Author.]]

This valuable and interesting work contains Mr. Ball's first impressions of South America, during a journey which occupied the five months from March to August 1882. He went direct from Southampton to Panama, sailed down the West Coast, through the Straits of Magellan, up the coast of Brazil as far north as Pernambuco, and then home.

It will be seen that this embraces a glance at the whole of South America, except the Orinoco region treated of by Humboldt, and the Amazons by Bates. It has often been remarked that naturalists are the best writers of books of travel, because they observe more accurately, and convey their own impressions more graphically than other travellers. This work is an additional proof of the truth of the observation. In less than 400 pages it conveys a clearer idea of South America than the untrained traveller could give if he wrote a score of volumes. This then is the book for the general reader. But the general reader believes, with Pope, that "The proper study of mankind is man;" so when he reaches the opening chapter (p. 11), and finds the author say, "Next to the vegetable inhabitants, I was interested in the black population of the island"—he will be apt to stop short, fearing he will hear of little but botany. But this fear would be unfounded, for Mr. Ball is better than his word. All that is technical in his botanical work he has relegated to the pages of the *Journal of the Linnæan Society*. The botany in these "Notes" is of general interest, popular in style and interspersed with anecdotes. It is, for instance, something new about the thistle to learn that it now covers large tracts of country in Southern Chili, because an Englishman (Query, Scotchman), under the strange delusion that it would be useful as fodder, imported a sack of the seed and sowed it broadcast.

On another page we read that a Peruvian plant called the *tupa* is alleged by the Indians to produce temporary blindness if the eyes happen to be touched after handling the leaves of the plant. A local botanist, Mr. Nation, purely from a love for science, verified the statement by experiment.

When Captain (afterwards Admiral) Fitzroy left York, Fuegia, and Jemmy in Tierra del Fuego, in 1834, Darwin wrote in his *Journal* (p. 226)—"I fear it is more than doubtful whether their visit will have been of any use to them." This sad forecast has been realised. Mr. Ball's picture of the drunkenness and degradation of the natives in the Straits of Magellan makes it clear that they are a doomed race, unless spirits be removed out of their way.

It is pleasant to turn to a country where our author found striking evidences of progress and civilisation—the Argentine Republic, for which he has invented the compact and appropriate name, *Argentaria*. The most remarkable fact is the enormous stream of spontaneous immigration flowing into the country, chiefly from Italy. In 1875 it was, as stated by Mr. Ball, 47,500. In 1886 it had increased to upwards of 100,000 per annum. As the existing population is under 5,000,000, this represents a larger ratio of increase by immigration than any recorded in the history of nations—except, perhaps, in the Californian and Australian rush for gold; hence the rapid progress of *Argentaria* in material wealth, and the sudden development of agriculture in a country which, until recently, was purely pastoral.

Wending his way northward, our traveller then entered that paradise of the naturalist—Brazil. Judging by his glowing description of the marvels of tropical nature, which, however, do not go one hairbreadth beyond the truth, it is clear that if Mr. Ball had happened to reverse the order of his voyage, and taken the Brazil coast first, he would have spent his five months there, and the rest of the “Notes” would have been unwritten. The world would have been so much the poorer; but now that we have secured this book, let us hope that Mr. Ball’s next holiday may be spent in Brazil, so that it may be followed at no distant day by one on its natural wonders, which he is so well qualified to appreciate and describe.

Mr. Ball, throughout the volume and especially in the appendices, has contributed much that is of the highest interest to the scientific geographer. The first appendix deals with the fall of temperature in ascending to heights above sea-level. This is followed by another, of special interest, in which he discusses some points in connection with Dr. Croll’s theory of secular changes in the earth’s surface. While amply recognising the high value of Dr. Croll’s work, Mr. Ball indicates what he considers as one or two weaknesses in the line of argument. One important point he indicates is that recent observations seem to show that facts do not justify the assumption that the average temperature of the southern hemisphere is lower than that of the northern; if there is any essential difference it is more likely to be the other way. Mr. Ball, in connection with his very instructive isothermal map in the volume, refers to the effect of the so-called “Humboldt current” in lowering the temperature of the West Coast of South America. It will, no doubt, interest him to read what Mr. Buchanan says with reference to the supposed current in his paper in the ‘Proceedings R.G.S.’ for December 1886.—[C. M.]

[*Bolivia*.]—*La Bolivie (Lettres d’un Voyageur Suisse)*. 8vo.

**Giles, Pearce.**—*The True Source of the Mississippi*. Buffalo, N.Y., Matthews, Northrup & Co., 1887: 8vo., pp. 48.

This is another contribution to the tiresome controversy concerning the source of the Mississippi; it is written on behalf of Captain Glazier’s claim.

**Margry, Pierre.**—*Mémoires et Documents pour servir à l’Histoire des Origines Françaises des Pays Outre-Mer. Découvertes et Établissements des Français dans l’Ouest et dans le Sud de l’Amérique Septentrionale (1683-1724)*. Tome cinquième. Paris, Maisonneuve Frères et Ch. Leclercq, 1887: 8vo., pp. clx. and 697. Price 20s. (*Dulau*.)

The previous volume of this important publication was noticed in the ‘Proceedings’ for 1882, p. 122. The sub-title of the new volume indicates the nature of the documents which it contains—“*Première Formation d’une Chaîne de Postes entre le Fleuve St. Laurent et le Golfe du Mexique, (1683-1724)*.” M. Margry’s Introduction shows the bearing of these documents, and gives the history of the period to which the documents refer so far as the French in America are concerned. The first part contains contemporary documents referring to the subject indicated by the sub-title. Besides this there is a document by Lamothe Cadillac on Missilimakinak (on Lake Huron) and the countries beyond, in which the writer adduces a crowd of curious reasons for believing that the Hurons were descendants of the Jews. From the same writer there is a document on the establishment of a post on the

strait (Detroit) between Lakes Huron and Erie. In the second part we have various letters by Juchereau de St.-Denys on the communication between Louisiana and Canada by the affluents of the Mississippi. Part 3 contains many communications by Lamothe Cadillac and Le Moyne de Bienville on the establishment of the French on the coasts of the Gulf of Mexico, and by the latter and De Panger on the establishment of New Orleans and Balise, the embouchure and the passes of the Mississippi.

## ARCTIC.

[**Jan Mayen.**—Die Internationale Polarforschung, 1882–1883. Die österreichische Polarstation Jan Mayen ausgerüstet durch seine Excellenz Graf Hanns Wilczek geleitet vom K. K. Corvetten Capitän Emil Edlen von Wohlgenuth. Beobachtungs-Ergebnisse herausgegeben von der Kaiserlichen Akademie der Wissenschaften. II. Band. II. Abtheilung. [Wien] Karl Gerold's Sohn: 4to., pp. 175, diagrams. [Presented by the Imperial Academy of Sciences, Vienna.]

## GENERAL.

**Mommsen, Theodor.**—The Provinces of the Roman Empire from Caesar to Diocletian. Translated with the Author's sanction and additions by William P. Dickson, D.D., LL.D. London, Bentley & Son, 1886: two vols. 8vo.; vol. i. pp. xvi. and 367; vol. ii. pp. [iv.] and 366. Price 36s.

These two volumes are a continuation of Mommsen's well-known History of Rome. Apart from their great historical value, they deal so largely with the geography of the important period which they embrace, that they will be considered a valuable acquisition by the student of ancient geography. The ten maps by Dr. Kiepert add much to the geographical value of the volumes.

**Reclus, Elisée.**—The Earth, a Descriptive History of the Phenomena of the Life of the Globe. Edited by Professor A. H. Keane. London, Virtue & Co., 1886: imp. 8vo., pp. xii. and 500.

— The Ocean, Atmosphere and Life. A Descriptive History of the Phenomena of the Life of the Globe. Edited by Professor A. H. Keane. London, Virtue & Co., 1887: imp. 8vo.; pp. xii. and 500. Price 21s. each volume. [Presented by the Publisher.]

As there is no preface to these volumes we do not know to what extent the reprint of the translation of M. Reclus' well-known works has been brought up to date. So far as we can see the main addition to the volume on the Earth is Professor Keane's Appendix on the Progress of Recent Geographical Exploration, which is referred to neither in contents nor index. In the next reprint some of the Alpine heights and names should be more carefully revised. On the whole, 'The Earth' is a very full and trustworthy, as well as eloquently written, account of the chief facts of physical geography up to the date of M. Reclus' own revision.

To 'The Ocean' Professor Keane has been able to do much more than to 'The Earth.' The volume bears evidence of considerable research on his part, and many of the results of recent ocean investigations have been embodied. The Ocean occupies only the first section of the volume; part ii. dealing with the Atmosphere and Meteorology, and part iii. with Life. The two volumes, it will be seen, cover a wide field, and are, no doubt, intended to serve as an introduction to M. Reclus' Universal Geography. The illustrations and maps are as abundant and beautifully executed as in all the other works that come from M. Reclus' hands.

[**Scientific Geography.**—Zeitschrift für Wissenschaftliche Geographie, . . . herausgegeben von J. I. Kettler (Weimar). Band vi. Heft 1. Weimar, Geographisches Institut, 1887.

We are glad to welcome the revival of this important organ of scientific geography, which has been in abeyance for some time. Dr. Kettler's colleagues



are Professors H. Fischer, A. Kirchhoff, O. Krümmel, J. Rein, S. Ruge, M. Schunke, and F. Wieser. The longest article in this number is Herr Reiter's paper on the Antarctic Question, to which we have referred as a separate publication. Dr. O. Krümmel contributes a valuable paper on surface temperatures of the ocean, with a map. In a note on the Post and Telegraph School of Berlin we are informed that in the higher classes geography occupies an important place, and judging from the programme of subjects given it is of a very thorough character.

**Guillemard, F. H. H.**—The Cruise of the *Marchesa* to Kamschatka and New Guinea, with notices of Formosa, Liu-Kiu, and various Islands of the Malay Archipelago. By F. H. H. Guillemard, M.A., M.D. (Cantab.), &c. 2 vols. 8vo., maps, and numerous woodcuts and coloured illustrations. Murray, 1886. Price 42s.

This work will take high rank as a book of travel. The cruise of Mr. C. T. Kettlewell's yacht *Marchesa* in the eastern seas, of which it is a narrative, occupied the months from January 1881 to April 1884, and appears to have been planned with the design of visiting the least-frequented lands of that part of the world, and studying their natural history and the physical and social peculiarities of the native races. With excellent literary tact Dr. Guillemard has chosen to pass lightly over, or say nothing about, places and countries which have come within the range of the globe-trotter or have been frequently before described. Thus we are spared an account of the voyage out via Suez Canal, of Ceylon, Singapore, Java, Hong Kong, and Japan, whilst ample space is given to the stranger region of Kamschatka, the eastern side of Formosa, the Sulu archipelago, North Borneo, Northern Celebes, and the western islands and mainland of New Guinea. Many of the smaller islands, unvisited by former travellers, and erroneously laid down on the best modern charts, were more or less carefully explored, so that the cruise, to that extent, has proved to be one of geographical discovery. Though teeming with valuable scientific information and original observation, the book is most agreeable reading, any tedium that might arise from the sameness of incidents which will sometimes occur in the conscientiously written narrative of even the most varied travel, being relieved by happy touches of humour and lucid descriptions of scenery. The work is beautifully illustrated, and the pleasure and profit of reading it are not a little enhanced by an abundance of single-page maps; the convenient plan being adopted of giving a general map, with routes, at the beginning of each main section of the region travelled over, and a special map on, of course, a much larger scale, for the separate islands or excursions. These maps, good and useful as they are, might, however, easily have been made better, for in many cases places mentioned in the text are omitted, rendering it difficult to follow on the map the author's narrative.—[H. W. B.]

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The following works have also been added to the Library:—

**Curzon, [Hon.] Robert.**—Visits to Monasteries in the Levant. Sixth edition. With illustrations. London, John Murray, 1881: cr. 8vo., pp. xx. and 373.

**Barbier, J. V.**—Essai d'un Lexique géographique. Paris, Berger-Levrault & Co., 1886: 8vo., pp. 115, tables.

**Morse, Edward S.**—Ancient and Modern Methods of Arrow-Release. [From the Bulletin of the Essex Institute, vol. xvii., Oct.-Dec., 1885.] 8vo., pp. 56, illustrations. [Presented by the Peabody Academy of Science, Salem, Mass.]

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## NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

## EUROPE.

- Bayern**.—Topographischen Atlas der Königreich —, bearbeitet im topograph. Bureau d. K. b. Generalstabes. Scale 1 : 50,000 or 1·4 inches to a geographical mile. Blatt 20, Bamberg, Ost.—39, Ansbach, Ost.—40, Schwabach, Ost und West.—60, Dillingen, West. Price 1s. 6d. each sheet. (*Dulau*.)
- Bayern**.—Positions-Karte vom Königreich. Bearbeitet im topograph. Bureau d. K. b. Generalstabes. 1 : 25,000. No. 543, Landau.—544, Eichendorf.—572, Simbach.—573, Arnsdorf.—602, Diepoltkirchen.—603, Schönau.—629, Neumarkt a/R.—630, Massing.—631, Eggenfelden.—632, Wurmannsquick.—657, Zangberg.—658, Mössling. München. Price 1s. 6d. each sheet. (*Dulau*.)
- Deutschen Reiches**.—Karte des —. Herausgegeben von der kartogr. Abteilung der Königl. Preuss. Landes-Aufnahme 1886. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sheets :—41, Wiek auf Rügen; 90, Zinnowitz; 518, Troppowitz; 539, Ewringen; 573, Karlsruhe; 587, Hagenau. Price 1s. 6d. each sheet. (*Dulau*.)
- Helgoland**.—Plan der Insel —, von Fr. Aeuckens. Helgoland. Price 2s. (*Dulau*.)
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- Russisch-Polen**.—Handkarte von —, und den angrenzenden Gouvernements, von G. O'Grady. Kassel, Fischer. Price 1s. (*Dulau*.)

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**Town Plans**—10-foot scale:—

ENGLAND AND WALES: Aberystwith, VI. 9, 8, 12 and 13, 14, 16, 19, 22, 23, 24; VI. 13, 3, 4, 8; 2s. each. Bradford-on-Avon, XXII. 14, 13, 14, 19; 2s. each. Trowbridge, XXXVIII. 7, 5, 9, 10, 13, 14, 15, 18, 19, 20, 23, 24, 25; XXXVIII. 8, 6, 11; XXXVIII. 11, 3, 4, 5; 2s. each. West Bromwich, LXVIII. 14, 3, 4, 10; LXVIII. 15, 1, 6; 2s. each.

(Stanford, Agent.)

ASIA.

**Asien.**—Uebersichts-Karte der ethnographischen Verhältnisse von —, und von den angrenzenden Theilen Europa's. Bearbeitet auf Grundlage von Fr. Müller's Allgemeiner Ethnographie und herausgegeben mit Unterstützung der kaiserlichen Akademie der Wissenschaften in Wien von Vinzenz v. Haardt. Ausgeführt im geographischen Institute v. Ed. Hölzel in Wien. Scale 1:8,000,000 or 109·5 geographical miles to an inch. Wien, 1887. Im Selbst-Verlage des Verfassers. Für den Buchhandel in Commission bei Ed. Hölzel in Wien, 6 sheets. Price 17. 10s. (Stanford.)

This important map exhibits the distribution of the various races of men inhabiting the continent of Asia and Western Europe. The difficulty which invariably presents itself when it is desired to illustrate graphically the details of any large subject, in consequence of the number of shades of colour which have to be employed, has been overcome in the present instance by the judicious system adopted by the author, which is as follows:—Each different shade represents some great division of the human race, the subdivisions of which are indicated by numerals placed on the colours used for the whole race. In all cases where the same tint extends over any large area the name of the people is given in addition to the colour. Altogether the arrangement appears to be good, and enables any one, with the aid of the very clear explanations given with the index, to see what special race of men inhabits any particular district contained within the limits of the map. The author informs us in the title that this map is based on Fr. Müller's 'Allgemeiner Ethnographie,' and great credit is due to Herr Vinzenz v. Haardt for the admirable manner in which he has placed before the student the information contained in that work. The scale is sufficiently large to admit of a fair amount of detail; it is well executed, and cannot fail to be of value to all who may be interested in ethnological studies.

**Indian Government Surveys:**—

Indian Atlas, 4 miles to an inch. Quarter Sheets: 32 N.W. Parts of Bickaneer Native State (Rajputana Agency). 39 S.W. Parts of Districts Ahmednagar, Kolaba, Poona, Satara, and of Bhor Native State (Bombay Presidency). 40 N.E. Parts of Districts Sholapur, Kaladgi, Satara, Kolhapur and Poona (Bombay Presidency), and Paranda Circar (Nizam's Dominions). 67 N.E. Parts of Bareilly, Kumaun, Tarai and Pilibhit (N.W. Provinces), and Nepal (Native

(State).—India, 1883, 80 miles to an inch. 2 sheets.—Trigonometrical Branch, Survey of India. Káthiáwár, 1 mile to an inch. Sheet No. 6 (2nd edition). Seasons 1863–64, 1867–68. Parts of Gohelvád and Ahmedabad. No. 7 (2nd edition). Seasons 1863–64–66–67 and 1867–68. Part of Gohelvád. No. 12 (2nd edition). Season 1868–9. Part of Jhálávád. No. 15 (2nd edition). Seasons 1866–67 and 1867–68. Parts of Gohelvád and N. Káthiáwár. No. 16 (2nd edition). Seasons 1866–67 and 1868–69. Parts of Káthiáwár, Gohelvád, and Undsarvaiya. No. 26 (2nd edition). Seasons 1870–71. Parts of Káthiáwár, and Gohelvád. No. 27 (2nd edition). Seasons 1870–71. Parts of Káthiáwár and Gohelvád. No. 28 (2nd edition). Seasons 1870–71. Parts of Sorath, Káthiáwár, Gohelvád, and Bábriávád. No. 32 (2nd edition). Seasons 1873–74. Parts of Halar and Machhu-Kánta. No. 33 (2nd edition). Seasons 1873–74. Parts of Hálár, Machhu-Kánta, and Jhálávád. No. 43. Seasons 1874–75. Part of Hálár. No. 52 (2nd edition). Season 1878–79. Part of Hálár. No. 53 (2nd edition). Seasons 1878–79. Part of Hálár.—Trigonometrical Branch, Survey of India. Sheet No. 15 of Gujarát (2nd edition). Scale 1 inch to a mile. City of Surat, with portions of its Collectorate, and parts of the Baroda and Sachin States. Seasons 1876–77.—Gujarát Survey, 1 mile to an inch. Seasons 1883–84 and 1884–85. Sheet No. 184. Parts of the Baroda State, and of the Rewa Kantha Agency.—Oudh Revenue Survey, 1 mile to an inch. Seasons 1860 to 65. Sheets No. 136. Districts Lucknow, Unao, Rae Bareli, and Bara Banki. No. 150. Districts Barabanki, Fyzabad, Sultanpur, and Rae Bareli. No. 164. Districts Sultanpur and Fyzabad.—Punjab Survey, 1 inch to a mile. Seasons 1853 to 56. Sheets Nos. 147, 148, 149, 150, 170, 171, 172, 173, 175, 194, 195, 196, 197, 198, 211, 212. District Montgomery. Sheet No. 251. Districts Jullundur and Ludhiana, and Kapurthala State. Season 1884–85.—Bengal Survey, 1 inch to a mile. Seasons 1857 to 69. Sheets Nos. 295, 296, 316, 317, 318, 337. District Jalpaiguri.—Mysore Topographical Survey, 1 inch to a mile. Season 1883–84. Sheets Nos. 60 and 61. Parts of Districts Bangalore and Mysore. District Kohat. 1880–81–82–83. Scale 4 miles to an inch.—District Lohardugga, Chota Nagpur, 4 miles to an inch. 1874. 4 sheets. (*Stanford, Agent.*)

## AUSTRALASIA.

**Queenland.**—Map of —, illustrating its Mineral and other Productive Capabilities. Scale 1:3,504,000 or 48 geographical miles to an inch. Printed and Published at the Surveyor-General's Office, Brisbane, 1886.

**Sumatra.**—Kart van het Eiland — en den Riouw-Archipel. Scale 1:1,500,000 or 20·4 geographical miles to an inch. Zamengesteld door W. J. Havenga voormalig Chef van den Topographischen dienst in Nederlandsch-Indië, 1886. G. Koff en Co., Batavia; Institut National de Géographie, Bruxelles. (*Dulau.*)

This is a beautifully executed map, on which the topography of the island of Sumatra is very clearly shown, and all details, such as means of communication by land and sea, are laid down. The towns and villages are distinguished, according to their importance, by symbols, and the boundaries of the several Residencies are given. The map is a fine specimen of cartography, but it would have been better if the coast-line had been marked in a more decided manner.

**Tarawera Volcano, New Zealand.**—Plan of the Seat of Eruption, 10th June, 1886. Scale 80 chains to an inch. Surveyor-General's Office, Wellington, 1886. (*Dulau.*)

## ATLASES.

**Bacon, G. W., F.R.G.S.**—New Complete Atlas of the World, containing all the latest Geographical Discoveries throughout the various Countries of the World, with General Description, Alphabetical Index, and Gazetteer of 1000 principal towns. London: edited and published by George Bacon, F.R.G.S. Price 2*l.* 15*s.*

This Atlas is for the most part composed of the maps of the "Dispatch Atlas," which was published about thirty years ago. Attempts have been made to correct these and bring them up to date, but an experienced eye will at once detect many errors and omissions. The most accurate portion of the Atlas is the manner in which the railroads have been laid down, but even in this respect there are serious errors, as for instance in the case of maps 101 and 102, one of which the Northern Pacific Railway, which has been working through for some years, is said to be a proposed line, and on the other the Canadian Pacific Railway is shown as incomplete. The topography is very poorly shown and contains numerous mistakes, some of the geography laid down being that given in the original maps, exhibiting the state of our knowledge thirty years ago.

**Berghaus' Physikalischer Atlas** (begründet 1836 von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Berghaus. Achte Lieferung. Inhalt: Nr. 30, Isothermen von Europa. Nr. 49, Florenkarte von Afrika und Australien. Nr. 57, Amphibien und Fische. Gotha, Justus Perthes, 1887. Price 3*s.* each part. (*Dulau.*)

**British Empire.**—The Colonial and Indian Atlas of the —. W. & A. K. Johnston, Edinburgh and London, 1887. Price 5*s.*

This atlas consists of twenty-nine sheets of maps, some of which are far superior to any that have been produced in the cheaper class of English atlases, of which so many have been published during the past and present year. The eight maps of the Indian Empire are specially worthy of notice, and appear to have been taken from the Royal Atlas. The maps of Canada and Australia are also good, evident care having been taken to use the best and most recent materials in their construction; the same remark applies to the smaller and inset maps. Though not part of the British Empire, the well-executed plan of the Suez Canal which is given, is a very useful addition to the Indian and Colonial maps which this class of atlas usually contain. As the expense of mounting full-page maps on guards would have considerably added to the cost of production, and consequently have raised the price, a system of dividing the maps by a blank margin in the centre has been adopted, by which means the whole of the map is open to view instead of being hidden in the centre, as it would be if this precaution had not been taken.

## EDUCATIONAL.

**Palestine.**—Pictorial Map of Palestine, giving a bird's-eye view of the Holy Land, and showing the peculiar features of the country, Jordan valley, the Ravines and Towns. Important events indicated by distinctive marks. By Frances H. Wood. Size 68 inches by 34 inches. Mounted on linen and varnished, with roller and Handbook. Price 9*s.* 9*d.* To be obtained, post free, from the author, Beckenham, Kent.

This would more properly have been called a picture than a map. It is very misleading as regards vertical scale, and though it might convey to the mind of a child some general notion of the positions of places of interest, it would at the same time give very false ideas as to the magnitude of the area embraced, and surface conditions of the country. It may also be remarked that the lettering is very indistinct.



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PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*The Alpine Regions of Alaska.*

By Lieut. H. W. SETON-KARR.

(Read at the Evening Meeting, March 14th, 1887.)

Map, p. 330.

ALASKA, or the north-west corner of North America, was bought from Russia by the United States twenty years ago. It is bordered on the east by British territory, and extends from 55° north latitude far into the Arctic Zone and offers one of the best regions for the study of the formation, movements, and extent of glaciers, especially that part of it which we visited and explored for the first time.

Having left England last April for the purpose of visiting these alpine regions, I found on reaching Victoria another expedition bound for the same spot, namely, Mount Saint Elias, and was allowed to join the party. It was equipped by the *New York Times*, and consisted of Lieut. F. Schwatka and Professor Libbey, jun., of Princeton College, N.Y.

On the conclusion of this expedition, I went on alone to the north and west, instead of returning by the United States man-of-war which came back for us in September; and I found that the glaciers were quite as extensive on the west of Mount St. Elias as they are on the east of it, while one of immense extent, near Cape Suckling, was named the Great Bering Glacier, this being the portion of America which that explorer first sighted.

Having now returned from my six months' exploration, and as the first traveller in the footsteps of Cook to make a complete circuit of this coast from St. Elias to Prince William Sound and thence to the westward, my impressions have been, that the St. Elias alpine region offers one of the best places for the study of glacial phenomena under the most powerful conditions. The air is warmed and charged with vapours by the Pacific currents, including the Kuro Siwo or so-called Japan current. It is suddenly confronted by a vast range of mountains rising directly from the ocean's edge. The result is a snowfall unusually heavy, and the



thickest and most extensive glaciers after those of Greenland or the Arctic regions.

Along the whole of this difficult coast, bordered as it is by a gigantic wall of icy mountains facing the sea and rising abruptly from its brink, from the end of the Inland Passage at Cape Spencer as far as Prince William Sound, there are only two spots where any shelter exists with a safe landing-place all the year round—namely Yakatat village and Kaiak. But at seven other points the Indians can land during the fine summer months, namely, at Lituya Bay, at Dry Bay, at the river near it, at the head of Yakatat Bay, at Icy Bay, at Cape Yagtag, and at a reef near Icy Cape.

None of the old navigators saw the true character of the flat broad plains which border this coast. To the east of Yakatat Bay, and to the east of Icy Bay, there exist small areas of flat land which are covered with a forest of spruce and cedar. But every other plain or flat expanse consists of ice, and is covered with stones and moraines. In other words, the country that intervenes between the range of the St. Elias Alps and the sea (from Cross Sound to the Copper river) with the exceptions I have mentioned, consists entirely and exclusively of glaciers and nothing else. The terminal moraines of these glaciers are so gigantic and extensive that the ice itself lies buried under millions of tons and hundreds of square miles of loose rocks and stones which it has carried down with it from the mountains in its slow and gradual advance. Large as are these moraines the bare ice is correspondingly immense in its extent. What we named the Great Agassiz Glacier is probably about 600 square miles in extent, and its moraines between one and two hundred; and what we named the Great Guyot Glacier, on the west of it, is of quite unknown extent. Where it projects into the sea the ice cliffs are 300 feet high. This forms Icy Cape. We saw no icebergs here, probably because the current carries to the westward the masses that fall off into the sea.

Vancouver described the coast between Yakatat Bay and Icy Bay as "a barren country composed of loose stones." No one could have guessed, without landing, that all these loose stones were the moraines of the glaciers which lay beneath them. But when we landed at Icy Bay and inspected the so-called barren country, it was seen that below the stones and rocks there lay solid ice ranging from three or four hundred feet in thickness in some places to six or seven hundred feet in other places. These moraines or accumulations of rubble and stones upon the surface of the ice at Icy Bay change and move with the ice so slowly, that parts are covered with brush and thicket of great density—so dense that it cost us many hours of labour to cross a mile of it.

La Pérouse, too, like all the navigators who have sailed along this coast, mistook the true nature of what he saw. He thought the ice, where it protruded from under the stones, was snow lying upon the

ground. He wrote that "masses of snow covered a barren soil unembellished by a single tree; this plain, black as if burned by fire, was totally destitute of verdure."

Forty miles W.N.W. from Cape Phipps lies Cape Sitkagi, which is the Pointe de la Boussole of La Pérouse. Vancouver's Cape Riou, about 15 miles N.W. by W. of it, is the Low Cape of Tebenkoff.

Icy Bay is merely a shallow crescent in the coast-line, though Tebenkoff marks 12 and 15 fathoms, and 5 fathoms at the head at a point on the chart which is now many miles from the sea, and consists of the gravelly and partially dry estuary of the river.

Mount St. Elias (according to Prof. Davidson's 'Coast Pilot of Alaska') lies in lat.  $60^{\circ} 22' 6''$ , and long.  $140^{\circ} 54'$ . Dall, the American surveyor, makes it 19,500 feet high; the Admiralty chart, 14,975 feet; the Russian chart, 17,854 feet; Grewink, 16,754 feet; and D'Agelet, 12,672 feet. It is thus one of the few mountains whose height exceeds the first estimations. It is said to have been in eruption in 1837 and 1847. If this be true, the eruption could hardly have issued from the summit, which is a sharp rocky peak, but rather from what much resembles an old crater on its south-east base, and which the maze of crevasses on the glacier prevented our approaching; but we found no traces of volcanic action. In the Report of the U.S. Coast Survey Mr. Dall says, "After a thorough search I have been able to find no trustworthy account of any eruption." St. Elias is, I believe, the Russian patron saint of thunder, which, strangely enough, is very rarely heard in the neighbourhood of Mount St. Elias. The massiveness of the peak made it appear to me not to be higher than 15,000 feet. The breadth of its form and the high mountains behind it have perhaps been the cause of its height having been underestimated. St. Elias has thus undergone promotion. Mount Hood, in Oregon, has suffered from treatment the very contrary, because it stands alone. It was originally, by a "rough" estimate, 17,000 feet high (I quote from an article in *The Times*). A "close" estimate made it 16,000 feet. Some measurements by angles dropped it to 14,500 feet, and a triangulation to 13,000. The first aneroid taken up was said to have made it 12,000 feet, and afterwards a mercurial barometer brought it out 11,225 feet; so that if these reducing processes go on, Mount Hood may, in the words of a pioneer of that region, "finally become a hole in the ground."

The scene or view of the St. Elias range from Yakutat is one of the most wonderful in the world. Mount St. Elias, hitherto considered the highest mountain in North America, stands upon the ocean's edge, from which it rises sheer to 20,000 feet—a mass of snow and ice from base to summit—the longest snow-climb in the world short of the Antarctic regions. Its summit has always been marked in modern maps (though not in that of Tebenkoff, which has formed the basis of all these maps) as exactly on the 141st meridian, which is the boundary line, as though two

nations were chary of claiming a summit which belongs to one of them; and what is more curious still, as exactly 10 leagues from the shore. This was the extreme limit to which the narrow strip of coast called South-east Alaska could extend inland. If the summit of the watershed came within that distance, the boundary was to follow that. If the shore-line has been correctly charted, I found that the summit was east of the meridian of longitude just mentioned. It was also more than ten leagues from the shore-line of Icy Bay. Mount St. Elias is therefore in the British Empire. It is to be supposed, as a San Franciscan officer remarked to me, that war will not ensue with reference to this question.

Vancouver (July 1794) writes: "At eight in the evening, Mount St. Elias bore by compass N.  $73\frac{1}{2}^{\circ}$  W., and Mount Fairweather, N.  $10^{\circ}$  E. The length of time we had been in sight of these very remarkable lofty mountains afforded us many observations for ascertaining their situation, whence the former appeared to be in latitude  $60^{\circ} 22\frac{1}{4}'$ , longitude  $219^{\circ} 21'$ . Until past eleven at night, Mount St. Elias was yet within our visible horizon, appearing like a lofty mountain; although at this time it was at a distance of one hundred and fifty geographical miles." This is in longitude  $140^{\circ} 39'$  W. from Greenwich, and more than thirty miles from the sea. We left Sitka on July 10th, in the U.S. man-of-war *Pinta*, for the Indian village in Yakatat Bay. We reached it on the 12th. There is a small landlocked harbour here; five Indian houses form the village. After waiting here for four days, trying to hire a large canoe, the vessel took us to the foot of St. Elias. Besides two white men and an Indian interpreter we had hired from Sitka, three Indians were brought from Yakatat, making a total of nine persons.

We were landed on July 17th, at Icy Bay. But not without difficulty, for the surf on this coast is heavy and constant. On the beach were an immense number of bear tracks; one of our men, who stayed at the base camp, killed three of these animals, while we saw another in the very heart of the icy region. A number of immense torrents reach the sea all along this coast. There are at least three between Point Riou and Point Sitkagi. So large is the body of fresh water brought from the glaciers by these torrents, that the sea is fresh on the surface and fit for drinking more than a mile from shore, notwithstanding the constant and strong current which sets from the eastward. But the extent of the glaciers, whose melting produces all this fresh water, is also immense. From the highest point attained in our ascent of St. Elias, nothing could be seen in the distance but plains of ice, much more extensive than I had ever seen before. The largest of these rivers issues from under the ice which has bridged it over, or buried it, just at the meeting of the Guyot and Agassiz Glaciers. It was called the Jones river; and up this river we had to make our way on the 19th of July. This river spread out into a fan-like delta, the apex of which was near what looked like a green wooded hill, which had

a curiously uneven outline like the teeth of a saw. Meanwhile, we were almost constantly wading in ice-cold water, and some quicksands had to be crossed, than which there is, I suppose, no sensation more unpleasant. It seemed as though an elastic crust of glacier mud were floating on a liquid mass below, and might break and let one in at any moment. But when at last this occurred to one of us, he sank, to our relief, no farther than his middle, saying he had struck bed-rock, or more probably the bed of the stream. About five in the afternoon we were near enough to the green hill (as we had thought it to be) to discover that it was nothing more nor less than a very large glacier, which we named, as I have said, the Agassiz Glacier, its front part being quite buried under enormous quantities of moraine, and overgrown with birch and willow. Large streams welled up from between the rocks at its foot, one of which we named the Fee River. This huge moraine must be one of the most extraordinary in the world. A great thickness of ice lies buried underneath it. It is now advancing faster than it can melt away, for the forest is being gradually swept down before it.

After waiting for two days in order to bring up more supplies, we started once more, and after penetrating for a mile through the thick brushwood on the moraine, we found that vegetation ceased altogether, leaving nothing but hillocks of stones heaped together on the ice, and more or less compacted by age.

The moraines of the Great Agassiz Glacier were mostly composed of granite, and those of the Great Guyot Glacier of slate. A wide depression in the glacier marks their line of junction, under which, unseen and unheard, flows the great river.

At dusk we were brought to a standstill by a large lake covered with icebergs, which we named after the President of the Italian Geographical Society (Castani). Beyond it lay a range of hills which we named the Chaix Hills, after the venerable Swiss professor of geography. At this point, one of the party getting lost detained us for two days. This was camp number three. Professor Lillie had thought this large lake could only be passed by our keeping to the east. I considered the west to be the best way. We both therefore set out in opposite directions to make sure. The Professor, as I have said, was unfortunately absent for two days without being able to find a practicable route. But meantime I had found a way on to the Chaix Hills. The way lay across a patch of timber, which subsequently became an island, but which when I first found it was not an island at all. On one side it was bordered by the ice-tips of the glacier, and nothing intervened between it and the Chaix Hills but a broad plain of gravel and the damp bed of a large river, or like part of the bottom of the lake, the waters of which seemed to have sunk below their usual level. Less than twenty-four hours later this river-bed—for such it was—was covered by 20 feet of muddy water, running past at enormous speed, carrying with it icebergs and trees. A large

chain of lakes had been dammed up and had burst loose again. The fires we had made along its banks to guide the lost one back to camp had set the small forest ablaze.

The ice was gradually advancing, and the pine trees were in process of being mowed down by the advancing glacier and ground up into mere heaps of matchwood. Three destructive agencies were thus at work at the same time within a yard or two of each other—fire, water, and ice. This breaking loose of the river accounted for the marks of sudden risings and fallings in the water-level on the distant flat-land of Icy Bay, where the vast mud-flats were always damp, as if from periodical inundations.

Our next day's march took us right to the base of Mount St. Elias, up a great glacier descending from the face of the mountain, which we named the Tyndall Glacier. The mocassins of our Indians were now for the second time worn out. But in any case they would have refused from superstitious fear to proceed with us any farther.

At half-past four next morning, we left our fifth and last camp for the final ascent. The party then consisted of Lieut. Frederick Schwatka, Joseph Woods (one of our two hired men) and myself. As the only one with any alpine experience, I tied Mr. Schwatka in the centre of the rope, and Woods and myself at the ends. As we approached the great bend and ice-fall of the Tyndall Glacier, the crevasses became covered with fresh snow. Mr. Schwatka's great weight—eighteen stone—would have made it very difficult for us had any of the snow bridges over the crevasses given way, and as it drew on towards midday these became quite soft.

We were now aiming for one of the bare rocky ridges which descend direct from the upper snow-fields. We soon found we were wasting much valuable time in trying to thread the labyrinth of crevasses without advancing at all nearer to the peak itself, which now was clouding over. Only one day's provisions remained. This was hardly enough even for an immediate return. We now felt the consequences of our delay of two days during the loss of Prof. Libbey. If the snow over any of the fissures had given way under Mr. Schwatka, we might have had very great difficulty in raising him to the surface again. With a couple of Swiss guides, and a whole fortnight, or even a week, at one's disposal, a great height would have been attained, if not the conquest of the actual summit. The state of the weather, and the time that would be wasted in passing the icefall, compelled us at last to attack the rocky ridges of the west spur, which seemed to present no difficulties which we could not overcome. Mr. Schwatka was unable, through illness, to ascend beyond a certain point, but I continued the ascent up a steep arête.

At a height of 6500 feet I could see the country to the north-west and south-east. It consisted entirely of plains of ice. Above the height

of 6900 feet I was in the clouds, and therefore saw nothing. It was only obvious that the summit of the ridge was reached by the fact that the ground in front commenced to fall away to the westward.

It was now about six in the evening, and I was alone upon the summit of the western ridge or spur of Mount St. Elias.

As shown by aneroid, the altitude was 1490 feet above where I had left Mr. Schwatka, who had retained one of the two large mercurial mountain barometers. Professor Libbey was meanwhile making simultaneous observations below at our fourth camp, with the second of these large instruments. The readings were afterwards connected with those at the base camp at Icy Bay, and gave for the point I had reached a total height of 7200 feet above the sea-level. To traverse the ridge itself towards the main peak was impracticable. The only thing that remained was to retrace one's steps and rejoin the other two who were waiting below. It was claimed in New York papers that this was the highest climb above the snow-level hitherto recorded. And where is the snow-level on Mount St. Elias? If the snow-line is defined as the limit downwards of the region of perpetual snow—in other words, as the height above the sea-level below which all the snow that falls annually melts during summer—then we were of opinion that the snow-line on the south side of St. Elias is only 400 feet above the sea-level. It is only on the coast that there exists such a heavy snowfall. The south-east winds are the rain-winds. Here the moisture they bear is condensed and precipitated for the first time. Further inland the humidity must be less.

It would probably be below the mark to name two thousand four hundred (2400) square miles as the area of the flat glaciers which bound the coast between Cross Sound and the Copper river, exclusive of the snow-fields of the range, or the inland glaciers.

I would distribute this area as follows:—700 square miles between Cross Sound and Yakutat, 700 thence to St. Elias, and 1000 between St. Elias and the Copper river.

At midnight on the 30th July we tried to leave Icy Bay to return to Yakutat in our whale-boat, which belonged to the *Pinta*. But the surf was too heavy, and we were swamped at midnight. The darkness of the night and the exceeding coldness of the water of Icy Bay added to our difficulties.

The following night, or rather at early dawn on the 1st of August, we were successful in making our escape from Icy Bay, though at the cost of abandoning most of the baggage. We sent the Indians back for these things later on. They succeeded in bringing them away in canoes after waiting some weeks for the surf to subside.

The boat which had been left with us by the U.S. man-of-war, was in every respect too large and heavy for nine men to drag when it was loaded with baggage. Without undue delay it would have been

impossible to procure a large canoe from the Yakatat Indians, and although we waited for several days in hope of doing so, the result only served to strengthen the impression we had formed of this tribe, and to emphasise the oft-repeated advice, that a sporting or exploring party should have the ability to render themselves independent of their assistance.

It should be mentioned that we found Icy Bay a shallow indentation in the coast-line, quite undeserving in every way the name of a bay, and with no protection even in the mildest weather from the long curling breakers that sweep in from the wide Pacific. It was almost the only thing which the natives had told the truth about; though from their evident desire to exaggerate every obstacle we had not placed much faith in their representations.

The man-of-war returned, as promised, early in September. Meanwhile, a small trading schooner had called, belonging to four Swedes who had settled on Kaiak Island for the purpose of hunting sea-otters. There are many places, especially near the Aleutian Islands, where Scandinavian hunters have made a temporary abode. They form the finest race of settlers that can anywhere be found.

I left the expedition at Yakatat, and on the 9th of August, I started on a journey to the north and west in this small schooner to Kaiak Island, and from thence in a canoe by the Copper river to Prince William Sound. When I left Yakatat and sailed westward I had thought that Icy Cape was the last great glacier which reached the sea from the St. Elias Alps. But I found that a plain of ice as large or larger than the Agassiz Glacier exists to the eastward of Cape Suckling, which I named Great Bering Glacier.

After staying with these hospitable Swedes on Kaiak Island, I went on in a large canoe, accompanied by two of the Swedes, an Indian medicine-man, and three Indians, to reach Cape Martin, the east corner of the great estuary or delta of the Copper river. Here, just as at Yakatat, is an Indian village, where a strong spirit is distilled from sugar. The whole village was drunk, and the inhabitants very rude and boisterous. After a considerable delay we succeeded in getting away from them. We next beached the canoe not far to the westward, and dragged it over the sandbars into the tidal lagoons of the Copper river. A vast expanse of mud was found, over which it was easy to drag the canoe with small fatigue. When the tide rose, recourse was had to paddling.

From our camp on the 23rd of August, 1886, on an island in the centre of the tidal lagoons of the Copper river estuary, a wide panorama was spread out before us. Northward the eye plunges for 50 miles into a valley from which the river issues. From Cape Martin, the south-east point of the delta, to the spot where the hills on each side first commence to close together—a distance of 20 or 25 miles—there stretches a

low dark range, from 3000 to 4000 feet in height, on which I counted eighteen small glaciers on the summits and four large ones in the valleys below. This line of mountains is broken midway by a gap eight miles wide, which allows a glimpse of an extensive snowy range lying behind it. The highest peak seems at least 13,000 or 14,000 feet high, with six others not quite so lofty.

The opposite or west shore of the delta of the Copper river is of much more remarkable formation. From the spot where the valley opens out, as far as the middle point of this west side, the mountains project out into the tidal alluvial plain. On this part I counted fifteen small summit glaciers and two large glaciers in the valleys, spreading out after the manner of Alaskan glaciers in the shape of an extended fan to the level of the river. But from this point westward to Cape Whitshed (25 miles) the shores form a deep wide bay, with hills thickly timbered below and devoid of glaciers above. Here are placed the two small Indian villages of Oodiak and Alanuk. But though, just here, there is no ice on the summits, there are three large valley glaciers descending from a group of snow-mountains lying behind; one of these is a double glacier. From this point westward the mountains are not so high, until Cook's Inlet is reached.

Nuchuk is an Indian village on a large island at the entrance to that wonderful inlet, Prince William Sound.

We reached Nuchuk on the 26th of August. A white trader lives here. It was one of the old Russian fur-trading posts. The schooner was expected daily, but it was not until the end of October that she arrived. I had long given up all expectation of seeing any vessel until the spring, and was preparing for a winter's journey round Prince William Sound. The Sound is surrounded by moderately high mountains on the east side; few reach to 10,000 feet. Those of the Kenai Peninsula are lower and less bold in shape. Everywhere the north sides are bare. The south sides are thickly wooded to 1000 feet with spruce and alder.

After crossing the Sound on the 25th October to the Indian village of Chenega, we left it through one of several channels which exist between Montague Island and the Kenai Peninsula. As we skirted the Kenai Peninsula I could see many glaciers reaching the sea. The mountains from which they descend seem to protect Cook's Inlet from the rain which is so prevalent in Prince William Sound.

The summer in Cook's Inlet is one long spell of clear warm weather, and it has earned the name from the miners who have visited it of "Summerland." The west shore of Cook's Inlet is mountainous and wooded up to a height of 1000 feet. The eastern shore is flat. Canoe travel is very rapid in Cook's Inlet at the commencement of the flood tide, when the incoming water covers the sand, which appears to vanish beneath it like a sinking stone.



Mount Ilyamna (12,000 feet) and Burnt Mountain (11,200 feet) are both on the western side of Cook's Inlet, and both active volcanoes. Augustin Island, close by, is also active, and broke out a short time ago with great violence, covering the sea with dust.

Ivan Petroff who made a census of most of the Indian tribes in 1879, and who was sitting by my side during the fearful murder, at our supper table, by a Russian madman, of the general agent of the Alaska Commercial Company, is the only person who has set foot upon the sides of Mount Ilyamna. The fierce brown bears of Alaska are very numerous in these volcanic regions; the explanation of this is to be found in the fact that the natives will not approach any of the volcanoes. The deer and bear—the latter more particularly—seek these regions instinctively, untrodden by man's foot as they are, and untrodden as they will ever be by the foot of any Indian.

John Bremner, a miner (whose simple diary I found at Nuchuk, recording the extraordinary events he witnessed among the Copper River Indians, and his life for seven months with this depraved and dissolute clan), found that it was impossible to persuade any one of the tribe to approach within several miles of Mount Wrangel, a volcano which rivals St. Elias in height. He however, alone, and in the dead of winter, made an attempt to reach its crater, when one of his snow-shoes breaking, he was compelled to return. The part of his diary referring to this daring adventure is as follows (the spelling being corrected):—"Nov. 16th, 1884. I made the attempt to get to the volcano (Mt. Wrangel) and failed. I got within about one mile of the crater when one of my snow-shoes broke, and I came very near passing in my checks. Before I could get back to the timber several of my toes froze, and my ears you ought to see them; they would match a government mule's. I do not think it is possible to make the ascent in the winter, but I think it would be easy in the summer. I could not get any of the natives to go with me. They are afraid to go anywhere near it." Still more is this the case on Unimak Island, where in addition to the feeling of reverence and horror with which Mount Shisaldin inspires them, the superstitious thoughts which the story of the Russian massacre has left in their minds, is an additional cause of fear, and this large island is totally uninhabited.

I add another extract from his diary:—

"Feb. 3rd, a beautiful day, not a cloud in the sky. I was treated to a sight to-day that I wish you could have seen; the Volcano has been very quiet a good while, but to-day it is sending out a vast column of smoke and hurling immense stones hundreds of feet high in the air; the masses it is throwing up must be very large to be seen here, at least thirty miles in an air-line distant from the mouth of the crater; it has made no loud reports, only a sort of rumbling noise.—Feb. 4th, a little colder, but pleasant. The Volcano has stopped throwing stones or

making a noise but is still sending out an immense cloud of smoke. It is very beautiful, not a breath of wind, and the smoke ascends to a great height in an immense column before spreading out."

Mount Pavlov is another volcano near the end of the Alaska Peninsula, which broke out into eruption last August with great violence, and destroyed a portion of itself. None of these volcanoes have been examined or explored.

The admixture of Russian blood seems to have prolonged the life of the Indian races in Prince William Sound and Cook's Inlet. They seemed a far finer set mentally and physically than the Yakatata, who are pure Indians. The character of the Yakatata Indians has not varied much since Ismaelof and Belcharof (1780) gave the following description of them:—"They cut their beards and paint their faces with stripes of various colours. These people have neither laws nor religion. They worship, however, crows, from which they affect to be descended. Among other objects of barter, the natives offered two boys about twelve years old." When we arrived, the Yakatata Indians had lately been tearing up their blankets, as they do each spring after a period of debauch.

There remains in the alpine regions of the North Pacific a wide field for explorers. Mounts Crillon, Fairweather, and La Pérouse, respectively 15,900, 15,500, and 11,300 feet high, are not quite so striking as St. Elias, but much nearer to civilised settlements. Probably, it would be easier to land at the wonderful inlet of Lituya Bay, than at Icy Bay, and it would certainly be easier to leave. There is no permanent Indian village here, but the natives put in to camp sometimes.

Lituya Bay is close to Mount Fairweather. The vessel of the U.S. Coast Survey entered it and compared it to the Yosemite Valley in California with the addition of glaciers. La Pérouse entered it and lost a boat and its crew, through misfortune and ignorance, on the bar at the entrance. Indians can land at Dry Bay, or at the mouth of a nameless river near at hand. At this point exists the only pass known over the St. Elias Alps—known to the Indians, and known to them alone, and traversable only in winter.

Dry Bay, from Indian report, must be nearly as interesting as Lituya Bay. It is nearly certain that a large Indian village exists somewhere in the neighbourhood; and by taking a small light canoe here, one could reach Yakatata by means of the series of lagoons behind the beach.

There is a large blank space upon the map of Alaska, lying between Cook's Inlet and the great Yukon river. It is as unknown as any of the unexplored regions on the globe. Indian report avers that there exist ranges of very lofty mountains, and that rivers lead to chains of lakes.

If any future expeditions should start for Mount St. Elias there

should be in the party experienced mountaineers, and it should land either on the west side of Yakatat Bay, or at Cape Yagtag, near Icy Cape, where there is said to be a reef which affords protection against the surf. It should number at least six persons, so as to be independent of the Indians, or at least not wholly dependent on them. If Yakatat Indians are hired, as many of them as possible should be engaged up to ten; but if Indians are brought from Chilcat not so many will be required.

The main object should be to be able to camp long enough on the spot to ascertain the easiest way of ascending Mount St. Elias, by "packing" with this object enough provisions to the base (three days' travel) to last for a fortnight. If the mountain is to be ascended at all, it will only be accomplished by experienced *alpinists*.

We next touched at Kodiak, where occurred the murder, to which I have alluded, of the general agent of the Alaska Commercial Company. We were seated in a small room after dark at supper. As the meal was nearly finished a shot was fired at us from the outside through a double glass window, which was smashed to atoms, filling the room with smoke, covering the table with fragments of broken glass, and killing the general agent, who was sitting by my side, besides severely wounding another occupant of the room. An insane Russian had fired into a crowd of unsuspecting men with a charge of buckshot! He had evidently aimed at the agent.

The schooner remained some days at Kodiak, and then sailed for San Francisco, where I arrived on the 15th of November.

The following discussion ensued:—

Mr. D. FRESHFIELD regretted that he could not add anything to Lieut. Seton-Karr's narrative from personal knowledge of the mountains of Alaska. But as the paper read had been somewhat brief, the meeting would perhaps allow him to offer some general remarks on the present position of mountaineering as a branch of geographical research. He would then take in detail certain points raised by Mr. Seton-Karr, and he would conclude by quoting some valuable notices of the same region, recently published in America. He had sometimes been tempted, while listening to the papers read at the Society's meetings, to amuse himself by inventing fancy classifications of the travellers who appeared before them. A learned German supplied him with the first classification. Herr Schwarz\* said that there were two great classes of travellers, those who sought for lateral progress and those who strove for vertical advance—the ordinary traveller who tried to get as far as possible from his fellows, and was, therefore, something of a misanthrope, and the mountaineer whose endeavour was to get a little nearer to the angels, and who might be called a philangelist. Another authority divided travellers into seafarers, landfarers, and snowfarers. Such a division might serve to enforce at least one useful lesson, that the craft of going above the snow-level was as distinct a craft as that of navigation, and that it is as impossible to explore efficiently snow-mountains without it,

\* 'Ueber Fels und Firn; die Bezwungung der mächtigsten Hochgipfel der Erde durch den Menschen,' &c., Leipzig, 1884.

as it is for a landsman to explore beyond low-water mark. Some people found it hard to understand this; and great nonsense was frequently talked by those who forgot that mountain people were not necessarily mountaineers, that they were often incapable of giving the smallest assistance to mountaineers, and that their testimony as to the practicability of ascents was worthless. Before the days of De Saussure no Alpine peasant had ascended any Alpine snow-mountain. At the present time it was proper to call attention to De Saussure, because this year was something more than a jubilee, it was the centenary of the ascent of Mont Blanc by the illustrious Genevese. His was not the first ascent of Mont Blanc, for that mountain had been climbed the year before by Balmat and Dr. Paccard, but it was the first properly recorded ascent, and, therefore, the ascent that had been most valuable to, and was best remembered by, the world. Its value was not, however, immediately manifest. Two fellow-citizens of De Saussure—Rousseau and Voltaire—set men's brains spinning in a different direction. It was not till within the last thirty years that De Saussure's travels had borne full fruit in the thorough subjugation of the Alps. By the present generation the exploration of the Alps had been taken in hand and finished, the secrets of the snow had been explored, and the icy wastes had been turned into the health-giving playground of Europe. The word "inaccessible" had been banished. From the Maritime Alps to the Gross Glockner not a single pinnacle raised its head unconquered. Augustus raised a trophy on the Maritime Alps above Monaco and inscribed it—"Devictis Alpibus gentibus a mare supero ad inferum": now a monument could be raised to De Saussure, "Devictis Alpibus." He did not desire to exaggerate the part of mountaineering in the exploration of the earth, the portion of which under snow was comparatively small. But he wished to show that mountaineers had been well employed, although their labours had occupied but a small space in the 'Proceedings' of the Geographical Society. A double reason might be given for that. First, they had been chiefly engaged in completing the task before them—exploring the Alps. The ice-craft learnt in Europe had as yet only been brought to bear in a few isolated instances on more distant ranges. Secondly, the Geographical Society had kept its eyes fixed beyond Europe, and had excluded from its sphere European travel and research. In Germany it would be found that Payer's Alpine and Arctic papers equally found a place in the leading geographical magazine.\* When he first frequented the Royal Geographical Society he was astonished to find that they had not the maps made by his friend the late Mr. Adams Reilly of the chain of Mont Blanc and the southern slopes of the Pennine Alps in their Map-room! He believed that the Society's gold medals had been given for much less hard labour and geographical research and accurate and artistic map-making than were embodied in these sheets.† But now the Royal Geographical Society and the Alpine Club were about to be forced into connection. The Club had done its work in Europe and would have to turn to other places. The maiden peaks of New Zealand, the Caucasus, the Himalaya, and the Andes would no longer be the objects of the occasional pursuit of a few chartered libertines; they would be constantly run after by a crowd of admirers. South America had already found its De Saussure in Mr. Whymper, whose long-promised work they must all look forward to with great interest. He was sorry that he could not say that North America had yet found a De Saussure. The journeys of Mr. Seton-Karr and Lieutenant Schwatka must rather be compared to the travels of

\* Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 17, and *passim*.

† Mr. Adams Reilly's MS. maps are now, by the permission of the Alpine Club, on view for a short time in the Map-room.

Pococke and Windham, the two adventurous tourists who went to Chamonix forty years before De Saussure, and visited the Montanvers. The party whose adventures had just been described were doomed to failure, for the expedition was not sufficiently provided with mountaineers. Lieut. Seton-Karr's own Alpine experience was limited, and he had with him a companion of eighteen stone; and to attempt to take such a companion up a mountain 19,000 feet high was a Quixotic enterprise. He did not think that Lieut. Seton-Karr need have felt any anxiety as to the trouble he might have had in lifting Lieut. Schwatka out of a crevasse. Alpine ropes had been thoroughly tested, and none of the ropes in use would bear the shock of an eighteen-stone man falling suddenly. To come now to some of the points in the paper, he would first refer to the name of the mountain—Mount St. Elias. It was curious to find in such a region the name of St. Elias. Why should the prophet Elijah be connected with that great mountain? Wherever the Eastern forms of Christianity prevailed, the prophet Elijah or Elias seemed to be the peculiar patron of mountain peaks. If they looked at the map of Greece they would find his name and chapel on the top of many mountains; and on Olympus, instead of an altar to Zeus, there were convents dedicated to St. Elias. In the Caucasus the primitive tribes who had been driven into the hill-fastnesses by the Circassians, were said to believe that the prophet Elijah frequently appeared on the highest mountains, and to appease him with milk, butter, and beer.\* Various explanations were given of this connection. Some people thought it was because the Greek Church attached so much importance to Elias's part in the Transfiguration; others said that Elias the prophet had, through a similarity of name, succeeded to the altars of Helios, the sun.† Another possible explanation might be found in a survival of the belief attributed (2 Kings ii. 16) to the sons of the prophets, who sent out a search expedition of "fifty strong men" to look for Elijah, because they thought, "Peradventure the Spirit of the Lord hath cast him upon some mountain." Of all the mountains on which the prophet's name had since been cast Mount St. Elias must be the farthest and the loftiest. With regard to the height of St. Elias, 19,500 feet might now be fairly taken as settled. Mr. Elliott, in his recently published 'Arctic Province,' spoke of Mr. Baker, who made the triangulation, as "one of the most accomplished mathematicians in the United States Survey." Another accomplished surveyor, Lieut. Allen, had, he stated, ascertained that Mount Wrangel rose 18,400 feet over the forks of the Copper river, and that those forks were over 2000 feet above the sea. That would make Mount Wrangel 1000 feet higher than Mount St. Elias, so that after all the United States might be happy in possessing the highest peak of the North American continent. He need hardly say to anybody in the room who had any experience in mountaineering that he utterly disbelieved in the ascent of Mount Wrangel by the miner, quoted by Lieut. Seton-Karr. He did not believe that he got anywhere near the top of the mountain, or even much further than its base. That a solitary man should ascend nearly to the summit of a peak of 20,000 feet, in that latitude, in winter, was absolutely incredible. With regard to the statement in the paper that the snow-level on the seaward slope of Mount St. Elias was only 400 feet, Mr. Elliott described the forests of Prince William Sound, a little farther west, as rising to 1000 feet, and the snow-level as between 3000 feet and 4000 feet; and another explorer had collected botanical specimens at between 1000 and 3000 feet. The ascent of Mount St. Elias would probably prove the longest snow tramp in vertical height on the earth's surface. But, whatever the snow-level might be, the height reached by

\* Klaproth, 'Voyage au Caucase,' vol. i. ch. 13.

† Bent's 'Cyclades.'

Lieut. Seton-Karr above the *sea-level* did not equal that of the summits of Elbruz above the Caucasian snow-level; and the pretensions of the New York newspaper with regard to this ascent must therefore be dismissed. He wished to ask Lieut. Seton-Karr if there was any chance of an explorer being able to cross the Indian pass from Dry Bay and get round by the lakes north of Mount St. Elias to the forks of the Copper river near Mount Wrangel? Such a tour, combined with the ascents of Mount St. Elias and Mount Wrangel, would probably be the most interesting mountain excursion possible in North America. He regretted very much that, owing to the non-arrival of the photographs that Lieut. Seton-Karr expected, he had been unable to illustrate his paper with the lantern. He hoped that mountain travellers in future would take photographic machines with them and make good use of them. It was a very easy thing to do. He had himself carried Mr. Donkin's camera nearly up Mont Blanc, and every one knew what superb plates Mr. Donkin produced. With regard to the accessibility of the region described in the paper, he had recently received an illustrated pamphlet, published by the Northern Pacific Railroad, and written by Lieut. Schwatka.\* It contained a promising account of the facilities soon to be afforded to travellers. It was in contemplation to build an hotel at Glacier Bay, close to Mounts Crillon and Fairweather, and to run excursion steamers from Sitka to Icy Bay. When travellers frequented these coasts the weather promised to be as great a topic of conversation on Alaskan steamers as it was at Swiss *table d'hôtes*. The rainfall at Sitka was 85 inches, but there were said to be 100 fine days in the year. At Glacier Bay, Mr. Wright, in August, out of 29 days, had 14, or nearly half, "beautiful beyond description." The witnesses were very contradictory, for another officer described the weather as "boisterous winds chronic, and howling gales frequent." Mr. Seward, on the contrary, thought the climate was infinitely superior to that of Northern Germany; but he was a politician, and not a disinterested one (for he had had a share in the purchase of Alaska), and therefore was politically biased, and could hardly be expected to tell the truth. In conclusion, he would give very briefly the main facts contained in an important note which had been published in the 'American Journal of Science' (January 1887) by Mr. Wright, who made some prolonged observations at the head of Glacier Bay, on a large glacier called the Muir Glacier. It was found that that glacier occupied a vast amphitheatre, with a diameter ranging from 30 to 40 miles, with nine main and seventeen smaller branches. The main trunk was two miles wide. It entered the ocean with a sea-front of a mile, rising in cliffs 300 feet in height. Bergs containing 40,000,000 cubic feet broke off from it. From measurements taken with care at the end of summer, the period of greatest motion, the velocity of the ice was ascertained—and this was a fact well worthy of attention—as 70 feet a day in the centre, and 10 feet in the margin of movement! Now, 1½ foot a day was about the motion of the *Mer-de-Glace*, and 55 feet in the year that of the *Aar* Glaciers. The only observations at all comparable in their results with those of the Muir Glacier were those of the Jakobshavn Glacier in Greenland, where the motion was said to be 3½ miles a year.† Despite this rapid motion, Mr. Wright stated that a period of glacier decrease was going on in Alaska, corresponding to that in the Alps and in the Caucasus, apparently just terminated. A still more remarkable fact was ascertained in the discovery of a forest buried in sand, from which the ice had recently retreated. Mr. Wright showed that the sand had been deposited by streams dammed by a side glacier during a long previous period of advance of the ice. The ice had

\* 'Wonderland, or Alaska and the Inland Passage,' by Lieut. Schwatka.

† See 'Alpine Journal,' vol. xii. pp. 229-30, for a summary of the most recent statements and conclusions as to glacier motion.

then passed over the sand without disturbing it. In this instance the ice had been partially supported by a spur of rock, and therefore its whole weight had not pressed on the sand. But Mr. Wright went on to say that "the capacity of the ice to move without disturbing them over such gravel deposits as cover the forests, is seen in the present condition of the south-west corner of the glacier itself. As the ice-front has retreated along that shore, large masses of ice are still to be seen lapping over upon the gravel. These are portions of the glacier still sustained in place by the underlying gravel." This, of course, was important evidence with regard to the boring faculty of glaciers. It seemed as if it would prove a confirmation of much that was written in Mr. Whymper's *Alpine* volume. He (Mr. Freshfield) had never been disposed to believe in the enormous powers attributed to glaciers as bores. They scraped and polished to a great extent, but he did not think that they dug deeply. They were not so much the sculptor's workman as the sculptor himself. Their share in hill structure was to give it artistic merit; to round a corner and polish a boss. Those who were interested in glaciers should not fail to study a very beautifully illustrated official report, published at Washington,\* on all the glaciers in the United States, excluding those of Alaska. The conclusion that Englishmen would arrive at would be that the glaciers of the rest of North-west America were a very poor lot—hardly worth looking at from the picturesque point of view, and scarcely equal to those of the Pyrenees. Another result would be to make Englishmen envy the Americans the amount of money which their government could afford to devote to the illustration and publication of scientific reports. He congratulated Lieut. Seton-Karr on the success that he had obtained in approaching the mountain and visiting the more remote parts of the Alaskan coast. Those who went first, and opened the way, were not less entitled to credit than those who came afterwards, and reaped the fruit of their predecessors' labours.

Mr. CLINTON DENT (President of the Alpine Club) said he had been very much interested in the paper, for it dealt at once with mountain and geographical exploration. He could fully endorse what Mr. Freshfield had said, that, to attack a mountain 19,500 feet high, with the very remotest prospect, not of success, but of attaining any height whatever, the expedition must be specially equipped. There must be no one in the party who was not a mountaineer. With regard to trusting to the natives, experience in Alaska would prove to be the same as in the Andes, as originally it was in the Alps, and as he had the opportunity last summer of finding it was in the Caucasus. Until the natives were educated to become mountaineers they would never be of the least use. The Swiss peasants had, however, been educated until they had become instructors of those who educated them. Among the natives in mountainous countries there was always at first an amount of superstition, and which resulted in a dread and abhorrence of attacking the higher peaks. It followed that to attain any success, even apart from reaching the summit of such a formidable mountain as Mount St. Elias, the explorer must be provided with those who could act the part of porters, and who were thoroughly reliable. From the description that had been given of the mountain, he fancied that the ascent must be one of a most formidable nature from its great length, and he considered that the route which had so far been followed was hardly likely to prove the right one. It appeared to him to be a very long way round, affording no opportunity for bivouacking sufficiently high. From the last camp the party seemed to have started with an idea that they could go up a height of something like 15,000 feet in a day, but in such cases 6000 feet was an exceedingly good day's work. With Mr. Freshfield, he congratulated Lieut. Seton-Karr on having broken new ground, and on having

\* 'Report of the Geological Survey,' 1883-4.

shown that in Alaska there were glaciers and mountains of the highest interest to every one connected, not only with geography, but also with the sister science, which he hoped geography would adopt, orography.

Lieut. SETON-KARR said the Indians had a pass from Chilcat to the north of St. Elias to Mount Wrangel down the Chichitka river. The Copper river had been ascended by Lieutenant Allen in 1884. The Indians, however, only crossed the pass in winter when the streams were frozen, but it might perhaps be done in summer. The snow-level depended on the snow-fall, and the conditions of St. Elias were such that the snow-fall was very heavy. Damp winds came up from the Pacific, and were condensed on the snow mountains which were immediately at the ocean's brink; the result was a very heavy snow-fall, greater than in any other part of Alaska. There was, therefore, more snow to melt, and consequently the snow-line descended lower. He judged it to be 400 feet, but other travellers might make it even lower. No doubt some of the glaciers were decreasing, but others at Mount St. Elias were advancing and getting larger. All the forest land which he saw was being destroyed by their advance. With regard to the weather, as a rule, June and July were fine. There was not a single drop of rain during the whole fortnight he remained on the slopes of Mount St. Elias, although it was cloudy. After that bad weather set in, and it rained the whole time he was in Alaska.

The CHAIRMAN (Mr. Francis Galton) congratulated Lieut. Seton-Karr on the opportunity he had had of exploring a country where the forces of nature were to be seen acting on a very large scale. The journey had evidently been performed under circumstances of great difficulty. We might expect a more detailed account in the narrative of his journey which he is about to publish. He experienced many difficulties which he has not mentioned in his paper, and on more than one occasion he was in peril of his life. It was to be hoped that Alaska would be further explored, and that fuller knowledge would be obtained of its most interesting characteristics.

*Between the Nile and the Congo: Dr. Junker and the (Welle) Makua.*

By J. T. WILLS.

(Read at the Evening Meeting, March 28th, 1887.)

Map, p. 330.

I NEED hardly remind you that in the fertile part of Central Africa, in the belt of tropical rains and rich vegetation which stretches from the Zambesi to Senaar and Lake Tsad, river navigation is the only means of cheap transport: and boats almost the only alternative to slave portorage. Rivers are here the trade routes and the lines upon which European influence must advance; and the big navigable rivers, with the exception of the Niger Benue and Zambesi, all are one of three points, Berber, Lake Tsad, and Stanley Pool. The last is alone at present accessible to us.

Let us first look for a moment to the history of the region in question. The first central African river explored and used was the Nile. Eighteen centuries before the Emperor Nero, two Roman centurions explored the Nile 500 miles beyond Khartum as far as the



the river closed in by reeds and morasses, full of tall grass into which there was no means of penetrating either by boat or on foot. This sudd region is a swamp of vast extent, where matted weeds and floating grasses choked with fine mud, and knit together by the tangled roots of aquatic plants, form rafts or islands of floating *sod*, on which other tall grasses grow, and which jamb and block the deep channels, like floating ice in polar seas, while all around papyrus and other reeds grow thick on the shallow swamps and inundated flats. The block so formed is variable and intermittent, and when exploring expeditions in 1839, 1840 and 1841, penetrated for the first time beyond the point reached by Nero's centurions, little hindrance was experienced, then or for the next twenty-five years; but in 1870 Baker's expedition had the greatest difficulty to get through, and the block of sudd that formed in 1878 continued on and off for three years, and after nearly frustrating Gessi's campaign in the Bahr Gazal, eventually caused his death in 1881. Emin Bey very possibly \* owes his safety now to the re-formation of this sudd in 1884.

When European ivory traders in and after 1845 followed the tracks of the Egyptian expeditions beyond the sudd, two navigable branches of the Nile were found; one navigable at all seasons as far as Gondokoro (Lado), and the other as far as Meshera el Rek. The custom was to *sail* up from Khartum to either of these points, in the dry season or winter, and to sail down again in June upon the flood. The winds are strong and steady from the north and N.N.E. for three or four months as far as Meshera, and for one or two as far as Lado; and they are nearly equally strong and steady from the south during an equal period, lessening in strength and duration up north towards Berber, as the winter north winds do towards Lado. Consequently the clumsy Khartum nuggers of 40 or 50 tons, with a 20 foot beam, low masts, and rotten, spliced, and cranky yards, often average up to the sudd some four or five miles an hour against a stream that generally runs two miles an hour. They thus do 48 to 60 miles a day, and in nine or ten days get to the sudd. Schweinfurth describes his nigger often staggering under bare poles, when the wind was best, for fear of breaking the yard.† This is the cheapest river navigation in Africa, and according to Gessi, freights from above Meshera to Khartum were only 2*l.* a ton. It costs at present between 30*l.* and 40*l.* a ton to get porters' loads carried up from the sea to Stanley Pool, and it used to cost 10*l.* a ton by camel from Suakin to Berber.

We all know how these trade-winds soon became slave-trade winds; how soon after the discovery of the great lakes and sources of the Nile

\* I beg leave to alter my opinion. News from the Soudan shows that the Khalif at Khartum has neither leisure nor power to attack him. Nor has any one else. I do not believe there are any rebels or Arabs now in the Bahr Gazal except a few score of petty slave-hunters, and those without political support. The reopening of trade with the Soudan, however, will quickly increase their numbers.—J. T. W.

† The yards, if made of fir, have to be imported from Trieste.

Sir S. Baker was sent up in 1870 to stop slaving on the Lado branch where it was least vigorous, and how he was followed by Gordon in 1874-75-76, while Zebehr and many other smaller slave-hunters continued their devastations practically unmolested in the Bahr Gazal. And we know how Nile explorations led to other explorations; how Livingstone traced the Zambesi to its source, and Barth visited the countries round Lake Tsad. In 1870 Schweinfurth went through the Bahr Gazal with an ivory trader and reached the big Welle Makua in Monbuttu, beyond the Nile watershed, just at the same time that Livingstone explored Lake Bangweolo, Lake Moero, and the Lualaba down to Nyangwe. Schweinfurth reported that his river was supposed to run to the Shari, Livingstone supposed his to be the Nile. Three years later, Cameron disclosed by his overland march the south watershed of the Congo, and Nachtigal got important but hearsay information of the south watershed of the Shari. The mouth of the Congo was known, but no one had got past the rapids between the sea and Stanley Pool. In 1875 Gordon was on the Upper Nile launching steamers\* (which are still in working order) on the upper Duffé and Lake Albert reach, which is separated from Lado by over 100 miles of land transit. He established the government which Emin Bey now maintains. Long, his lieutenant, navigated a considerable unknown reach on a still higher level in our enemy's country; and Stanley sailed round Victoria Nyanza, which pours its waters in Long's reach over more cataracts. Stanley then went to the slave-hunters at Nyangwe, and prepared to embark on the unknown river there in October 1876, just when Gordon went down to Egypt to say that he would not go back to the Nile unless he had full powers over the whole Soudan slave trade.

When Stanley emerged on the west coast and made known the Congo, Gordon, as Governor-General, was preparing to put down at last the roaring slave trade of the Bahr Gazal; and Zebehr was writing to his son there to rebel. That rebellion barred further exploration of the Welle Makua. Bohndorf, once Gordon's and afterwards Junker's servant, went by himself to explore in Zebehr's country, but was made to swear on the Koran, and was finally robbed and left naked. Dr. Junker, who was already in the Bahr Gazal in 1877, had to keep well to the east, where great hardships broke his health, and forced him to retire for a year to Khartum and Egypt.

Stanley, as we know, returned to the Congo, made firm his way, and took up his steamer to Stanley Pool, and in 1883 revisited for the first time the great arc of the Congo (above Kwa mouth), which he had paddled down six years before. He went along the south bank of the Congo, which is here generally so wide (and also full of islands), that the other bank is actually below the horizon and out of sight; when at

\* One 100 feet long.

length he crossed over and reached the mouth of a big tributary on the north side, and found from the friendly natives that they were in possession of certain peculiar and unmistakable Italian beads (which had come down this river through the Watumba from traders who came from the north), he was surprised more than interested, and passed on to view with dismay the presence of Tippu Tib's Nyangwe slave-hunters at Stanley Falls, and at the mouth of the Aruwimi.

These beads were Rafai's beads: the big river which Stanley was told came far from the north or north-east, and was so wide above that one could not see the other shore, was the Loika (or Itimbiri), and was found last year to be navigable for at least 100 miles at all seasons from its mouth. It is identical with the big water or lake reached by Rafai, six days' journey south from the Makua across the country of the Ababua, where Rafai had a secure trading post. Petermann's Mittheilungen had published Rafai's news (which Lupton had sent) a full year before, and I am rather surprised to find that such items of news were not forwarded with the usual letters through Belgium to Stanley on the Congo.

Hicks, with his army of 10,000 men, had been slain four or five days before Stanley appeared on the Loika (on November 10th, 1883), Lupton, at Dem Suleiman was receiving, as a precious gift, 300 percussion caps from Bohndorf, Dr. Junker's servant, who had hurried off with news of his master to catch the expected steamer—the last steamer that ever visited the Bahr Gazal. Rafai, Lupton's best captain, had fallen fighting bravely against the slave-hunters or Mahdiists. Rumbek was taken by storm by the rebels, and Emin's garrison there put to the sword the same month, and the news of that disaster recalled Emin Bey from Tangasi in Monbuttu, on the Makua, five days after his long and anxiously expected arrival in that neglected district, and forced Dr. Junker also to retire from his half-explored rivers to Lado. Thus connection between the Soudan and the Congo was just *not* made in 1883, and no further exploration of northern tributaries of the Congo took place till fifteen months ago.

Let us now trace Dr. Junker's explorations, all made before November 1883 and on foot. After having recruited his health in Egypt, he arrived in the spring of 1880 in the Bahr Gazal, where Gessi was celebrating the first anniversary of his great victories over the slave-hunters. Gessi had 40,000 liberated slaves on his hands, and was planting them in the colonies, hoping they would settle down as cultivators. He was building nuggers on the Wau, and was collecting a good quantity of ivory, and 50 tons of first rate indiarubber. Ndoruma, a great Zandeh chief, whose country lies on the watershed of the Nile basin, and who had for years successfully repulsed the slave-hunters, and on one occasion had destroyed a force of 800 muskets, had recently "come in," first sending envoys with a present of 100 tusks of ivory to ascertain if the good news

about the new governor was true, and then coming himself to do homage or make submission. He gave Gessi all his ivory, 1000 loads, i. e. 150 tons, and also offered to give up the 800 captured muskets. To Ndoruma's, therefore, Dr. Junker went, but as his armed escort of ten negro riflemen or basingers caused great alarm, he sent them back at once from the chief's border, trusted then and thenceforward to the goodwill of Zandeh chieftains, and never had cause to regret this course.

From Ndoruma he went to the Makua, and acted in fact, though not in name as a government ambassador. "I am looked on," he writes, "as a mediator. Gessi is only too anxious to punish the deeds of violence which the natives suffer at the hands of the Nubians whom he sends out to collect ivory. As long as I remain here, robberies and murders are not likely to be committed, for fear of my reporting them. Ndoruma's belief in my protective power is shared by many other chiefs near here, all of whom have either visited me or sent messengers: they are afraid, not only of the Arabs (Nubians), but also of their own kith and kin. Blood feuds are frequent, and each prince fears to go in peace to his own cousins and brothers." Semio, for instance, to the west of Ndoruma, who had felt the weight of Zebehr's and Suleiman's attacks ever since the destruction of Mofio, his liege lord and northern neighbour in 1874, had become a mere vassal of Suleiman, intrusted by him with the use of besinger riflemen for the purpose and on condition of getting slaves and ivory from his neighbours. Semio, now that times had changed, dared not go outside his own marches, and sent many urgent requests to Junker to come to him. Kifa also sent to ask him to try his persuasion upon a rebellious relative.

Junker, however, sending Bohndorf to pay calls on these chiefs, went south and struck the Makua, where there were alarms of war, which made the natives (here Monbuttus) distrust him and show hostility. He was very glad when Ndoruma, who had heard he was in difficulties, arrived in hot haste with all his forces and set him free. He then surveyed this country in the bend of the Makua, and reconciled two brother-chieftains who had been egged on to fight each other by detachment of so-called troops, who were here doing pretty much as they liked. He also effected a reconciliation in the family of Wando, another Zandeh chief. Wando's son, Hoqua alone of all the family, had submitted to the Egyptian Government, which means, I must explain, that he had agreed to help Yussuf Bey, Mudir of the Rohl, to get slaves and ivory from the territories of his brothers and father.

When Dr. Junker arrived on the Makua there was a body of his troops, under a Colonel Hawash, fitly described by Casati as brigands, here well out of Gessi's reach and control, who were bullying the Monbuttus on the south of the Makua, to the great alarm of Kanna and even of Bakangai, great Zandeh chieftains, lower down the Makua on its south side.

Dr. Junker probably knew that Gessi had then quitted the Bahr Gazal, finding his position under the new Governor-General intolerable, but he did not know that he was then dead, having been rescued too late, and at the point of starvation, with fifty other survivors only out of 400, from the middle of the sudd in which his worn-out steamer had been helplessly blocked for three months (September 1880 to January 1881). He therefore avoided the Monbuttu region for a time, and having waited for one of Gessi's more respectable ivory-trading agents, Osman Badui, and for the escort of his caravan, went to Bakangai's, where (July 1881) he found much confidence reposed in him, and much alarm felt at the doings of Hawash. He kept promising the people a better future when Emin Bey should come to set things in order, and "often," he says, "did I hear them speak thus in reply: 'Tell us again such sweet tidings; this year of your coming is a fortunate one for us. Through your words we hope for a better future.'" He wrote to Emin Bey of this, and to say that he had promised that he would presently come to set things right. There was no governor in the Bahr Gazal all that year. Lupton arrived only in December 1881.

From Bakangai he went back through Kanna's country to where Colonel Hawash had been fighting Manbanga, Munza's cousin, for over a year, and was lying by till he could avenge the defeat of some detachments by annihilating the Monbuttu chief. He was well received and listened to both by Hawash and Manbanga, and succeeded in making a truce and in getting Hawash to observe it while he reported his conduct to Emin by letter. Emin's reply came back by letter over a distance of 400 miles, and was (as I gather from Casati) obeyed by Hawash.

Dr. Junker's own account of his action in this matter is very modest, but Casati shows that it was much more considerable in weight and effect. Casati met Junker here, and describes him as follows:—A man of great culture and intelligence, modest and unaffected, full of open-hearted kindness to me, who won my highest esteem—a man of firm character too, quiet and self-possessed. "I left him," he adds, "full of content and happiness." Dr. Junker has been described very unfairly and incorrectly by Mr. Stanley in the *Times* as an honest little man, altogether absorbed in recording geographical minutiae on an elaborate large-scale map, and as a Russian. Dr. Junker is a German, of German parents, born and bred in Germany, educated entirely at German schools and colleges, and German to the backbone. In justice to him I must ask your attention to the good political work which he did here and elsewhere.

Dr. Junker returned to Bakangai, explored the southern watershed of the Makua, and waited for Emin's arrival and for the reply to his report upon Hawash, in which, when it came, Emin made a promise to follow soon, which promise events did not allow him to fulfil. He then

went south through Monbuttu to the banks of a river Nepoko, 70 yards wide, which almost certainly runs into the Biyerre,\* and which he struck in about 1° 48' N. Here he was detained by Sanga, a Monbuttu chief, who was trying to reorganise on the Nepoko part of the shattered remains of Munza's people, who had been driven by the slavers from the banks of the Makua. The numbers of the nation have greatly decreased, Junker says, and in their present seats, whither they have thus been driven, they form an aristocracy of a few thousands, ruling numerous backward and comparatively uncivilised indigenous tribes. Sanga detained him as he did not know whether he was friend or foe, and Junker had to send secretly to Gambari, a Monbuttu whom he had visited further east, to give him a good character. Gambari was a slave, brought up in Yussuf's household, who had been sent by Yussuf to Monbuttu to rule it as a conquered country, but having failed † and having been dismissed, he had been himself captured lately by the miscreant Arabs on the Rohl, and was just saved by Emin's arrival from being sent down to Khartum to be sold as a slave. Gambari's representations set Junker free, and in September 1882 he rejoined his servant Bohndorf at Semio's, after a year and a half's absence, and reposed awhile, being ill from bad food and want of necessaries, out at elbows, out at heel, and consequently lame.

Dr. Junker found that between the south water-shed of the Makua and the Nepoko, and rather to the west of his route to the Nepoko, lay the head-springs of the Nawa which flows west and becomes a big river; it runs five or six days south of Bakangai's and must, as he says, be Rafai's big water, and Stanley's Itimbiri, which we ought to call Loika.

Dr. Junker left Bohndorf (whom he did not see again) at Semio's in the end of 1882. He explored the Werre or Opi, which falls into the Makua about long. 24½°, and found rapids on the Makua, near the junction; these being the only *known* rapids on it below the Kibali rapids in long. 28°. Travelling as usual overland, from one Zandeh chief to another, he struck the Makua at several other points of which Ali Kobo's seriba in about 22½ E. 3½ N. was the furthest. The Makua was here colossal, and full of islands (as it is elsewhere above) some of which are thickly populated while others are full of elephants. From bank to bank the river was perhaps six miles across. It ran north-west, and six days beyond was joined by the Kuta; of this junction he is quite positive, the point being well known to the Zandehs; in fact all the Zandeh chiefs seem to know it, for Casati up at Kanna's was told how these rivers joined in the land of Ambanenghe, and Potagos learnt the same at Ingimma's years before, with this addition, that canoes there had sails.

\* Miscalled the Aruwimi.

† In supplying eunuchs; but not for want of trying. He was one himself. The matter is fully dealt with by Gessi in an unpublished letter to General Gordon.

Dr. Junker had no means of navigating the river. The Zandebs, whose chiefs were everywhere friendly to him and glad to see him, do not own boats. The tribes inhabiting the banks and islands are quite distinct in race and language, and knew nothing of Gessi or Lupton, or of their anti-slavery policy. Ali Kobo and other government ivory traders were new comers and were only just beginning to get acquainted with them; a voyage would have meant fighting. Dr. Junker therefore went back to the north-west to connect his surveys with Lupton's. Between Ali Kobo and Singio's he passed no river of any size running to the Kuta. Singio's is a little above the junction of the Shinko and Mbomo and just below the junction of the Warre (of which one fork is called Ualle) and the Mbomo. He then went to Semio's and sent news of his return (and of the Makua having been last seen to the south-west) to Lupton and Bohndorf. Lupton replied that he had explored as far west as Foro, along lat.  $7^{\circ}$  N., and had taken latitudes. Junker connected his survey at Mbanga, where Lupton had taken sixteen stellar observations for latitude, and at Dem Bekir closed his own circuit. Junker only surveyed with compass, and by reckoning distances travelled, yet he took such care and had made so many cross routes and subsidiary triangles, that at Mbanga he was not much out in his reckoning (according to Lupton's latitude). Still he was out of course. Correcting the map so as to fit Lupton's latitude we get the Makua into the position shown on my sketch map. Dr. Junker's uncorrected mapping makes it cross Grenfell's Loika.

Lupton's letter reported that all the streams he had crossed going to Foro ran south or south-west to the Mbomo, and two of them the Shinko and Enji were as big as the Mbomo itself. The Shinko or Paperwer (Bohndorf's Ghenko) is formed by the junction at Marra of several streams, some of which rise three or four days S.S.W. of Hofrat el Nahas. Marra is 1980 feet above the sea, or 1000 feet above Stanley Pool, and the Shinko there was 20 to 25 feet deep and 90 yards wide with steep banks. It is not fordable in the dry season anywhere lower down. From Foro, which is beyond the Enji but in its basin, Lupton had sent a man south or S.S.W. rather to the Kuta (as the joint Mbomo Shinko is called there) to report upon it. The man took 44 hours and odd minutes on the way, halts excluded, to Barusso on the Kuta, which places it about  $5^{\circ} 20'$  N., and found the river two or three miles wide, running west. A river which Lupton calls the Welle joined it 13 hours above, and a big river joined it also from the south four days below Barusso. This last must be the Makua, for Junker found no other intermediate river of any size, except one that ran west to the Makua.

It will be well for the future, to avoid confusion, to call the Welle Makua, "Makua," and the Werre or Opi, "Opi." Makua is the Monbuttu name; the Zandebs call it Warshal. Welle, I believe, only means river.

Lupton's letter is dated October. Hicks and his army perished,

and Stanley arrived at the mouth of the Loika in November; the last steamer came up and took down Bohndorf with Lupton's news in December; Gordon met Bohndorf in the Korosko desert in January, learnt his news in full at Khartum, and must have been encouraged by it in his long considered plan\* for going south to Lupton with all steamers and stores, and holding the Bahr Gazal till he could open up a route to the Congo, and find a water-way up the Makua or to the Makua by which the negro Soudan could be permanently held against the Mahdi, and against all slave traders. I call attention to this plan of Gordon's because we are now perhaps able to carry it out.

I must leave Dr. Junker himself to describe these countries and their people in full. As you see from the map a great quadrangle of country between the Bahr-el-Arab on the north, the Lado-Nile or White Nile on the east, the Makua on the south, and Foro, the Enji, and Ali Kobo on the west, has been explored from the side of the Soudan. The water-shed runs from corner to corner diagonally from Wadelai to 60 or 70 miles south-west or W.S.W. of Hofrat el Nahas (the copper mines), the extreme known point here being a mountain with a wide view, ascended by Potagos in 1877, in company with Arabs who told him what he was looking at. The watershed is highest in the south-east, and beyond Wadelai it flanks Albert Nyanza in mountains 7000 feet high. There are passes of 4000 to 5000 feet leading to the sources of the Makua from Wadelai. Mount Baginze, due south of Meshera, is 4000 feet; there are several mountains probably higher than this in Makaraka about the sources of the Rodi, and a large tract of country above 3000 feet high. To the north-west the watershed seems to be pretty flat in many places.

The rivers on the Nile slope run north in long parallel courses. The eastern or longer rivers, Rodi, Rohl, Roah, and Tonj, in and after the rainy season inundate large parts of the great triangle of low flat plain that fills the whole space between the Bahr-el-Gazal and Nile as far as Rumbek, and nearly as far as a north-west and south-east line drawn through Lado and Djur Ghattas. Their lower courses are therefore lost in swamps and reeds, and are not navigable. The five shorter rivers on the west are all navigable from Meshera for at least five months in the year to boats drawing five feet of water, up to points ascertained by Lupton. Dem Saleiman is close to one of these points. There is at least 10 feet of water up to Wau and Kurshukali for seven or eight months.†

The low flats sweep round up the Bahr Arab, and Hofrat is on a great open which is lower (at 40 miles east of Hofrat) than the Nile at

\* See Lieut.-Gen. Sir G. Graham's article in the 'Fortnightly Review,' Jan. 1887, and Gordon's 'Last Journals,' pp. 47, 48, 49, 87, 112, 145, 200, 225.

† Gessi (unpublished letter).



Wado. Hofrat is the copper mine, for the sake of which Zebehr made war on Darfur. The ore stands up in a long wide reef, protruding two or three feet above the ground. It is very pure. Zebehr and Gessi worked it and bartered copper for ivory. Copper is the only precious metal known to the Monbuttus and other Congo negroes, and was much valued. The Bahr-el-Arab is fordable in the dry season at  $25\frac{1}{3}^{\circ}$  east, but not, it is said,\* lower down. For five months or more it floods the swamps on its banks so as to form an almost impassable barrier between the negro and Arab, the fertile and the desert regions of the Soudan, everywhere east of Hofrat, or of long.  $25^{\circ}$ . It is no doubt obstructed by sudd and reeds below, but except for this ought to be navigable for eight months; its course is only too flat. This triangular flat would be suitable for growing rice, but at present is worthless, and is thinly inhabited by Dinka negroes with their thin, but highly venerated cows. It must always be very unhealthy. The valuable and healthy part of the Nile slope is the upland plateau 2000 to 3000 feet high, which begins just north of the line Djur Ghattas-Lado and continues beyond the watershed. Schweinfurth fully describes its characteristics—the rich red ferruginous and rather spongy soil, the park-like and moderately timbered uplands (where the tall grass is fired every year, as it is on the low triangular flat and throughout Senaar), the real tropical forests which clothe the banks of the narrow river cuttings † which are generally 200 or 300 feet deep, in which the air is close and heavy in contrast to the fresh and open air above.

In the Makua basin, the vegetation is more luxuriant, and the trees bigger. Indiarubber (for instance) which Gessi and Lupton exported in quantity, and of first rate quality (much better than the Brazilian) is more abundant. The banana grows in Monbuttu, but in the Nile basin not north of Wadelai. There is more forest, though the Zandehs regularly burn the tall grass annually. I do not know if this firing of the prairies is a long-established practice or not; its effect in creating prairies is of course great. Going from Rumbek to Tangasi in the hottest six months of the year, Casati found  $66^{\circ}$  and  $97^{\circ}$  were the extremes of temperature ( $19^{\circ}$ – $36^{\circ}$  C.) which is very moderate. Monbuttu country proper is distinctly healthy, very fertile and well watered, but rolling, well drained, and 2500 to 2800 feet high. The Nubians were bringing their wives and children to settle there in 1871, and, as we know, they are not so tolerant of moist heat as Englishmen. Ten or twenty thousand of them, must have emigrated for good, or rather for evil, to the Bahr Gazal, before Gessi turned them out. By all accounts the Makua slope is healthier than the Nile slope. Bohndorf notices the difference at Mbang, which is at nearly the same altitude as Dem Suleiman. Lupton, in the Bahr Gazal, thanks to constant activity, had not a day's sickness.

\* Schweinfurth.

† Schweinfurth's *galerie* forests.

The two chief races in the Makua basin are the Zandebs and the Monbuttus (the latter is a name given by the Arabs). The south bank of the Makua generally is Monbuttu, and the north Zandeh as far east as long. 28°. The Zandebs stretch along the watershed to near Lado; the Makarakas who supply Emin with his best, and with most, of his soldiers, being Zandebs. To the north-west they reach the Shinko, and the south bank of the Kuta. The Bandas,\* who occupy all the country west of the Shinko and north of the Kuta, as far (according to Nachtigal) as latitude 9° north, are the same as the Zandebs in language and customs, but there are political differences, and they refuse to be called Zandebs. The Zandebs also have conquered and occupied, not long ago, the Bomokandi basin, thus cutting off the Monbuttus proper of Schweinfurth (in Munza's and Degberra's kingdoms) and from the A-Babūa, who are of the same race and language, and who extend from about the Mbelima as far as Ali Kobo, and apparently south to the Nawa-Loika. The original inhabitants of the Zandeh countries in the Bomokandi basin, are called Mēge and A-Barambo. The tribes east and south of the Monbuttu, are by them called Momvu,† and those south of Nepoko, Mabōde. The Mēge are Monbuttu in language if not in race. The tribes south and east of the Monbuttu's proper, as far as the Albert Nyanza watershed, are looked down on by them as poor savages, and as above stated, the Monbuttus, though much broken up by slave-hunters, exist now chiefly as an aristocracy ruling inferior subject races.

Of the tribes through which Stanley means to go east and north-east from Stanley Falls, little is known. According to Dr. Junker they are disorganised and disunited, and probably sparsely scattered in a rough, hilly, forest country: they have goats, and those nearest Lake Albert have cattle. The rivers there beyond the Nepoko have probably a rapid fall. The river that joins the Congo just below the Falls is twice broken by rapids a short way up.

The Akkas or dwarfs, exist only in scattered colonies. In the country west of the Shinko, and north of the Kuta, which the Nubians call Dar Abu Dinga, are a peculiar people, the Nsakkara. The A-Bassango, who inhabit the banks and islands of the Makua, and who practically *monopolise its navigation throughout*, are distinct from the Monbuttus, Zandebs and others. They have canoes sixty-feet long.

The attention of travellers and linguists will be directed mainly to the Zandebs, Monbuttus (i. e. A-Babūa, &c.) and A-Bassango.

The Monbuttus are a superior and intelligent people, superior to any of the Bahr Gazal tribes, from whom, as Schweinfurth says, you may expect an intelligent answer and a sound judgment, and whose word you can rely on in matters of business. In Munza's time they emphatically formed a nation, and knew it. They stood by each other faithfully as fellow-countrymen, and they are faithful to friends. Many of them

\* Or Bandja.

† A term of contempt.

fought under Gessi. He saved them for a time, and deposed Gambari. Emin came to Tangasi in 1883, and administered the country, which is part of his province; the nation was then much broken and decayed, and looked to him for protection.

The Monbuttus are agriculturists and smiths. Their population in 1870 was very dense; according to Schweinfurth, about a million in a space of a square degree, or 250 to the mile. Though they have neither pincers or file, or the art of tempering by immersion, they supplied the Zandehs with many of their weapons. They felled trees, and made canoes 40 feet long and 5 wide, with a tedious little iron hatchet. Munza's great hall, 100 feet long, 50 wide, and 40 high, was the architectural triumph of Central Africa. They did not know how to weave cloth in 1870, though the A-Babūa did. The men dressed in fig-bark, while the women went naked. They are light-coloured, have rather long curved noses (for negroes), and are all circumcised. They are great cannibals, and naturally so, as they have no domestic animals to eat, and are not great hunters. Bananas, cassava, yams, sweet potatoes, and sesame, are their chief food.

The Monbuttu women are, according to Schweinfurth, a striking and most displeasing contrast to the Zandeh women, who are modest and retiring, faithful as wives, and devotedly attached to their husbands.

King Munza was a powerful monarch who levied taxes, and kept good order. He had a great retinue of courtiers and officials, and affected much state and pomp whenever he emerged from his usual privacy. All that he touched was sacred. He protected his people from the abominable malpractices of the slave-dealers, and steadily refused to let any of his numerous daughters marry an Arab or Nubian. For these reasons they murdered him in 1876.

The Zandehs are a less civilised but more promising race. Their domestic virtues seem to be considerable, and their fighting qualities are superior to those of any other negroes in the Soudan. The testimony as to this last is clear and unanimous. Emin has written most emphatically of the gallant defence of Amadi by his Makarakas, who ate their boots and then at last cut their way out. The negro battalions in Hicks's army stood out a whole day without water after he and his Egyptians perished, refusing to capitulate, and saying they had eaten the Effendina's\* bread, and therefore meant to do their duty. Continually during the rebellion the basingers died like the Old Guard, selling their lives very dearly. The best of them, without any doubt, were Zandehs. Lupton's intention to take to the jungle with a spear, along with his trusty Zandehs, when his ammunition should be spent, and to so continue resistance, argues in favour of the troops as well as of the leader. Sudden betrayal only prevented him doing so.

\* i. e. the Government's.

The Zandehs are a nation of hunters. Hunting is their chief occupation. Meat is their word for food, and they hunt for meat. They have no cattle, and a third of their grain (eleusine) goes in brewing a drink that deserves the name of beer. They can carve well, and make pottery and iron weapons. Their huts are tasteful, and they are very fond of music, even of their own. They take auguries regularly before going to war, and seem to have a faint sort of hero worship. Schweinfurth thinks their religious ideas are poor, but the Banda tribes\* have a male and female deity, each of whom has a shrine in each homestead, where they lay their offerings, take oaths, "baptise" their children, and take auguries. In person, they are remarkable for their round broad heads, short legs, and big full eyes set wide apart, and above all for their graceful agility and ease of motion, high training, and evident mastery over every accomplishment that befits a hunter.

Politically they are disunited, through the number and turbulence of an aristocracy of petty chiefs, each of whom is implicitly obeyed by his retainers. Succession goes by primogeniture, but the insubordination of brothers greatly tempers the rule. It is the custom for a Zandeh to ask his chief to find him a wife, or to intercede for him, rather, with the father of the maid he has courted. In most savage countries a man buys his wife direct from the father. The Zandeh custom suggests that not long ago their nation was organised for war like the Zulus, who being all soldiers, might only marry by permission of their leader.

Each chief or clan has round it a waste or forest mark, where it hunts, and which separates it from the next. Sometimes independent brothers are found living and ruling side by side within the same belt of waste. The word clan is perhaps wrong; for change of allegiance, and taking service under another more popular chief seem to be not uncommon.

The chiefs affect no state, but may be known by their pride of mien. Schweinfurth says that they do not lead their retainers in battle; but they alone declare war and peace and direct the campaign. They have power of life and death, and now and then "indulge in fits of Cæsarism," lest the fact that they can kill without giving a reason should be forgotten. All the ivory belongs to them, and half the carcass of elephants. They recognised Gessi's and Lupton's authority over them, by asking for protection, by making large gifts of ivory, by referring disputes to Dr. Junker, whom they treated as a government commissary, agreeing to trade ivory only with government agents, and other ways. In 1883 most of the country north of the Mah Kobo and Barusso eastwards was in fact an Egyptian proteo-

I have mentioned examples of the intestine discords of the and of the struggles of brothers for independence, or leaders, were so cruelly fomented by the slave-hunters. Dr. Junker's

\* According to Nachtigal's Bornu man. see

seems to show that they had had their surfeit of civil wars, and wished for internal peace and for protection under a strong leader, a wish which would require another European arbitrator and protector like Gessi or Lupton to carry out. Khartum traders will infallibly foment dissensions in order to get ivory and slaves, for this is their invariable policy. Whoever can prevent this and organise the nation ought to be able to stop the whole Bahr-el-Gazal slave trade. At least that was Gordon's plan in 1884.

So much for the people: let us return to the rivers. Where does the Makua flow to? It must flow either to Lake Tsad or to the Congo; that is quite clear. I dismiss as utterly absurd the idea maintained by Stanley in his book on the Congo that it is the Bierre; and I cannot understand how such an authority could have written in 1885 two pages of argument to maintain that it does, for upon the face of the facts which were known on Bohndorf's arrival in Europe, and which were in print in the middle of 1884, the hypothesis is untenable. Explorers look only to their own discovery.

We now know, thanks to explorations made in December 1885 or February 1886 by the missionary Mr. Grenfell, that the Loika is navigable to about  $23^{\circ} 25'$  E.,  $2^{\circ} 50'$  N., that the rapids he stopped at are possibly passable at high water, and that the river about Christmas has a volume of some 30,000 cubic feet a second. We also know of the Mobangi, up which he went 100 miles before he found he was not in the main Congo (such is its size and the sharp angle at which the two streams meet), and found it navigable to  $4^{\circ} 27'$  N. at lowest water; and we know also that the only other northern tributary of the Congo between the Mobangi and Aruwimi is the Ngala, near Bangala, which in December had a volume of about 25,000 cubic feet a second. The Ngala has since been navigated in time of flood by a tiny steam-launch to about  $3\frac{1}{2}^{\circ}$  N. and perhaps  $21^{\circ}$  E. It and its branches are there very small streams, barred by rapids and waterfalls, in a hilly and rocky country. Its sources in these hills defines the watershed of the Makua. Grenfell searched carefully for other northern tributaries and found none.

The French, in January 1886, navigated the Sekoli-Bonga, another large Congo tributary, parallel to the Mobangi, and only 60 miles further west, which in October had a volume of about 40,000 cubic feet a second. All these estimates of volume are by Mr. Grenfell. The Mobangi is by far the biggest of these northern tributaries, not excepting the Bierre; \* the Makua must be the Mobangi, or else must go to Lake Tsad: that is quite clear.

[NOTE.—The following argumentative paragraphs were not read at the meeting. They meet Mr. Ravenstein's arguments.]

Now the Lake Tsad streams were explored by Barth and Nachtigal. They are two, the Shari and the river of Logon. The latter is

\* Stanley's "Aruwimi."

fordable in March (at Logon), and is there about two-thirds the size of the Shari. The Shari in March has been described by Barth as 600 yards wide, quite shallow for two-thirds that width, and 15 feet at deepest. The current in the deep-water channel ran two to three miles an hour, and over the shallows of course much less. Say current  $2\frac{1}{2}$  miles an hour throughout, and average depth for 200 yards 13 feet and for the rest three feet (a very liberal interpretation), and you have 42,000 cubic feet a second. Barth says the year was a very rainy one. Nachtigal travelled along the Shari for many days above Barth's point in March, and says it is 330 to 450 yards wide, fordable half-way across, and for a third part beyond (i. e. for a third of its width), 10 to 15 feet deep; current two miles an hour. If the remaining sixth part is the slope down from the edge to the 10 foot depth, and if the fordable half averages three feet, this gives 20,000 to 28,000 cubic feet a second.

But then the Shari splits into four streams, which flow from east to west. Both in Bagirmi and Wadai, Nachtigal found they were well known and that there was no other. He took into his service an intelligent and reliable man, who had crossed them all in the dry season, though apparently not at the driest. The Aukadebbe, which joins in lat.  $10^\circ$  (Nachtigal went beyond its mouth to lat.  $9\frac{1}{2}^\circ$  on the west side of the Shari), and the White and Blue rivers, which join below lat.  $9^\circ$ , have together about as much water, or more, than the fourth or main stream, the Ardhe. One was 80 yards by three feet, the second 200 or 300 yards by 4 feet, the third 100 or 150 yards, but not fordable, and the currents of all three were nothing particular. The Ardhe was 300\* yards wide and fordable, but it had a current which made fording rather difficult. Now a four mile an hour current three feet deep, or a three mile an hour current four feet deep, is pretty bad to cross, and the former at four or the latter at five feet would lift one off one's legs. These depths and currents if maintained right across the river give (which could hardly be) from 17,000 to 30,000 cubic feet a second. This crossing was not said to be at the lowest season.

Evidently this fordable Ardhe is not the Makua. Roughly speaking, it is about half the Shari, which is *perhaps* at very most 40,000 (in a wet year), but more likely some 25,000 cubic feet a second in a usual dry season. The Makua in long.  $28^\circ$  near Munza's has 10,000 cubic feet of water a second, and at Ali Kobo is six miles wide in the dry season.

But suppose the Ardhe was the Kuta-Makua. The Kuta-Makua certainly at long.  $22^\circ$  drains at least 120,000 square miles of country for its watersheds are known. Where would the other half of the Sha-

\* This is native information. The man did not measure widths, but compared it a river bed before their eyes which Nachtigal promptly measured. Had he been Londoner his estimate would be nearly worthless, but a slave-hunter, whose business is to cross many rivers, looks twice at them and with a practised eye. An Arab knows a bowshot; a mountaineer the height of a snow-slope, and the time a Chinese tailor will eye his customer and then fit him perfectly without

(the three northern streams) find a proportionate drainage area? Indeed they would require a far bigger one, for they run in latitudes where the dry season is very dry indeed. Where would the Logon find its proportionate area? And where would the Mobangi find a basin three or four times as big as that of the Kuta-Makua-Ardhe? Grenfell was at  $4^{\circ} 27'$  N. on the Mobangi in its very lowest season, at the end of February: at the season when the Kuta and Makua too are at their lowest. The river was 640 yards across, of 25 feet average depth, and had a current of one to two miles an hour: say a current of  $1\frac{1}{2}$  miles an hour, and its volume is 75,000 cubic feet a second, which is three-quarters of what all the other northern tributaries of the Congo below the Aruwimi put together contribute in November and December, and two-thirds of what the united Kasai-Sankuru gives (120,000 cubic feet a second)\* in June (a month perhaps from its lowest). An area of 180,000 square miles is drained by the Kasai-Sankuru. The Kuta-Makua drains two-thirds as much, and presumably has two-thirds of its volume, which is just the volume apparently discharged by the Mobangi.

Again, Nachtigal had another informant, a trader from Bornu, who had gone south across the Ankadebbe and White rivers, which rise, he says, much further east (in the hilly Nile watershed toward Hofrat el Nahas), and no doubt are the streams which Potagos had pointed out to him from his mountain point of view near the junction of the Shari, Nile, and Kuta basins. Beyond these rivers, and fifty miles beyond the springs of the Blue river (which lie in a hilly country), the Bornu man passed through Foro (Lupton's Foro), close to which also, in a hilly country, were the springs of the Ardhe, a river which he knew all about; and 100 miles beyond Foro, he reached the Kuta, which he said was a river bigger than the Shari itself, which certainly did not run into it, flowing west, and full of inhabited islands, some of them rocky. He gives other names besides Foro, which Lupton identifies. He spoke the Banda language, and said it was spoken from lat.  $9^{\circ}$  N. to the Kuta, and he gave examples to show Nachtigal that all its dialects are mere dialects and nothing else. This uniformity of language of course facilitates the spread of good information. His distances as mapped by Nachtigal are so correct that the Kuta so mapped (though Nachtigal himself was nearly 400 miles from it in Wadai) is only forty or fifty miles further south than Lupton found it to be.

Nachtigal consequently did not pretend that this Kuta could flow into the Ardhe, but threw out a suggestion that it may flow into the Logon (the Congo then was unknown). But this cannot be, for the Ardhe, according to the other informant's distances, lies only 120 miles from Grenfell's furthest on the Mobangi. The Kuta-Makua would have to make a tremendous sweep to get round it to the Logon (which, as stated, is a fordable stream two-thirds the size of the Shari in the dry

\* By an estimate more careful than any of the others given above.

season, not capable of receiving a fifth part of their waters) and would almost run into the Mobangi on the way.

The fact of the Logon swelling, so as to equal or even exceed the Shari in the rains, is easily accounted for by its position: its basin lies where the summer rainfall must be drawn from the Atlantic, and may reach further south than the Ardhe.

The reported connection between the Shari (Ardhe) and Logon, which, if true, makes Bagirmi an island, is immaterial. *Primá facie* it is not likely, and Nachtigal himself says he is inclined to disbelieve it; its existence is negatived by the unequal rise and fall of the two rivers. As in the dry season it is said hardly to flow at all, it hardly affects my argument.

The origin of the idea that the Makua flows to the Shari is found in the tale told to Schweinfurth in Monbuttu, that it flowed to a big water where the people prayed like the Arabs, and had white clothes like theirs. I explain this tale by another whose truth is immaterial as long as we suppose it to have been repeated for true. Rafai, in 1877, on the banks of the Mbomo, told Potagos that beyond the Shinko was a river Sebanga, running south to the Mbomo (the Enji we may suppose), and beyond it another which bifurcated, one part going to the Shari, and the other to the Mbomo (Kuta). Rafai also told him that Zebehr had a few years before descended the Tsigo (Shinko?) in a canoe to the Mbomo, and from the Mbomo had ascended the Sebanga \* and had learnt of this other peculiar river. Potagos adds that he asked Zebehr about this afterwards, who assured him that this was so. If Zebehr and Rafai believed such a tale it would also reach Munza's through the Arabs.

In face of the known positions of the Makua and Mobangi it is scarcely necessary to weigh the Shari hypothesis any more. Before the discovery of the Mobangi was made it was scarcely tenable.

The matter is now one of practical importance. The Mobangi is known to be a waterway hardly inferior to the main Congo for practical purposes: deep; never less than 600 yards wide, even in February, when the Kuta-Makua certainly (and it too apparently) is at its lowest level; and navigable at all times from Stanley Pool 650 miles thence straight N.N.E. to lat. 4° 20' N. beyond the limit which the Congo State, by private treaty with Germany, has placed to its future "sphere of operations," and beyond the limits which the French will probably occupy if they win in their dispute with the Congo State as to which of the two shall not operate in the Mobangi basin. It is then found to turn sharply to the east, flowing from the east through a gap it has cut in a line of quartz and red clay hills 1000 feet high, hills which may be a

\* The sources of this Sebanga were pointed out to Potagos on the mountain in the Shari basin, where he had such an extensive view. It is probably the Enji. All that we know of the chances of such a bifurcation is that the lower Ardhe runs in a wide flat country, where there were no mountains to be seen to the south.



continuation of the hilly watershed between the Makua at Ali Kobo and the sources of the Ngala. The gap is narrow, and big rocks rise in mid-stream: at high water it is difficult to pass; but at low water, after reconnoitring, Mr. Grenfell got the *Peace* through easily, in February. Where we know the Kuta-Makua next, they are placid and colossal; the Shinko at Marra is still 90 yards wide, 20 to 35 feet deep in October, and only 1980 feet above the sea. Stanley Pool is now said to be 916 feet above the sea;\* but Mr. Grenfell, who is more likely to be right, makes it only 800 feet. Equator Station at Mobangi mouth is 130 feet, and Grenfell's furthest just 500 feet higher—say 1300 feet. Therefore more rapids on the Mobangi-Kuta may be expected.

The river strikes at the very roots of the slave trade, and renders its suppression easy by commercial and peaceful means. Take away the ivory, turn a lucrative trade from Khartum to the Congo, and the great incentive to slave-hunting and slave wars is gone; philanthropy is cheap, for the profits will be enormous. Ivory is now worth in London twenty to twenty-five times the cost of its transport from Stanley Pool to here, the remaining 900*l.* or so a ton will pay for river steamers, trading stations, and the rest. Lupton carried his ivory from south and south-west of the Makua, and almost all of it from the Congo side of the watershed overland to Meshra. He claimed to show a net profit through this trade of 60,000*l.*, reckoning the whole cost of his province as part of the expenses.

What Gordon proposed to do when writing as Governor of the Congo to Stanley, in January 1884, can be done now. "If we act in the countries where the slave-traders hunt and make treaties with the chiefs, we can prevent their raids and truly stop the slave trade." †

We have not heard the last of the negro Sudan or of the way thither. A way lies through the country of the Zandehs the loyal subjects of Gessi Pasha and Lupton Bey, up the two rivers Dr. Junker has traced to their confluence.

After the paper,

Sir FRANCIS DE WINTON considered that the Society was much indebted to Mr. Wills for his paper, which was really a history of the exploration of Central

\* 280 metres. Mr. Wauters has just accepted this figure.

† These blacks are becoming the Janissaries or Mamelukes of the Sudan, just as Gordon prophesied they would. "My belief is," he wrote, "that this Mahdi business will be the end of slavery in the Sudan. The Arabs have invariably put their slaves in the front and armed them (with rifles); the slaves have seen that they were plucky while their masters shirked. Is it likely that they will ever yield obedience to their masters as heretofore?" The last Blue Book is an instructive commentary upon this. Upon a promise of 10 dollars a head to each black who should come down to Fgypt desertions have begun freely, and the would-be-conqueror of Assouan, Walad-el-Njoui, had to stop and try to disarm the only drilled troops or decent riflemen that he had in his army. [Since this was written Njoui has been beaten by the loyalists and the Khartum Khalif has been transferring his arsenal to the swampy island at Khartum for fear of a loyalist coalition.]

Africa, and will prove very useful to students of that region, giving, as it did, a succinct account of what had taken place there during the past ten years. The question which most interested him was whether the Congo would in future be the route to the district, and whether the Mobangi would prove navigable up to Kibali. Mr. Wills had omitted to mention that Grenfell in coming down ran on rocks, and very nearly sank his vessel, the *Peace*, which only drew 18 inches of water. It was a general characteristic of all those rivers to have rapids where the navigation became very dangerous. Therefore until it was known whether its course was navigable it would not be safe to prophesy whether the Mobangi (or Welle) would or would not become the great highway in the future. He had been connected with the Emin expedition, because of his friendship with Mr. Stanley. The expedition arrived at the Cape on the 10th March, and reached the mouth of the Congo on the 18th, one day ahead of the calculated time, without any hitch or misadventure. He had just received a telegram from Sir Frederic Goldsmid, the President of the West African Telegraph Company, stating that the *Madura* arrived all well with a party of 796 all told. Mr. Stanley's party numbered 638. All the Europeans were well and in excellent spirits. Tippoo Tib was with them, in order that they might get as much information as possible out of him with regard to the country which it was proposed to cross. The expedition were about to enter into the territory of the Congo Free State, and the Committee were sure that the King of the Belgians and his officers serving there, would do all in their power to forward the party on at the most rapid rate possible. Of course, calculations made about travel in Central Africa were subject to variations, but it was hoped and believed that Mr. Stanley would arrive at Stanley Falls and cross the 350 miles to Wadelai by the middle or end of July. The messengers despatched from Zanzibar would no doubt, carry to Emin Pasha the tidings of the relief that was being sent, and that would keep his soldiers in good heart. It might be thought that the route from Zanzibar was very much shorter than the Congo route, but from Wadelai to Zanzibar would necessitate a land journey of over 100 days. That was the opinion of Mr. Stanley and Colonel Grant, both of whom had had great experience in African travel; but by the Congo route the land journey could be accomplished in about fifty days. Among Emin's party there were many women and children, with whom an overland journey of 100 days would be a very difficult task. It was also known that when once a road was opened in Africa by a white man it became known as a white man's road, and if the territory described by Mr. Wills were once traversed by Europeans a great blow would be struck at the heart of the slave trade.

Mr. RAVENSTEIN said that Dr. Junker's work was among the very best that had been done in Africa. To him and Schweinfurth we owed nearly all we know about the countries lying to the west of the Upper Nile. He had found no difficulty in adjusting the work of these explorers to the latitudes observed by Mr. Lupton. Still, the map of that part of the country rested upon very unsatisfactory data. Neither the Meshra er Rek, and a point on the Upper Yeyi, had been determined with accuracy. As to the latitude of the former, Lupton and Petherick differed to the extent of ten miles, whilst Marno's and Petherick's observations in the south were quite irreconcilable with each other. For the longitudes of these places we still had to trust to very unsatisfactory itineraries. We ought not too readily to accept the positions inserted upon Dr. Junker's most recent map, for a survey of a winding river, unchecked by observations for latitude, or facilitated by prominent landmarks, was a task not very easy of accomplishment. He trusted that Mr. Stanley's relief expedition would bring home a few points fixed with great care. He supposed that after Dr. Junker's most recent statements they must accept it as a

fact that the Welle-Makua found its way into the Mobangi. Still, he could not help thinking that with the facts until quite recently before them, as good a case might have been made out in favour of the Shari as of that tributary of the Congo. Dr. Schweinfurth told them that the Welle begins to rise about the middle of April, whilst the lower Shari first rose sensibly in June, and was highest in September and the beginning of October. The discharge of the Welle was estimated by Schweinfurth at 40,000 cubic feet a second when in flood, whilst the Shari, according to Nachtigal, discharges 64,000 feet in spring, when it is low. Assume a rise of twelve feet, and the discharge would be nearly 200,000 cubic feet. We knew little about the way in which the Shari conducted itself on its way to Lake Tsad. There might be a sort of half-way house, he meant a lake, from which it issued with reduced volume. It was known, however, that the river turned spendthrift on approaching the lake, and instead of going along decently, it sent one branch to the right, another to the left, and even parted with some of its water to the Benue. This, at all events, was asserted by Dr. Vogel to be the case. As to the Mobangi, it appeared to differ considerably according to the seasons. Where Grenfell passed with ease, Captain Rouvier failed to make any progress. The Shari, notwithstanding its vagaries, was a considerable river all the year through, and kept Lake Tsad, whose water-level might fairly be estimated at 10,000 square miles, pretty well up to its level, even causing it occasionally to overflow through the Bahr el Gazal. If we assumed the annual rainfall over the Tsad to amount to 36 inches a year, and the evaporation to 120 inches, then that lake would require an annual supply of two million millions of cubic feet to maintain its level, and this the Shari alone contributed at the rate of 63,570 cubic feet a second. Unfortunately, in all these speculations we dealt with assumptions and not with facts, for the volume of none of the rivers in question had ever been accurately ascertained even for a single day. The basin of the Tsad, which covered an area of 550,000 square miles, of which 246,000 were unproductive, yielding no rain, was deserving of being explored, and he hoped that the Royal Niger Company would make it their business to settle the various problems still awaiting solution.

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#### GEOGRAPHICAL NOTES.

**Dr. Junker.**—The distinguished African explorer, Dr. Wm. Junker, will arrive in London in a few days, and it is expected that he will read a paper at the Society's meeting on the 9th inst. The preliminary sketch-map given in the present number, in illustration of Mr. Wills's paper, shows the substance and the extent of Dr. Junker's discoveries. Since the end of 1883, Dr. Junker has been with Emin Bey, shut up in the Equatorial Province on the Upper Nile, and only last year succeeded in negotiating a passage through Uganda, and so reached Zanzibar about Christmas. Dr. Junker's travels in the Sudan and Central Africa have lasted from the spring of 1876 to the end of 1886, with the exception of about a year and a half in 1878-80. In his first journey he found the sources of the Welle Makua near Lake Albert Nyanza, but Suleiman's rebellion and his own ill-health prevented further exploration to the west. In 1880-83 he explored the basin of the Makua and Kuta (Upper Mobangi), travelling without any armed escort, and known as

the Pasha's (Gessi's) brother. The news of the capture of Rumbek by the rebels in the end of 1883 made him retire upon Lado to Emin Bey.

**A new Expedition to the Owen Stanley Range, New Guinea.**—The Government of Victoria are preparing to send out a well-equipped expedition to explore the Owen Stanley range from Port Moresby, and have offered the leadership to the man of all others best able to carry so difficult an undertaking to a successful issue, namely, the Rev. J. Chalmers. A grant of 2000*l.* has been made towards the cost of the expedition, and further contributions are expected.

**Climate of Blantyre, South Central Africa.**—We have received copies of a brief report of meteorological observations, taken during the year 1886 (with instruments lent by our Society) by Dr. Milne, of the Scottish Missionary Station at Blantyre, which supply information regarding the interesting subject of local climate in Central Africa, otherwise so difficult to obtain. Blantyre is situated on the highlands between the river Shiré and Lake Shirwa, in S. lat. 15° 47' 30" and E. long. 35° 3' 54", at an altitude of 3320 feet above the sea-level. The observations show the mean temperature of the year to be 64·8° Fahr., the hottest months being October, November, and December (respectively 74·2°, 73·9°, and 73·1°); the coldest, June and July (60·9° and 58·2°); the mean daily range showing a maximum of 21·8 (August), and a minimum of 10·4° (March). The total rainfall of the year was 55·78 inches, and rain fell on 109 days. The greatest daily rainfall was 2·35 inches, in January. The rainfall for 1882 was 50·84 inches, and for 1882, 52·72 inches. The prevailing winds are easterly—south of east in March and July, north of east during the rest of the year. Westerly winds, north of west from October to March, and south of west in January and February, include only 64 out of an annual total of 730 observations; they nearly always bring rain, although the greater proportion of the rain comes from an easterly direction. The mean monthly range of the barometer was ·23 inch; the mean daily range ·44 inch.

**Captain Casati.**—The two couriers which the Milan Society for Commercial Exploration in Africa and the Italian Geographical Society have united in sending out for the relief of their compatriot, are announced as having started on the 9th March for Unyoro. They are travelling under the powerful protection of Tippo Tip, and carry very little baggage. They are further provided with letters of credit to all the mission and commercial stations along the route, so that Casati, on his return in their company, will not be without the necessary means. It is expected that the return journey will have been completed in less than nine months' time. These messengers will be able to communicate to Emin Bey the news of Stanley's expedition for his relief.—The latest news (23rd January) from Uganda announces the safe arrival

at its destination and return to Uganda of the caravan which Dr. Junker equipped and despatched to Emin Bey in August 1886.

**The Mungala River (Central Africa).**—A very brief account of a journey made by the Belgian Lieutenant Baert on this river is published in the 'Mouvement Géographique' (1887, No. 5). The Mungala is one of the northern tributaries of the Congo, and is described as unimportant by Grenfell, who however did not navigate it for any great distance. Lieutenant Baert ascended the river for 220 miles, reaching a point in  $3^{\circ} 30'$  N. lat. and  $22^{\circ}$  E. long., which is supposed to be very near Dr. Junker's most westerly point. Here he was debarred from further progress by the rapids. It is certain, however, that the Mungala is not identical with the Welle, because Lieutenant Baert found the breadth of the former to be only about 11 yards, and its greatest depth 5 feet, whereas the breadth of the Welle at Ali-Kobo in Bassange Land is so great that Dr. Junker could not determine it.

**A Visit to Sokoto.**—The 'Mittheilungen' of the German-African Association, and the 'Verhandlungen' of the Berlin Geographical Society, publish further reports of the visit to Sokoto of Messrs. Staudinger and Hartert, members of the expedition of the late Mr. Flegel. Starting from Loko on the Benue on August 12th, 1885, the travellers arrived on the fourth day at Anasarawa, the residence of a king subject to the chief of Zaria. His palace is enclosed within a lofty battlemented mud-wall, and is an imposing structure. The interior, however, is disappointing. Two days afterwards they reached Kefi-Abd-es-Senga, one of the most important parts of the Haussa empire, where European merchandise is exchanged for ivory. They found the market well supplied with provisions and native manufactures, including leather wares, pottery, cutlery, and textiles, as also with slaves. Passing Gitata, grotesquely perched on a rock and the beautiful Panda valley, they crossed, on September 7th, a lofty range of granitic mountains, and arrived two days afterwards at Kashia, a flourishing Fulbe settlement. After a delay of eleven days they were permitted to proceed to Zaria, which had previously been visited only by Clapperton and Vogel. The town covers a large area, but is thinly peopled. It is enclosed by a lofty wall, pierced by numerous gates, at every one of which stands a tax-collector, who levies a toll in cowries upon all persons attending the market. The market was well attended, and plentifully supplied with cattle, asses, sheep, goats, horses, and slaves. The native manufactures exhibited much taste, but were dearer than European. The delay which occurred here was availed of to pay a flying visit to Kano. After their return they left for the camp of the Sultan of Sokoto, who had taken up his quarters within a day's journey of Kaura, th Zamfara, and was engaged collecting tribute from the kings and towns. The sultan granted them an audience

received the presents which had been sent him by the German Emperor, and which consisted of fifteen needle guns, cavalry swords and sabres, mirrors, ivory carvings, bracelets, stuffs and jewellery. He assured his visitor that his "Empire was open to all traders; that ground would be ceded for building factories, and that not an inch of land had been surrendered, nor a monopoly granted to the English." Previously to returning to Loko the German envoys visited Sokoto (where they arrived on January 12th, 1886), Gandu, and Wurnu, where the Sultan presented them with a reply to the Emperor's letter, and with a bill for a million cowries drawn upon the King of Zaria, who commuted the payment by the gift of a horse. Leaving Wurnu on February 20th, they were back at Loko on April 20th. The account is accompanied by a valuable map.

**MM. Capus and Bonvalot in Central Asia.**—Further news\* of these travellers has reached the Geographical Society of Paris in a letter written from Margilan (Ferghana) which relates their movements down to 23rd February last. Their stay at Samarkand, after unsuccessfully attempting to enter Afghanistan, was not of long duration. They had decided to return to France by way of Karchi, Kerki and the Turkoman desert on the Afghan frontier, when, hearing that caravans in winter frequently travel from Kashgar to Leh (Ladak), they determined to try this route to British India. With this object they set out quickly to Margilan, where at the time of writing they were making preparations for this important journey. The plans of the travellers, which had been modified at the suggestion of General Karalkoff, to whose assistance they were greatly indebted on their last journey, were as follows. At Gultcha, their base of operations, provisions, pack and saddle-horses would be obtained, and also a stock of fuel, as they had to cross a perfect desert at an altitude of from 13,000 to 16,000 feet. From Gultcha they would proceed through the Taldik (? Terek) pass to Lake Kura Kul, then over the pass of Tuyak, and along the frozen river of Akbaital. After following this stream for some distance, the travellers would leave it and endeavour to reach the little river Almagan, near the khanate of Kundjut, in order to avoid being stopped by the Kara-Kirghiz and the Afghans. They would then push on to Nagar through the passes of Darkot and Yassin. This route presents few difficulties in winter, which is the best season for avoiding conflicts with the summer inhabitants of the Pamir. The travellers hoped to be able to conciliate the young ruler of Kundjut, who had quite recently succeeded his father, after having caused him to be assassinated by two of his servants. In view of the importance of this route through country little known to Europeans, we shall await with interest the result of this bold enterprise.

\* *Vide Proc. R.G.S. 1887, p. 245.*

**Surveys and reconnaissances in Upper Burma.**—Colonel Woodthorpe, R.E., arrived at Paungbyin on the Kyendwin (lat.  $24^{\circ} 16'$ , long.  $94^{\circ} 50'$ ) on the 27th January, having crossed the Kubo valley from Tammu by what is called the Sweja route. Leaving Tammu on the 25th, he marched to Auktang, then to Kaia, 6 miles north of Auktang, whence he ascended the Kyendwin in a Berthon boat to Paungbyin. From Paungbyin, Colonel Woodthorpe was to proceed a five days' march up the Yeu or Uru river, accompanied by Lieutenant Daly, the political officer. They intended to proceed by an inland route and return by river, paying a visit to Samjok (Thaungdut) on the way. After this trip, Colonel Woodthorpe intends to go to Kindat, where he hopes to meet Mr. Ogle. Up to the present, though delayed by bad weather, they have cleared and observed at 8 peaks, and fixed a good many points to work from; while they have surveyed the Kubo valley and gained a fair knowledge of the hills to the west, which are inhabited by Chins or Burmese Nagas. The Yeu river has been partially surveyed, and also a good deal of the country to the south-east of Manipur and west of the limit of Major Badgley's survey of 1882. The outturn of work up to the end of January amounts to 800 square miles on the quarter inch and 260 square miles on the one-eighth of an inch scale.—Captain Hobday reports from Mandalay that he had just returned from the Ruby mines, marching with a column first to Mainlung, then to Mogok, where Mr. Kennedy, who had surveyed up from the river at Kyan-nyat, met him. He then went on to Engouk (elevation 6000 feet), which is to be an experimental sanitarium; the climate is cold and invigorating, the temperature at night going down to  $26^{\circ}$  Fahr. From Engouk, Captain Hobday returned to Mandalay by a new route viâ Shwen-aungbin to Thabytkyon on the Irawadi, which is reported to be much better and shorter than that viâ Kyan-nyat, which becomes impassable in the rains. Mr. Kennedy is left in the Ruby mine district to continue the survey, and Captain Hobday intends to accompany the Sawbwa of Thibaw of the Shan States back to his capital, and to take the opportunity to reconnoitre a large bit of unknown country. He expected, in all probability, to be away from Mandalay till the end of March.

**North Alaska.**—Some interesting details concerning Lieut. Howard's daring journey across the north of Alaska, which we briefly noticed in the December number of the 'Proceedings' (p. 789), have recently been published. In the course of his expedition he descended the Ikpikpuk, the river mentioned by natives as flowing between the Yukon and the Glacial Ocean. Accompanied by a sailor named F. J. Price, he started on 12th April, 1886, from Fort Cosmos on the Kowak river, with instructions from Lieut. Stoney, of whose expedition he was a member, to cross the country from the river Putram to Point Barrow. He took with him two sledges and sixteen dogs. He travelled as far as practicable in company with the natives of different tribes, and in this way was

escorted by from 30 to 100 men at a time. The journey was full of hardships, and the cold intense, the thermometer descending as far as 30° below zero (? Centigrade). In the mountainous districts it became necessary to unpack the baggage and carry it. Lieut. Howard was very well received by the natives, who had never seen a white man. The people resemble the Esquimaux rather than the Indians of North America; they are, without exception, given to the use of tobacco; men, women, and children all smoke. The traveller journeyed in the sledge for seven days on the river Cadwell, which was frozen all over, and then crossing a mountain chain he discovered the river Ikpikpuk. From 23rd May to 3rd June he encamped close by its source. He now suffered much from hunger, his supply of provisions being completely exhausted, and unable, like the natives, to eat putrefied seal fat, he had to content himself with roots. Upon the breaking up of the ice, he started down the river in a boat made of skins sewn together, and descended the river for 200 miles, down to its mouth, where it forms a great number of lakes and swamps, some of which are more than five miles broad. He arrived with his skin boat on the shore of the Arctic Ocean at Point Barrow, whence he returned to San Francisco, having travelled for a distance of 1000 miles in Alaska. He determined his position daily by astronomical observation.

**Antarctic Exploration.**—We learn from Melbourne that a further step\* has been taken in promotion of an expedition towards the South Pole by leading men in the colony of Victoria. Acting on an offer made by the gallant Arctic explorer Sir Allen Young to lead such an expedition, it is stated that Sir Graham Berry has brought the question of a Government grant towards the cost of the enterprise (stated to be 8000*l.*) before the Cabinet, and that the matter is being urged forward with a view to the vessel or vessels starting from Hobson's Bay in October or November next. The object of the expedition is to be entirely geographical, but incidentally much advantage is expected to accrue to the whaling and sealing interests who would profit by the information gained.—It is rumoured that a movement is on foot also in Sweden for the despatch of an expedition to the Antarctic regions, and that Baron von Nordenskiöld has expressed his willingness to take the command.

**German New Guinea.**—Great activity is being displayed by the New Guinea Company, and their Chief Commissioner, Admiral von Schleinitz, in making voyages of discovery along the coast of this part of New Guinea. The first two numbers of this year's 'Nachrichten über Kaiser Wilhelms-Land' contain reports upon these operations. Huon Gulf has been thoroughly explored, with the result that besides the rectification of the coast-line, eight natural harbours, previously

\* *Vide* 'Proceedings R.G.S.,' 1886, p. 718.



unknown, have been surveyed, and nine rivers discovered. While the party was unable to ascend these streams for any great distance, it seems pretty certain that one of them, Markham river, presents an excellent starting-point for the exploration of the interior, as the river-valley is broad, and bordered by high mountain chains. The coast between Astrolabe Bay and the mouth of the Empress Augusta river was explored during November last. This journey led to the discovery of new bays, islands, and streams, which will cause much alteration to existing maps. Information regarding the character of the country and its suitability for cultivation has been collected. A very carefully prepared map of Huon Gulf, on scale 1:500,000, is published with the foregoing reports.

**The Great Watersheds of the Globe.**—General von Tillo, the well-known Russian geographer, contributes a brief note to the current number of Petermann's 'Mitteilungen' on the subject of the principal watersheds of the earth. He gives a cartographical representation of this great water-divide which, starting from Cape Horn, extends along the whole of the west coast of the American continent up to Behring Straits, and then, continuing on the opposite side of the Straits, runs in a kind of irregular diagonal across the continents of Asia and Africa, terminating at the Cape of Good Hope. This diagonal runs roughly along the line of the great mountain ranges of Central Asia which end in the Caucasus, and then, with a bend through Syria and across the Isthmus of Suez, follows the mountains of the West of Africa down to the Cape. The whole line is thus unbroken in its continuity, except for a few miles at Behring Straits. After this great watershed, the next in importance is, according to General Tillo, that of the Indian-Pacific, and then follow the particular water-divides of the different continents. It will be seen that the line sketched above has a characteristic concavity as regards the North Polar-Atlantic basin, to which belong the greater part of the land-masses of the old world and the greatest part of the land in the new.

**The German "Geographentag."**—The annual Assembly of German Geographers took place this year at Karlsruhe, from April 14th to 17th. Among the more important subjects brought before the meeting were Antarctic Explorations, by Dr. Neumayer; Progress and Present Position of German Surveys, by Dr. Jordan of Hanover; On the Promotion of Geographical Study and Education; On Morocco, by Professor Rein; On Mountain Grouping, by Dr. A. Böhm; The Natural Conditions of Historical and Social Development in the Rhine Valley and the Black Forest, by Professor Gotheim. Herr Paul Reichard gave an account of his recent journeys in East Africa, and Herr Hugo Zöller read a paper on the Boundaries of the Explored and Unexplored Region in Togoland and the Cameroons.

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**REPORT OF THE EVENING MEETINGS, SESSION 1886-7.**

*Ninth Meeting, 28th March, 1887.*—General R. STRACHEY, R.E., F.R.S.,  
Vice-President, in the Chair.

**ELECTIONS.**—*Dr. B. Borun; Frederick V. Dickins, Esq.; Colonel Augustus Le Mesurier, R.E.; John Henry Lile, Esq.; Alexander Macdonald, Esq.; Arthur Patchett Martin, Esq.; John H. May, Esq.; Philip Menell, Esq.; Jos. Gurdon Leicester Stephenson, Esq., C.E.*

The paper of the evening was :—

“Between the Nile and the Congo: Dr. Junker and the (Welle) Makua.” By J. T. Wills. *Ante*, p. 285.

*Tenth Meeting, 25th April, 1887.*—General R. STRACHEY, R.E., F.R.S.,  
Vice-President, in the Chair.

**ELECTIONS.**—*George Stapyhton Barnes, Esq.; Staff-Surgeon Horace E. F. Cross, R.N.; Charles Washington Eves, Esq.; Jos. Wm. Johnson, Esq.; Lieut.-Colonel Edmund Molyneux; Edw. Wm. Parsoné, Esq.; Townsend Percy, Esq.; Rev. Charles E. Stevens, B.D., PH.D.; Sir John Willoughby, BART.; Matthew Wyatt, Esq.*

**PRESENTATION**—*G. Stanley Philip, Esq.*

**ROYAL MEDALS AND OTHER AWARDS FOR 1887.**

At the opening of the meeting, the Chairman announced that,

The ROYAL MEDALS and other awards for the present year had that day been adjudicated by the Council, as follows :—

The FOUNDER'S MEDAL, to Lieut.-Col. T. H. HOLDICH, R.E., in consideration of the services he has rendered to geographical science by the zeal and devotion with which he has carried out the surveys in Afghanistan; first, in 1878-80, when he explored the Bori Valley route and mapped the country near the Beluchistan border, and subsequently, as senior survey officer with the army in Northern Afghanistan, ascended the Lughman Range; in 1881-83, when in the course of his surveys of the Eastern Afghan boundary he carried his instruments to the summit of the Takht-i-Suliman; and lastly in 1884-86, when, as chief of the survey party on the Russo-Afghan Boundary Commission, he availed himself of the opportunity to extend the survey operations over an area of more than 100,000 square miles. Also for his numerous valuable contributions since 1879 to the Society's 'Proceedings.'

The PATRON'S or VICTORIA MEDAL, to Mr. G. GRENFELL, for the extensive explorations he has carried out during his thirteen years' residence in West Africa; first in the Cameroons country, and afterwards on the Congo, and especially, for his reconnaissance surveys of the tributaries of the Congo, eleven of which he has ascended, laying down their courses in a series of preliminary charts on a large scale.

The MURCHISON GRANT, to Mr. GEORGE BOURNE, second in command, and now sole survivor of the Landsborough Expedition which crossed the continent of Australia in 1861, in search of Burke and Wills.

The BACK PREMIUM, to SARAT CHANDRA DRAS, for his researches in Tibet, in 1879 and 1881-82.

The GILL MEMORIAL, to Mr. J. F. NEEDHAM, in recognition of his services in exploring the valley of the Lohit Brahmaputra between Assam and the Zayul Valley of Tibet.

The paper read was :—

“The Lu River of Tibet; is it the source of the Irawadi or the Salwin?” By General J. T. Walker, R.E., F.R.S.

## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris, March 4th, 1887:** M. JANSSEN in the Chair.—The Minister of Public Instruction forwarded a circular announcing that the 25th Annual Congress of the Learned Societies would be held on the 31st May, at the Sorbonne Hall, and giving the list of subjects to be discussed by the Geographical Section.—A communication was read by the Secretary from M. A. Dumont, civil engineer, giving some account of the scheme for opening up the valley of the Euphrates to European commerce.—Dr. Labonne informed the Society that he had just been charged by the Minister of Public Instruction with a mission to Iceland and the Færoe Islands for the purpose of further pursuing his researches on the natural history of these islands.—A letter was read from Dr. A. d'Elyseeff, physician of the Russian Imperial Guard, announcing his return to St. Petersburg from a fresh journey in Asia Minor. After exploring the north of Syria, he proceeded to Mesopotamia across the country of the Kurds. For three months he was engaged in making anthropological researches in the heart of the mountains of Kurdistan and Armenia. He then travelled from Cherput to Samsun. An important work on the Upper Red River and its affluents was received from M. Gouin, French Resident at Son-Tay (Tongking). In a letter accompanying this presentation M. Gouin announced that he contemplated making a complete study of the mountainous districts on the borders of Tonking, inhabited by the Muongs, Thos, Chaus, and other tribes. M. Gouin's paper will be inserted in the Quarterly Bulletin.—M. Petit communicated some information as to the Congo received by him in a letter from Stanley Pool (25th December, 1886), from which we learn that the Arabs, after gaining possession of the Falls station, had descended the river, plundering as they proceeded. The Bangala station was in danger. The transport service also from the coast to Stanley Pool had been interrupted on both banks in consequence of the attacks by the natives on the caravans; the State appeared to be unable to cope with the mischief.—The latest news of M. A. Thouar was contained in a letter, dated 9th December, and forwarded by the Minister of Public Instruction. He had started on 2nd December on his journey across the Gran Chaco, escorted by forty men.—M. E. Hangsen Blangsted communicated the following information as to the population of Greenland. The number of natives in North Greenland about the end of 1885 was 4414, and in South Greenland 5500; these figures showed an increase for the year 1885 of 86 and 31 respectively.—The American explorer, Mr. R. Peary, civil engineer, who was despatched last summer by the Government of the United States to Ritenbenk to study the continental ice and its movement towards the coast, had succeeded, in company with a Dane, in penetrating farther than any previous traveller. The details of his expedition were not yet known.—In conclusion a paper was read by M. Jean Broussali, an Armenian student, on Armenia and its people. The lecture was illustrated by projections of photographic views.

— March 18th 1887: M. JANSSEN in the Chair.—M. G. Rolland, mining engineer, and member of the scientific mission of exploration in Tunis, sent a copy of a communication recently made by him to the Academy of Sciences on the geology of the region of Lake Kelbia and the littoral of Central Tunis. The conclusions at which he arrives, may be summarised as follows:—the configuration of the land on the littoral of Central Tunis has not undergone any practical alteration within historical time. During the Roman period it is possible that the level of the waters was higher in consequence of very heavy rains then prevalent, but at that time, as to-day, Lake Kelbia only communicated with the sea in an intermittent way and

by an unimportant stream.—The question of the locale of Tavernier's grave again occupied the attention of the Society, papers being read by the Secretary from MM. W. Martin and Ch. Joset on the subject.—A letter, dated 23rd February, 1887, was received from the travellers MM. Capus and Bonvalot, now in Central Asia.—M. B. du Caillaud communicated two short papers, one on a Chinese Atlantis, the other on earthquakes in China.—M. Desgodins forwarded, among other documents, one containing the observations of the Abbé Desgodins on the rules formulated by the Society for the orthography of geographical names. He complains of their incompleteness, and states that numerous Chinese and Tibetan names cannot be written according to them. He instances, in the case of the Chinese language, the want of any distinction between "an" and "ane," "in" and "ine," "on" and "one," "h" softly and strongly aspirated. As regards Tibetan, no provision is made by the rules for the sound "nga."—An extract from an American paper relative to Lieutenant Howard's journey across Alaska was sent by M. Jules Girard.—M. Ramon Lista informed the Society of his projected expedition to Tierra del Fuego, under the auspices of the Argentine Government.—Several publications dealing with questions of colonisation and scientific exploration in Canada were presented to the Society by M. G. Demanche. Among them a report by Lieutenant Gordon, commander of the *Alert* on his two years' summer cruises in Hudson's Bay. M. Demanche pointed out the advantages offered by Canada to French emigrants.—M. Mich. Venukoff wrote announcing the completion of the calculation of the length of the 52nd parallel between Valencia (Ireland) and Orsk (Russia); the results obtained would be published at the end of the year.—In conclusion, M. Gastonnet des Fosses read a paper on the construction of a new summer palace at Peking.

**The Geographical and Anthropological Societies of Berlin.**—Special meeting held in honour of Dr. Junker on 16th March, 1887: Herr W. REISS in the Chair.—The Chairman, after welcoming the traveller in the name of the Geographical Society, sketched briefly his achievements, referring to the severe trials and dangers he had experienced, and commenting on the energy and endurance he must have displayed in having successfully overcome them. The valuable anthropological collections had, it was true, he said, been lost, but the traveller's diaries and the wealth of geographical material obtained by him had been preserved, as the excellent maps exhibited at the meeting testified. Amid great applause from the numerous attendees, the audience rising *en masse* from their places, the Chairman presented Dr. Junker with the diploma of honorary membership of the Society. The traveller was then welcomed in the name of the Anthropological Society by Professor Virchow, who dwelt on the fact that Dr. Junker had grown up in an anthropological atmosphere; his family were natives of Göttingen, where Blumenbach then taught, and later on he had come under the influence of K. E. von Baer. After these preliminaries, Dr. Junker commenced his lecture with a short reference to the purely geographical results of his journey, the details of which, he said, he desired to reserve for a written account. On the present occasion he would endeavour to give his hearers a general sketch of the regions through which he had passed, and of the origin of the Mahdist rebellion. His usual mode of travelling, inasmuch as he was never accompanied by a large band of porters, but as a rule only by a small number of servants, was to arrange for a long stay at a given point, and from there to make extended tours into the neighbouring territories. In dealing with the native potentates, it was his practice in the first instance to send messengers to their places of residence, through whom he assured them of his peaceful intentions, and of the fact that he was coming without a military escort. On the side of the wary chiefs, envoys were then usually

sent back with the traveller's messengers in order to satisfy themselves of the truth of the assertions made. In this way the traveller gained easy admission everywhere. The stations at which he was obliged to remain for some length of time were always surrounded with a fence and a hedge of thorns on account of the numerous leopards in the vicinity. These animals very frequently attack human beings, particularly the women, who go out in the evening to fetch water. The habit which they have of returning to their prey, if unable to consume it all at one time, causes them to be easily caught in snares laid for them. Lions, which abound in equally large numbers, are more cautious: they avoid nets of every kind. The natives therefore secure themselves at night by spreading light nets over their huts. Hunting is laborious work, in consequence of the tall, thick, sharp grass. Only during the months of December and January, when the dry grass is burnt up, is it possible to take exercise with comfort. The game retreats to those spots where the grass is not burnt away; here the elephants, whose feet are injured by the burning of the grass, fall an easy prey to the Akkas. In April the grass becomes again so tall that travelling is exceedingly arduous. The great Monbuttu and Niam Niam empires have completely fallen to pieces in consequence of having been divided among the very numerous descendants of the late powerful ruler; the people are continually quarrelling, and throughout the whole of the country traversed by Dr. Junker there is not one really powerful king. In Monbuttu land the women paint their bodies with tricoloured devices resembling an inlaid floor; among the women of rank this toilet is extraordinarily elaborate and ingenious. The first signs of the Mahdist movement, which was destined to set the whole of the Sudan on fire, began in the year 1882. The revolt of the Denka tribes cut the traveller off from returning to Bahr-el-Ghazal by way of Meshra-el-Rek. At first Lupton Bey hoped to be able to quell the rebellion, but inasmuch as the men under his command were only irregular troops, Dongolas and Arabs, instead of the native troops which, as a rule, remained true to the Government, and as he received no help from the Egyptian Government, he was compelled, after many unsuccessful battles, and after being deserted by his troops, who fraternised with their fellow-believers, to give himself up to the Mahdists, in whose hands he is at the present moment a prisoner. Dr. Junker defends Lupton vigorously against the attacks which have been made upon him. Lupton, he says, did the utmost possible under the circumstances, and fought bravely. When Dr. Junker saw the impossibility of penetrating to the north, he retraced his steps eastwards about the end of the year 1883, and met with Emin Bey at Lado. Here he received the letters which had been sent to him in the previous May from Europe; they proved to be the last tidings of home for a long time. Instead of European news, the beleaguered men now began to receive violent and threatening communications from the Mahdists containing reports of the defeats of the English, to which, however, but little credence was given. Immediately after the fall of Khartum, the Emir Karamalla, whom the Mahdi had despatched against Emin Bey, sent a proud, insolent letter to the latter. This letter Dr. Junker read to the meeting. In consequence of the continued advance of Karamalla, who in April 1884 had seized Amadi and shortly afterwards got Makaka into his power, Emin Bey deemed it advisable to remove the State archives from Lado to Dufle, and prepared himself for the worst, when suddenly the rebel leader stopped his onward movement and returned to the north. Why he took this strange step is an enigma which still remains to be solved. At length, on January 2nd, 1886, Dr. Junker left Emin and Casati in order to reach Zanzibar through Unyoro. The way in which he successfully accomplished this journey is well known. In the opinion of the traveller, it would now be an easy matter to reconquer the Sudan provinces, as the people are weary of war and of the continual disturbances; more-

over, the Mahdi's successor has already been murdered. It would almost appear as if political considerations had prevented the reacquisition of the Equatorial provinces. A number of German Geographical Societies were represented by delegates at the meeting, while others sent congratulatory telegrams. The Geographical Society of St. Petersburg announced by telegram the nomination of Dr. Junker as an honorary member of that Society. The map of the country traversed by Dr. Junker, which was exhibited at the meeting, was on scale 1:410,000, having been prepared in Cairo under the direction of Dr. Schweinfurth, from the original maps of the traveller. The new route-surveys, prepared by Dr. Junker himself, comprise the region between Dem-Bekir in the north, the Baginse Mountains in the east, Ali-Kobbo's zeriba in the west, and Ssanga on the Nepoku, which is probably the upper course of the Aruwimi, in the south. The approximate longitude and latitude of these points are as follows:—*Dem Bekir*, long.  $26^{\circ} 28'$ , lat.  $6^{\circ} 47'$ ; *Baginse Mts.*, long.  $28^{\circ} 53' 30''$ , lat.  $4^{\circ} 23'$ ; *Ali-Kobbo's zeriba*, long.  $22^{\circ} 57' 40''$ , lat.  $3^{\circ} 43'$ ; *Ssanga*, long.  $27^{\circ} 55'$ , lat.  $1^{\circ} 54'$ .

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

### EUROPE.

**Baedeker, K.**—Italy. Handbook for Travellers. Third part: Southern Italy and Sicily, with excursions to the Lipari Islands, Malta, Sardinia, Tunis, and Corfu. With 26 maps and 17 plans. Ninth revised edition. Leipzig, Karl Baedeker; London, Dulau & Co., 1887: 12mo., pp. xlviii. and 416. Price 6s.

**Laveleye, Emile [De].**—La Péninsule des Balkans. Vienne, Croatie, Bosnie, Serbie, Bulgarie, Roumelie, Turquie, Roumanie. Bruxelles, C. Muquardt, 1886: 8vo., 2 vols. I., pp. 360; II., pp. 435. Price 7s. 6d.

———. The Balkan Peninsula. Translated by Mrs. Thorpe. Edited and revised for the English public by the author, with an introductory chapter upon the most recent events, and a letter from the Right Hon. W. E. Gladstone, M.P., with a map. London, Fisher Unwin, 1887: 8vo., pp. xxvi. and 384. Price 16s. [Presented by the Publisher.]

M. de Laveleye's instructive work may be regarded as an important contribution to political geography. Of course it deals largely with the history, the public men, and the special politics of the Balkan States, but at the same time contains much that will be found useful by the geographical student. The translation seems faithful, and is readable, and contains an introductory chapter bringing the book up to date.

**Sandys, John Edwin.**—An Easter Vacation in Greece; with Lists of Books on Greek Travel and Topography and Time-tables of Greek Steamers and Railways. With a Map of Greece, and a Plan of Olympia. London, Macmillan & Co., 1887: cr. 8vo., pp. xvi. and 175. Price 3s. 6d. [Presented by the Publishers.]

This little book contains a short account, in journal form, of a tour in Greece taken by the author and his wife in the spring of last year. A week was spent at Athens, from whence excursions were made to Salamis, Eleusis, Phyle, Pentelicus, Laurium, and Sunium; Tiryns and Mycenæ, Nemea and Corinth, Delphi and Olympia, Zante and Corfu, were afterwards visited. The map is intended to show the principal land and sea routes, and the lines of railway. There is little in the book that cannot be found in well-known sources of information.

**Saunders-Forster, C. G.**—Beneath Parnassian Clouds and Olympian 'Sunshine. London, Remington & Co., 1887: cr. 8vo., pp. 284. Price 7s. 6d. [Presented by the Publishers.]

A popular account of a lady's journey in Greece. Among the various places visited may be mentioned—Thebes, Livadia, Chærónia, Arachova, and Delphi; the valley of the Upper Kephissus, Thermopylæ, Lamia, and Stylida; Volo, Larissa, Athens, Korinth, Mykene, Tiryns, and Epidauros; Tempe, Kalamakka, and the Metéora Monasteries.

**Woodward, Horace B.**—The Geology of England and Wales; with Notes on the Physical Features of the Country. Second Edition. With Geological Map and Illustrations. London, George Philip & Son, 1887: 8vo., pp. xv. and 670. Price 18s. [Presented by the Publishers.]

#### ASIA.

**Branda, Paul.**—Le Haut-Mekong, ou le Laos ouvert. Paris, Fischbacher, 1887: 8vo., pp. 64. Price 1s. 2d. (*Dulau*.)

This is an account of journeys made by M. Branda in 1884 and 1886 on the Upper Mekong, and adds something to our knowledge of that river and its vicinity. It contains a sketch-map of the river from Sambok to Stung-treng.

[**D'Aramon.**]—Recueil de Voyages et de Documents pour servir à l'Histoire de la Géographie depuis le XIII<sup>e</sup> jusqu'à la fin du XVI<sup>e</sup> siècle. VIII.—Le Voyage de Monsieur D'Aramon, Ambassadeur pour le Roy en Levant, escript par noble homme Jean Chesneau, l'un des secrétaires dudict seigneur ambassadeur, publié et annoté par M. Ch. Schefer, membre de l'Institut. Paris, Leroux, 1887: large 8vo., pp. lxi. and 295.

Contains reproductions of some of the original plates.

**Hoche, Jules.**—Les Pays des Croisades. Paris: A La Librairie Illustrée. [1886.] Imp. 8vo., pp. 646. Price 15s.

The chief geographical value of this handsome and richly illustrated work lies in the fact that it gives a very complete and satisfactory idea of the actual condition of most of the places and sites of interest in Palestine. There is besides a vast amount of historical, antiquarian, and ethnological description. The work is the result of the author's own journeys through the country of the Crusades, supplemented by research in various authoritative sources. There is no index, and no list of illustrations, and so far as we observe, only the small map, that of Palestine.

[**Japan.**]—Memoirs of the Literature College, Imperial University of Japan. No. 1. The Language, Mythology, and Geographical Nomenclature of Japan viewed in the light of Aino Studies. By Basil Hall Chamberlain, including 'An Aino Grammar,' by John Batchelor, and a catalogue of books relating to Yezo and the Ainos, 1887, published by the Imperial University, Tôkyô: large 8vo., pp. 174. [Presented by H. Watanabe, President of the Imperial University, Tôkyô, Japan.]

**Oliphant, Laurence.**—Haifa, or Life in Modern Palestine. Edinburgh & London, Blackwood, 1887: 8vo., pp. vi. and 369. Price 7s. 6d. [Presented by the Publisher.]

Mr. Oliphant's letters, mainly contributed to American journals, extend from the end of 1882 to the end of 1885. Most of this time his home was at Haifa, on the Bay of Acre, under the shadow of Mount Carmel. From this he made frequent excursions in various directions to places of antiquarian and historical interest. His observations on the topography of the country around the Sea of Galilee are of special utility. His letters are a series of pictures of the life of the people among whom he lived, of the country around, and of its present condition, geographical, social and industrial. Mr. Oliphant lived long enough in this one region to be able to become thoroughly familiar with it, and his observations are therefore of unusual value.

- Realia.** Register op de generale Resolutiën van het Kasteel Batavia, 1632-1805. Uitgegeven door het Bataviaasch Genootschap van Kunsten en Wetenschappen. Derde Deel. s'Gravenhage, M. Nijhoff, 1886: 4to., pp. 406.
- Schumacher, G.**—Der Descholan. Leipzig, Baedeker, 1886: 8vo., pp. 204. Price 5s. 3d. (*Dulan.*)

Herr Schumacher is an engineer, resident in Haifa, and has done much good survey work in Palestine. The present memoir contains a very complete study of the Janin district to the east and north of the Sea of Galilee, which, for the first time, was surveyed by Herr Schumacher. There are numerous illustrations and plans, and an excellent map, on the scale of 1 : 152,000.

## AFRICA.

- Ancelle, J.**—Les Explorations au Sénégal et dans les Contrées Voisines depuis L'Antiquité jusqu'à nos jours. Précédé d'une notice Ethnographique sur Notre Colonie, par le Général Faidherbe. Paris, Maisonneuve Frères et Ch. Leclerc, 1886: 8vo., pp. xi. and 444. Price 2s. 8d. (*Dulan.*)

This is a useful summary of explorations in the Senegambian region, between 10° and 20° N. lat. and extending inland to Timbuctu. There is a map on the scale of 1 : 5,000,000, showing the itineraries of travellers.

- Capello, H., and R. Ivens.**—De Angola á Contra-costa. Descripção de uma viagem stravez do Continente Africano por H. Capello e R. Ivens. 2 vols., Lisboa, Imprensa nacional, 1886.

The Portuguese, notwithstanding the great discoveries they made in the past, have not infrequently been reproached with not having contributed to our knowledge of Africa to an extent at all commensurate with the vast territories which they hold or claim in that continent. That reproach, however, can no longer be fairly levelled against them. The explorations carried on by such men as Serpa Pinto, Capello and Ivens, have very materially enlarged our knowledge, and although the narratives which they have published may not be entitled to a place in the first rank of works of that kind, the information which they convey is of a very substantial nature, and their value not merely ephemeral like that of so many other books of travel with which the market has of recent years been flooded.

Messrs. Capello and Ivens are no novices as African explorers. Their former journey, of which they published a record in 'Benguela to the territory of the Yacca' (London, 1882), filled up some very provoking blanks on our maps, and on the present occasion they have done equally well, if not better. If it was not in their power to rival a Livingstone or a Stanley by the brilliancy of their discoveries, they have at all events laid down a track across the continent which may safely be trusted for guidance.

It was originally the intention of the authors to make their way inland from Pinda, but finding the country on the upper Koroko impracticable, they shifted their basis of operations to Mossamedes, and proceeded by the ordinary route to Huilla, crossing the Shelia mountains at an elevation of 6000 feet, the highest altitude attained throughout their journey across the continent. The environs of Huilla (5669 feet) are described as being admirably adapted for European settlement, the climate being healthy and agreeable, and the soil producing nearly everything. One great drawback, the difficulty of communicating with the coast, may be overcome in course of time. After an excursion to Kipango, the "land of millet," the explorers proceeded by a well-known route to Humbe (3500 feet) on the Kunene, and then ascending the broad and swampy valley of that river as far as Kiteve, they crossed it at a spot where it is confined within high banks. Its width there is 100 to 160 yards, its depth about eight feet, and it appears to be navigable throughout the year. A journey through a deserted country then led them to the undulating plateau of Handa, since occupied by Roman Catholic missionaries, and previously visited by M. Dufour, and by several traders coming from Orambo Land. Mica-schist and Laurentian gneiss are overlaid here by clay, limestones, and sandstones of tertiary and secondary



age, and indications of mineral wealth are not wanting. The rivers are partly periodical, as they are further south, and the explorers distinguish between "Dambas" or torrent beds, along which the water flows at all times in the same direction, and "Mololas," along which it flows in contrary directions, according to the state of the flood in the rivers with which they are connected. A careful survey of one or more of these periodical river-beds is a great desideratum.

On July 11th the explorers arrived on the Kubango, about 120 yards wide, and flowing between prettily wooded banks. The Ambuella, who live in the villages along its left bank, are physically superior to the tribes nearer the coast. They dress in cloth instead of in hides; are good musicians, dexterous smiths, good agriculturists, and expert fishermen. Their huts are circular, with pointed roofs. Manioc, millet, and batatas are the principal crops grown. Cattle are scarce.

The western section of the country, extending between the Kubango and the Upper Zambezi or Liambai, is a sterile waste of sand, but further east the steppe bears a luxuriant vegetation during the rainy seasons, when it is the resort of vast numbers of zebras, gungas (*Boselephas orcas*), buffaloes, gnus, and gazelles, which during the dry season retire to the rivers. The population is scarce, and the inhabitants raise their houses on piles, in the midst of swamps, as a security against the predatory Manbunda and Makia. The resources of the whole of this region are poor, and the vast swamps adjoining the Zambezi are hardly passable during the rainy season. The greatest altitude attained between the Kubango (3760 feet) and the Liambai (3230 feet) was 4062 feet.

On December 13th the Liambai was crossed near Libonta, and the travellers having followed its valley until they were well within the borders of the empire of the Muata Yamvo, turned to the north-eastward, and reached the Kabompa river, one of the principal tributaries of the Liambai, but not the main stream, as has sometimes been supposed. The river had a width of about 200 yards, and its greenish waters flowed along with a velocity of three miles an hour. Crocodiles abounded. Following the course of this river, the explorers speedily found themselves in a vast forest region, frequented by occasional elephant-hunters, but almost devoid of permanent inhabitants. The hardships of a march through such a region were increased by the presence of the tsetse, to whose stings the riding-oxen soon fell victims. Several of the porters died from exhaustion, and the caravan only escaped a more serious disaster through its timely arrival at the village of the Muene Kanyinga (3993 feet), a chief still owing allegiance to the Muata Yamvo. Shortly before this, the Lualaba, whose basin interlaces curiously with that of the Zambezi, had been crossed near its source, and we are told that the natives look upon this river as the real "head" of the Zaire, to which the Luapula is merely a tributary. Geographers, however, with the map of Africa spread out before them, will hardly be prepared to accept this view. Red loam predominates throughout this inland region, besides which the explorers noticed mica-schist, iron-ores, and, on one occasion, clinkstone, a volcanic rock, apparently of post-tertiary age.

Having crossed the wooded hills of Kitangule and some tributaries of the Kafue, the explorers, on October 23rd, entered the basin of the Zaire, and eight days afterwards arrived in the prettily wooded district of Takata (4134 feet), with whose chief, Muene Ntenke, they speedily established cordial relations. They were now within the limits of the empire which Msiri, a native of Unyamwezi (called Ukalaganja or Garanganza by the western tribes), has carved himself out of the ancient dominions of the Kazembe, and which extends from Lake Kikonja and Urua in the north to the Mushinga mountains in the south, and from the Luelaba eastward to the Luapula. This vast region is by no means devoid of natural wealth, but it has been depopulated by war, and the traveller sometimes spends days on the march without encountering a single human being. After some much-needed rest Captain Ivens started for the residence of Msiri. His route led through a country of picturesque hills, and past Kalabi, one of the famous copper-mines of Katanga, the produce from which, in the shape of ingots, bracelets, and wire, finds its way westward as far as Bihe. Palaeozoic schists prevail throughout this region, and in addition to malachite and iron-ores, Captain Ivens discovered coal.

The "Kimpata" of Msiri, in the district of Bunkea, is approached through a perfect labyrinth of narrow lanes planted with euphorbias, and decorated at intervals with trophies of human skulls, every one of which has a history attached to it, proclaiming the detestable cruelty of this parvenu among African rulers. Permission to proceed to Kazembe's town, or even to visit the western shore of Lake Moero, having been refused, on the ground of the unsettled state of the country, Captain Ivens rejoined his companion at Ntenke's, and they resolved to make their way to the Luapula.

The intervening region is a wooded wilderness, almost deserted of men, but abounding in elephants. The hills are composed of gneiss; the more level tracts are covered with loam, frequently dyed red with oxide of iron. Having successively crossed the Lufira, which flows to the north, and the Loenge or Upper Kafue (4637 feet), which is tributary to the Zambezi, the Luapula was reached at length. It takes its course through a fringe of forest, and has a width of about 600 yards. Kinyame, the chief of the Ma-ussi, on its further bank, turned out to be a "good man, with whom many days were spent happily," although he looked upon his visitors as spies of Msiri, and consequently refused them permission to visit Lake Bangweolo or to trace the Luapula to Lake Moero. This restriction of their movements prevented the Portuguese explorers from joining their work with that of Lieut. Giraud. Somewhat reluctantly they turned to the south, and almost immediately they entered a deserted wilderness, through which they travelled for 140 miles without encountering a single human being. At length, after suffering much hardship, they stood upon the brink of the Mushinga range (about 3600 feet), and looked down upon an extensive lowland which lay 1300 feet beneath them. Accustomed as they had been to travel over comparatively level ground, the steep descent proved very trying. They were very much struck by the contrast between the verdure-clad tableland, with its woods of acacias, mupandas (*Brachystegia tamarindoides*), and other trees, and the burnt-up plain beneath. For the first time since leaving Kapangombe, at the foot of the Shella mountains, they saw Bauhinias, baobabs, gonga-trees, thorn-trees, as also hyphænas and Livingstonia palms. The villages lay in the midst of extensive plantations of sorgho, and lofty scaffoldings rose around them, occupied day and night by watchmen, whose duty it is to scare away wild beasts.

The Zambezi was reached on April 26th, at a spot about 40 miles below its confluence with the Kafue, and thence to Quilimane the explorers followed, with some slight variations, the route which Livingstone took during his memorable journey in 1856. On June 24th they stood on the shore of the Indian Ocean.

The maps which accompany the narrative are drawn on the uniform scale of 1 in 1,000,000. They are evidently based upon a careful itinerary survey adjusted to 67 observed latitudes, and 57 longitudes. The latter are all of them determined by chronometer, for Captain Ivens lost his telescope, which precluded him from availing himself of eclipses of Jupiter's satellites, and he looks upon lunars as "impracticable." He took, indeed, forty sets of lunars when on the Luapula, but finding that the results differed to the extent of 30 min. he rejected them altogether. Comparing Captain Ivens's longitudes with those previously determined on the Liambai, by Dr. Livingstone and Captain Serpa Pinto, it is gratifying to find that the agreement with the latter is absolute, while Livingstone's result differs to the extent of nine miles only. On the lower Zambezi likewise the agreement with Livingstone is equally satisfactory, the difference, in the case of Tete, amounting to five miles only. It is therefore somewhat startling to find that Lienzo, on the Kuti, which Serpa Pinto places by observation in latitude  $14^{\circ} 42' S.$ , longitude  $20^{\circ} 25' E.$ , should occupy latitude  $14^{\circ} 38' S.$ , longitude  $20^{\circ} 52' E.$  on Capello and Ivens's map. In that section of the country which adjoins the Luapula, the Portuguese explorers are substantially in agreement with Lieutenant Giraud, who shifted the Kazembe's capital thirty miles to the east of the point assigned to that place by Dr. Livingstone.

A very full list of altitudes is given in the appendix, but as the geographical co-ordinates of the tables have in many instances been rejected on the maps, we are frequently left in doubt as to the exact locality to which the altitudes apply. The great feature brought out by these hypsometrical observations is the uni-

formity in the height of the tableland of Central Africa. The greatest altitude attained by the explorers (6001 feet) was on the Shella mountains, and thence, as far as the Mushinga range, which forms the edge of the plateau, they never descended below 3000 feet, nor do they ever appear to have ascended a height exceeding 5000 feet after they had left the immediate neighbourhood of Huila. Their lowest point (3232 feet) was on the Liambai, their highest (4885) between that river and the Luapula.

The meteorological journal was kept with much care. Observations were usually recorded thrice daily, and extended to temperature, atmospheric pressure, moisture, direction and force of the wind and hours of rainfall.

Frost was recorded on five nights in June and July, when the travellers were between  $15^{\circ} 50'$  and  $16^{\circ}$  S. lat., and at an altitude of 3700 to 4000 feet above the sea. In the heart of the continent, between latitudes  $11^{\circ}$  and  $12^{\circ}$  S., the rains set in about the end of September, and grow heavier, and more frequent in proportion as the sun approaches the southern tropic, attaining a maximum in December. In January there is a slight decrease, but a second maximum is attained in February. By the end of March they cease. Rains are brought by south-easterly and north-easterly winds.

The magnetical observations made at twenty-two stations are of considerable importance, and extend to variation, dip, horizontal force, and total intensity. Lists and descriptions of the zoological, botanical, and mineralogical specimens collected are given in an appendix.

The illustrations throughout the work are excellent and trustworthy, many of them being taken from photographs.

**Gamble, John G.**—Catalogue of Printed Books and Papers relating to South Africa. Part II. Climate and Meteorology. Cape Town, W. A. Richards & Sons, 1885: 8vo., pp. xl. [Presented by John G. Gamble, Esq.]

— Altitudes above Sea Level of places in South Africa south of  $20^{\circ}$  S. Latitude, collected by John G. Gamble. Cape Town, W. A. Richards & Sons, 1886: 8vo., pp. 28. [Presented by J. G. Gamble, Esq.]

**Schwarz, [Dr.] Bernhard.**—Kamerun. Reise in der Hinterlande der Kolonie. Leipzig, Froberg, 1886: 8vo., pp. 358. Price 10s. (*Dulau.*)

Dr. Schwarz visited the Kameruns in 1885-6. He made a land journey into the interior by the east flanks of the mountains, and as far as the foot of the Bafurumi Mountains, returning by the river. The book is largely descriptive in character, but at the same time contains solid information concerning the districts and the people visited by Dr. Schwarz. There is a good map of the region on the scale of 1:600,000.

#### AMERICA.

[**America, United States.**]—Department of the Interior. United States Geological Survey, J. W. Powell, Director. Bulletin of the United States Geological Survey, Nos. 30-33. Washington, Government Printing Office, 1886: 8vo., plates. [Presented by the Director of the U.S. Geological Survey.]

No. 30.—Second Contribution to the Studies on the Cambrian Faunas of North America, by Charles Doolittle Walcott. No. 31.—Systematic Review of our present knowledge of Fossil Insects, including Myriapods and Arachnids, by Samuel Hubbard Scudder. No. 32.—Lists and Analyses of the Mineral Springs of the United States. [A Preliminary Study] by Albert C. Peale, M.D. No. 33.—Notes on the Geology of Northern California, by J. S. Diller.

[**Argentine Republic.**]—Anuario Bibliográfico de la República Argentina. Año VII—1885. Fundador Alberto Navarro Viola. Buenos Aires, Imp. de M. Biedma, 1886: 12mo., pp. 486 and xlvii.

**Hort, [Mrs.] Alfred.**—Viá Nicaragua. A sketch of Travel. London, Rei 1887: 8vo., p. 267. Price 7s. 6d. [Presented by the Publisher.]

This is an old story of a journey to San Francisco viá Nicaragua to Panama, evidently before the days of Pacific rail-

lively, and gives a good picture of the discomforts of travel in those days, but there is little information of geographical interest.

[**Lake Lahontan.**—United States Geographical Survey. Geological History of Lake Lahontan, a Quaternary Lake of North-western Nevada. By Israel Cook Russell. Washington, Government Printing Office, 1885: 4to., pp. xiv. and 288. [Presented by the Director of the Survey.]

There is much in this work that is of interest to the geographer as well as the geologist. The numerous magnificent illustrations and maps especially render it of great geographical value.

[**Panama.**—Le Canal de Panama en 1886. Rapport présenté par M. Jules Ch. Roux, Délégué et Membre de la Chambre de Commerce, Marseille. 1886: 4to., pp. 131. [Presented by M. Roux.]

M. Roux, who is President of the Marseilles Geographical Society, was sent out by the Chamber of Commerce of Marseilles in the early part of last year to report on the works in connection with the Panama Canal. He had every facility for obtaining information on the actual state of the works, and his report is therefore of considerable practical value. It contains forty-five large-sized photographic illustrations of places and persons, which render it of some geographical value.

[**Simson, Alfred.**—Travels in the Wilds of Ecuador and the exploration of the Putumayo River. London, Sampson Low & Co., 1886: 8vo., pp. v. and 270. Price 8s. 6d. [Presented by the Publisher.]

Mr. Simson, while staying at Guayaquil, was attracted by the mystery surrounding the Eastern (Oriental) Province of Ecuador. This was the scene of Gonzalo's (the youngest and most brilliant of the Pizarros) romantic expedition to the river Napo, during which he was deserted by his second in command, Orellana, who descended the Amazons, returned to Europe, and claimed the whole merit and reward of the discovery for himself. This region had remained practically unvisited, except by Jesuit missionaries, who published nothing concerning it to the world, from that time (1541) until now. It was a task, therefore, worthy of Mr. Simson's energetic and adventurous character to explore this region, and the present work is the creditable result.

The first difficulties were the double line of Andine passes (the Sierra and the Cordillera), which he successfully surmounted, chiefly on foot, and reached the eastern watershed, which is practically, as far as the boundaries in these regions permit of definition, the Oriental Province. Across this province he penetrated, still on foot, through dense forests, until he reached the river Napo, which he descended in canoes, to Iquitos, an important town and port on the Upper Amazons.

At this point, after five months' arduous labour, he had successfully achieved his original design. The delays and dangers through which he had already passed—flooded rivers, savage Indians, attacks of sickness, villages decimated or deserted in consequence of small-pox, more dreaded than any other scourge—ought to have satiated the most robust appetite for adventure. But it was not so with our traveller. He casually met near Iquitos a Brazilian in command of an expedition to explore the River Putumayo, or Iça, and accepted his invitation to join it. He took a very prominent and dangerous post, being placed in command of the pioneer steamer, which preceded and selected the channel for the larger one which followed. He successfully ascended the Putumayo 900 miles. This interesting expedition is described in Chapters XVII. and XVIII., and although Mr. Simson is chary of giving dates, this fact enables us to fix the period of his journey at about ten or eleven years ago.

The book is full of information of great interest and novelty concerning the scenery, the Jesuit missionaries, the Indians, both civilised and barbarous, and the natural history of the regions through which Mr. Simson passed. We do not remember to have met with anything more striking than his description on pages 131 and 132 of the ravages of vampire bats at Aguano on

the Nago. The map is quite unworthy of the book, and of no service in following Mr. Simson's journeys. In taking leave of this delightful traveller, we cannot refrain from expressing the hope that, though ten years have now elapsed since his journey, the spirit may move him to explore some other unknown part of South America, and give us an equally useful and interesting account of his adventures.—[C. M.]

**[United States, &c.]**—Bradshaw's A.B.C. Dictionary to the United States, Canada and Mexico, showing the most important towns and points of interest. London, Trübner, 1886: 8vo., pp. 304. [Presented by the Publishers.]

This contains much useful information in a handy form. Canada, however, receives very meagre treatment, the space being mainly devoted to the eastern provinces. Mexico is treated in much greater detail.

### ‡ ARCTIC.

**[Greenland.]**—Observations Internationales Polaires, 1882–83. Expédition Danoise. Observations faites à Godthaab sous la direction de Adam Paulsen. Publiées par l'Institut Météorologique de Danemark. Tome ii.—1<sup>ère</sup> Livraison. Copenhagen, G. E. C. Gad, 1886. [Presented by the Institute.]

This volume is mainly occupied with tables of atmospheric pressure, and ebb and flow of the tide. Observations were made for the longitude of Godthaab, the mean result being 3h. 26m. 54s. W. of Greenwich.

### AUSTRALASIA.

**Australia, Western.**—Report by the Director of Public Works on the Public Works of the Colony, for the year 1885. Perth, R. Pether, Government Printer, 1886: folio, pp. 24.

The Appendix consists of Mr. H. S. Carey's Report on the Telegraph Line from Northampton to Roebourne, and the Extension from Roebourne to Cossack, which contains some useful information on the country embraced, illustrated by a map.

**British New Guinea.**—Issued by Messrs. Burns, Philp & Co. Sydney, printed by John Woods & Co., 1886: 4to., pp. 36, illustrations. Price 6*d.* [Presented by Theodore F. Bevan, Esq.]

### OCEANIA.

**Hager, Carl.** Die Marshall-Inseln, in Erd- und Völkerkunde, Handel und Messen. Mit einem Anhang: Die Gilbert-Inseln. Leipzig, Lingke: 8vo., pp. iv. and 157. Price 2*s.* 8*d.* (*Dulau.*)

This is a summary of what is known concerning the Marshall Islands, apropos of recent German enterprises in the Western Pacific. There is a short introduction on Micronesia and an Appendix on the Gilbert Islands.

### GENERAL.

**Albert de Monaco, [Prince].**—Sur le Gulf-Stream. Recherches pour établir ses Rapports avec la Côte de France. Campagne de l'*Hirondelle*, 1885. Paris, Gauthier-Villars, 1886: large 8vo., pp. 41, maps.

**Bastian, Adolf.**—Zur Lehre von den Geographischen Provinzen. Berlin, Mittler und Sohn, 1886: 8vo., pp. xxv. and 118. Price 2*s.* 8*d.* (*Dulau.*)

Dr. Bastian discusses in this brochure the subject of the division of the earth's surface into geographical provinces, involving the question of the influence of geographical surroundings on mankind. He brings much learning to bear on the discussion, and introduces a perplexing multitude of references and quotations.

**Campbell, [Sir] George [M.P.]**—The British Empire. [Cassell & Company [1887]: 8vo., pp. viii. and 184. Price 3s. [Presented by the Publishers.]

In this little volume, Sir George Campbell deals with the various classes of dependencies of the British Government,—India, Crown Colonies, Territorial Companies, Protectorates, mainly from the political or Imperial point of view. Such questions as federation, emigration, and our relations to other colonising nations, are discussed; Africa receives a chapter to itself.

**[Colonial Exhibition.]**—Reports on the Colonial Section of the Exhibition. Issued under the supervision of the Council of the Society of Arts, and edited by H. Trueman Wood, M.A., Secretary. London, Clowes, 1887: 8vo., pp. v. and 505. Price 10s. 6d. [Presented by direction of H.R.H. the Prince of Wales.]

This volume contains a series of reports, twenty-three in all, on the leading products shown at the recent Colonial and Indian Exhibition. Those of most geographical interest seem to us to be Mining Industries, by Dr. Le Neve Foster; Grain, by Mr. Proctor Baker; Tea, by Mr. A. G. Stanton; Coffee, by Mr. H. Pasteur; Wines, &c., by Mr. R. Bannister; Tobacco, by Dr. G. Watt and Mr. J. McCarthy; Wools, by F. H. Bowman; Silk, by Mr. J. Wardle; Timber, by Messrs. F. Leslett and Allen Ransome.

**Fitz-Patrick.**—An Autumn Cruise in the Ægean: or Notes of a Voyage in a Sailing Yacht. London, Sampson Low & Co., 1886: 8vo., pp. x. and 316. Price 10s. 6d. [Presented by the Publisher.]

The cruise here recorded was made in the autumn of 1885. Besides Athens and other places in Greece, about which and its antiquities we are told much, several of the Ægean Islands were visited, and a good many places on and near the coast of Asia Minor. Although the ground gone over is not new, Mr. Fitz-Patrick, who tells his story attractively, has many notes on the present condition of things, as well as on the past, which render his book instructive. It will be useful to those who think of following his example. There is a good map of the Ægean region.

Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetismus. Officielle Publication. Jahrgang 1885. Neue Folge, XXII. Band. Wien, Wilhelm Braumüller, 1886: 4to.

Journal of the College of Science, Imperial University, Japan. Vol. I., part I. Published by the University, Tōkyō, 1886: large 8vo., pp. 112, plates. [Presented by the Imperial University, Tōkyō, Japan.]

**Palestine Pilgrims' Text Society.**—Of the Holy Places visited by Antoninus Martyr (Circ. 530 A.D.). Translated by Aubrey Stewart, M.A., and Annotated by Col. Sir C. W. Wilson, B.E. London, 1885: 8vo., pp. viii. and 44, maps.

— The Pilgrimage of the Holy Paula. By St. Jerome. Translated by Aubrey Stewart, M.A., and Annotated by Col. Sir C. W. Wilson, K.C.M.G., &c. London, 1885: 8vo., pp. viii. and 16, map.

— Of the Buildings of Justinian. By Procopius (circ. 560 A.D.). Translated by Aubrey Stewart, M.A., and Annotated by Col. Sir C. W. Wilson, B.E., &c., and Prof. Hayter Lewis, F.S.A. London, 1886: 8vo., pp. viii. and 178, maps, plans, plates.

— Description of Syria, including Palestine. By Mukaddasi (circ. 985 A.D.). Translated from the Arabic and Annotated by Guy le Strange. London, 1886: 8vo., pp. xvi. and 64, map and plans.

— Itinerary from Bordeaux to Jerusalem. 'The Bordeaux Pilgrim' (333 A.D.). Translated by Aubrey Stewart, Esq., M.A., and Annotated by Col. Sir C. W. Wilson, K.C.B., &c. London, 1887: 8vo., pp. xii. and 116, plans.

**Stephen, Leslie.**—Dictionary of National Biography. Vol. X. Chamber—Clarkson. London, Smith, Elder & Co., 1887: 8vo., pp. vi. and 456. Price 12s. 6d.

[**Tasman.**] Abel Janszoon Tasman. Door Mr. Ch. M. Dozy. In *Bijdragen tot de Taal- Land- en Volkerkunde van Nederlandsche-Indië*, 5<sup>de</sup> Volgreeks, 2<sup>de</sup> Deel, 2<sup>de</sup> Aflevering. 's Gravenhage, Nijhoff, 1887.

This paper is a welcome addition to the little that we know of the personal life of Tasman, as well as to the sources of information we possess concerning his work as an explorer.

[**The 'Challenger' Voyage.**]—Report on the Scientific Results of the Voyage of H.M.S. 'Challenger' during the years 1873-76, under the command of Captain George S. Nares, R.N., F.R.S., and the late Captain Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, K.T., F.R.S., &c., and now of John Murray, one of the Naturalists of the Expedition. Zoology—Vol. XVII. London, Eyre & Spottiswoode, 1886: 4to., pp. viii., 178, l., 362, viii. and 47, chart and plates. Price 40s. [Presented by the Lords Commissioners of Her Majesty's Treasury.]

[—] Ditto. Botany—Vol. II. London, Longmans & Co., &c., 1886: 4to., pp. iii. and 178, plates. Price 15s. [Presented by ditto.]

— Report on the Scientific Results of the Voyage of H.M.S. *Challenger* during the years 1873-76, under the command of Captain George S. Nares, R.N., F.R.S., and the late Captain Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, K.T., F.R.S., &c., and now of John Murray, one of the naturalists of the Expedition. Zoology—Vol. XVIII. (in Two Parts, with a Volume of Plates) and XIX. London, Eyre & Spottiswoode, 1887: 4to. Price (Vol. XVIII.) 5l. 10s., (Vol. XIX.) 25s. [Presented by the Lords Commissioners of Her Majesty's Treasury.]

[**The East.**]—Nouveaux Mélanges Orientaux. Mémoires, Textes et Traductions publiés par les Professeurs de l'École Spéciale des Langues Orientales Vivantes à l'Occasion du Septième Congrès International des Orientalistes réuni à Vienne (Sept. 1886). Paris, Imprimerie Nationale, 1886: imp. 8vo., pp. xiv. and 598. [Presented by the French Minister of Public Instruction.]

The section of most geographical interest in this volume is that which gives a translation of the travels of Basileus Batatzé, of Constantinople, in Asia and Europe, in the beginning of the 18th century. In England he was much struck with the philhellenism of the English, and especially of Oxford. "What struck me most in England was the celebrated University of Oxford, where they teach all the sciences. I offered to that establishment the map of Central Asia which I had had engraved; they thanked me very warmly for this gift."

**Thomas, A.**—Etymologisches Wörterbuch Geographischer Namen. Namentlich solcher aus dem Bereiche der Schulgeographie. Breslau, F. Hirt, 1886: 8vo., pp. iv. and 192. (*Dulau.*)

As its name implies, this little book contains a selection of geographical terms and names of places with their etymologies. So far as it goes, it seems on the whole satisfactory, though necessarily, some of the etymologies are conjectural, if not fanciful. Why should London and Cambridge be given, but neither Oxford, Liverpool, nor Edinburgh? The book is to a large extent based on Egli's works.

The following works have also been added to the Library:—

Annual Report of the Board of Regents of the Smithsonian Institution for the Operations, Expenditures, and Condition of the Institution for the Year 1885. Part II. Washington, Government Printing office, 1885: 8vo. plates. [Presented by the Smithsonian Institution.]

**De Rance, Charles E.**—The Water Supply of England and Wales; its Geology, Underground Circulation, Surface Distribution, and Statistics. London, E. Stanford, 1882: 8vo., pp. x. and 623, maps. Price 25s.

**McCarthy, John.**—Commercial and Technical Report on West Indian and British Honduras Products, at the Colonial and Indian Exhibition, 1886. Compiled under the direction of Sir Augustus Adderley, K.C.M.G., Executive Commissioner. [1886]: 8vo., pp. 128. [Presented by Sir Augustus Adderley.]

**Men of the Time:** A Dictionary of Contemporaries, containing Biographical Notices of Eminent Characters of both sexes. London, Routledge, 1887: 8vo., pp. viii. and 1121. Price 15s.

A good deal has been done to bring this useful reference book into conformity with the time. There is, however, a great want of proportion. Many obscure and undistinguished journalists, about whom no one cares to know anything, are allowed as much space to write about themselves, as the editor devotes to some men of the highest rank of eminence. In the editor's estimation, the following geographers and travellers are evidently not "men of the time":—Emin Pasha, Dr. Junker, Schweinfurth, De Brazza, Bates, the Hydrographer to the Admiralty, Joseph Thomson. And yet we find Schwatka. In the article on Mr. Thiselton Dyer, "the late" Sir J. D. Hooker is referred to.

**Science.** An Illustrated Journal, published weekly. Vols. I.–VIII. February–June, 1883—July–December, 1886. Cambridge, Mass., and New York, the Science Company, 1883–1886: 4to.

**Smith, W. Anderson.**—Benderloch; or, Notes from the West Highlands. Second Edition. With Map and Index. Paisley, Alexander Gardner, 1883: sm. 8vo., pp. 366 and 5. Price 6s. [Presented by the Publisher.]

— Loch Creran: Notes from the West Highlands. Paisley and London A. Gardner, 1887: sm. 8vo., pp. 322. Price 6s. [Presented by the Publisher.]

The English Catalogue of Books published from January 1835 to January 1863, comprising the contents of the "London" and the "British" Catalogues, and the principal works published in the United States of America and Continental Europe, with the Dates of Publication, in addition to the Size, Price, Edition, and Publisher's Name. Compiled by Sampson Low. 1864: pp. vi. and 910.—Ditto. Vol. II. January 1863 to January 1872. Compiled by ditto. 1873: pp. 452.—Ditto. Vol. III. January 1872 to December 1880. Compiled by ditto. 1882: pp. 562.—Ditto for 1884 . . . with the addition of an Index to Subjects. 1885: pp. 130.—Ditto for 1885, ditto. 1886: pp. 120.—Index to the British Catalogue of Books published during the years 1837 to 1857 inclusive. Compiled by Sampson Low. 1858: pp. 292 and xxx.—Index to the English Catalogue of Books. Compiled by ditto. Vol. II. 1856 to January 1876. 1876: pp. 408.—Ditto. Vol. III. January 1874 to December 1880. 1884: pp. 175. London, Sampson Low & Co.: 8vo.

## NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

### EUROPE.

**Bruges.**—Plan de —, par Joseph Kips, R.G.S. Scale 1:7500 or 9·7 inches to a geographical mile. London: Joseph Kips. Price 10d.

**Bruxelles.**—Plan de — (Brussels), les Environs, et Plan de Waterloo. Par Joseph Kips. London. Price 10d.



- Colberg.**—Karte der Umgegend von —, nach den von Offizieren des 7. Pommer-  
schen Infanterie-Regiments No. 54 gelieferten Nachträgen zu den Original-  
Aufnahmen des Generalstabes bearbeitet in der Königl. Landes-Aufnahme. Scale  
1: 25,000 or 2·9 inches to a geographical mile. Berlin: Simon Schropp (J. H.  
Neumann), 1887. Price 1s. 6d. (*Dulau.*)
- Cöslin.**—Specialkarte des Regierungs-Bezirks —. Scale 1: 300,000 or 4·1  
geographical miles to an inch. Entworfen von Nowack, Kgl. Plankammer-  
Inspektor des Stat. Bureaus. Berlin, Simon Schropp (J. H. Neumann), 1887.  
Price 2s. (*Dulau.*)
- Deutsch-Lothringen.**—Geologische Uebersichtskarte des westlichen —.  
Herausgegeben von der Commission für die geolog. Landesuntersuchung von  
Elsass-Lothringen. Scale 1: 80,000 or 1·1 geographical miles to an inch.  
Chromolith. Fol. Mit Text. Berlin, Simon Schropp (J. H. Neumann). Price 5s.  
(*Dulau.*)
- Uebersichtskarte der Eisenerzfelder des westlichen —. Heraus-  
gegeben von der Commission für die geolog. Landesuntersuchung von Elsass-  
Lothringen. Scale 1: 80,000 or 1·1 geographical miles to an inch. Berlin, Simon  
Schropp (J. H. Neumann). Price 1s. (*Dulau.*)
- Deutschen-Reiches.**—Karte des —. Scale 1: 100,000 or 1·3 geographical miles  
to an inch. Sheets No. 534, Kemnath, Herausgegeben vom topogr. Bureau des  
K. Bayer. General Stabes, 1886. No. 601, Saarburg i. Deutsch-Lothr. Heraus-  
gegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme,  
1887. Price 1s. 6d. each. (*Dulau.*)
- Dresden.**—Neuester Plan von Ad. Liebers. Scale 1: 15,000 or 4·8 inches to a  
geographical mile. Mit Strassenverzeichniss. Leipzig, O. Dietrich. Price 1s.  
(*Dulau.*)
- Erfurt.**—Specialkarte des Regierungs-Bezirks —. Scale 1: 300,000 or 4·1  
geographical miles to an inch. Entworfen von Nowack, Kgl. Plankammer-  
Inspektor des Stat. Bureaus. Berlin, Simon Schropp (J. H. Neumann), 1887.  
Price 2s. (*Dulau.*)
- Europa.**—Eisenbahn und Dampfschiffrenten Karte von J. Franz. Scale  
1: 3,000,000 or 41·6 geographical miles to an inch. 6 sheets. Glogau, Flem-  
ming. Price 13s. (*Dulau.*)
- Frankfurt a/O.**—Specialkarte des Regierungs-Bezirks —. Scale 1: 300,000 or  
4·1 geographical miles to an inch. Berlin, Simon Schropp (J. H. Neumann),  
1887. Price 3s. (*Dulau.*)
- Gand.**—Plan de — (Ghent), par Joseph Kips, F.R.G.S. Scale 1: 10,000 or  
7·3 inches to a geographical mile. London, Joseph Kipps. Price 10d.
- Gran Sasso d'Italia.**—Carta Topografica del —, pubblicata a cura della Sezione  
di Roma del Club Alpino Italiano ed eseguita dal Socio G. E. Fritzsche. In base  
alla nuova Carta dello Stato Maggiore Italiano. Scale 1: 80,000 or 1·1 geo-  
graphical miles to an inch. Istituto Cartografico Italiano e Stab. Lit. L. Rolla,  
Roma, 1887. Price 4s. (*Dulau.*)

This map contains the whole group between the Vomano and Pescara  
valleys. Its extreme limits are the Pizzo di Sevo and the city of Teramo to  
the north, and the railway station of Bussi to the south, thus including the  
“*Mandamenti*” of Amatrice, Monterealto, Aquila, Popoli, Sassa, Paganica,  
Barisciano, S. Demetrio nei Vestini, Capistrano, Teramo Montorio, and  
Tossiccia. The single sheet of this map includes an area, portions of which  
are given on four sheets of the 1: 100,000 map of the Italian General Staff.  
The elevations are shown by contour lines 100 metres apart, and the hill work

is coloured in five shades of brown, the forests and meadows are green, and the railways, roads, and paths are all plainly indicated. An inset map of the Gran Sasso d'Italia is given on the scale of 1:25,000, with contours for every twenty-five metres of difference of altitude. The map is well drawn, the colours are judiciously chosen, and the lettering clear.

**Merseburg.**—Spezialkarte des Regierungs-Bezirks — Scale 1:300,000 or 4·1 geographical miles to an inch. Entworfen von Nowack, Kgl. Plankammer-Inspektor des Stat. Bureau. Berlin, Simon Schropp (J. H. Neumann), 1887. Price 2s. (*Dulau.*)

**Potsdam.**—Spezialkarte des Regierungs-Bezirks — Scale 1:300,000 or 4·1 geographical miles to an inch. Entworfen von Nowack, Kgl. Plankammer-Inspektor des Stat. Bureau. Berlin, Simon Schropp (J. H. Neumann), 1887. Price 3s. (*Dulau.*)

**Russland.**—Karte der Eisenbahnen der europäischen — mit Theilen der angrenzenden Länder und Klein-Asiens. Scale 1:6,000,000 or 82·5 geographical miles to an inch. Wien, Artaria & Co. Price 1s. 6d. (*Dulau.*)

**Siebengebirges.**—Uebersichtskarte des —, angefertigt unter Benutzung des amtlichen Materials vom Oberbergamts-Markscheider Adolf Schneider in Bonn. Scale 1:12,500 or 5·8 inches to a geographical mile. Berlin, Simon Schropp (J. H. Neumann), 1887. Price 2s. (*Dulau.*)

**Sverige, Norge och Danmark.**—General Karta öfver — samt angränsande delar af Östersjö län der jemte jernvägs kommunikationer. 3<sup>de</sup> tillökta och förbättrade Upplagan. Sammandragen och författad i sex Blad. Scale 1:1,000,000 or 13·6 geographical miles to an inch. August Hahr, Stockholm, 1887. Pa Förlag af F. and G. Beijer. Price 1l. 1s. (*Dulau.*)

This is a new edition of Hahr's well-known map of Sweden, Norway, and Denmark, with corrections and additions which bring it up to date.

### ORDNANCE SURVEY MAPS.

Publications issued during the month of March 1887.

#### 1-inch—General Maps:—

ENGLAND AND WALES: New Series. Sheets 85, 95, 97, 222, 1s. each.  
SCOTLAND: Sheets 123, 129 (outline), 1s. 9d. each.

#### 6-inch—County Maps:—

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**Town Plans**—10-foot scale:—

ENGLAND AND WALES: Aberystwith, VI. 9, 17, 2s. each. Crewkerne, LXXXIX. 13, 21, 2s. each. West Bromwich, LXVIII. 14, 9, 15; 2s. each.

(Stanford, Agent.)

AFRICA.

**Ostafrika**.—Politische Übersicht von — nach den neuesten Verträgen und Besitzergreifungen. Scale 1: 8,000,000 or 109·5 geographical miles to an inch. Aus R. Kiepert's Politischer Wandkarte von Afrika in 6 Bl. Berlin, Dietrich Reimer, 1887. (Dulau.)

Although the public have from time to time been informed, through the press, of the annexation of extensive territories in the general scramble that has taken place among European nations for African possessions, yet the process of annexation has been so gradual that it is not until the publication of a map like that under consideration, that we are able to take in the full meaning and extent of the changes which have taken place in the political geography of Africa in the last decade, or even within a much briefer period. This map shows that the once extensive territory where the authority of the Sultan of Zanzibar was acknowledged, is now reduced to a mere strip of land extending along the coast for a distance of 950 miles, that Germany has secured a vast extent of country, and in addition to this, has also taken possession of the mouth of the Tana river, although the English possessions, which are laid down as including the greater portion of Masailand and the Kilimandjaro district, are immediately in the rear of this position, and are, in fact, bounded on the north by the very river the mouth of which, according to this map is claimed as a German port. Madagascar and all the outlying islands are coloured as French possessions, the Portuguese territory is laid down as extending across the Continent, and the recent acquisitions of the Italian Government on the coast of the Red Sea, are marked as extending from Massowah to a point nearly opposite the island of Perim. It would be impossible in such a notice as this to call attention to all the points of interest, for these we must refer the reader to the map itself, a comparison of which with Boulton's map of Africa, published in 1800, will show what wonderful progress has been made during the present century in our knowledge of the interior of Africa, and how all the eastern portion of Equatorial Africa, which appears as a blank in Boulton's map, is now divided into states, and possessions of European countries, with an amount of detail and precision closely resembling that which was formerly only to be found in maps of Europe.

**South Africa**.—Original Map of —, containing all South African Colonies and Native Territories, compiled from all available information, combined with the results of his own explorations, by the Rev. A. Merensky, formerly Superintendent of the Berlin Missions in Transvaal. Scale 1: 2,500,000 or 34·4 geographical miles to an inch. 4 Blatt. Second and revised edition, 1887. Berlin, Simon Schropp (J. H. Neumann). Price 12s. (Dulau.)

**Tanganika-See und dem Luálaba**.—Dr. Richard Böhm's und Paul Richard's Routenaufnahmen zwischen dem — (Quellgebiet des Congo) 1883-1884. Construiert und gezeichnet von Richard Kiepert. Scale 1: 750,000 or 10·3

geographical miles to an inch. 'Mittheilungen der Afrikanischen Gesellschaft in Deutschland,' Bd. v. Taf. 2.

Profil längs Dr. R. Böhm's und P. Reichard's Route von Mpala am Tanganika-See nach Kagoma in Usanga. Profil der Routen zwischen Mkande am Upämba-See und der Landschaft Katanga. Längenmassstab 1:750,000 or 10·3 geographical miles to an inch. Verhältniss des Längen- zum Höhenmassstabe = 1:30. 'Mittheilungen der Afrikanischen Gesellschaft in Deutschland,' Bd. v. Taf. 3. (*Dulau.*)

## CHARTS.

**Admiralty.**—Charts and Plans published by the Hydrographic Department, Admiralty, in January and February 1887.

No.	Inches.	
959	m = 0·4	West Indies, Honduras:—Approaches to Belize. Price 2s.
969	{ m = 4·8 m = 9·6 }	South America, east coast:—Pernambuco roads, with Pernambuco harbour. Price 1s. 6d.
554	m = 0·13	South America:—Magellan strait. Price 2s. 6d.
958	m = 1·1	China, south coast:—Hie-che-chin bay. Price 1s. 6d.
1126		Ports and anchorages in Corsica island:—New plan of Gulf of Porto Vecchio.
1497		Reunion island:—Plan added, Port Pointe des Galets.
1382		Tahiti and Moorea:—New plan of Papetoai and Cook bays.

(*J. D. Potter, Agent.*)

## CHARTS CANCELLED.

No.	Cancelled by	No.
554	Magellan strait .. .. . New chart, Magellan strait .. ..	554
1963	Plan on this sheet, Chino bay .. .. . New plan, Hie-chi-chin bay .. ..	958
740	Plans of this sheet, Vingorla roads, Malwan bay.	

## CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1895. England, south coast: Dungeness to the Thames. 494. West Indies:—Anchorages in Martinique. 40. India, west coast:—Karachi harbour. 740. India, west coast:—A'chera river to cape Ramas. 1985. China, east coast:—Hai-tan strait. 1761. China, east coast:—Port Matheson to Ragged point.

(*J. D. Potter, Agent.*)

**French Charts.**—No. 4119. Côte Nord de France. Rade de Cherbourg. 1886.—4126. Corse. Golfe de Porto-Vecchio. 1886.—4127. Golfe du Tonkin. Lagunes entre Thuan-An et le Cap Choumay. 1886.—4142. Terre Neuve. Côte Nord-Est. Grand et Petit Bras de la Source situés à la Partie Sud de la Baie Aux Lièvres. 1886.—4137. Côtes du Pérou. Baie de Salinas. 1886.—4150. Mer des Indes. Mouillages à la Côte Ouest de Madagascar. Morondava, Croquis du Mouillage. Iles Barren et Atterrages de Maintirano. Bosy, Croquis de l'Entrée du Bras de mer. 1886.—4149. Mer des Indes. Mouillages à la Côte Est de Madagascar. Vatomandry. Croquis du mouillage de Mahanoro. 1886. Service hydrographique de la Marine, Paris. (*Dulau.*)

**Norwegian Charts.**—Specialkart over den Norske Kyst fra Terningen til Beian og Rödberg. 1:50,000. Kartet rettet til 1887.—Specialkart over den Norske Kyst fra Beian til Lövä, 1:50,000.—Chart of the Coast of Norway from Stavfjord to Trondhjems Fjorden (no title). Udgivet af den Geografiske Opmaalning, Kristiania. (*Dulau.*)

**United States Charts.**—No. 995. Great Circle Sailing Chart of the South Atlantic Ocean. Price 2s. 1d.—No. 1026. Port Elena (Elena Bay), West Coast of Costa Rica. Price 1s. 3d.—No. 1028. Murcielago Bay, West Coast of Costa Rica. Price 1s. 3d.—No. 1029. Potrero Grande Bay, West Coast of Costa Rica. Price 1s. 3d.—No. 1033. Ballena Bay (Gulf of Nicoya), West Coast of Costa Rica. Price 1s. 3d.—No. 1035. Uvita Bay, West Coast of Costa Rica. Price 1s. 3d.—Pilot Chart of the North Atlantic Ocean, February, March, and April 1887. Published at the Hydrographic Office, Navy Department, Washington, D.C.

## ATLASES.

**Berghaus' Physikalischer Atlas** (begründet 1836 von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Berghaus. Neunte Lieferung. Gotha, Justus Perthes, 1887. Price 3s. each part. (*Dulau.*)

This part contains the following maps:—No. 38, Regenkarte der Erde. Nr. 50, Florenkarte von Amerika. Nr. 60, Haustiere und Parasiten.

**North Atlantic.**—Synchronous Weather Charts of the — and the adjacent continents for every day from 1st August 1882 to 31st August 1883. Published under the Authority of the Meteorological Council. Part I., Charts from 1st August to 7th November 1882. London: Printed for Her Majesty's Stationery Office, and sold by J. D. Potter, 31 Poultry, and Edward Stanford, 55 Charing Cross, 1886. Price 17s.

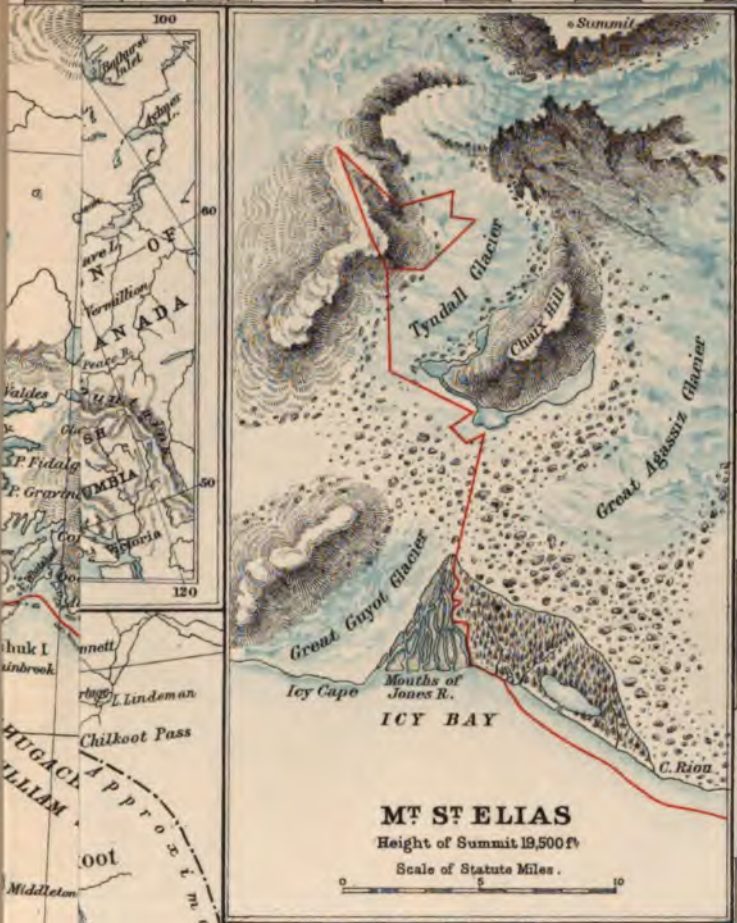
This is the first part of a Meteorological Atlas which, when completed, will contain the results of a large number of observations extending over a period of thirteen months, from August 1st, 1882, to August 31st, 1883. These have been collected from a large number of ships, and they supply the means of exhibiting with considerable precision the principal meteorological elements for every day during the period over the whole area dealt with. The present issue embraces a period commencing August 1st, 1882, and ending on the 7th November of the same year. The charts, which are drawn on the conical projection, are reductions from drawings on a much larger scale; two are given for each day, one showing the barometric pressure, the wind, and the weather; the other showing the temperature of the air and sea, and the weather. In order that the barometric observations taken in various parts of the world should be truly synchronous, the hour for taking the readings was fixed at Greenwich noon, and that for taking the temperatures at local noon. The barometric pressure has been deduced by interpolation for Greenwich noon of each day, and has been entered at a point corresponding to the ship's place at that time, the result being that the pressures shown are strictly synchronous. The curves of equal barometric pressure are represented by black lines, drawn for each tenth of an inch, a dotted line for the twentieth of an inch being occasionally introduced. Figures in the central area of depression show the lowest reading of the barometer, recorded by vessels which passed through it. The force and direction of the wind is indicated by black arrows of different form, the winds at high elevations being indicated by red arrows. The weather is shown by appropriate shading on both the pressure and temperature charts. The isotherms are shown by red lines over the sea for each 5° Fahrenheit, and by thick red lines over the land, those over the continent of America being for Greenwich noon, and over Europe for about 8 A.M. local time.

The production of these weather charts must have entailed a vast amount of labour, and if continued for a series of years they will be of great value. It is not, however, mentioned whether it is the intention of the Meteorological Council to carry on this work beyond the date mentioned, August 31st, 1883, though it is to be presumed that such is the case, as the observations for any single year, though highly interesting and serving to illustrate meteorological theories, would in point of fact be of little real service to the mariner.

134

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130

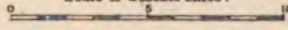


60

### Mt ST ELIAS

Height of Summit 19,500 ft.

Scale of Statute Miles.



58

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PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*The Annual Address on the Progress of Geography: 1886-7.*

By General R. STRACHEY, R.E., F.R.S., Vice-President.

(Delivered at the Anniversary Meeting, May 23rd, 1887.)

THE unavoidable absence of Lord Aberdare, caused by the effects of the very unfortunate accident which occurred to him in the course of last winter, has led to a departure from the ordinary practice of the Society, under which the President of the past year addresses you at the Anniversary Meeting. At the desire of the Council I have undertaken to discharge this duty, feeling alike the obligation that is imposed upon me as one of your Vice-Presidents to do all in my power to further the interests of the Society, and to meet its requirements, as well as the great honour that is done me by selecting me from among so many able and distinguished colleagues, to replace so eminent and successful a predecessor as Lord Aberdare.

It is hardly necessary for me to say that the entire Council has felt most deeply for Lord Aberdare, while it has most fully appreciated the extraordinary value of his services to the Society, and has regretted the untoward cause of his absence on this occasion. The Fellows will bear in mind that, with the exception of one year, Lord Aberdare has held the office of President since 1880, and I think you will concur in the opinion that I express that, with the exception of Sir Roderick Murchison, there is no one of our Presidents to whom the Society has been so much indebted. Lord Aberdare's long and varied official and business experience, and his special connection with the cause of education, qualified him in an unusual manner to preside over the action of the Council, during the last four or five years, in which those aspirations towards the extension and improvement of geographical education in this country, which were the frequent themes of his addresses, were given a practical form, and are at length on the point of becoming realised, in connection with the teaching of the two great universities of Oxford and Cambridge.



That the general prosperity of the Society has not fallen off during the period of Lord Aberdare's tenure of office is sufficiently shown by the continued increase of the number of subscribing Fellows, which during the last year has increased somewhat more than during the previous year, while the total number on the list on the 1st of May was 3392. The financial position is likewise satisfactory, and it is anticipated that the grant of 1000*l.* which has been made in aid of the Stanley Expedition in relief of Emin Bey may be met from the income of the Society, after meeting all other demands, without trenching on the invested capital.

It may be of interest to the Fellows to notice that about 3000*l.* is spent on the publications of the Society, so that nearly 1*l.* is returned to each of them in the value of the 'Proceedings' and other publications.

The losses of the Society by death during the year have been 76, besides 5 Honorary Corresponding Members. I may detain you to name a few of these more prominently distinguished by their services to geography. More or less detailed biographical notices of several of these have already appeared in the pages of our 'Proceedings,' written in most cases by colleagues who were well qualified for the task by personal acquaintance with the deceased and the work they had performed. Thus, an account of the career of that eminent Indian officer Major-General Sir Charles Macgregor, the author of 'A Narrative of a Journey through Khorassan and the North-west Frontier of Afghanistan,' has been contributed by his friend Colonel Holdich; a life of Colonel Sir J. Bateman Champaign, the zealous engineer officer who so long occupied the post of Director of the Indo-European Telegraph, has been written by his professional colleague Sir Frederic Goldsmid; a memoir of Mr. A. W. Moore, by his fellow-traveller in the Caucasus, Mr. Douglas Freshfield; and one of Sir T. Douglas Forsyth, the leader of the celebrated Yarkand Mission of 1870 by his brother, Mr. W. Forsyth, q.c. Our pages have also recorded the chief incidents in the active life of Admiral Bedford Pim, R.N., one of the most adventurous of our Arctic explorers, who virtually accomplished the long sought "North-West Passage" during the search for Sir John Franklin, by crossing the ice from one of the searching vessels, the *Resolute*, which had come from the Atlantic, to the *Investigator*, which had come from the Pacific.

Other deceased members, who had achieved deserved reputations as geographers, or in departments of science allied to geography, are Colonel G. C. De Prée, R.E., the late Surveyor-General of India, an able officer, devoted to his profession, whose health had been seriously affected by his long service in India; Dr. R. J. Mann, the eminent meteorologist, who contributed much to his special department of science by his addresses as President of the Meteorological Society, and his admirable paper on the Physical Geography and Climate of Natal, founded on his own personal observations in that colony for a long

series of years; and Mr. James Wyld, the enterprising cartographer and map publisher.

One of our deceased honorary corresponding members, General C. M. P. Stone (of the United States Army) will be honourably remembered for the part he took, during the years of his service in Egypt as Chief of the General Staff, in promoting the scientific exploration of the little known provinces in the Soudan, then newly annexed to the Egyptian dominion. It was he who directed the surveys then carried out by Engineer officers under his command, especially in Darfur, and also the work of measurement of the Nile level. He took, for many years, a leading part in the proceedings of the Geographical Society of Cairo, having been vice-president since its foundation in 1875, and president from 1879 to the date of his retirement. He died, after his return to America, on the 25th of January last.

I have already alluded to the prospects of the early realisation of the endeavours which the Council have been making for some years past to improve and extend geographical education. It was resolved by the Council at the end of June last, that the most practical way of attaining the object in view, with the means at the disposal of the Society, was, in relation to the higher class education, to make specific proposals to the Universities of Oxford and Cambridge for providing lecturers on geography, with the aid of funds to be supplied by the Society; and in relation to secondary education, to offer scholarships and prizes for competition among the persons of both sexes who present themselves for acceptance as certified teachers at the yearly examination held by the Education Department, to be awarded to those passing highest in the geography examination.

The proposals made to the Universities were as follows:—

That the Council should appoint, with the approval of the Vice-Chancellor or his delegates) a Lecturer or Reader in geography who should deliver courses of lectures at both Universities, arranged so as to suit students in the Honour Schools. The salary of the lecturer to be paid by the Council, and the University to accord him, as far as practicable, the status of a Reader attached to the University.

Or, as an alternative:—

That each University should join with the Council in supplying funds for a readership. The reader to be appointed by a committee in which the Royal Geographical Society should be represented.

Further it was decided:—

That the Council are prepared to award in alternate years at each University an exhibition, value 100*l.*, to be spent in the geographical investigation (physical or historical) of some district approved by the Council, to a member of the University of not more than eight years' standing, who shall have attended the geographical lecturer's courses during his residence.

Or, in lieu of the above:—

“In the event of it being considered undesirable in any year to award the exhibition, the funds may be devoted to two prizes of 50*l.* and 25*l.* respectively, to be offered to members of the University of the same standing, for an essay on a geographical subject, the conditions of which would be laid down by the Council.”

The Council contemplated that such a lecturer should from time to time deliver lectures in London, which they did not doubt would be quite compatible with the discharge of University duties.

These proposals were forwarded to the Vice-Chancellors of the two Universities, with letters expressing the hope of the Council that they would receive the favourable consideration of the University authorities.

Both the Universities have responded very cordially to the proposals thus made to them. The arrangements contemplated by the Council are likely, however, to be so far modified as to substitute the appointment of two lecturers, one for each University, in place of one to serve for both, a change which certainly appears to be for the better. The University of Oxford, it is anticipated, will now take very early steps for the nomination of a Reader in Geography. The authorities at Cambridge have expressed a wish to postpone the appointment of the lecturer until next year, and have requested the Council to endeavour to arrange in the interval for the delivery of an introductory course of lectures, illustrative of the general character and scope of the instruction in geography which it will in the future be the duty of the lecturer to impart. This the Council hope to be able to accomplish.

The proposals made to the Education Department have also been most readily assented to. The final form in which this part of the scheme is understood to be settled is as follows:—The Council offer one scholarship, value 15*l.*, and four prizes, consisting of atlases or books, to the successful male candidates passing highest in the examination in geography at the yearly examinations for teachers' certificates conducted by the Education Department; and a like scholarship and four prizes to the female teacher candidates. At the same time a wish has been expressed that the Council may be furnished with the answers of the selected candidates, in order that they may form a judgment as to the standard of education acquired, and to regulate their future action in respect to the prizes. Effect will be given to this at the examinations to be held in December next.

It may therefore be confidently expected that in the course of the ensuing year these arrangements will come into practical operation, and I trust that at the next Anniversary Meeting of the Society it will be possible to adduce direct evidence of the successful inauguration of these important measures.

The Council has further endeavoured to promote the cause of

education in geography by assisting the Oxford University Extension course of lectures, so far as this particular branch of instruction is concerned. The reports which the Council has received of the success of these lectures, in arousing an interest in the study of geography among an important class at some of the larger centres of population, are such as to justify the hope that valuable results may be secured in this direction also.

In immediate connection with this statement of the action taken for the furtherance of geographical education, I may conveniently refer to important discussions on this subject that have been raised during the past year before the Society at two of its ordinary meetings, and before the Geographical Section of the British Association.

Some divergence of opinion might, perhaps, have been expected among those who took part in these discussions, as to the best method of dealing with geographical instruction. I think, however, that when certain ambiguities of form and expression are set aside, there will be found to be substantial identity of judgment on the essentials of the questions involved.

In the first place, it was for the most part rather assumed, than specifically stated, that the discussion had reference to the more advanced education, and that the students proposed to be dealt with had already acquired some elementary knowledge both of the main facts of topographical geography, and of the chief physical forces that are effective in determining the conditions of the earth's surface. In describing what I gather from these discussions to have been the general opinion as to the system of instruction to be adopted for pupils thus prepared, I cannot do better, I think, than follow with very little modification the words of Mr. Bryce, whose lucid observations very ably summed up the essential points under discussion. Was it not the function of scientific geography, he asked, to exhibit the way in which a variety of physical causes played firstly upon one another and secondly upon man, and was it not the case that the duty of a University professor of geography, would be best discharged when he dealt first with the elementary causes, and then showed the students by successive stages how each cause passed into a secondary or subsidiary cause, until the world as it now is was arrived at? He would naturally begin with the distribution of land and sea, of the continents, islands, and oceans; of the directions and elevations of mountain chains. Thence, he would pass to the winds, rains, and climate, which depended on the distribution of the land, the mountains, and the sea. From this secondary set of causes he would follow the distribution of vegetation and of animal life, examining the resulting fertility and productive power of different countries, and showing the sequence of cause and effect through the varying rainfall, the distribution of land and sea, and the influence of the sun's heat. He would then pass on to

consider how all these causes operated upon man and determined the course of human history.

If this be, as there can be no reason to doubt that it really is, the right method of teaching geography, it follows of necessity that the scope of geography as a scientific study is marked out by the same general principles. Geography is essentially a science of observation, and as such is ancillary to many other branches of science, to all of which it brings its aid, supplying them with those data relating to the distribution of land and sea, to the configuration of the surface whether above or below the sea-level, to terrestrial position, and so forth, by which are determined those conditions of climate that are now, or have been influential, or which indicate former conditions of the earth, the consideration of which is involved in the development of those sciences.

I cannot but regard as idle the questions that have sometimes been raised as to the claim that geography has to be regarded as a science. There is no reason for hesitation in declaring that geography has for its object a perfectly definite branch of knowledge, namely the investigation and representation of the various features of the earth's surface, and the study of the secondary effects of these features on all that is observed on the earth, and that to the series of facts thus brought together, scientific methods are perfectly applicable. There is, in fact, no greater difficulty in recognising the legitimate place of geography as one of the sciences of observation, because of the close relation that subsists between the matters with which it deals, and those that fall within the scope of other branches of science such as geology or biology, than there is in assigning the like character to chemistry and electricity, because of the interaction of the forces with which they specially deal, with those that constitute the principal subject of inquiry in other specialised fields of human knowledge.

The only expedition now on foot under the direct control of the Society is that under Mr. Last, which, according to accounts just received, has returned to Zanzibar, and to which I shall again refer hereafter.

At the end of last year the steps that had been taken for the despatch of an expedition for the relief of Emin Bey were brought before the Council, with a view to seeking the aid of the Society in the undertaking, and the Council having been informed that such an expedition had been organised under the control of a responsible Committee, with the approval of the Egyptian Government, and with the promise of a grant in aid from that Government, it was resolved that the Council being satisfied that valuable new geographical data are likely to be obtained by whichever route the expedition proceeds, a grant of 1000*l.* should be made to the Managing Committee of the expedition, to be applied in aid of the geographical exploration of the

country to be traversed, and in the hope that the results of that exploration may be communicated for publication by the Society.

The Managing Committee, through Mr. W. Mackinnon, in acknowledging this grant, stated that it was understood that all new geographical information which might be obtained by Mr. Stanley during the progress of the expedition towards Emin Bey's headquarters, and on the journey back, should be communicated to the Society immediately on receipt, for publication by them.

Mr. Stanley started on the 17th February *via* Egypt and Zanzibar, and his progress so far as now known will be noticed subsequently.

According to long-established custom, I now proceed to review the chief geographical events of the year; a task which the ever-increasing volume and complexity of the literature of the subject, and the growing number and variety of explorations, renders yearly more difficult. It will naturally be impossible to notice more than the principal occurrences, and I will commence with Africa, which continent, as in so many former years, has been the chief field of activity.

The attention of geographers during the year, as far as regards Africa, has been chiefly directed to the basin of the Congo, where many explorers, of various nationalities, have been employed in exploring and surveying the numerous streams which combine to make the Congo one of the greatest fluvial systems of the world. Other explorers have been engaged in the same region in examining into its economical and prospective commercial resources, but at present without definite results. An excellent summary of the geographical work done in the Congo region up to the middle of last year was given to the Society in this hall, in June last, by Sir Francis de Winton, who had then recently returned from his two years' administration of the country. The most important of the new explorations he described was that of Lieutenant Wissmann and his party, who had embarked on the upper waters of the Kassai river, near the part made known to us by Livingstone and Cameron, and navigated it to its junction with the Congo. Since then Dr. Wolff, one of Wissmann's companions, has explored the Sankuru, a large northern tributary of the Kassai, and found it navigable for a long distance. One result of this latter exploration is to show that another navigable river of the far interior, the Lomami, enters the Sankuru from the north-east, and that it is a distinct river from the Lomami of Cameron, recently ascended by Grenfell, which enters the Congo near Stanley Falls.

The direction which the Kassai takes—in a long curve, from south-east to west-north-west—causes it to be the recipient of nearly all the drainage of the southern half of the Congo basin, and, near its junction with the main stream it adds to its volume the waters of another great tributary, the Quango, besides the Mfini from a chain of great lakes further north. The united waters are poured

into the Congo through the Kwa, which, according to Mr. Grenfell's measurement, is contracted in its passage through a range of low hills, and at its mouth is only 700 yards wide (a little higher up only 450 yards); the depth of the swiftly flowing stream Mr. Grenfell was unable to ascertain as no bottom was touched with a line 120 feet long.

The prospective value to the Congo State of the Kassai, with its immense mileage of navigable waters flowing through fertile plains, is acknowledged on all hands. Already stations have been founded on its banks, and Portuguese traders are choosing the newly-discovered river route in preference to their old inland road into the interior from Loanda. It has been during the past few months repeatedly reascended by river steamers, once by Sir Francis de Winton himself.

Equal in importance and extent have been the explorations and surveys along the main river and many of its tributaries carried out by Mr. Grenfell. The chief of these explorations were noticed by the Marquis of Lorne in the Address of last year; and a brief general account of his surveys was given, together with a reduction of his admirable series of river charts, in the October number of our 'Proceedings.' Since then Mr. Grenfell has added to his achievements the ascent of the unknown portion of the Quango between its junction with the Kassai (or Kwa) and the Falls of Kikunji, which latter was the farthest point, coming down river, reached by a former traveller, Von Mechow.

Other considerable additions have been made to our knowledge of the Congo region, by Lieutenants Kund and Tappenbeck, members of a scientific expedition sent out in 1884 by the German African Association. These two courageous travellers, instead of following the courses of the rivers like others, and gleaning information only of the country and people along the banks, struck across the country, first from Stanley Pool to the south, and thence towards the east, crossing in succession all the southern tributaries, from the Quango inclusive to the Lukenye, beyond the Kassai; a toilsome and dangerous march of about 600 miles. Another member of the same expedition, Dr. Büttner, made also a land journey, of less extent but not less interest. Starting from San Salvador, the old capital of the Congo, he travelled eastward and crossed the Quango, reaching the capital of a negro potentate named Kasongo, whence he struck northward to the main Congo above Stanley Pool. Much valuable information regarding the configuration of the country and the ethnology and products of the interior was obtained, on these two journeys. We learn, for example, that the whole western section, to a distance some 400 miles inland, is a hilly country cut up by deep valleys, to which succeeds, further inland, a wide stretch of undulating plains, wooded only along the courses of streams, and that it is only when the eastern side of the Kassai is reached that continuous tropical forest is met with.

North of the Congo the French have been active both in completing the pioneer exploration of their new possessions and in laying down with scientific precision large tracts of country imperfectly known. The most important work of the latter kind is that of Captain Rouvier, the representative of France on the joint commission for laying down the boundary between the Congo State and the French Possessions. This accomplished surveyor fixed numerous positions by a long series of observations both for longitude and latitude, and his report, which will be accompanied by an atlas of thirty-eight maps on various scales, will form a solid contribution to our geographical knowledge of the region. An important pioneer exploration, about the same time, was made by M. Jacques de Brazza, brother of the eminent traveller, to the north and east of the French stations on the river Ogowé, undertaken soon after Mr. Grenfell's discovery of the magnitude of the Mobangi, and apparently with the object of ascertaining whether that great river flowed within the French boundary as fixed at the Berlin Conference. After a journey of a month's duration through dense forests M. de Brazza emerged on an open plain through which flowed, not the Mobangi but the Sekoli, an independent tributary of the Congo lying far to the westward. After a fruitless attempt had been made to penetrate beyond this river, his party built canoes and descended the Sekoli to its mouth. It has been recently announced that by arbitration the French boundary has been extended a little farther to the east than fixed by the Berlin Conference, so as to include the right bank of the Mobangi. A complete and very useful *résumé* of all the geographical work accomplished by recent French explorers in the Ogowé-Congo region, by Major de Lannoy de Bissy, was contributed to our 'Proceedings' for December last, illustrated by a map reduced from the French surveys.

Public interest has recently been directed towards the region north of the Congo, and the practicable routes it may offer to the Niam-Niam countries and the Egyptian Soudan, in consequence of the despatch of the expedition under Mr. Stanley, for the relief and rescue of Emin Bey, which has adopted the Congo route to the Upper Nile in preference to the more direct and shorter route inland from Zanzibar. A paper giving a *résumé* of all published information regarding this region was recently read in this hall by our accomplished young colleague Mr. J. T. Wills. Since then you have had before you the greatest of all travellers in this little-known region, Dr. Junker, and heard his own account of his six years' explorations. The wide open plain country lying between the Congo and the Nile, which Dr. Junker described to us, is watered by numerous streams, the chief of which, the Welle-Makua, flows westerly in the direction of the Upper Mobangi, and, judging from Dr. Junker's maps, it is difficult to dispute his conclusion, in which Mr. Wills agrees, that the two rivers are the same. Other geographers believe that the Welle-Makua belongs to the Shari system



and flows into Lake Chad. The alternative offers one of those problems in which speculative geographers seem to delight; but in this case it will not be long before a solution is arrived at in the only satisfactory way, namely, by actual exploration. Meantime we learn, by the latest news from the Congo, that Mr. Stanley has chosen to adopt a somewhat more direct route to Emin Pasha than that first proposed, namely, from the Congo near Stanley Falls by land to the shores of the Albert Nyanza.

Two more journeys across the continent have been brought to a successful conclusion during the past year. One by M. Gleerup, a Swedish officer, formerly in the service of the Congo State, who crossed from Stanley Falls to Zanzibar, and the other by the experienced traveller and geologist, Dr. Oscar Lenz, who undertook in 1885 an expedition for the purpose of reaching Dr. Junker and Emin Pasha viâ the Congo. Reaching Stanley Falls in February 1886, Dr. Lenz was unable to obtain men from the Arab traders there to accompany him on the march through the unknown country between that point and the Upper Nile, and proceeded to Ujiji in the hope of meeting with better success there, and advancing northwards along the eastern side of Lake Tanganyika. The disturbed state of the country and the excitement in Uganda made this impossible, and he took the Tanganyika and Nyassa route to the Indian Ocean, emerging at the Portuguese settlement of Quillimane.

Further south Dr. Hans Schinz, a learned botanist and ethnologist, has been exploring with fruitful results the region between the Kunene and Lake Ngami.

On the eastern side of the continent our Society is especially interested in the expedition of Mr. J. T. Last, who was commissioned by us in the summer of 1885 to proceed to the region between the Rovuma and the Zambesi and follow up the work of Mr. O'Neill by exploring the Namuli Hills and the Lukugu Valley. We hear by recent telegram of his safe arrival at Zanzibar, and may shortly expect him home to give us in person an account of his journey. The letters which we have received from him from time to time have informed us that he has carried out his programme, though he found the summit of the Namuli Hills inaccessible, and in addition traversed the whole region a second time, striking into the interior from Quillimane, and emerging at Ibo on the Mozambique coast.

Count Pfeil, one of the most active of the pioneers in the newly-acquired German Protectorate of Eastern Tropical Africa, published last year an account of his two journeys in Khutu and in the neighbouring region, a country previously known to us only through Thomson's expedition to the Central African Lakes. Some additions to our knowledge of the geography of this part of the African interior have resulted from Count Pfeil's labours, the most interesting of which is the dis-

covery of the main stream of the Ulanga, or upper course of the Rufigi, a river which this explorer claims to be of some importance, and which he navigated in a boat for upwards of 150 miles.

The unsuccessful attempt of the experienced African traveller Dr. Fischer to carry succour to Dr. Junker in 1885-6, a mission with which he was charged by that traveller's family, would have excited great interest in the earlier days—not long past—of Central African travel. The route he took led for several hundred miles through a totally unexplored country, namely, from the Pangani westward across the region which still remains a great blank on our maps to the caravan route between Unyanyembe and Victoria Nyanza. He reached the southern shores of the Victoria in January 1886, but found it impossible to obtain leave to pass through the territory of the fanatical king of Uganda. Turning backward he made a valiant attempt to reach the Upper Nile by the eastern side of the great lake, but his supplies failed him by the time he arrived at Lake Bahringo, and he returned with a sorrowful heart to the coast. He did not long survive the fatigues of this arduous journey, but died soon after his return to Europe, in November last.

In the continent of Asia the most important addition to our accurate geographical knowledge of the interior is no doubt that gained by the joint Russian and British Commission, which has been engaged on the survey of the northern frontier of Afghanistan from the borders of Persia to the Upper Oxus, but pending the diplomatic settlement of disputed points this information has not been made public, though it will doubtless soon become available. A brief note of a portion of this work, describing surveys made by Captains Maitland and Talbot, between the Hari-rud and Bamian, connecting Herat with the last-named place, and also with points north of the Oxus, and the neighbourhood of Knnduz, has appeared in our 'Proceedings.' The total area surveyed amounts to about 120,000 square miles, mapped on the scale of  $\frac{1}{4}$  inch to the mile, in 60 sheets. These brilliant results are believed to be unique in the annals of surveying. The chief of the British topographical staff, by whom these surveys were undertaken, was Colonel Holdich, to whom one of the Gold Medals has now been awarded, in recognition of the valuable services to geography rendered by him in this and other similar expeditions.

Much valuable geographical work has also been accomplished by Mr. Ney Elias, the Gold Medallist in 1873, who was despatched from Ladakh on a mission to Chinese Turkistan, and diverging westward at Yengi-Hissar, traversed the Pamir Plateau for a distance of 360 miles, to the Khanat of Shignan. The details of this journey have not yet been made known by the Indian authorities, but Sir Henry Rawlinson has communicated to our 'Proceedings' a note in which he points out that his former suggestion that this route, first brought to notice by

Major Trotter, was probably that by which caravans of Rome passed from Bactria, and had been used as a military road in comparatively modern times, is confirmed by the additional light now thrown on the subject; and he identifies the lake *Rang-Kul*, visited and described by Mr. Elias, as the famous Dragon Lake of Buddhist cosmogony, and as answering very closely to the description given by the Chinese traveller Hwang-tsang in the seventh century.

Mr. A. D. Carey, a gentleman in the Indian Civil Service, has in a most enterprising manner devoted a period of leave of absence to a very remarkable journey in Eastern Turkistan and Tibet, and has traversed a large part of those central regions which have lately been made known by General Prejevalsky, and of which a brief résumé was given in the last Presidential Address. Accompanied by Mr. Dalgleish, an enterprising trader, who had previously visited Eastern Turkistan, he started from Ladakh in the summer of 1885, taking a route which had never before been trodden by a European, from Leh eastward across the high Tibetan plateau, and descending to Kiria by an extremely difficult and rugged defile viâ Polu. After a short stay here, he traversed the desert northward, along the course of the Khotan river, and arriving at the Tarim crossed that river to Shah-yar and Kuchar. At the end of the year he tracked the Tarim to Lake Lob and proceeded thence in a southward direction to the foot of the great escarpment which in this meridian forms the northern limit of the Tibetan highlands, where he wintered, and made a fresh start across the Altyn Tagh in the spring of 1886. No news having been received of him for many months, his friends had begun to fear for his safety, but all anxiety has been set at rest by recent telegrams from India announcing his safe arrival at Ladakh at the end of the winter. Considering that Mr. Carey travelled without escort and unarmed, and that his journey has been performed on slender means through vast unknown tracts peopled by tribes supposed to be of hostile and fanatical temper, his exploit is one of the most remarkable in the recent annals of adventurous travel.

Northwards of Khatmandu, the capital of Nepal, about four hundred miles of entirely new traverse in Nepal and Tibet has been contributed by a native explorer, surnamed M—H., besides a confirmation of the details of a hundred miles of ground previously travelled over. It is regretted that the explorer brought back no determinations of heights, which would have been most interesting, for he crossed the main ridge of the Himalayas by one of the highest passes (the Pangu-la) and approached within fifteen miles of Mount Everest. Another native surveyor, R—N., who accompanied Colonel Tanner in his explorations on the Tibetan border in the autumn of 1884, was despatched across Bhutan and the mountains to the east to reach Gyala Sindong, the lowest point yet reached on the Sanpo, and starting from the left bank of the river, to find his way back to India by *any* practicable route, without recrossing

the river. The object was to set at rest the vexed question of the connection between the Brahmaputra and the Sanpo on the one hand and the Irawadi on the other. The explorer met with bad luck at the outset, from the fact of there being hostility between Tibet and Bhutan, a state of things which had closed all the passes into Tibet. He therefore had to find his way back to India down the Hachhu and Wongchu rivers to Baxa, having been detained and kept under surveillance for ten days by the *jongpon* of Chukhajong. His next attempt was made from Dewangiri, whence he proceeded by a pretty direct route to the Monlakachung Pass, and thence to the vicinity of Seh, a very large monastery on the Lhobra river, the position of which had been previously obtained from the north by Lama U—G.'s traverse of 1883. Here, in consequence of the rumours regarding the advance of the Tibet mission from the south, and of a party of Russians from the north, the officials absolutely stopped his further progress, and kept him in custody for nine days, and then conveyed his party under escort to Seh. Thence he escaped with his party by night, and, keeping away from the beaten tracks, found his way to Menchuna (lat. 28° N., long. 92° E.), and thence, viâ Tawang, to Odalguri, along the route formerly traversed by Pundit Nain Singh. His work furnishes about 280 miles of new route survey, and throws light on the general geography of Bhutan, forming a connection with the work of Pemberton (1838) from the south, and of the Pundit and the Lama from the north.

Another journey carried out by three English gentlemen through the heart of Manchuria, from south to north from the shores of the Yellow Sea, and from west to east to the Russian settlement of Vladivostock on the Pacific coast, also calls for notice. The party consisted of Mr. H. E. M. James, of the Indian Civil Service, Mr. F. E. Younghusband, of the King's Dragoon Guards, and Mr. H. Fulford, of the Chinese Consular Service. We have received at present brief accounts only of this meritorious achievement; but they are sufficient to show that the travellers made excellent use of their opportunities of gaining accurate information regarding the country, its inhabitants and products. One of their objects was to ascend the Pei-shan or White Mountain, the highest mountain in the country, which they accomplished, and fixed its altitude by boiling-point and aneroid at 7525 feet, the estimates previously given in books making it 10,000 or 12,000 feet. A very good map of their route was plotted and a copy obligingly communicated to the Society. Mr. James has just arrived in England, and we may hope to have an early opportunity of hearing from his own lips an account of his journey.

The recent addition of Upper Burma to the territories administered by the Viceroy of India, makes it certain that before long the various questions that have till now puzzled geographers in relation to the course of the rivers that rise in Tibet and flow from that country, will

be finally cleared up, and a staff of surveyors under Captain Hobday is already at work in this country. The sources of the Brahmaputra have already been clearly designated, but doubts still surround the origins of the Irawadi, which actual surveys will, it is to be hoped, before long dispel.

The expectations entertained of the opening up of the still unknown interior of New Guinea, from the southern or British portion of the island, by the expedition of Mr. H. O. Forbes, have, unfortunately, not been fulfilled. Mr. Forbes spent the rainy season in the early part of 1886 in camp, at a short distance inland from Port Moresby, profiting by the enforced inactivity, in cultivating friendly relations with the tribes, learning the languages and making botanical collections. The remainder of his resources during these months was exhausted, and when at the commencement of the fine season, in April, he made a bold attempt with the great advantage of the companionship of the Rev. J. Chalmers, to reach the summit of the Owen Stanley range, the term of service of his Amboynese escort had expired, and he could do no more than make a few observations in the rugged country at the foot of the mountains, 75 miles distant from the coast. Since then he has not been enabled to renew his explorations. We learn, however, that the Government of Victoria has taken the matter in hand, and that a well-equipped expedition is in preparation for the exploration of the interior, the leadership of which is to be offered to Mr. Chalmers, whose account of his varied explorations along the south-eastern coast region, given at one of our evening meetings during this session, will be fresh in your memories. The great influence which this experienced missionary pioneer has obtained over the natives, and his knowledge of their habits, inspires us with great hopes in the success of this enterprise, which so much depends on the willingness and fidelity of native followers. Several minor excursions have since been made by various travellers, but very little has been added to our knowledge of the southern portion of the island. Captain Everill's larger expedition, fitted out in New South Wales, succeeded in ascending the Fly river and penetrating for some distance up an eastern arm or tributary named the Strickland, which is said to flow in the rear of the range of coast hills, but the map of the parts explored has not yet reached us.

In German New Guinea the discovery of the important river, named after the Empress Augusta, was confirmed by Captain Dallmann who in April 1886 ascended it in a small steamer for a distance of 40 miles, and it has since been further navigated by Admiral Von Schleinitz and Dr. Schrader in the steamer *Otilie*, which reached a distance of 224 miles from the mouth, the ship's steam launch ascending 112 miles further, finding still sufficient water but being obliged to return for want of fuel.

The progress made in the great continent of America which still offers wide fields for the explorer and still wider and more productive fields for the physical geographer, remains now to be briefly noticed. As a contribution to physical geography, Mr. John Ball's recently published volume on his voyage round South America and various short journeys inland at various points, merits special mention. It is a model of what serious books of travel that aim at conveying accurate knowledge of the countries visited, ought to be.

In Central America, our colleague, Mr. A. P. Maudslay, continues his explorations of the sites and his studies of ruined cities, having returned to Yucatan and Guatemala after reading to us in June last the results of his second and third visits to Central America. His work has great geographical and ethnological as well as antiquarian interest, and his excavations at Copan show that the ruins are those of a city and not simply of a group of sacred edifices, and that the course of the Copan river has changed somewhat since the remote time at which the massive walls of the buildings had been erected. He believes that he has good ground for concluding that Copan and other cities were abandoned before the Spanish discovery of America in 1492.

Lastly, there remains to notice an admirable labour of exploration in the interior of Brazil by a private scientific expedition consisting of Dr. Karl von den Steinen, Herr W. von den Steinen and Dr. Otto Claus. These gentlemen set themselves the task of exploring the course of the Xingu, one of the great southern tributaries of the Amazons. The work was accomplished in 1884, but the first detailed accounts of it were published only in May and June last year. The party proceeded in the first place overland to Cuyaba in the far interior and, organising there their caravan, proceeded to the sources of the great river, and descending along the banks of the principal stream, through wild Indian territory, to the point where it becomes navigable, built bark canoes and paddled down the river a distance of about 1000 miles to its junction with the Amazons. Throughout the journey, in addition to the geographical survey, physical, biological, and anthropological observations were made with the usual thoroughness of German travellers.

For the following brief report on the Admiralty surveys of the year 1886 I am indebted to our colleague, Captain W. J. L. Wharton, Hydrographer.

The portions of the globe where surveying vessels have been engaged under the orders of the Lords Commissioners of the Admiralty are as follows:—England, east and west coasts; river St. Lawrence; British Guiana; north-western coasts of Africa and Spain; Eastern Archipelago; China; Australia; Tasmania; Coral Sea; New Guinea; and Banks Islands, New Hebrides. These vessels consisted of seven steamships of war, three sailing schooners of Her Majesty's Navy, and two hired steamships, manned by 81 officers and 659 men. A detailed report of the

work accomplished by each surveying vessel will shortly be presented to Parliament in accordance with custom.

The chief additions to hydrography resulting from the labours of the surveying officers are as under:—

*At home.*—A re-survey of the Would, an important navigable area fronting the Norfolk shore between Winterton and Cromer, including the dangerous shoal banks Haisborough Sand and Hammonds Knoll, which were last examined in 1828-30. A thorough examination for the first time of the outer Dowsing Shoal, an extensive bank 30 miles from the shore at the north-eastern approach to the Wash. Completion of the new chart of the British Channel.

*Abroad.*—In the river St. Lawrence, a re-survey of the narrowest and shallowest passages eastward of Quebec, known as the Traverses. This survey showed that considerable changes had taken place since it was previously examined, nearly sixty years ago.

In British Guiana, a re-survey of Demerara with its approaches, as also the ship channel leading into Essequibo river.

On the north-west coast of Africa, a new survey of the mouth of the river Gambia, embracing Bathurst anchorage, and determination of the astronomical positions of the salient points and chief places between Bathurst and Marighan.

In China, a detailed triangulation of the coast and islands from Amherst rocks, at the mouth of the Yang-tse, southward to Ockseu, a distance of 400 miles in a direct line, was executed with precision and accuracy. A chart of the outer approaches to the river Min, embracing the islands of Changchi, Matsou, and White Dogs, was made and joined to the survey of the northern entrance to Hai-tan Strait. Completed 1885.

In the Eastern Archipelago, the charts of the trade routes between China and the Australian Colonies have been improved by a survey of Cuyos Islands (Sulu Sea), and additional soundings taken off the north part of Cagayanes Islands and in Banka Strait (Celebes). Near Port Darwin, Dundas and Clarence Straits, now being much used by vessels, have been partly re-surveyed. On the West Coast of Australia, a survey in ample detail of that portion of Shark Bay north of Dirk Hartog Island. In Tasmania, a new chart of D'Entrecasteaux Channel leading to Hobart and a re-survey of the eastern entrance of Bass Strait between Flinders Island and Wilson Promontory on the mainland of Australia. On the Queensland Coast, completion of the shore-line and waters inside the Great Barrier Reef from Cape Upstart northward to Townsville.

The rapid advance of the colony of Queensland has made it desirable to ascertain whether more passages do not exist through the Great Barrier Reef that stretches for so many miles along the coast and bars the approach, than are now known, as also to settle definitely the positions of the many dangers which stud the Coral Sea, which must be

traversed by vessels coming from the north-east. To this end the surveying vessels in Australia have examined parts of this great reef and the following passages have been surveyed:—Lark Pass, a new and good channel and convenient for vessels leaving Cooktown; Flora Pass, an opening south of Cape Grafton (reported in 1883), proves to be a convenient and safe passage through the Barrier; an opening directly opposite Townsville that was recently reported to be fifteen miles wide. No wide and straight opening could be found in this locality, although the detached nature of the reefs makes the passage easy from inside in favourable weather. In addition to these surveys the chart of Flinders Passage also received amendments from the four tracks of a surveying vessel through it.

Our knowledge of the Coral Sea has been much enlarged by the successful charting of the following coral reefs and islets:—Holmes, Flora, Moore, Flinders, Dart, Herald, Surprise, Bougainville [Heath Reef], Diame Bank [Owen Sand Islet], Coringa Islets. Some of these dangers were a source of anxiety to the mariner, from the doubtful positions assigned to them; and it is now believed that the long vexed question of the dangers reported by Bougainville, so far back as 1768, but which have never since been sighted, although searched for by more than one ship, is now settled. The soundings obtained over that area of the Coral Sea in which the above reefs and islets are situated, furnish the first information as to the general depths, and it appears by them that the known reefs stand upon a great plateau, from 600 to 800 fathoms beneath the surface, and that oceanic depths do not exist between the reefs.

In New Guinea, an accurate survey has been made of the passages leading to Goschen Strait through China Strait. This route will, no doubt, be at some future time largely used by steamers trading between Eastern Australia and China and Japan. The shore-line of New Guinea from Su-a-u eastward, to the North Foreland, as also between Killerton Point and East Cape, was included in China Strait survey. Northward of Port Moresby, in continuation of the portion surveyed in 1885, the shore-line was charted as far as Hall Sound. In the New Hebrides, a sketch survey of Banks Islands has been carried out.

Under the orders of the Indian Government the Marine Survey of British India charted the principal approaches to Mergui, a rising port of trade on the coast of Tenasserim, and also examined the usual track through Mergui Archipelago, southward to the entrance of Pak Chan river. Detailed surveys were also made of the near approaches to Bhaunagar, on the west side of the Gulf of Cambay, and also Mandwa Bay outside that gulf.

Under the Dominion Government of Canada, the northern shores of Georgian Bay, between Collins and Byng Inlets, have been charted.

During the year the Hydrographic Department has published 57  
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new charts and plans, and improved 20 charts by the addition of 29 new plans. 2700 corrections have been made to the chart plates.

It will not be out of place, at the present time, when our countrymen are celebrating in all parts of the globe the fiftieth year of the reign of Her Majesty Queen Victoria, to look back on the progress that has been made in geographical knowledge since the commencement of that reign which dates seven years after the foundation of our Society. The time at my disposal will only admit of an extremely brief review, and I would refer you for more ample details to the valuable memoir drawn up by our esteemed secretary, Mr. Clements Markham, and published by the Society a few years back, under the title of 'Fifty Years' Work of the Royal Geographical Society.' A comparison of the maps of fifty years ago with those of the present day shows how great have been the additions made to our knowledge during this period. Foremost, in this respect, must be placed the maps of Africa, the interior of which has been transformed from an almost complete blank, containing little more than hypothetical geographical features derived from the reports of native traders, some of which had been handed down to us from the time of Ptolemy, to trustworthy representations, based on precise data, of a vast system of rivers, lakes, and mountains, the existence of which had been wholly unknown to the civilised world. This continent has at length been traversed and retraversed in all directions, and what remains unknown, consists of details needed to fill in well-ascertained large outlines, rather than essential features still to be discovered. Closely following the progress of geographical research, some of the latest fruits of which it has been my agreeable duty to recognise to-day, when presenting one of the Gold Medals of the Society to Mr. Grenfell, the advance of commercial enterprise is already carrying the pioneers of civilisation, recruited from all the principal States of Europe, into the heart of what may without exaggeration be called a newly-found quarter of the globe.

The additions to our knowledge of the great insular continent of Australia have been hardly less remarkable; and the difficulties that have been overcome, and the enterprise and endurance displayed in the investigation of its geography, have never been surpassed in the history of the earth's exploration. Here, too, hand in hand with the advance of geographical knowledge, the domain of civilisation has been extended, and the Australian colonies have started into existence fully armed as it were from their birth for the battle of national life. Our fellow-subjects in those distant countries have already displayed their complete fitness to undertake the task of further geographical investigation in that quarter, and to them we may now confidently leave it, assuring them of the continued sympathy and interest with which their labours will be regarded by this Society.

During the period to which I am referring, much also has been

done to add to our knowledge of the formerly little understood geography of Central Asia. The Russian geographers on the north, and our own surveyors on the south, have now almost entirely cleared away the darkness that shrouded this part of the earth's surface. The limits and the nature of the central plain lying between the mountains of Siberia and of Tibet have been at length satisfactorily ascertained. The long discussed problem of the true source of the Brahmaputra has been finally solved. The remarkable plateau of Tibet has been crossed in many directions, and important parts of it have been accurately surveyed, so that here also what remains to be done is rather to complete the delineation of details than to enter upon altogether new investigations.

The large geodetic and topographical operations in connection with the international demarcation of the northern boundary of Afghanistan, will supply all that seems still required to complete the maps of Western Asia between the Indus and the Caspian.

Turning to the American continent, we find a measure of progress which, to say the least of it, quite equals that obtained elsewhere. The exploration of the vast tract lying between the valley of the Mississippi and the Pacific has been carried out by the United States Government with a degree of completeness, both in respect to its topographical representation and its physical characteristics, that has probably never been approached elsewhere, and the whole country has thus been thrown open to the enterprise of the energetic citizens of the United States, who have not been slow to possess themselves of its natural wealth.

In British North America, under less favourable conditions for the prosecution of such systematic surveys as those carried out in the territories of the United States, much has still been done, and the recent opening of the railway connecting Columbia on the Pacific with the eastern Canadian States, and the establishment of another through route to Eastern Asia, will doubtless before long lead to the thorough exploration of the countries through which the railway passes.

The Arctic voyages which had been originally commenced with the hope of finding a practically useful north-west passage to Asia, have long ceased to be animated by such an expectation, and their repetition has been undertaken in the cause of geographical exploration alone.

The results of the numerous expeditions undertaken during the last fifty years, combined with those obtained by land journeys directed from British North America, have very completely defined the southern border of the Polar Sea between Behring Strait and Greenland, and have secured the precise delineation of the somewhat complicated system of channels by which the northern border of the American continent is intersected, and of the islands formed by them, along the Arctic circle. In like manner the boundary of this sea has been determined by voyages directed to the north-east along the northern border of Asia.

The highest latitude reached hitherto is rather less than  $83\frac{1}{2}^{\circ}$  N.—that is, within 500 miles of the Pole. The further extension of the exploration of the north of Greenland and of Franz-Josef Land may still be possible, and it is by journeys in this direction that any closer approach to the North Pole will probably be most readily attainable.

I should not omit mention of the memorable voyage to the antarctic circle under the most experienced of the Arctic naval commanders of his time, the results of which were of the greatest scientific value, though the difficulties arising from climate that stand in the way of a near approach to the South Pole prevented the expedition reaching a higher latitude than  $78^{\circ} 11' S$ .

Lastly, I may notice the remarkable additions that have been made during this epoch to our knowledge of the ocean, its depths, its temperature, the winds and climates that prevail over its various portions, its currents, and the life with which it abounds. Much of the knowledge thus acquired has supplied completely new and wholly unexpected data with which to deal in our endeavours to interpret the earth's history, and to understand the phenomena it presents to us.

It has been in connection with the extension of geographical discovery, both that to which I have thus more specially referred, and other similar explorations to which specific reference has not been possible, that there has been accumulated a great mass of knowledge which has had a most important place among the causes which justify our assigning to this epoch its conspicuous character of deserving to be recorded in the history of the present times, as the age of scientific progress. There is no room to doubt that it was only by aid of the accumulation of a knowledge of numerous forms of life from various countries, developed under different conditions, that the remarkable generalisations of Darwin and Wallace as to the origin and distribution of species became possible; and that in this sense those great conceptions of the signification of the wonderful variety in the forms of animal and vegetable life, and of the remarkable manner in which they are found associated in various parts of the earth, which it has truly been said are worthy of being classed with the sublime discoveries of Newton, may be regarded as consequences of geographical exploration and discovery. In a somewhat similar manner the progress of geology follows that of geography, and the same may be said of almost all the natural sciences.

In some branches of science the student is able to submit his conclusions to the test of experiment, to vary the conditions of his investigation at his pleasure, and to draw his inferences from the varying results under the changed conditions. In the great laboratory of nature no such control of conditions is within our power. But by suitable variation of our geographical position, we are able to observe the effects that the physical forces of nature have produced under varied conditions,

and it thus becomes possible to some extent to obtain a substitute for the power of direct experiment.

Properly to estimate the relation between geographical conditions and any observed effect, it is obviously necessary to possess a sound knowledge of the physical forces that may be called into operation in producing that effect, and consequently such a knowledge is of essential importance to every geographer.

I shall not detain you to say anything more on the much-discussed subject of geographical education. I desire to point out, however, that for such reasons as I have briefly indicated, it is hardly possible to over-estimate the value of exact and scientific geographical research, and that this can only be attained by those who have been properly prepared by previous training. Such a training, it is hoped, may be provided by the instruction which it has been the earnest desire of the Society to see imparted at our chief Universities, and which I trust may not only add to the number of our scientific travellers, but serve generally to throw on many other branches of study that light which an intelligent knowledge of geography alone can supply.

#### OBITUARY FOR THE YEAR 1886-7.

As stated in the Council Report, we have lost by death during the year no fewer than seventy-five of our number, besides five Honorary Corresponding Members. Among them were several of our most active and esteemed colleagues, and others eminent as geographers and scientific travellers. Detailed notices of some of these have already appeared in the pages of our monthly 'Proceedings,' viz. Colonel Sir J. U. BATEMAN CHAMPAIN, R.E.; Sir T. DOUGLAS FORSYTH; Colonel C. M. MACGREGOR, K.C.B.; M. A. W. MOORE, C.B.; Admiral BEDFORD PIM; and Dr. E. RÜPPELL. A brief account of the chief work of General C. M. STONE, Colonel De PRÉE and Dr. R. J. MANN is given in the foregoing Presidential Address, and a memoir of DON MARIANO FELIPE PAZ SOLDAN, from the pen of Mr. MARKHAM, appears in the present number of the 'Proceedings.' The names of the others, many of whom were men of high distinction in different walks of life, are as follows:—

Sir WM. P. ANDREW, whose active life was spent in the promotion and administration of railways in India, and who was for many years Chairman of the Scinde Railway Company: he was the author of several pamphlets on the Euphrates Valley route to India; Dr. HERMANN ABICH, known for his biological investigations in the Caucasus; G. F. ANGAS, artist and traveller, the author of a pictorial work on Zululand, and of popular volumes on Australia and Polynesia; he died on the 4th October last; Rev. A. AEDY; Rear-Admiral W. ARTHUR, C.B., who had seen much active service in the Maori and Kafir wars of 1845-7 and 1851-2, in the Baltic and Black Sea during the Russian war, and in the China war of 1857-60. He served as naval attaché at Washington from 1879 to 1882; the Right Hon. A. S. AYRTON; R. A. BROOKS; Sir C. J. FOX BUNBURY, Bart.; J. BEGBIE; Captain E. BURSTAL, R.N., the eminent marine engineer, Secretary to the Thames Conservators since 1857; J. H. BATTEN; GEO. BISHOP; H. BLAINE; A. C. BALDWIN; Viscount BARRINGTON; J. H. BAXENDALE; Capt. E. G. BAYNTON, R.N.R.; Rev. THOS. BUTLER; J. BRAMLEY-MOORE; E. BICKERS; W. BENSON; F. COOKSON; E. COOLING; A. CASSELS; GEORGE CLOWES, member of the well-known printing firm of William Clowes & Sons, the Society's printers; J. R. DEANE; Capt. NEIL D. C.

F. DOUGLAS, Scots Fusilier Guards; W. E. H. ELLIS; H. ECCLES; Viscount FALELAND; W. FUIDGE; J. FIELDEN; W. GILLESPIE; G. B. GLOVER; J. Y. GIBSON, the eminent Spanish scholar and translator of Cervantes; JAMES GIBBS, C.S.I., Member of the Indian Government and Chancellor of the University of Bombay, at an earlier time Assistant Commissioner in Scinde under Sir Bartle Frere; R. R. GLOVER; R. HANKEY; A. B. INGLIS; R. JEFFS; R. WARD JACKSON; T. C. JACK; Sir GEO. KELLNER, K.C.M.G., a distinguished Member of the Indian Civil Service, who amongst other posts had occupied that of Financial Commissioner in Cyprus; J. KEMPSTER; Lord KINNAIRD; Sir LUKE S. LEAKE; A. LAWRENCE; Rev. J. LONG; Colonel Sir W. OWEN LANYON, K.C.M.G., whose chief military services were rendered in Africa, for he was aide-de-camp to General Wolseley in the Ashanti Expedition, Administrator in Griqualand West, taking part afterwards in the Zulu war, and in 1882 was Commandant of the base of operations in Egypt; A. B. McQUEEN MACKINTOSH; G. DE LAUDRE MACDONA; Admiral Sir G. N. BROKE-MIDDLETON, Bart.; his period of service in the Navy extended from the battle of Navarino, at which he was present as a midshipman, and the capture of St. Jean d'Acre, to the Crimean war; A. MATHESON; General R. C. MOODY, R.E., who was Governor of the Falkland Islands from 1843 to 1847, and from 1858 to 1863 Chief Commissioner of Lands and Works in British Columbia, during which period the foundations of the capital, New Westminster, were laid, and Port Moody (named after him), the westernmost point of the Canadian Pacific Railway; Lieut.-Col. G. NAPIER, R.A.; E. PIERREPONT; W. L. POWELL, R.N.; Capt. W. B. PHILLIMORE, Grenadier Guards; Capt. LONSDALE POUNDEN; EUGENE RIMMEL; E. R. SIMMONS; E. STORY; Rev. M. C. T. STURMAN; J. SARLL; Sir CHARLES E. TREVELYAN, Bart.; R. VAUSE; W. S. WHITWORTH; G. W. WHEATLEY; E. WATT; and lastly JAMES WYLD, the well-known cartographer and map publisher, who contributed much during his time to the diffusion of geographical information, especially by his "Great Globe," which he erected in Leicester Square in 1851, and maintained as a public exhibition for ten years.

*The Lu River of Tibet; is it the source of the Irawadi or the Salwin?*

By General J. T. WALKER, R.E., F.R.S.

(Read at the Evening Meeting, April 25th, 1887.)

Map, p. 398.

THAT vast and highly elevated region, in the heart of Asia, which is called Tibet by Europeans but Bod-yul or Peu-yul by the natives of the country, is bordered to the south principally by the Himalayan mountain ranges, which stretch 1600 miles in longitudinal chains, running east and west between the 74th and the 98th meridians, and also by a system of meridional chains lying across a further stretch of about 250 miles up to the 102nd meridian, at right angles to the Himalayas, which are offshoots from the Tibetan plateau into Upper Burma and the Yunnan province of China. The region is highest on the north, its loftiest tableland, the Lingzi-tang plateau—which lies between Eastern Turkistan and Ladak—rising to the enormous altitude of 17,600 feet above the sea-level. This plateau abuts against the Kiun-Lun (Kuen-Luen)

ranges which constitute the northern scarp, as the Himalayas the southern, of what is probably the greatest existing protuberance above the general level of the earth's crust. Thence the surface of the ground slopes gradually to the east and west and south, nowhere falling below 10,000 feet but on the extreme southern border. On the north various small rivers find their way through openings in the Kiun-Lun to become lost in the Tarim basin and the Gobi desert, and one considerable river, the Hoang-ho, descends into the plains of Northern China and the desert beyond the Great Wall, and after many windings enters the Whanghai or Yellow Sea; but the general tilt of the ground compels all the other rivers to pass through the southern scarp of Tibet, in making their way to the ocean. The longitudinal chains of this scarp present formidable barriers to the downward progress of the waters, but the meridional chains facilitate it by the outlets which the intervening valleys present for their egress. Thus, there is a stretch of no less than 1400 miles between the two great fissures in the Himalayas through which the Indus and the Yaro-tsanpo enter India, on the extreme west and east; whereas in a stretch of only 150 miles three great rivers make their exit between the meridional chains; these are the Di-chu as it is called by Tibetans, or Kin-sha-kiang as called by the Chinese, which becomes the Yang-tse-kiang or Blue river of China; the Chiamdo-chu or Lantsan-kiang, which becomes the Mekong river of Cambodia; and the Giama-Nu-chu, which the Chinese call the Lu-kiang, or Lu-tse-kiang indifferently. The latter river is generally held to be the source of the Salwin, but I purpose to show you that it is more probably that of the Irawadi.

But first I must just remind you of the long controversy between English and French geographers regarding the lower course of the Yaro-tsanpo, the former maintaining from information derived from the natives that it enters the Brahmaputra, and is the principal source of that river, the latter carrying it into the Irawadi, on the authority of Chinese geographers. It is now known with certainty to enter the Brahmaputra,\* but to this day the lower hundred miles of its course out of the Tibetan plateau has not been explored by any European, or any Asiatic of sufficient intelligence to give a rational account of it; and to this day, an even greater length of the lower course of the Lu river remains similarly unexplored. These lengths lie, the first within, the second on the border of the Eastern Himalayan region, and I wish particularly to draw your attention to the circumstance that this region is materially lower than any other portion of the Himalayas, and yet that it presents the greatest difficulties and barriers in the way of geographical research. It commences about the 93rd meridian which separates it from the great Himalayan chain of lofty peaks covered with perpetual snow, which forms so prominent an object from the plains of

\* See Note 7 on the eastern basin of the Yaro-tsanpo.

Upper India, throughout their entire extent from east to west; the peaks are mostly 20,000 feet above the sea-level, several exceed 25,000, and the highest yet measured—Mont Everest—is 29,000. They are distributed pretty evenly over the entire extent of the range; thus Nanga Parbat, which towers over the Indus on the extreme west, is 26,600 feet high, and on the extreme east, in Bhutan, there are peaks rising above 26,000 feet; but for a considerable distance to the east of the 93rd meridian there is nothing above 16,700 feet. Yet the higher region is better populated, and the inhabitants have more or less constant intercourse, in times of peace, with each other, and with the people of India and Tibet on either side; the lines of communication between neighbouring valleys and villages are well established, though occasionally they are very circuitous, in order to avoid the physical difficulties presented by the stupendous scarps of some of the hill ranges and the deep-fissured channels of some of the rivers; but by some route or other Asiatics may travel through the entire length and breadth of the country, excepting when the passes are closed by snow; and Europeans may do so too, excepting when hindered for political reasons, as in Nepal and Tibet.

In the lower region the highest peaks do not attain the altitude of the principal passes in the gorges between the western peaks, and the general configuration of the ground is less rugged and precipitous; but the hillsides and the plateaus are overgrown with a dense tropical vegetation which presents a very formidable barrier to intercommunication, even between neighbouring localities. The decayed vegetation of ages clothes the ground with a coating of rich soil, from which the inhabitants readily raise a sufficiency of food to supplement the fruits and roots which nature provides bountifully for their own requirements and their cattle and goats and pigs. Thus in every locality the people have a tendency to become isolated from their neighbours; intercourse between members of the same tribe is restricted by the difficulties of transit through dense forest and jungle; different tribes, and even different clans of the same tribe, regard each other with more or less suspicion and alarm, and thus in their isolation they have become savage and barbarous, and they are much dreaded by their more civilised neighbours in Assam and Tibet. Frequent attempts have been made by officers of the Survey of India to obtain natives of the borderland to train as surveyors and employ in making geographical explorations of this region, as has been done so successfully in other parts of the Himalayas and in Tibet; but as yet no one has been found who could be trusted to make his way any distance beyond the border. Whatever exploration has been accomplished in this region has been mainly achieved by Europeans, and it is to Europeans that we must look for the elucidation of the geographical problems which still await solution. *See Note 1.*

In 1826 Wilcox attempted to reach the sources of the Lohit or Eastern Brahmaputra, the basin of which lies between the basins of the Lu and the Yaro-tsanpo. He ascended the Lohit from the station of Sadiya, in Upper Assam, to the point where it enters the plains, near the Brahmakund, or pool of Brahma, so famous in Indian mythology; there he entered the country of the barbarous Mishmi tribes, and made his way up the narrow and circuitous channel through which the river flows down from its sources, across the great spur from the Himalayas which forms the eastern boundary of Assam; he passed into an open valley beyond, and had reached the village of Jingsha, a Mishmi chieftain, midway between the Brahmakund and the Zayul plateau of Cis-Himalayan Tibet, when he was prevented from proceeding any further. But he obtained some valuable geographical information; the Mishmis showed him the general direction of the river and the mountains in which its sources are situated, and they gave him the names and distances of the principal villages on its banks.

In 1836 Dr. Griffith, the celebrated traveller and naturalist, ascended the Lohit from the Brahmakund, and had got about half as far as Wilcox, when the Mishmis, who had accompanied him so far, declined to take him a foot farther, or even into the lands of the neighbouring Mishmi clans, so he had to return to Assam without having reached Tibet.

In 1852 the Abbé Krick, a priest of the French Roman Catholic Foreign Mission, succeeded in making his way up the river through the Mishmi country, and beyond, to the village of Sama, which is situated a few miles below Rima, the chief town in the Tibetan district of Zayul. After three weeks' residence the authorities insisted on his return to Assam. His journey to and fro occupied about three months, and he wrote a very interesting and animated account of it, which was published soon afterwards in France,\* but which seems to have been as yet quite overlooked by geographers, though it contains some important geographical information, as I will presently indicate. In 1854 he again travelled through the Mishmi country, this time accompanied by a fellow-priest, M. Boury; they reached the Tibetan village of Sama, and there they were both treacherously murdered. This second journey is well known to geographers, and Colonel Yule, in his geographical introduction to the last edition of Captain Gill's 'River of Golden Sand,' concludes his analysis of the evidence (*see Note 2*) whether the rivers of this region flow into the Brahmaputra or the Irawadi, in the following eloquent words:—

"Thus, singular to say, from the blood of those two missionary priests, spilt on the banks of the Lohita (the 'Blood-red'), is moulded the one firm link that we as yet possess, binding together the Indian and the Chinese geography of those obscure regions."

\* 'Relation d'un Voyage au Thibet en 1852, par M. L'Abbé Krick. A la librairie de piété et d'éducation d'Auguste Vatou.' Paris, 1854.



I only heard of the published narrative of M. Krick's first journey quite recently, from the Abbé Desgodins, in reply to my inquiries whether any geographical information was forthcoming from the extant accounts of the second journey which terminated so sadly. And I will now give you a brief epitome of it, as the information it contains has an important bearing on my subject this evening.

M. Krick prepared himself for the journey to Tibet by acquiring a sufficient knowledge of the Mishmi language to enable him to converse freely with the Mishmis, without the aid of an interpreter. The English officials in Upper Assam did all in their power to help him, gave him presents to conciliate the Mishmis, and on the failure of his efforts to induce any Assamese to take service with him, as carriers of his goods and supplies of food for the journey, they induced a Kampti chieftain, Chowsam Gohain, who had previously been employed in endeavouring to open up communications with Tibet, to accompany him and furnish him with Mishmi porters. They started from Sadiya in December 1851, "a party," he says, "of seventeen travellers in all, not including the dog Lorrain who ran on in front." They followed the course of the Lohit Brahmaputra, in some parts traversing the bed of the river, and having to spring like acrobats across great boulders, in other parts making their way along either bank, scrambling over precipices or cutting paths for themselves through dense forest and jungle. They had frequently to cross the river by suspension bridges of a single cane, along which the traveller has to pass, his body resting in a cradle attached by a ring to the cane, down which he shoots rapidly to the lowest point, midway, and then hoists himself, laboriously climbing with both hands and feet, up the rise to the opposite bank; happily, his face all the while looks up to the sky, and away from the roaring torrent below. M. Krick says that the first time he ventured on this means of transit, and placed himself in the cradle, he felt like a man putting a cord round his own neck; but after arriving safe and sound on the opposite shore, without ever feeling the possibility of a fall, he reproached himself for his mistrust of Mishmi bridges, and from that time voted that they should be recommended to the Society of Progress.

The presents with which he had been liberally furnished by the English officials, seem to have been rather an anxiety to him than otherwise; for they excited the cupidity of the chiefs of the clans through which he had to pass, each of whom endeavoured to get as much as he could for himself. But wherever he went his knowledge of the language stood him in good stead, and he met with a friendly reception; at every stage, however, he was strongly advised not to proceed any further, each clan fearing to compromise itself with its neighbours and with the Tibetans; he was nowhere actually stopped, but everywhere endeavours were made to terrify him into returning by tales of the dangers which assuredly awaited him. On reaching Jingsha's village,

where Wilcox had been turned back, he was taken to the edge of a lofty precipice overhanging the Brahmaputra, and shown the place where two Asiatics, who were endeavouring like him to make their way into Tibet, had been murdered, some years previously, and their corpses thrown into the river. "See," said his informants, who appear to have been really anxious for his welfare, "there are the stains of their blood; if you go on you will be murdered and your body thrown into the river." But he was resolved to proceed at all risks, and when they found this they guided him onwards and supplied porters to carry his stock of goods, which, however, was being rapidly diminished by petty thefts and presents to the chiefs. He had a gun, and always kept it by him, and as the Mishmis had very few firearms, the possession of this weapon made them somewhat afraid of him, and he appears to have prudently abstained from ever firing it, and thus betraying his small skill in its use. One night, when close to Tibet, he was aroused by an Assamese whose release he had obtained from slavery to the Mishmis, who informed him that the people were plotting his murder, and he should keep awake with his gun in readiness; too tired to do this, he dropped the gun and fell asleep, commending his soul to God who, he says, knew the motives of his journey, and could if He pleased protect him; next morning he awoke with some surprise at finding himself still alive. He met with no further opposition, and his next march brought him into an open valley, "seemingly formed by the alluvium of the Brahmaputra;" and in the distance he saw the villages of Tibet. Great was his joy at a sight which more than made amends for his past perils and privations. He entered Tibet repeating the *Nunc dimittis*, happy if need be to die there, but hoping to be permitted to settle among the people and learn their language and make converts to Christianity. They received him kindly, their gentle and courteous manners forming a striking contrast with the savage rudeness and untutored ways of the Mishmis. Equally striking was the transition from the tangled thickets and rugged paths of the wilderness of hills through which he had passed, to the open valleys, the smiling fields, the softly undulating pasture lands, and the happy homesteads of the Tibetans; "inhabitants, houses, cultivation, scenery, everything," he says, "wore a gracious aspect; the change was as from night to day."

He took up his quarters in a Tibetan family, and at once set to work to learn the language from his hostess, who was very good to him. He seems to have been treated with all the more consideration because he avowed himself a priest of the Christian religion; lamas from the surrounding monasteries came to visit him, and would prostrate themselves before his cross, and raise his breviary respectfully to their foreheads. But all too soon the local authorities insisted on his leaving the country; they said that an insurrection was imminent, for which reason his presence was not desirable at the moment, but he might return after-

wards when matters had quieted down. Very reluctantly therefore he commenced to retrace his footsteps. His stock of presents was exhausted, he was almost reduced to beggary, and his prestige was much diminished. On reaching Jingsha's village he found the chief suffering greatly from a bad wound in one of his legs; he was told to cure the leg in three days or he would be killed if he failed to do so; happily, he had gone through a course of medical study in France under a Doctor Lorrain, after whom the dog, who was his sole companion, was named; he had still some medicine, and he succeeded so well in his treatment of the wound that Jingsha became very grateful and friendly, and rendered him substantial assistance for the remainder of his journey back to Assam.

After waiting two years for the suppression of the insurrection in Tibet, M. Krick returned to Sama accompanied, as already stated, by M. Boury. There they were murdered by a Mishmi chief named Kaisha, who was afterwards captured in his own village by a detachment of the 42nd N.I., under Lieut. Eden, sent from Assam, was tried, convicted, and hanged. But the murder took place in a Tibetan village, and it was instigated by a Tibetan official; this man was eventually arrested by the Chinese Mandarins at Kiangka, near Batang, and so severely beaten that he died shortly afterwards. Thus the murder of the missionaries was avenged both by the Chinese and the British officials, apparently without any preconcerted arrangement on the part of the two Governments.

That the Abbé Krick should have braved the perils and privations of a second journey through the Mishmi country to Tibet, in order to preach the gospel of Jesus Christ, and teach the philosophy of the Cross, in lands where Buddhism reigns supreme, is an instance of courage and heroism and self-devotion of a very high order of merit. In this country we have more opportunity of becoming acquainted with the labours of the notable missionaries of the Protestant Churches, as Livingstone, Williams, and Paterson, and Hannington, the most recent martyr of the Church of England, than we have of those of other branches of the Christian Church. I have therefore deemed it an act of simple justice, and one which will certainly enlist the sympathy of my audience, to endeavour to rescue from oblivion the noble enterprise of this earnest and devoted Frenchman and Roman Catholic priest; it illustrates the happy fact that the heroes of Christianity are not confined to any one nation, to any one branch of the Church, or to any particular school of Christian thought and discipline; but that the noble army of martyrs finds worthy recruits wherever the banners of the Cross are unfurled.

The account of M. Krick's first journey to Tibet is a long buried chapter of geography which it has been a pleasure to me to exhume and bring to light; had it been more widely known, geographers would have been spared a great deal of blundering and false geography, as I

will presently show. But first I must resume my narrative of the exploration of these regions.

The next explorer was Pandit Krishna (A—k) of the Indian Survey, of whose 'Four years' journeyings through Great Tibet' I gave an account to this Society two years ago. (See 'Proceedings' for February 1885.) He was returning to India from Darchendo, the easternmost town of Tibet on the frontier of China, and had made his way across the system of meridional mountains and valleys which I have already alluded to, and entered the Zayul basin from the east, and reached the village of Sama, with the intention of proceeding to Assam by the direct route through the Mishmi country, when he was told that if he did so he would certainly be either murdered or enslaved. He therefore returned to India by a very circuitous route which took him almost up to Lhasa. In this case the Mishmi barrier proved most beneficial to the science of geography; for the long route taken by the Pandit to avoid it lay, for upwards of 600 miles, in entirely new ground, the exploration of which has thrown much light on a very obscure but important region, and has enabled the limits of the eastern basin of the Yaro-tsanpo to be defined with considerable precision. Had he taken the direct route to Assam, he would merely have confirmed what geographers had already been told by Wilcox, and might have learnt from the Abbé Krick, that the rivers of the Zayul district are the sources of the Lohit Brahmaputra.

Now this fact is fatal to the theory of the identity of the Yaro-tsanpo with the Irawadi. Thus as the region between Sama and Brahmakund had not been traversed by either Wilcox or the Pandit, Mr. Robert Gordon, who had published a great folio volume in support of that theory, maintained that the region is much broader than is shown in either Wilcox's map or the Pandit's, that it is crossed by the Yaro-tsanpo which here receives the Zayul river and then passes down into the Irawadi, that the Lohit is too inconsiderable a river to receive the Zayul which is a much greater river, and that the head-waters of the Lohit are situated in the hills bordering Assam, at a much higher level than the level of the Zayul at Sama. He put forward his reasons for these remarkable assumptions so dexterously, in a paper which he read before the Society (see 'Proceedings' for May 1885), that Lord Aberdare, who was presiding on the occasion, appears to have been half persuaded by them, and concluded the discussion with the remark that,

"Mr. Gordon had very fairly thrown out a challenge, that if the upper waters of the Brahmaputra were at a higher elevation than the Zayul river, into which he assumes the Sanpo to flow, that would settle the question. Of course rivers did not run up-hill, and if the Sanpo near Rima was lower than the upper waters of the Brahmaputra there could be no more dispute about the point. He hoped that some gifted traveller would before long be animated by a desire to solve the problem by actual travel down the Sanpo."

The challenge was immediately taken up by a British police officer in Assam, Mr. Needham, who proceeded, with the approval of the local Government, not "down the Sanpo," which no one has yet attempted, but up the Lohit Brahmaputra, accompanied by Capt. E. H. Molesworth. Ascending this river, they passed through the Mishmi country, and reached a point within a mile of Rima, the chief town of the Zayul district, a few miles beyond Sama, and then returned to Assam, again travelling along the banks of the Lohit Brahmaputra. They have fully confirmed the broad facts of Wilcox's geography and the Pandit's (*see Note 3*). And they came across a still standing memorial of MM. Krick and Boury, in two upright slabs, on a very large stone beside a stream marking the boundary between Mishmi and Tibetan country, which they had erected to commemorate their passage across the Jordan that lay between their wilderness and their promised land.

Krick gives a most vivid monograph of the Lohit Brahmaputra. He describes the river as descending into the Zayul basin from mountains to the north-east, through a channel which resembles a narrow cleft between two towering pinnacles; he testifies to its great water-power, the irresistible impetuosity of its course, the wild beauty of its banks, and the thundering roar with which it startles the surrounding solitudes; he describes its bed in the Mishmi hills as all too narrow to contain the volume of water; thus it does not flow, but bounds furiously; its surface is everywhere a sheet of white foam, save in rare intervals of comparative calm, where it seems to slumber in deep pools under the shadow of huge trees, whose verdure is mirrored in its surface. He says its volume is so great that it is not sensibly augmented even by affluents of considerable size. This is a very important observation, as it indicates that the river has probably another and more distant source than either of the two mentioned by Wilcox and traversed by the Pandit, which rise in the south face of the Himalayas, and that its principal source probably originates in the Tibetan plateau to the north, whence it descends into the Zayul basin, between the two towering pinnacles which were specially pointed out to him.

And now let me take you away from this region into Upper Burma. A range of hills which juts southwards from the eastern extremity of the Himalayas separates the Zayul basin from that of the Lu river to the east, and then, bending westwards in horseshoe fashion, separates it from that of the Irawadi, and then again trending southwards, separates Assam and Eastern Bengal from Burma. This range is crossed by two routes from Upper Assam to the Irawadi, which were explored, one by Wilcox sixty years ago, the other recently by Colonel Woodthorpe and Major Macgregor. Of the latter an interesting account was given to this Society last December by Major Macgregor. It lies a little to the south of Wilcox's route, but sufficiently near to enable Woodthorpe to test the accuracy of Wilcox's work in the region of the

Upper Irawadi, and we have the gratification of knowing that Wilcox has been as fully corroborated in this quarter as he has been in the region of the Lohit Brahmaputra by Pandit Krishna, by the Abbé Krick, and by Mr. Needham. Now it is so much more pleasant to be able to testify to the goodness of a man's work than to speak of any flaw or blemish in it, that it is with some reluctance, and without any thought of detracting from the credit which is very justly Wilcox's due, that I would point out an unfortunate mistake which he made, not in his geography, but in his nomenclature. He reached the river which is called Nam-kiu by some natives of the country, and Mali-kha by others, and he called it *the* Irawadi. It is doubtless a source of the Irawadi, but it is certainly not the principal source, even should the river be proved to have no source outside Burma; for the Pandit's survey shows that the range which separates the Zayul basin from Upper Burma—and which is called by some the Nam-kiu, by others the Kampti, and by others the Khanung range—trends considerably to the north of the sources of the Mali-kha, and gives birth to other rivers of greater magnitude. The erroneous employment of the definite article *the*, in place of the indefinite article *a* or *an*, is liable to cause mischief in geography as in all other departments of knowledge, and its employment by Wilcox has caused many geographers to look on the Mali-kha as the principal source of the Irawadi. Dr. Anderson, in a paper which he read before our Society in June 1870, maintained that this view was erroneous, and that the river was probably fed by waters descending from the Tibetan plateau, and entering Burma by what was then known as its eastern branch. Here again the erroneous use of the definite for the indefinite article has troubled geographers, for Wilcox told of a branch of the river which he calls *the* eastern branch, and which certainly rises in the Namkiu-Kampti range; thus it has been alleged in opposition to Dr. Anderson that there is no room for his river between Wilcox's eastern Irawadi and the Lu, and therefore that the Irawadi can have no other sources than those indicated by Wilcox; and there is considerable force in this objection; for we now know with certainty, from the Pandit's surveys, that no Tibetan river west of the Lu can possibly enter Burma, because it would first have to cross the Lohit Brahmaputra and the Namkiu-Kampti range. If then any Tibetan waters enter the Irawadi, they can only do so by the channel of the Lu.

Of this channel the portion with which we are best acquainted is that lying due east of the Zayul basin, between the parallels of 28° and 29°; it has been frequently traversed by the Abbé Desgodins and his brother missionaries, who settled themselves at a place called Bonga, a little to the east of the river, on the lower parallel, for upwards of a year, when they were driven out of the country by the Tibetan officials; it has also been crossed and geographically fixed on the upper parallel

by Pandit Krishna. I had the privilege of making the acquaintance of the Abbé Desgodins some years ago when we were both residing in Calcutta. He brought me a map of Eastern Tibet which he had drawn to illustrate a paper he was about to read to the Asiatic Society of Bengal,\* and in which he runs the Lu river into the Salwin, boldly writing the name Salwin along its upper course in Tibet, as if there could be no possible doubt on the subject. At that time I had other things than Tibetan rivers to think of and attend to, and it did not occur to me to question the accuracy of the Abbé's nomenclature any more than I had that of Wilcox. But the enforced leisure of retirement from the public service has permitted me to turn my thoughts to the subject; and my attention has been specially drawn to it by Herr Loczy, the geologist attached to Count Szechenyi's expedition to Western China and Tibet, who has crossed the Salwin a little below the 25th parallel, on the road from Talifu to Bamo; he maintains the Salwin to be too insignificant to have its sources far off in the heart of Tibet, and therefore that the Lu river must be the source of the Irawadi.

This induced me to inquire of the Abbé Desgodins whether he had any positive information regarding the course of the Lu below Bonga. He replied that the lowest point on the river which had been reached by any of the French missionaries was the village of Chamoutong, some 30 miles below Bonga, about latitude  $27^{\circ} 45'$ , which had been visited by Father Dubernard; that beyond this, to the south, lay a region occupied by barbarous Lu-tse and Ly-su tribes which none of the missionaries had entered; but that he had met several Chinamen, natives of the town of Young-chang, which is situated at no great distance (20 miles) from the Salwin river, between it and the Lan-tsan or Mekong, in lat.  $25^{\circ}$ , where the Salwin is generally known as the Lu; that these Chinamen were in the habit of trading with the Ly-su and Lu-tse tribes to the north, and had made their way up to Bonga, and that they had never told him that the Lu river near Young-chang was not the same river as the Lu near Bonga. How, he asks, are we to account for two rivers so near each other having the same name? and he urges that though there are many instances of a river having different names in different parts of its course, he knew of none of two distinct rivers so near each other having the same name. He admits, however, that he has no positive information on the question of identity. Then he makes an interesting suggestion; he says he has crossed both the Lu and the Lan-tsang rivers repeatedly between the parallels of  $28^{\circ}$  and  $29^{\circ}$ , and that the Lu is there sensibly the larger river; but Gill and Loczy had crossed the Salwin and the Lan-tsang three degrees lower down on the road between Talifu and Bamo; if then it can

\* This map was published at the time by the Asiatic Society, and has been reproduced in 'Le Thibet d'après la correspondance des Missionnaires, par C. H. Desgodins,' 2nd ed. Paris.

be proved that at their points of crossing the Salwin is the smaller river of the two, he thinks there would be a great probability that the Lu turns into the Irawadi below Bonga.

The name obviously explains the identity which geographers have hitherto assumed, but of itself it is an insufficient proof, and I know of no other. We are told by Pandit Krishna that the Lu of Bonga is known by Tibetans as the Giama-Nu, or simply the Nu (which the Chinese have turned into Lu) for a considerable distance in its upper course through Tibet; thus it cannot acquire its name from the country of the Lu tribe which lies below Bonga in the southern scarp of the Tibetan plateau; but a river rising in that country and flowing into the Salwin might very probably do so. It is to be remembered also that the characters used by the Chinese in writing, however well adapted for the expression of ideas, are ill-adapted for the phonetic expression of words,\* and thus identity of name does not always establish identity of the things named. Moreover, Chinese geography has no uniform system of terminology, and it presents at least three instances of two rivers, no further apart than these, having a common name; the Lo, the Shu, and the Whai.

As regards the relative magnitudes of the Mekong and Salwin rivers on the line of the road from Talifu to Bamo, Gill has given us nothing on the subject; Baber says the Salwin is "beyond question the largest";† Sherard Osborne says the Mekong is "decidedly the most important."‡ Colquhoun is silent, but in his book 'Across Chryse' he gives pictures of the bridges at each crossing from his own photographs, and of these I have had the enlargements made which are suspended on the wall behind me for your inspection. You will notice that the Salwin is crossed by a suspension bridge in two spans, and the Mekong in one span; each span of the Salwin is nearly equal in length to that of the Mekong, and thus at first sight the Salwin has the appearance of being decidedly the greater river; but Herr Loczy maintains it to be much the shallower river of the two and to have a much smaller volume. He says:—

"The Lau-tsan [Mekong] was found to be deeply cut into the rock at the point where it was crossed by the bridge, a little below a narrow portal-like opening between steeply inclined limestone banks several hundred feet in height—Gill says 1300, I would say only 600–700—through which the river emerges; its surroundings

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\* For example, I am informed by the Abbé Desgodins that he believes the name Lu, or Lu-tse, of the little tribe to the south of Bonga to be "a Chinese corruption of the native name 'A-Nong'; as the Chinese language does not contain this syllable Nong, and has no characters to express it, they must have said Lu instead," a statement which can scarcely be considered lucid and identificatory.

† In his "Notes on Route of Mr. Grosvenor's Mission through Western Yunnan," p. 178 of 'Supplementary Papers R.G.S.,' vol. i. part 1.

‡ See p. 217 of our 'Proceedings,' vol. iv., Session 1859–60.



were very similar to those of the Kin-sha-kiang near Batang, both rivers being deeply eroded and well developed, with deep water, smooth surface, and constant fall, and the sources of both were apparently far distant. The bridge was a suspension bridge with an extreme length of 120 paces, corresponding to the actual breadth of the channel; the river, though only at low water, occupied the entire breadth of the channel; the high-water mark was 18 feet above the actual level.

"The Lu-kiang [Salwin] flowed in an open valley between two terraces 200 to 300 feet in height, the nearest hills being two miles distant. It was crossed by a fine suspension bridge about 200 paces in length, with a centre pier resting on a great rock which rose from an island in the middle. The river was not actually more than 80 paces broad, and was flowing wholly in the eastern channel; a bed of dry shingle and boulders was left exposed in the western channel. It was very rapid and with a broken surface indicating shallowness. The actual level was very little below the high-water mark. The course of the river between its banks was winding and irregular, the surface uneven, and the fall uneven. The bottom of the valley is composed of tertiary lake deposits. The large boulders, and the velocity and general shallowness of the water, indicated that the source of the river was probably at no very great distance."

This opinion of a professional geologist is obviously of great weight; I think it fatal to the hypothesis that the Lu river which has a course of upwards of 700 miles in Tibet, and is known to be a considerable river above Bonga, can ever become so restricted in volume as is the Salwin 200 miles lower down. (*See Note 4.*)

I will not discuss the question whether the magnitude of the Irawadi is not of itself sufficient to prove that the river must receive a considerable body of water from Tibet in addition to what it receives in Burma, as has been so strongly and repeatedly urged by Mr. Robert Gordon. Excellent authorities hold that the rainfall in Upper Burma is enormous and sufficient to account for the entire volume of the Irawadi; and this view was put forward by Colonel Yule and supported by General Strachey quite recently, on the occasion when Major Macgregor read the interesting paper to which I have already alluded. But I submit that we are not yet in possession of sufficient information regarding the actual rainfall and the relations between the amount which sinks into the ground and which passes into the river, to come to any positive conclusions on this point. I remember that Mr. Gordon has urged that the Brahmaputra needs no affluent from Tibet because of the enormous rainfall in its Assam basin; yet we now know with certainty that it receives the Yaro-tsanpo from Tibet. If any weight whatever is to be attached to his laborious investigations of the volume of the Irawadi, as showing the necessity for the river to have a Tibetan origin, that weight must now be transferred from the Yaro-tsanpo to the Lu.

There is a remarkable consensus of opinion among both Chinese and Tibetans that one or more rivers rising in Tibet flow into the Irawadi. Their notions regarding the hydrography of Tibet to the north of Burma

are curiously confused, but I think this is probably due to the circumstance that the principal lines of communication in this region run east and west, that being the general direction of the roads between Peking and Lhasa, while, on the other hand, the general direction of all the rivers but the Lohit Brahmaputra is from north to south; thus, as a rule, the roads strike across the rivers, and do not pass along them, and consequently the identification of the upper and lower courses of a river is probably often a matter of mere conjecture. Thus erroneous information has been promulgated which has had its influence, even on the latest European geographers. For example, Captain Kreitner, the geographer attached to Count Szechenyi's expedition, published a map,\* in 1881, in which he shows two rivers flowing through Tibet to the west of the Lu, one of which he calls the Djama-nu-dschu—obviously the same name as the Pandit's Giama-Nu-chu—and runs into Wilcox's eastern Irawadi, the other he runs into Wilcox's Irawadi proper on the west. The Abbé Desgodins, in the map which I have already mentioned, shows a single river, rising not so far north as either of Kreitner's, which passes a town called Song-nga-kieu-dzong, and then flows through the eastern Himalayas into a branch of the Irawadi. (*See Note 5.*) Mr. Lepper in his map of the Singpho-Kamti country, published in 1882 by the Asiatic Society of Bengal, shows the same river, and runs it into an eastern source of the Irawadi which is called the Phongmai-kha by some people, the Shumai by others, and southwards is known as the Meh-kha, which joins the Mali-kha above Bamo; this eastern branch M. Lepper calls the Irawadi proper. (*See Note 6.*) But these three maps were constructed before the Pandit's explorations were published, and we now know with certainty that no Tibetan river west of the Lu can possibly enter the Irawadi.

Dr. Griffith and Dr. Anderson have both concluded, from information which they personally obtained when travelling on the Irawadi above Bamo, that the eastern source of the river is the most considerable, and that it rises in the northern plateau above Burma; Wilcox in one of his maps actually shows it as possibly doing so; and the gallant Frenchman, Lieut. Garnier, whose promising career was so sadly extinguished in Tonquin, where he fell fighting singly against fearful odds, arrived at the same conclusion, from information obtained in the course of his travels in Western Yunnan and the Shan States.

I have now placed before you all the information I have collected on this interesting question. Of course, the chief argument in favour of the identity of the Lu above Bonga with the Salwin-Lu is the identity of name, and this is a strong argument, but it is not sufficient of itself to establish the oneness of the two rivers. Hitherto a strong argument has been the Abbé Desgodins's belief in their identity, he having resided

\* 'Karte von China und Ost-Tibet mit besonderer Berücksichtigung der Graf Szechenyi'schen Route in den Jahren 1878-80.'

so long at Bonga; but this cannot be longer urged now he has frankly admitted that he has no positive information regarding the course of the river for more than a few miles below Bonga; I rather think that he has still a warm corner in his heart for the Salwin theory, but so he once had for the belief that the Yaro-tsanpo is the source of the Irawadi, which he has long since abandoned.

But there is no such certainty regarding the lower course of the Lu as we have of the Yaro-tsanpo; for though a length of fully 100 miles of the lower course of the latter river remains unsurveyed, the limits of its basin are known with precision, but a greater length of the Lu is unsurveyed, and nothing is known of the limiting basin.

Happily, the exploration of this region would probably prove much more practicable for Europeans than that of the Yaro-tsanpo; for the Ly-su and Lu-tse tribes who inhabit it, though they are said to be fierce and barbarous, allow foreigners to travel through their country, and this the tribes inhabiting the other region will not do. Thus an important geographical problem is definitely presented for investigation, the solution of which should be well within the bounds of the practicable for some of our countrymen in Upper Burma. Therefore, as our President, Lord Aberdare, hoped in the matter of the Yaro-tsanpo, I now hope that some gifted traveller may before long be animated by a desire to solve the problem, by actual travel up the Lu; and that, as in the case of the Lohit Brahmaputra, the scientific world had not to wait long between the propounding of the problem by Lord Aberdare, and its solution by Mr. Needham, so now they may not have to wait long for the unravelment of the problem of the Lu which I have endeavoured to set before you this evening.

#### NOTES.

1. *The Lamas' Survey of Tibet*.—Geographers have long been in possession of maps of Tibet from surveys executed early in the eighteenth century by Lamas, under instructions from the Jesuit Fathers who were then making a survey of China for the Emperor Kanghi. The Lamas' Survey is said to have been accomplished in two years, and as the area covered exceeds half a million square miles, the result can only be rude and approximate, and must have been derived to a greater extent from hearsay than from actual survey. The distances along the main roads were probably measured with chains or ropes, but it is doubtful whether the directions were determined by magnetic bearings, and probable that they were merely estimated by the eye, aided by reference to the positions of the sun and stars, for the longitudes are much more accurate than the latitudes; thus there is much less error in longitude between Darchendo (Ta-t sien-lu) and Lhasa, distant 650 miles, and between Lhasa and Leh, in Ladak, distant 825 miles, than there is in latitude between Darchendo and Batang, which are only 160 miles apart. This is singularly in contrast with geographical mapping in general, latitudes being as a rule determined much more accurately than longitudes; and it is probably due to the fact that the general direction of the principal roads is east and west, and that the distances were measured instrumentally while the bearings were only estimated. The Survey is

supposed to have been based on astronomical determinations of position; but this is scarcely possible, for the latitudes of such important places as Lhasa and Batang are very erroneous, the first by 30, the second by 70 miles.

The geographical details—as published in D'Anville's Atlas, 1737—are very meagre, and occasionally very misleading; but they would seem to be generally reliable along the principal lines of communication, and they have been corroborated at several points by the work of the trained Pandits of the Indian Survey.

2. *Memorandum on the countries between Tibet, Yunnan, and Burma, by Monseigneur Thomine des Mazures, Vicar Apostolic of Tibet.*—This memorandum was communicated in a letter written by the Vicar Apostolic, when residing at Bonga, to Bishop Bigandet of Rangoon, which is published in the 'Journal of the Asiatic Society of Bengal,' for 1861. The writer mentions a range of hills 30 miles to the west of the Lu, to the west of which he says there is a rather inconsiderable river called the "Kouts Kiang, or Schété Kiang," which enters the province of Yunnan under the name of "Lountchang-kiang," and joins the Irawadi below Bamo; beyond it there are several ranges of mountains, of which the general direction is from north to south, and then a considerable river "named in the maps Gakbo Dzanbo" and "called by the Chinese Kanpoo tsangbo" which flows into the Irawadi, and in the district of which, "according to the Tibetans, is the village of Samé, where our two priests MM. Krick and Boury were murdered." Thus as we know that village to be on the banks of the Lohit Brahmputra, we might infer that the Lohit is the same as the Kanpoo, and Colonel Yule has drawn this inference.\* But there is only one range of hills between the Lu and the Lohit on the main road from the east into the valley of the Lohit; there are several meridional ranges west of the Lu opposite Bonga, but they are all spurs from the Namkiu-Kampti range to the south of the Zayul basin; and the Kanpoo is certainly a river of the eastern basin of the Yaro-tsanpo. (See Note 7.) Kouts, Schété, Loung-tchang (Young-chang?) appear to be Chinese names for one or more of the several rivers rising in the Namkiu-Kampti range, which we know to be sources of the Irawadi.

The worthy Bishop's geography has evidently been confused by errors in the map of Andriveau Goujon, Paris 1841, to which he refers, and by his Chinese and Tibetan informants wrongly combining different rivers, as has been humorously suggested by Colonel Yule.

3. *Needham's corroboration of Wilcox and the Pandit.*—Needham was not in a position to make a regular route survey, but he estimated his marches carefully, and took bearings with a magnetic compass for some distance, but unfortunately the needle of this instrument fell out and was lost as he was entering the as yet unsurveyed, and therefore most important, portion of the route; he also took frequent readings with an aneroid barometer.† He makes the distance from Sadiya to Rima 187 miles, the corresponding measure on the map which has been constructed to illustrate the Pandit's travels, being 120 miles. But the greater portion of the route was surveyed by Wilcox; and his positions of peaks to the north of his easternmost point agree so closely with those of prominent peaks fixed half a century afterwards by the Great Trigonometrical Survey, that his rendering of what he actually saw, and did not merely obtain from native information, may be accepted

\* In his Geographical Introduction to Gill's 'River of Golden Sand,' condensed by E. C. Baber, p. [76].

† This instrument appears to have had a large index error, giving readings about 1000 feet in defect; thus, its height of Tamemukh, 46 miles above Sadiya, on the Lohit, is only 450 feet, which is the height of Sadiya; and its Rima is about 3600 feet, the Pandit's value, deduced from the boiling point, being 4650 feet.

without hesitation. This then fixes the Lohit up to the point where he saw the Gulma and La Thi rivers enter it, near each other, on the south or left bank. From thence to Rima is about 47 miles by Needham, which is 12 miles more than by the map of the Pandit's travels, and 23 more than was estimated by Wilcox.

4. *The sources of the Lu river.*—The general course of this river from its sources down to Bonga, has not yet been surveyed. Pandit Krishna crossed the river and fixed it on the line of the road between Batang and Zayul, in the 28th parallel. He says that the Tibetans call it the Giama-Nu-chu, and that he frequently heard of it as lying to the east of his route from the Zayul valley northwards to Lhojong, in lat.  $30^{\circ} 45'$ ; also that it is crossed by a bridge at the village of Shang-ye-Jam (left bank) on the road from Lhojong to Chiamdo; and that when he turned westwards towards Lhasa, he was told that the river was still parallel to his route.

In Vol. XIV. of the great French collection of 'Mémoires concernant l'histoire, les sciences . . . des Chinois,' the river is said to have the Mongolian name Hala-ou-sau (lit. Black water) and the Tibetan name Nga-eulh-y-tchou; to rise to the north of Lhasa, beyond the Terkiri Lake (the Tengri Nur) in the Pouka lake, whence it winds through the Nga-eulh-ki-keu and the Ha-la-tche lakes, and then flows north-east to So-ko-toung (lit. the town of Sok); then turning southwards, it passes to the east of Lo-loung (Lho-jong) and enters the lands of Mi-la-loung, whence it passes to Nou-y and takes the name of Nou-kiang.

The Lamas' map shows the river as rising in hills near the Hara lake, to the north of Lhasa, and flowing due east until joined by a river coming from the north, past the town of Souc (Sok); the united stream then flows southwards, and is crossed by a bridge at Sapia, on the line of the road between Lourondson (Lho-jong) and Chamtu (Chiamdo), and lower down is called the Nou-kiang.

Huc, in travelling from Lho-jong to Chiamdo, reached the village of Kia-yu-kiao, on the right bank of the "Souk-tchou, *qui coule entre deux montagnes et dont les eaux sont larges, profondes et rapides*"; he found the villagers in great tribulation because a fine wooden bridge across the river had just been carried away by a flood; he was consequently obliged to cross on a raft.

The Abbé Desgodins travelled from Batang via Kiangka (Chinese) or Gartok (Tibetan) up the valley of the Lan-tsan to Chiamdo (his Tchamouto), and was endeavouring to proceed to Lhasa by the road via Lho-jong, when he was stopped on the plateau at the head of the Ou river (his Ou-Kio), which lies between the Lu and the Lan-tsan. He says of this road that it crosses the Lu by a wooden bridge on stone piers, at a place called Kia-yu-kiao by the Chinese and Jelyè-Sam by the Tibetans.\* He travelled along the Ou from its sources down to the town of Tehraya (the Pandit's Dayul) and on to its junction with the Lu opposite Menkon, in lat.  $28^{\circ} 34'$ , confirming the Pandit's rendering of the Lu, but correcting his map, which shows a river flowing from Dayal into the Lan-tsan, though only by dotted lines, implying uncertainty.

The Pandit, in travelling northwards from Lhasa, entered a district to the east of the lake region which was called the Nag-chu-kha (lit. Black water district), where he crossed a succession of streams flowing eastwards, and coming from the northern spurs of the Niuchentangla range and the lake region; in his map these streams are represented as combining into a single river, the Nag-chu, and then flowing eastwards in a direct line to Chiamdo, and then turning southwards and becoming the Lan-tsan; but the whole of this system of hydrography is purely conjectural,

\* These are probably the names of two places on opposite banks of the river, the first on the right bank, as we know from Huc, and the second, the Pandit's Shang-ye-Jam, on the left bank.

as is indicated by the dotted lines of the map. The delineation is obviously improbable, and it appears to have been adopted merely because the only information the Pandit obtained on the spot regarding the Nag-chu was that "it was believed to run into China."

It is in this region that the work of the Pandit from the south meets that of Prejevalsky from the north; the eminent Russian traveller descended to a little below the Dangla range into the basin of a river which he calls the Nap-chu or Khara-nssu (Black Water), and in his map he shows the river as probably rising in lakes to the west and flowing eastwards.

There is much reason to accept the concurrent evidence regarding the course of this river, within Tibet, which is furnished by the Lamas' map and the 'Mémoires concernant les Chinois.' The sources are obviously identical with the Pandit's Nag-chu and Prejevalsky's Nap-chu; the further course, first towards Sok and then to the bridge on the road from Lho-jong to Chiamdo, is supported by Huc and Desgodins; and the course below that bridge, down to the parallel of 29°, is corroborated by Desgodins and the Pandit; the channel between 27½° and 29° is well known, from the journeys of the French missionaries at Bonga; it is only below 27½° that the river enters an unknown region, and becomes lost.

5. *The Sanga river the probable source of the Lohit Brahmaputra.*—A town called Sanga-chu-jong (lit. the town on the river Sanga) is situated to the north of the eastern Himalaya and west of the Lu. In the map of the Pandit's travels the Sanga river is shown in dotted lines as probably flowing eastwards into the Lu; in M. Charles Desgodins's 'Thibet' (p. 287, 2nd edition) it is said to join the Zayal river; in the maps of the Abbé Desgodins and Mr. Lepper it is shown as flowing southwards into an eastern branch of the Irawadi. The Abbé is now satisfied, after perusing the Pandit's report, that it cannot pass down into the Irawadi, but he still holds that its direction below the town to which its name is given, and which he writes Sang-nga-kieu-dzong, is south, not east. Thus it is probably the river which the Pandit came across at Dowa, where joined by the stream from the Tila pass, along which his route lay; he mentions it as "the Zayul-chu coming from the north"; he also says that "a route branches off [from Dowa] to Sanga-chu-jong, distant about 50 miles to the north." He crossed the river a few miles below Dowa, by a wooden bridge 80 paces in length, and found it "deep, and with a rapid current"; so considerable a river must have a more distant source than the one shown conjecturally in the Pandit's map, and is most probably the Sanga river, after its descent from the Tibetan plateau, "through the narrow cleft between two towering pinnacles" mentioned by the Abbé Krick in his vivid description of the Lohit Brahmaputra.

6. *The Irawadi proper.*—Of the two branches of this river, the Meh-kha and the Mali-kha, which come together in lat. 25° 50', above Bamo, it is a question which is the greatest. Either of the two may join the Lu in the unsurveyed region between the parallels of 26° and 27°. The western river, the Mali-kha, has been generally regarded hitherto as the principal stream, on the authority of Wilcox; but in Mr. Lepper's map the Meh-kha is called the "Irawadi proper." A native surveyor who was sent up the river from Bamo, by Captain Sandeman, in 1879,\* found it much swollen at Mainla (Maingna), 25 miles below the junction, in the middle of January; leaving the river and proceeding overland, in six days he struck the Meh-kha, the eastern branch, a few miles above the junction, and found it occupying only a portion of its bed; he crossed it in a boat, proceeded north-

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\* General Report on Operations of Survey of India, 1879-80, Appendix, p. 32.

wards for some distance, and, returning in the middle of February, found that the Meh-kha had fallen, whereas the combined river at Mainla was more flooded than when he last saw it. Captain Sandeman has therefore concluded that the Mali-kha is the greater river. But the flooding may have been due to local rainfall at the sources of the Mali-kha, which we know from Wilcox and Macgregor to be very heavy in the months of January and February. The native surveyor was informed that the Meh-kha becomes flooded in April; thus, as all the great rivers of India which rise in Tibet or in the Himalayan mountains begin to be flooded by the melting of the snows in April, the Meh-kha may very possibly be the Irawadi proper, and the continuation of the Lu.

7. *The Eastern Basin of the Yaro-tsanpo.*—When Pandit Krishna found himself unable to make his way to Assam through the Mishmi country, he turned northwards from Sama, and proceeded up the Rong Thod valley of Western Zayul to the Himalayan range, which he crossed at the Atagang pass; thence continuing northwards for about 150 miles, he passed through the districts of Nagong and Pashu to Lho-jong, and then, travelling westwards for about 200 miles, he passed through Pemba and Arig to Lharugo. Throughout this distance his course lay over highly elevated plateaus, nowhere below, and in parts much above, 11,000 feet, which constitute the eastern and northern borders of the eastern basin of the Yaro-tsanpo; the hill ranges which define the water-parting lay in some parts on his right hand, in others on his left. Leaving Lharugo he found the hill ranges trending south-west through Kongbo—in general parallelism with the Ninchen-tangla range, between Lhasa and the Tengri Nur—down to the channel of the great river, where they face spurs from the northern slope of the Himalayas, the two together forming the portals of the eastern basin. Down to this point the general course of the river for many hundred miles, from its sources in the Manasarwar lake region, is a little south of east; but now it trends northwards and flows due north-east—in general parallelism with the Kongbo hills and the Ninchen-tangla—for about 100 miles, when it turns abruptly to the south; its course has been explored to Gia-la-Sindong (8000 feet), about twenty miles below the bend, but no farther. Measurements of the discharges of the principal rivers entering Assam from the north, and other collateral information, conclusively identify it with the Dihong of Upper Assam, which has been explored upwards to a point about 100 miles below Gia-la-Sindong. Nothing is known definitely regarding the connecting channel, excepting that it must have a fall of about 7000 feet, or as much as the entire fall of the Yaro-tsanpo in a course of between 900 and 1000 miles through Tibet.

Very little is known of the interior of this eastern basin, for Pandit Krishna's route lay altogether outside it. But he fixed the sources of an important affluent called the Nagong-chu (lit. Black-water), which rises near the Atagang pass; it is shown in his map as having its sources near those of the Sanga-chu on the east, and the Rong Thod-chu on the south, and flowing westwards, and joining the Yaro-tsanpo or Dihong river. Needham's Mishmis told him that it "flows away west into the Abor country." Its existence appears to have been known to Wilcox, who was told by a Mishmi chief that the Dihong has two branches: "one from or passing Lhasa, and the other, the smaller of the two, rising near the heads of the [Lohit] Brahmaputra," adding that "the Lhasa people on their way to the Lama valley [Zayul] go up the lesser Dihong, and cross over the snowy mountains from its source to that of the Brahmaputra." This lesser Dihong was described by the Pasi Meyong Abors to Capt. Beresford in 1879 as "the Kala-pani (lit. Black-water), which falls into the Dihong some distance in the interior of the hills;" and they also mentioned a route into the Lama country by following up the Kala-pani and crossing the snowy ranges. Again, Lumling told Lieut. Rowlett in 1845 that from the west side of the same

mountain from which the Brahmaputra issues, likewise proceeds the Dihong."\* Thus we have a chain of concurrent testimony to the flow of the Nagong-chu into the Yaro-tsanpo, and to an important route from Lhasa to Zayul following the course of the Nagong. For the latter reason, it seems probable that the junction is "some distance in the interior," say a little below Gia-la-Sindong, rather than immediately above the point where the Dihong enters the plains of Assam, as shown in the Pandit's map.

Other important rivers must exist in this basin of the Yaro-tsanpo, flowing southwards from the northern scarp; and the Pandit's map shows one, the Daksong-chu, as rising in the Arig and Lharugo districts, and joining the great river a little above Gia-la-Sindong. The map of Pandit Nain Sing's last exploration shows this river very similarly. But to its east there is a great region which is a blank on both maps. We get some information about it, however, in the 'Mémoires concernant les Chinois' and the Lama's map. The former mentions a Kang-pou river rising in the Tchouo-la-ling mountains to the east, flowing southwards, entering the kingdom of Lo-ka-pou (the Abors), and joining the Yaro-tsanpo. The latter shows a Ken-pou river rising in the Tchamto mountains, to the south of a road passing westwards from Lourondson to Choupatou and Tardson; the two first places are obviously identical with Pandit Krishna's Lhojong and Shiobado, and the third probably with his Alado. This enables us to fix the sources of the Ken-pou with certainty, and to see that the river cannot pass near Sama, as supposed by the Bishop des Mazures (*see Note 2*). Further, the Lama's map shows a river flowing from the Amdso lake to the south-east, near the [Himalayan] water-parting, which may probably be the Pandit's Nagong-chu, and is represented as joining the Ken-pou near a town called Chourton; below this the Ken-pou is made to flow for some distance parallel to the great Tsanpo, and then both are stopped on entering *terra incognita*. Here the map says "*Un peu plus loin de ce cote sont les frontieres du Royaume d'Ava, nomme Ya-oua-Koue*;" and this has probably caused some geographers to conjecture that the rivers flow into Burma, and are sources of the Irawadi. The 'Mémoires' say that after passing into the kingdom of Lo-ka-pon-tchau [the country of the Abors], the great river turns to the south-west and enters the kingdom of Ngo-no-te [now a part of Eastern Bengal], whence it flows into the sea; and this shows that among Chinese geographers there were some, though possibly a minority, who had an accurate knowledge of the general course of the Yaro-tsanpo from its sources to the ocean.

After the paper,

Dr. J. ANDERSON said that his attention was originally directed to the subject of the sources of the Irawadi about seventeen years ago when he was travelling in Upper Burma with Sir E. Sladen on the first expedition to Western Yunnan. He was at that time very much struck with the size of the Irawadi, and bearing in mind the very limited geographical distribution assigned to it on the maps, he was led to make inquiries not only with regard to it, but also with regard to the Salwin, General Walker had stated that in the paper which he (Dr. Anderson) read in 1870, he said that the Irawadi was probably fed by waters descending through the Tibetan plateau and entering Burma by what was then known as the Eastern Branch, but the fact was that he was very careful to guard himself in expressing an opinion as to the branch from which the river got its waters. What he stated was that it was probable that some Tibetan river flowing down in the direction of the Irawadi might

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\* See paragraph 20 of letter dated 21st June, 1886, from the Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, Foreign Department.



be one of its upper sources, but others might be branches of the Yang-tse-kiang, and the Irawadi drained that part of the area between Lhasa and Batang, which had previously been apportioned to the Cambodia and the Salwin. In 1870, he regarded the upper portion of the Salwin as the source from which came the great body of water which found its way into the Irawadi, and in a map which he constructed he drew the Sope river as coming down from the South Tanga range. He was very much gratified to find that his view had received such ample verification from the facts which General Walker had brought before the meeting. There was one important fact which General Walker had stated with regard to the physical configuration of the area between the Zayul basin and the meridional ranges to the east. Only one range of mountains intervened between the Lu-kiang and the Lohit Brahmaputra. Of course, that was entirely based upon the survey of the Pundit which he supposed was approximately correct. There was, therefore, no possibility for another river to be introduced between the Lohit Brahmaputra and the Lu-kiang. When he was in Moulmein he made inquiries as to the dimensions of the Salwin, and he ascertained from the natives that the river at that point, as General Walker had stated on the authority of Loczy, the geologist, had not a large quantity of water, had not any eroding channel, and that it was a comparatively shallow river crossed by a ferry-boat and also by a bridge. The facts that he collected were verified by the observations of Loczy. He thought General Walker had made out a very fair case for what was called the upper waters of the Salwin not being the Salwin at all. In the map that he (Dr. Anderson) drew he cut off the Salwin about 150 miles north of Moulmein, showing that he believed the district above belonged to the Irawadi. The only way in which the question could be solved was by actual observation on the spot, and by tracing the Lu-kiang to its original source, but General Walker had made out a strong case as to the possibility of the Lu-kiang flowing down into the Irawadi. If the Lu-kiang was proved not to be connected with the Irawadi, then the immense rainfall at the northern portion of the Irawadi valley must be looked to as a source from which that river derived its great mass of water.

Colonel Sir E. B. SLADEN, having been called upon by the President to join in the discussion, said that he rose with great diffidence, as he was present at the meeting almost by accident and did not know until he entered the room the subject of the paper of the evening. Dr. Anderson had read a paper in that room some eighteen years ago on the sources of the Irawadi: he (Sir E. B. Sladen) was present on that occasion, and was called upon to say a few words. He then said, as he said now, that he knew nothing definitely about the sources of the Irawadi, though he was acquainted with certain peculiarities connected with the rise and fall of the waters of that river in its mid course. These peculiarities, however, were too remote to throw any light on the vexed question of the river's sources. He thought General Walker had added a valuable link to the speculative chain of criticism, which seemed to prove that the Irawadi had a Tibetan source, but he did not think the actual question would be satisfactorily solved, until an expedition had been sent for the purposes of special exploration and survey. There was one point upon which he might perhaps be regarded as an authority. Having lived for many years in Upper Burma, he thought he might say that the rainfall there, and in the parts contiguous to the north, could not alone account for the large volume of water which was carried away by the Irawadi.

Sir THOMAS WADE said that, without having, like the Abbé Desgodins, "a warm corner in his heart" for this theory or that, it did appear to him that the new conditions assigned by General Walker to the course of the Irawadi, would compel us to ignore the existence of the Lung-ch'uan and one or two important streams besides, which Chinese geographers laid down as rising in Tibet, and subsequently

entering China, and which, if they existed at all, could hardly fail to be feeders of the Ta Chin-sha Chiang (Ta Kin-sha Kiang), the Great Gold Sand River, otherwise the Irawadi. The course of the Lu Kiang, or, as it is called before it crosses the border of Yün-nan, the Nu Kiang, is traced with apparent completeness from its rise in Koko Nor, as the Sok, past Shobando in Tibet, which country it traverses under various names until it leaves it as the Nu Kiang. Then, crossing the border land of the Nu savages, it enters Yün-nan as the Lu Kiang, and its course through the three prefectural jurisdictions of Li-kiang Fu, Ta-li Fu, and Yung-ch'ang Fu is described in the great geography of Yün-nan with remarkable minuteness, until on reaching the southern frontier of Yung-ch'ang Fu, it proceeds through the country beyond as the Cha-li or Tsa-li, and becomes known to foreign geographers as the Salwin. He did not wish to be understood to protest against General Walker's theory as unsustainable but simply to deprecate its immediate adoption.

Mr. CHAS. H. LEPPER said his excuse for venturing, as an amateur, to criticise the theories of one who has so recently held General Walker's eminent and professional position was this. Ever since 1878 he had taken a deep interest in matters connected with this frontier of India. In the cold weather of 1881-2, when at Sadiya, preparing to start on one of his little trips across the frontier in search of information, he heard that the Abbé Desgodins was on his way up the Brahmaputra also in quest of information. The Abbé Desgodins had lived for over a quarter of a century on the Tibeto-Chinese frontier, at places not much more than 200 miles from our extreme frontier, and yet that 200 miles is still such an obstacle, thanks to our Government, that he had had to travel thousands of miles, right across China, down its coast, round by the Straits, across the Bay of Bengal, and up the Brahmaputra, to reach the British frontier, at a point about 200 miles from the point he had lived at in China. His visit was a chance of acquiring information he (Mr. Lepper) could not miss. Telegraphing to his friends in Darjiling, the reply brought the welcome news that he would reach Sadiya in about three days. On his arrival he readily accepted his (Mr. Lepper's) invitation to accompany him for a portion of his trip, and an extremely pleasant fortnight was spent together in the dug-out canoe which served both for conveyance and for sleeping apartment. Much of what the Abbé Desgodins told him about Tibet has since appeared in the *Nineteenth Century Review*. They had with them works of reference to which they constantly referred, both as a check and as a guide; and whatever was written in English, he having dictated in French, was read over to him for correction. The notes so taken down can therefore be trusted, either as affording the Abbé's opinion at that time, or, as stating in other instances the conclusion come to after discussion and consultation of references. It is true that all this happened before A—k's return from his splendid journey, but he should advance nothing here which can clash with that authority.

The first comment in analysing General Walker's speculations—that expression was applied with all respect—was this. It appears that the lecturer has not taken quite as much note of the monsoon influence as is necessary in drawing conclusions as to the length of rivers by comparing their *volume*. He lays great stress upon these comparisons of volume, and argues that because one stream may contain less water than another at about the same latitude, therefore the former cannot have a much longer channel than the latter. This, he (Mr. Lepper) feared, is hardly an axiom. On the other hand, the consequence of a river being within the monsoon influence is a very good reason why its volume should be greatly in excess of that of even a much longer river whose course lies outside of the region of monsoon influence. Coupled with this omission there is another: the area of the watershed along the course of the rivers referred to—speaking now of the Irawadi, the Salwin,

and the Mékong in their upper waters—is never alluded to, yet this the lecturer, he was sure, would allow to be an important factor in the speculation. With reference to the region over which the monsoon is felt, the following items occur among the notes received from the Abbé Desgodins. “The limit of the region affected by the rains of the Bay of Bengal is about half-way between Tseku and A Tun-Tzû, near the 28° of latitude. Yerkalu is outside the area, and irrigation there is necessary. The further south towards Yunnan, and the nearer the Irawadi the greater the influence. Menkon is outside the area, *as is also the Lu Tse territory.*” We all know that both of the Irawadi branches are well within the area of monsoon influence. Now the Irawadi’s western branch is stated by all our authorities as under 90 yards in width, and Major Macgregor makes it “in no place over five feet deep.” Wilcox states that he was “surprised to find but a small river not more than 80 yards broad, and still fordable, though considerably swollen by the snows.” These are details which guide us in estimating the size of the eastern branch, which he (Mr. Lepper) ventured in 1882 to call the Irawadi Proper, and which may still prove to be so, though, in having to agree with General Walker in turning the Song Nga Kiu of Tibet into the Brahmaputra, one of his (Mr. Lepper’s) chief reasons for giving the eastern branch of the Irawadi the title of “Irawadi Proper” has been cancelled. Wilcox told us that among the objections to assigning the eastern branch a very distant source was its want of magnitude, for it is *not described as larger* than the Kampti branch. Major Macgregor reports that the Kamptis all seemed to agree that the Phungmai (the eastern branch) was about the same size as the western branch. Mr. Lepper’s own notes acquired from natives who had seen both, are to the effect that the eastern branch is a little bigger than the western, and hence it is called, among its numerous aliases, Nam Kiu *Lung* or big Nam Kiu, in distinction to the western branch or Nam Kiu. These details are very important, as going to show that the two branches are much the same size, at a point where neither have commenced to receive many tributaries. If they are so nearly the same size, how is it, if, as the lecturer advances, the Lu, which is already a big stream in Tibet, and has a course of 700 miles in Tibet before emerging from the Himalayas, how is it that the branch receiving all this drainage is not immensely bigger than the other—or western branch—which is not so favoured? and which cannot be so favoured, unless it has a subterranean course under the Lohit.

Taking up next the case of the Salwin as compared with the Mékong :—The Abbé Desgodins has crossed the two repeatedly—for he (Mr. Lepper) hoped to show good circumstantial evidence for still considering the Lu and the Salwin the same river—and he found between the parallels of 28° and 29° that the Lu—or Salwin—is there sensibly the larger river. That is a much more important fact than that Gill and Loczy found the case reversed 180 miles lower down, after (as in the case of the Salwin) one had been running in a necessarily very narrow defile between two high ranges for by far the greater portion of its course, and *outside* the monsoon area, whereas the other had enjoyed a much greater (i.e. wider) watershed after reaching the monsoon region, and had therefore most probably received several tributaries. If Herr Loczy found the Salwin to be only 80 paces broad, and shallow, and if that is to be used as an argument against the Salwin being the Lu, on account of the latter’s 700 miles in Tibet, then that argument tells equally well against the Lu being the eastern branch of the Irawadi, which, by all accounts, is about the same size, or not much over 80 yards in width, and shallow too.

Next as to the identity of name. General Walker lays it down that the Lu *cannot* acquire its name from the country of the Lu tribe, which lies *due south* of Bonga, and not south-west as shown on General Walker’s map. General Walker’s experience of Chinese etymological idiosyncrasies, he ventured to think, is limited.

General Walker evidently abstains from using as an argument the Chinese trait of doing things, according to our notions, backwards. He (Mr. Lepper) had had several years among the Chinese, and he thought that they are quite capable of having named this river backwards, so to speak. For these reasons: the Salwin is not only called the Lu, but also the Lu-Tse-Kiang, by the Chinese, as stated on the Abbé's map. The Chinese traders ascending it so called it from the territory of the Lu-Tses from whence it descended into that no man's land to the north of Upper Burma. Having begun by calling it the Lu-Tse-Kiang, the Chinese on reaching Tibet and finding it called Nu, or, as it should be written, Ngeu, would be the very last people to change their Lu into Ngeu. The Chinese play all kinds of havoc with Tibetan names, often approximating the Tibetan name to Chinese sounds, conveying a meaning to Chinese ears, quite irrespective of the original Tibetan meaning. They frequently do not even attempt to approach the sound of the Tibetan names; as a case in point, the Mékong is called the Lan-tzang-Kiang (pure river of the south) in Chinese, whereas the Tibetans call it Da-Kiu, and sometimes La-Kiu. There are many Tibetan sounds which the Chinese cannot pronounce, and possibly Ngeu is one of these, and they may have had an additional inducement to adhere to their name Lu, inasmuch as by so doing they would be following that which Chinese are so tenacious of, their dearly loved "old custom." Sometimes the Chinese try to hit the sound as nearly as they can, and thus Gungra in Tibetan becomes Khong-la in Chinese, which has no meaning, but is their best approach to Gungra. They have no syllable for "Gung," and cannot pronounce *r*. As General Walker (according to a footnote) thinks that an explanation given him by the Abbé (that "Lu" may be the nearest approach the Chinese can make to "A-nong," the Chinese language not containing the syllable "Nong") can scarcely be considered lucid and satisfactory, he (Mr. Lepper) could give him several others, such as the case of the town Do (sometimes Ta-tsey-do, i.e. the junction of the Ta and the Tsey rivers) in Tibetan, which becomes Tatsien-lu in Chinese (the place where arrows are forged!).

On one speculation he completely accepted General Walker's view—that of the Song-nga-kiu being one of the sources of the Brahmaputra. It would take too long to repeat from his paper in the 'Proceedings' of the Asiatic Society of Bengal his former reasons for drawing that stream as a part of the Irawadi, but he must ask General Walker to notice that there is a trifling error in saying that the Abbé's map published by the Asiatic Society of Bengal is reproduced in the 2nd edition of 'Le Tibet.' In the former the Song-nga-kiu did not flow into the Irawadi, but, by dotted lines, into the Brahmaputra. The new map in the 2nd edition of 'Le Tibet' agrees with his (Mr. Lepper's) in making the Song-nga-kiu fall into the Irawadi. Both agreed to make this alteration, as they thought they had collected sufficient evidence of a kind to justify the change, as nobody at that time knew what A—k has since brought to light, viz. that the Lohit (i.e. the Brahmaputra) intervened. Hence they "corrected" what, as it happened, was correct into an error, not an uncommon event in speculative geography.

He would now ask General Walker what we are to do on our maps with that river up which those Chinese traders met by the Abbé have ascended, and which they have called Lu or Lu-tse-Kiang, and which they have told him—this he (Mr. Lepper) took from his notes—passes for four days' march through the territory of the Lu-tses? In asking this question he must point out that *Chinese traders do not visit Bor Kampti, a tract through which both branches of the Irawadi flow.*

In conclusion: the Irawadi, although in full position for receiving monsoon rains, and although it has a comparatively wide watershed, is only about 80 yards wide, and shallow; is it not much more probable then that *it* should have a shorter course than a river confined in a gorge between two mountain ranges, shut out from the

monsoon and from tributaries, and which river is also 80 yards wide? Is not the latter's only chance of attaining a volume equal to that of the Irawadi dependent upon its longer course?

Though he had made use of the identity of name in his argument, he trusted he had made clear that "the *chief* argument in favour of the identity of the Lu above Bonga with the Salwin" is not, after all, this identity of name. And as regards the "still warm corner in the heart" of the Abbé Desgodins, which the lecturer appears to think is all that the Abbé has left for the Salwin theory, all he could say is that, notwithstanding that the Abbé had commissioned him (Mr. Lepper) to edit and to translate 'Le Thibet,' and notwithstanding that he had had two letters from him within the past month—one by last mail—he makes no reference whatever in either of these to any desire on his part to make any alterations in the text of 'Le Thibet,' as he would have done, he thought, had he been converted to the lecturer's views. (*Vide* page 293, 2nd ed. 'Le Thibet.')

He thanked General Walker for his kind permission to make these remarks, and he was sure they would be accepted in the spirit in which they were offered.

General WALKER said that Mr. Lepper had given the results of conversations he had had with the Abbé Desgodins some years ago, before the travels of the Pundit had been published, but he (General Walker) had heard from the Abbé during the last few weeks. If the Abbé had said that the Chinese traders from the south had travelled up the Lu river, that would have settled the matter, but what he actually said was that they had not told him that they had not done so. The fact was that the French maps in the Abbe's possession had biassed him to believe that the Lu-kiang was the upper source of the Salwin. When he constructed his own map he was so certain about it that he wrote the name "Salwin" on the course of the river high up in Tibet. Now, however, that he had got further information, he admitted that there was much reason to question the accuracy of his early impressions; from the Chinese traders he obtained no information whatever regarding the river; indeed they never told him that they had travelled up any river at all.

The CHAIRMAN (General R. Strachey) said the discussion had been very interesting, but after all it was only speculative geography. The subject was one in which he personally felt considerable interest, having for many years past thought a good deal about Tibet. His own disposition at the present time, with such information as was available, was to side with General Walker. The three great rivers which flowed from Tibet, the Kin-sha-Kiang, the Lan-tsan-kiang, and the Lu-kiang, were crossed in their upper parts by the Pandit Krishna. He crossed the first at an elevation of 7700 feet, and described it as 300 yards wide. The next he stated was crossed by two bridges at an elevation of 9450 feet, and the Lu was said to be 200 yards wide at an elevation of 7100 feet. As to the Kin-sha-Kiang there was no possible doubt. Where Gill crossed the Kin-sha-Kiang on his journey from Batang to Talifu and Bhamo he made it 200 yards wide. Then he crossed the Lan-tsan-kiang below Talifu, where it was only 50 yards wide, at an elevation of 4000 feet. Next he crossed the river which is certainly the Salwin, to which he also gives the name of Lu-kiang, by a suspension bridge, the stream being about 70 yards wide, at an elevation of 2600 feet. The middle river of the three, where crossed by the Pundit, seems to have been the smallest, and considering what the Salwin afterwards became it was rather curious that the third of those rivers should convert itself into the Salwin, while the second became a far larger river, the Mekong. The monsoon reached to the extreme northern part of Burma, and made it very difficult to form any clear opinion as to the source from which the rivers that traverse the country are fed, based on their apparent size. It seemed to him that as the Lu was relatively so deep in the upper part of its course, the

probability was that it had its outfall at a lower level than the others, and that there was a greater chance of the waters of the Lu-chu discharging into the Irawadi than into the Salwin. It was, moreover, extremely improbable that a river should have such a course as was marked out for the Salwin, coming down from latitude  $30^{\circ}$  to  $25^{\circ}$  almost without any affluent at all, and confined strictly between two mountain ranges.

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### GEOGRAPHICAL NOTES.

**Mr. Carey's Route in Central Asia.**—In the R.G.S. 'Proceedings' for January 1887, a brief note will be found tracing the explorations of Mr. A. D. Carey up to the village of Cháklik, near Lake Lob, where he spent the latter part of the winter of 1885–86. Information has now been received from Mr. Carey, dated from Leh in Ladak (to which place he returned near the end of April last), showing how the second year of his adventurous wanderings has been passed. About the 1st May, 1886, a start was made from Cháklik, with the object of exploring some of the northern regions of Tibet, during the few months of summer that enable such elevated and inhospitable regions to be visited. Mr. Carey passed south across the Altyn and Chiman mountains, and reached the foot of a high chain, which is probably the true Kuen Lun. Here his guides failed to find a pass by which it was possible to cross so early in the year, and he had to travel a considerable distance eastward, through barren and difficult country, until, at length, an opening was found leading to the valley of the Ma Chu—the head source of the Yang-tse Kiang. The Ma Chu seems to have been followed down until the main track between Lassa and Koko-nor was struck, when want of fodder and supplies obliged the party to turn northward again, and recross the Kuen Lun by passes which General Prejevalsky and the Pundit A—k have already described. Mr. Carey now found himself in the Tsaidam region, and made an interesting round journey from a place called Golmo (where his caravan was, in the meantime, left to recruit), and back to the same point. During this excursion a good deal was seen of the nomadic Kalmuks and Mongols who inhabit the comparatively low-lying valleys of Tsaidam. They seem to have been peacefully inclined, but not over hospitable, and frequently refused to part with either food or grain in exchange for money. Eventually, in the autumn, the explorer made a second journey over the Kuen Lun, and then again turning northward, struck straight across the Tsaidam country and the Gobi, to SÁCHAU and HAMI, whence he travelled to Urumtsi, in the Tien Shan, now the capital of Chinese Turkistan. Here the party was well received by the Chinese governor and despatched to Yarkand, where it arrived early in the present year, and whence a start was made on the 7th March for Ladak. From the few particulars contained in Mr. Carey's letter from Ladak, it would seem that the obstacles he had

to contend with in exploring northern Tibet were snow, want of fodder, and mutinous pony drivers. From Cháklik to the point where the Lhasa track was struck, in July, occupied eighty-three days, and during this time no human being was met with. A great part of the ground traversed appears to be new to geographers, both on this section of the journey and in Tsaidam; while some parts of the homeward route to Yarkand are also, to all intents and purposes, new. In any case, Mr. Carey and his assistant Mr. Dalgleish are the only Englishmen who have ever travelled through the entire length and breadth of Chinese, or Eastern, Turkistan.

**Explorations in the Island of Hainan.**—Mr. B. C. Henry, the author of 'Ling-Nam, or Interior Views of Southern China,' informs us that last year he made a second visit to the Island of Hainan, and made still more extensive journeys than before recorded among the aborigines of the interior mountain region, reaching the geographical centre of the Lee territory, and demonstrating the fact that this region, supposed to be impassable, can be traversed from east to west and from north to south with comparative ease. We hope soon to receive from Mr. Henry further details of his interesting journey.

**Expedition to Nova Zembla.**—M. Constantin Nosiloff, the Russian traveller and naturalist, informs us, in a letter written from Kazan, of his intention to undertake this summer an expedition to Nova Zembla. M. Nosiloff has recently been engaged in exploring the Ural Mountains in order to find an easy route between the Petchora and the Obi. The objects of the present expedition to Nova Zembla are (1) to prepare a detailed map of the coasts and the interior of the island; (2) to study the hydrography of the coast, and make observations regarding the movements of the ice in the Kara Sea and in the straits leading into it; (3) to make meteorological observations, and to collect zoological and botanical specimens; (4) to study the ethnography of the Samoïedes. He invites suggestions from specialists in these branches of science resident in England.

**Eastern Siberia.**—At the recent general meeting of the Geographical Society of Paris, M. Joseph Martin gave an account of his second journey in Eastern Siberia, which extended over a period of nearly four years (May 1882 to Jan. 1886). In 1882 he was entrusted by a Russian mining company with a mission to organise and survey its mines in the neighbourhood of Vitim and Olekma, on the river Lena. The prevailing formation of this mining region is slate, with iron pyrites and reefs of quartz. The workings are confined to the auriferous deposits, the gold being obtained in the form of spangles and nuggets at a maximum depth of 170 feet. While the auriferous deposits of the Lena appear from the fossil remains to be of the same age as those of the Amur, the former are found at a much greater depth than the latter. His mission with regard

to the mines having been fulfilled, M. Martin determined to carry out a long-cherished scheme of exploration in the little-known country between the Lena and the Sea of Japan, including the region of the Stanovoi Mountains. The general direction of the march from Olekma, on the Lena, was south-west. Six or eight mountain ranges, denuded of vegetation, with watercourses in the intervening valleys, were crossed in succession, their elevation ranging from 1300 to 2700 feet. The party at length reached Lake Nitshatka, where the vegetation is more abundant. Several soundings in the lake were made, which showed a depth of 490 feet. The lake is fed by streams from the lofty glacier-crowned summits in the vicinity, and discharges its waters eastwards into the Tchara, an affluent of the Olekma. Not far from the lake, to the south-west, the valley of the Vitim is separated from that of the Tchara by a narrow ridge, which was crossed by the party at a height of about 9000 feet. The crevasses of the glaciers on the northern slope of the range made travelling difficult. The flora, of which the traveller obtained specimens, is quite alpine in character. Beyond Lake Nitshatka the mountainous region is perceptibly more elevated than that previously traversed. The party then journeyed down the valley of the Tchara for about a month, and crossing again the water-divide into the valley of the Vitim, reached a plateau containing a series of lakes, the principal of which is Lake Amadisse. The country between this plain and the Kalar, an affluent of the Vitim, is drained by numerous tributary streams. Although this was in August snow had fallen twice. In this region winter succeeds summer very quickly. The transition generally takes place between the 15th August and the 1st September. At the first sign of winter the Tunguzes of the party began to get unruly, and were disposed to desert. On the marshy plateau which commands the valley of the Kalar the traveller discovered two small lakes situated at an altitude of about 3000 feet, one of which is called by the natives Dwajang, and the other he named Lake Martin. The succession of tablelands between Lake Amadisse and Lake Martin are of slate formation, and rich in minerals, such as iron, copper, coal, and lead. The party then again entered the valley of the Olekma, where the vegetation in the direction of the Stanovoi Mountains is quite southern in character, and presents a sharp contrast to that of the Vitim valley. After six months' toilsome marching the foot of the Stanovoi range was reached. It was the intention of the traveller to cross the range to the south-east, near the source of the Aldan, in order to explore the river Zea, but he was compelled, through the insubordination of the Tunguzes and the approach of winter, to turn almost due south. Between the Olekma and the northern part of the Stanovoi, and separated from the former by a ridge of 4000 feet, flows the Tunguir, an affluent of the Olekma. The Stanovoi range, in the part visited by the traveller, consists of rounded peaks, covered with forests of larches and birches. Here and there are summits, rising to an



elevation of from 4300 to 5000 feet, bare of vegetation, and snow-covered during part of the year. As far as explored by the traveller, the range presents a less accentuated relief than the watershed between the Olekma and the Vitim. The crossing of the Stanovoi Mountains, which at that point run in parallel chains, occupied, by forced marches, three long days, and was accomplished without any guide but the compass, and under the most trying conditions, the reindeer sinking three feet into the snow. The traveller had constructed a number of light sledges, and made some rough snow-shoes for the men. The party then debouched into the valley of one of the upper tributaries of the Amur, where a snow-storm, lasting ten days, overtook them. After marching parallel with the Amazar, they eventually reached the banks of the Amur itself in November 1883 (nine months from starting), at a village thirty miles from Albazine. From this point, accompanied by a devoted Tunguz, he made his way to Kara, and afterwards returned to Irkutsk. In the spring of 1884 he set out on a journey to the mining district of Trans-Baikal, on the Mongolian frontier, whence, after a stay of six weeks, he travelled east to study the region between the Argun and the Chilka. Having reached Albazine a second time, he travelled along the south slope of the range into the upper valley of the Zea, which is mountainous, picturesque, and covered with beautiful forests. The route along the base of the Stanovoi was difficult, owing to the "tundras." He spent some months on the Amur and the Ussuri, and he ascended the latter river to Lake Khinka and Vladivostock. The itinerary of his route between the Lena and the Amur, carefully prepared by the traveller with the aid of the compass, has been submitted to the Russian Staff, and the results will be incorporated into the map of Siberia.

**Norwegian Coast and Deep-sea Survey in 1886.**—Captain Fabricius, director of the hydrographical section of the Geographical Survey of Norway, gives the following particulars as to the results of the hydrographical researches carried out by him on the north-west coast of Norway last year:—The part of the coast sounded off the islands of Röst and Værö (lat. 67–68° N., and long. 29–30° E.) is of far more interest than those of previous summers, as we have here, in all probability, discovered the end of the bank projecting from the west side of the Lofoden Islands. West of the two islands named a large submarine plateau was sounded during last summer, having a fairly gradual slope southwards, a sharp fall towards the deep ocean, and finishing towards the west. This plateau forms probably the southernmost and widest part of the bank which projects from the Lofoden and Vesteraalen Islands, the width of which appears to decrease northwards, so that its edge or fall on the ocean side is here closer to the coast. About four geographical miles west of the islands of Röst and Værö the depth was found in several places to be 50 fathoms, and the bottom sand. Inside this line the bottom is uneven, with several

smaller elevated banks, called by the fishermen *skaller* (shells), whilst westward it gradually slopes until 36 miles west of Röst the depth is 100 fathoms. Here the depth runs nearly north to south for a distance of about 40 miles, or from south of the Skomvær Island (the southernmost islet of the Röst group) to the southernmost point of Moskenæsö (Lofoden Islands), whence it trends eastwards. As regards the southern part inwards about four miles south of Skomvær, and as regards the northern towards Værö, until 28 or 30 miles west of that island, it curves north-eastwards. Inside this line the bottom is uniformly sand, and sand mixed with pebbles and marine shells. Further westwards the plateau continues with a still gradual, but somewhat quicker, increase of depth, until 60 miles west of Röst it attains a depth of 150 fathoms. The nature of the bottom still remains the same until the last-mentioned depth is approached, when the lead brought up sandy clay. This spot is on the edge or fall of the bank towards the deep ocean, as a few miles further west the depth increases rapidly from 150 to 300 fathoms and more. About 70 miles west of Skomvær a depth of 438 fathoms, with clay bottom, was found, and a sounding of a series taken by the Norwegian North Atlantic Expedition, about five miles further west, showed a depth of 593 fathoms and a similar bottom. Northwards the 150 fathom line of depth and the lines of depth beyond—running nearly parallel for 200, 250, 300, and 350 fathoms—approach somewhat to the above-mentioned 100 fathom line, which seems to indicate a sharper fall oceanwards outside the latter depth as we proceed northwards. In fact, the soundings already known on the sea-border of the Lofoden and Vesteraalen Islands and the coast of Finmarken tend to show, as stated, that the edge of the Lofoden bank lies nearer to the shore further north. On the coast outside the islands Langö, Andö, and Senjen, for instance, it will most probably be found 15 to 20 miles from the shore, and here the face appears to be sharper too. North of Senjen the edge seems to sheer straight northwards and recede more rapidly from the shore, whilst its declivity also seems to decrease. Preliminarily a chart has been drawn of the part of the Sea of Röst and Værö sounded last summer, the scale being 1:200,000, which has been reproduced by lithography. The chart forms an addendum to the coast-chart "Fleina and Landhornet to Tranö," which latter has been revised and brought up to date. It is expected that next autumn there will be sufficient material in hand to issue a fishing chart of that part of the bank referred to lying outside the Lofoden Islands.

**Swedes on the Congo.**—According to the Journal of the Swedish Geographical Society, 33 Swedes have up to the present been employed in the service of the Congo State. Of these, ten died there through accidents or from fever, six were compelled to return home on account of ill-health, seven returned on the expiry of their three years' service, whilst ten are still in Africa.

**Lunda.**—Captain Carvalho, the leader of the recent Portuguese expedition into Lunda, in a letter to Senhor L. Cordeiro, published in the 'Boletim' of the Lisbon Geographical Society, gives some interesting information on that Central African empire, which supplements that previously obtained by Dr. Pogge, Dr. Buchner, and others. Lunda, according to him, is quite a recent creation, reaching hardly back to the middle of the last century. The country on the Kalanyi and westward to the Kasai, the present centre of the empire, was originally inhabited by the Tubungo, ruled over by numerous petty chiefs (*muene-u-áta* or *muáta*), the principal among whom was the *Tatuko* (father) *Shakala*. This *Shakala* quarrelled with his two sons, *Kingúri-a-Konda* and *Yá-lá-ia-Konda*, and with the consent of the other chiefs appointed his daughter *Luézhi* to succeed him. The *Lukáno*, or bracelet of human sinews, was consequently entrusted to this lady, as a symbol of her sovereign power, until she should make choice of a husband. One day a hunter (*Kibunda*) appeared on the *Kalanyi*, and won the lady's favour. His name was *Ilunga*, and he claimed to be the son of *Kasongo* a powerful chief of *Luba*, whose eldest son had succeeded to his father's possessions (in *Rua*) whilst a younger son, *Kanyoka*, had established himself to the north-east of what subsequently became known as *Lunda*. When *Kibunda Ilunga* married *Luézhi* his elder brother sent him a battle-axe (*ki-nbui-ka*), as a legacy from his father, and this axe still forms one of the royal emblems of the empire. *Luézhi's* brothers left the country in disgust, and having assisted the Portuguese in their wars against *Jinga* (*Matamba*) finally settled down as chiefs in *Kasanje* and the *Songo* countries, where their descendents still reign.\* *Kibunda Ilunga*, at the suggestion of one of the chiefs, assumed the title of *Muátyan-vu-a*, or, in full, "*Muáta-yanvua manganda mawóso nimitondo nimanita niatuendi a kua Lunda*," which means "The Lord who owns all the land, all the rivers and all the people of *Lunda*," *Lunda* itself being interpreted to signify "union" or "unity." The royal household of the *Muátyan-vu-a* rivals in numbers that of any European sovereign. The foremost place in it belongs to the *Lukoquésá*, the "person who looks after the *muátyan-vu-a*." She is the modern representative of *Luézhi*, is appointed by the *Muáta* among the members of the royal family, but cannot apparently be deposed by him. Her influence is very considerable. The other leading ladies of the court are the *Muári*, or first wife, the *Temeinyo*, or second wife, the *Ngina muana*, or official "mother" of the *Muáta*, and the *Ngina banza* or his official "sister."

\* It is difficult to reconcile these native traditions with the Portuguese historical records. Wars against the various rulers known as *Jinga* were waged repeatedly since 1590 and up to 1745, in which year *Bartholomew Duarte de Sequeira*, the *Capitão mór*, captured the *Jinga's* capital. *Cavazzi* already mentions a chief, *Cassange Cun-quiringuri*, who was born in 1608 near *Ambaca*, and who may have been a son of the *Kinguri* who came out of *Lunda*.

Among the councillors (*kanapunbe*) the chief places are accorded to the *Muitio* (or attorney-general), the *Suana mulopo* (official "brother"), the *Mona uta* ("master of arms"), and the *Muári muishi* (cook). The chiefs who now rule over the various districts of Lunda are stated to have gone forth from the original seats of the Tubungo, and claim kindred with *Luézhi* or *Ilunga*. *Senhor Carvalho* furnishes pedigrees of many of these chiefs, but we are able to mention only a few of the more prominent. Among *Luézhi's* relatives were *Kahungula* of *Mataba*; *Bungulo* or *Buhungulo*, a son of the former, now represented by *Kilwata*; *Kahungula ka Mazai*, another son, now represented by *Sna-Muteba*, the seventh of the line; and the *Muene Puto Kasongo*, on the *Kuango*. The most prominent among the members of *Ilunga's* family was *Ka-Shina Mayo*, who assumed the title of *Mayo munene*, and is now represented by *Ka-Mwanga*, the seventh of the line. *Bumbo Attema* took up his quarters in the *Mungo* mountains, to the east of the *Kuanza*, in lat. 11° S., and became the head of the *Makioko* (plural of *Kioko*), who have thence spread to the north and to the south. *Kinbundo*, *Katema*, *Kabinda*, and others became rulers of the *Makóza* (a nickname); several *Luba* chiefs (*Mukelenge mutonbo*) went to the north-west; others, including *Livingstone's Shinde*, were sent to the south, whilst the *Muata Kazembe* was despatched to the east.\* If *Senhor Carvalho's* information can be trusted, only fourteen *Muátyan-vu-a* have ruled since the foundation of the empire. The first of these was *Kibunda Ilunga*, the husband of *Luézhi*, and founder of the empire. To him succeeded five sons (*Noézhi*, *Unbála*, *Mutéba*, *Mulázi*, and *Mukanza*). This last was on the throne when the *Pombeiros* passed through the country in 1806. *Yánvo*, the seventh ruler, was a son of *Noézhi*. To him succeeded his second son, *Kikomba*, the first son, *Ditenda*, having died. *Noézhi II.* was a son of this *Ditenda*, and ruled when *Graça* visited the country, in 1849. *Molazhi*, a son of *Noézhi II.*, and *Mutéba*, the youngest son of the same, succeeded. *Mutéba* was a popular ruler. He appointed *Kata*, the chief wife of his brother *Molazhi*, to be his *Lukoquézha*. He ought to have been succeeded by his son *Unbála*, a favourite of the people, but the *Lukoquézha* intrigued in favour of her son *Shanáma*, who rose in revolt, and was eventually chosen by the chiefs, in 1874. This ruler is described as the "Terror of Lunda." He was murdered, and was succeeded by his sons *Kibinda Ditende* and *Kan-gá-pua*, neither of whom ruled long. The sceptre was then offered to *Nbála*, a son of *Mutéba*, but he declined the proffered dignity, stating that *Kivunza Yánvo*, the brother of *Shanáma*, at that time (1885) living an exile near the *Kuango*, was the rightful heir. Eventually *Kivunza Yánvo* was raised to the throne, and it is with him that *Senhor Carvalho* has concluded a treaty which places all Lunda under the protection of Portugal.

\* The fourth *Kazembe* was on the throne in 1792 when *Dr. Lacerda* visited the country, and the fifth (*Ampata*) in 1831.

**Patagonia.**—Lieutenant C. Moyano, who in 1877 with M. F. Moreno, made a journey into the south of Patagonia, accomplished some time ago another excursion into the country south of the Santa Cruz, the results of which he has reported to the Argentine Government. The party numbered thirteen, and the explorations lasted about two and a half months. Lieut. Moyano had, on his previous journey, visited Lake Argentine and observed in the south-west of the same an important influx, which he supposed connected the lake with a smaller lake basin lying to the south. In 1880 the Chilian explorers, MM. Ibar and Rogers, visited this small lake and found it had a discharge to the west into the Pacific, but no connection with Lake Argentine. In his last journey, M. Moyano has been able to confirm his previous observations as to the union of these two lakes. The subjoined details will show that this latest expedition into the still imperfectly known region of South Patagonia, has rendered considerable service to geography. The traveller has explored the sources of the Gallegos and Coile rivers, determined the geographical position of the two large lakes which lie in the extreme west of the Coile valley. Besides ascertaining the union between the two lakes referred to above, he has collected numerous data from which it may be concluded that all the lakes of South Patagonia are connected with each other. With regard to the character of the country, the coast zone is covered with a sparse herbaceous vegetation which is suitable for rearing cattle, sheep, goats, &c., and stands the climate all the year. Some small tracts in the river valleys would be suitable for agriculture on a small scale. The centre of the country is less fitted for cultivation, owing to the poverty of the soil and to the severity of the winter, which is increased by the heights of these tablelands and their distance from the coast. The mountainous region on the west which begins with the first span of the Cordillera, is distinguished by dense and endless forests of antarctic beeches and by a herbaceous vegetation which satisfies the utmost demands of cattle-breeders. The traveller found traces of coal and iron in several places, but unfortunately very far from the commercial routes. Other minerals he did not meet with. The following are the positions of three mountain peaks which he named:—Monte Andrade, a mountain 5808 feet high, situated in  $50^{\circ} 58' 30''$  S., and  $73^{\circ} 5'$  W.; Monte Guido, 4200 feet, in  $50^{\circ} 5'$  S. and  $72^{\circ} 25'$  W.; and Monte Guerrico, about 4495 feet, in  $50^{\circ} 48' 30''$  S. In connection with this exploration we may announce the publication of Fontana's map embodying the results of his expedition to the Chubut River,\* which will cause much alteration in existing maps of Patagonia.

**Tierra del Fuego.**—The expedition of M. Ramon Lista, which started in November last on an exploration of Tierra del Fuego,

\* 'Proc. R.G.S.,' 1886, p. 527.

returned to Buenos Ayres in February, having been completely successful. The current number of Petermann's 'Mitteilungen' contains a letter from M. Ramon Lista to General B. Mitre, in which he gives some account of the results of his journey. The Argentine (Eastern) part of the island, which he explored for 440 miles from Sebastian Bay to Le Maire Straits, is more fertile than the Patagonian coast zone bounded by the Chubut and Cape Yungfrau, and has, in the traveller's opinion, a greater industrial future before it. The generally accepted reports as to the inhospitable, barren, and even uninhabited state of the island may, he says, be true as regards the western half of the same, but are certainly false regarding the eastern or Argentine portion. The latter part of Tierra del Fuego may be divided with reference to its physical features into two sections: (i.) that extending from Cape Espiritu Santo to Cape Penas, where the country consists of valleys more or less broad, covered with most excellent fodder, and watered by rivers of considerable volume, and partly navigable, which spring from a snow-covered range of mountains (Bartholomé Nodal) in the interior. This district enjoys an agreeable temperature; the little snow which falls in winter soon melts. (ii.) South of this region, which may be called the "meadow country," extend the antarctic forests. Here the fodder vegetation is not so rich, and the streams have less water, but the landscape has a more beautiful appearance, reminding the traveller of Switzerland, with small lakes, high mountains, and enchanting woods. On the third day, after leaving the south-west corner of Sebastian Bay, the party reached a river flowing into the Atlantic Ocean, where they came suddenly upon some of the natives. The latter were full of mistrust, which, however, was speedily removed when they heard the word "brother." This form of salutation was evidently unaccustomed to them; they are usually greeted with a volley of musketry by the Chilian miners of Useless Bay. Some of the Indians approached the traveller and commenced dancing and leaping. Most of them were young men, tall and powerful, with their faces painted red; a few of them had their arms and hands coloured white with clay. All wore their hair cut behind and anointed with an unctuous red pigment. They wore no clothing except a kind of cloak made of the skin of the silver fox, and strange to say, this was worn with the rough side outwards. The traveller observed many huts deserted for the moment, and dogs in them, some with long shaggy hair, others dark coloured. He desired to appropriate one of these animals, which had the appearance of a sheep dog, but an Indian interposed and made him understand that the dog belonged to him, and had been trained to hunt the guanacos. Besides his geographical studies the traveller made numerous scientific observations during his journey across the island, more particularly of an anthropological and geological character. His notes on the land an

sea fauna are interesting. He measured many of the natives, and has prepared a vocabulary of the language used by the natives of the forest-region between Cape Penas and Polycarp Bay. The animal kingdom on land is represented by some mammalia, guanacos, and foxes (*Canis magellanicus*), the latter very much prized on account of its beautiful skin. Among the rodents, which unfortunately are far more numerous than the mammals, may be mentioned the *Ctenomys magellanicus*, a veritable land-plague, which infests the northern part of the island. Of birds, which fill the woods and river banks, the traveller mentions the parrot, duck, snipe, plover, wild goose, ibis, &c. He also gives examples of the sea fauna.—The finding of gold on the shores of the Straits of Magellan has quickened the general interest in the island of Tierra del Fuego, and an expedition under the Argentine governor, Captain Paz, is announced to start into the interior.

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### Obituary.

**Don Mariano Felipe Paz Soldan**,\* our Peruvian Honorary Corresponding Member, died at Lima on the 31st of December, 1886, aged 65. He was born at Arequipa on August 22nd, 1821, of a family of old Castilian descent, and was one of several talented and accomplished brothers. His nephew, who writes under the pseudonym of "Juan de Arona," is a poet of such eminence as to have been elected a Corresponding Member of the Royal Academy of Spain. Mariano Paz Soldan was educated at the College of San Geronimo in Arequipa, whence he went to study law at Lima, and at an early age he was called to the Peruvian Bar. In 1844, when still very young, he received a judicial appointment at Caxamarca; and his attention was early turned to the condition of the prisons, and to the best means of ameliorating the wretched fate of condemned persons in Peru. To this philanthropic work Paz Soldan devoted the best years of his life. In 1853 he undertook a journey to the United States with the sole object of studying the penitentiary system in the United States. It was necessary that he should not only inform himself respecting prison discipline and treatment, but also that he should become thoroughly acquainted with the designs for penitentiaries, and even with questions relating to building materials, and the organisation of labour. For the subject was new to his countrymen, *ab ovo usque ad mala*. Paz Soldan devoted his whole energies to this self-imposed task, and some of his results appeared in his earliest publication, 'Informe sobre las Penitenciarías' (1854). Two years afterwards the building of the penitentiary at Lima was commenced under his superintendence. It was completed in about six years, on the most improved principles, and is a noble monument of the patriotism and enlightened perseverance of our late Corresponding Member. Paz Soldan afterwards filled the posts of Minister of Public Works and of Education in several administrations, and was for many years the Director of Public Works in Peru. Several of the most useful undertakings and improvements in that country, during the last quarter of a century, have been due to the energy and zeal of Mariano Paz Soldan.

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\* By C. R. Markham, C.B., F.R.S., Secretary.

In the midst of his active public life, our Corresponding Member devoted much time to the elucidation of the geography of his native country. Geographical studies, and the gradual collection of a valuable library, were the occupations of his leisure. Yet he devoted much time to our science, with valuable results. His first geographical work was the 'Geografía del Peru,' completed in 1861, of which the physical sections were written by his brother Mateo; and this was followed by the Peruvian Atlas, a work which involved immense labour and research, and called for great tact and perseverance in its execution. Señor Paz Soldan made a special journey to Paris to arrange for the engraving and publication. But his most important geographical work was the Geographical and Statistical Dictionary of Peru, which was completed in 1877. It is due to the present Admiral Don Aurelio Garcia y Garcia, that the interest he has always shown in the promotion of geographical work should here be recorded. When he was Minister in 1875, he spontaneously gave orders that the dictionary of Paz Soldan should be printed at the expense of the Peruvian Government. These works of Paz Soldan, presented by the author, are now in the Society's Library, and are indispensable to students of South American geography.

Don Mariano Paz Soldan was president of the Commission for demarcating the boundaries of Peru. In 1879 he originated, and his son Don Carlos became the editor, of a literary periodical called the *Revista Peruana*. Mainly consisting of essays on historical, antiquarian, and philological subjects, some of them of great value, it also contained original geographical information. The deplorable war with Chile brought the literary labours of its contributors to a close. Many of them fought, and some fell in defence of their country.

The last years of Mariano Paz Soldan were clouded by the misfortunes of his beloved fatherland. The Chilians occupied the capital of Peru, and these conquerors behaved in a way which, fortunately, is without a precedent among civilised nations and in modern times. The building of San Marcos, the most ancient university in the new world, was converted into cavalry stables. The public library was used as a barrack, and its priceless treasures were thrown into the streets or sold as waste paper. The persecution of all distinguished Peruvians was rigorous and unceasing during the occupation. Many old and respected civilians were seized and sent prisoners into the south of Chile. Paz Soldan took refuge in Buenos Ayres, where the illustrious exile was received not only with respect, but with the most cordial hospitality. The University appointed him to a professorship, and he endeavoured to requite the kindness of his generous and sympathising hosts by working at a geographical dictionary of the Argentine Republic. He also wrote his history of the war with Chile, during the period of his exile. The return of our Corresponding Member to his ruined fatherland was clouded with sadness. He saw much of the work of a lifetime destroyed by the desolating war, and he could not hope that he would be spared to aid in the labour of reparation. He may truly be said to have died of a broken heart.

Paz Soldan was the John Howard of Peru. He was a man of broad views and enlightened sympathies. As a statesman he originated and matured numerous useful measures, both in the departments of education and of public works. As a geographer he was indefatigable, and enthusiastic. He was a good linguist and an able scholar. In these respects his accomplished son, Don Carlos Paz Soldan, is following in his respected father's footsteps.

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## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Eleventh Meeting, May 9th, 1887.*—F. GALTON, ESQ., F.R.S., Vice-President, in the Chair.

ELECTIONS.—*Louis Adler, Esq.; Thos. Morris Ash, Esq.; Melvill Beachcroft, Esq.; T. J. Beard, Esq.; Joseph Gill, Esq.; John Gillespie, Esq.; Rev. Jno. Oxley Oxland; Alfred Radford, Esq.; Henry Reynolds, Esq.; Robert Davies Roberts, Esq.; William Warry, Esq.; Rev. G. F. Whidborne.*

The paper read was:—

“Explorations in Central Africa.” By Dr. Junker.

Will be published, with map, in the July Number of the ‘Proceedings.’

## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris**, April 1st, 1887: M. JANNSSEN, of the Institute, in the Chair.—Among the works presented at the meeting were the following:—‘*La Frontière Sino-annamite*,’ by M. G. Devéria, containing some interesting geographical and ethnographical information, and a work entitled ‘*La Tunisie*,’ by M. J. L. de Lanessan, embodying the results of personal observations. M. Costenoble a publisher of Leipzig, forwarded the German edition of an important work by Dr. A. Voelkef, the eminent Russian professor, entitled ‘*Die Klimate der Erde*,’ which was published in 1884 in the Russian language. The first volume of this work treats of the general conditions which influence climates, and the second volume deals with the different climates of the globe. Among the chapters of special interest we note one on river and lake systems and their dependence on the rains and snow, two chapters devoted to the consideration of snow and ice, another on the question of surface temperatures, and the final chapters of the first part which treat in a general way of the distribution of heat, atmospheric pressure, and rain over the earth’s surface. Excellent maps and diagrams accompany this valuable book.—A long manuscript was received from M. A. du Paty de Clam on the Basin of Central Tunis in ancient times; it was stated that this paper would be inserted in the Quarterly Bulletin.—M. H. Duveyrier sent a letter relative to a passage in his report last year on the journey of MM. Capello and Ivens, in which he discussed the important difference in the position of the cataract of Mambirima as given by these travellers and by M. Giraud. The letter concluded with the statement that the explorer who should fix definitely the position of the south-west point of Lake Bemba and survey the first 100 miles of the course of the Luapula would render a real service to geography.—The Secretary read a letter from M. Frederick Schwatka to M. W. Huber, which was dated 9th March, 1887, from Rock Island. The writer promised to send the Society one of the first copies of the report on his second journey to Alaska, which would be ready in about a month. He mentions several inaccuracies in existing maps of Alaska; not one of them shows the Grandidier glacier.—The Minister of Public Instruction forwarded a letter from M. A. Thouar, dated 15th January, 1887, from Lagunillas on the frontier of the Bolivian Chaco. The march from Padilla to Lagunillas had been attended with great hardships, owing to violent storms and the roughness of the paths, where such indeed existed. Notwithstanding some sickness the staff of the expedition remained intact. M. Thouar intended to start from Lagunillas on the following day with provisions for three months.—The Chairman announced that the Academy of Sciences had just voted the sum of 40*l.* to M. Virlet d’Aoust, one of the oldest members of the Society,

to enable him to continue his researches on the causes of earthquakes.—The General Secretary called the attention of the meeting to a large wall-map of Brazil, exhibited in the hall, which had been prepared by M. E. Levasseur, of the Institute. This important map had taken three years to execute, and was practically a map of South America. It was prepared on the scale of 1:3,000,000 and contained all the latest information.—M. Ch. Rabot announced to the Society the departure of M. Nossiloff, the Russian naturalist, on a new expedition to Nova Zembla, and stated the objects of the mission. He further made a communication on the subject recently before the Society, of the transport of matter by icebergs. He supported the opinion of M. Thoulet that the banks off Newfoundland were not formed by the deposits from icebergs. He referred to the results of his own observations in Spitzbergen in 1882, when he had occasion to study the ice in the fiords.—M. Dutreuil du Rhins then read a paper\* by M. Gouin, French resident at Son-tay, on the Upper Red river and its two affluents the Black and the Clear rivers. M. Baudens, who travelled in the country in 1885-6, then made some remarks with reference to the course of the Black river, which according to M. Gouin, has a northerly direction. M. Baudens' survey shows it as flowing west or north-west. Some discussion followed upon this point. M. Baudens gave further some interesting notes on the navigation of these rivers and the physical features and present state of Tongking.—M. Gauthiot, General Secretary, announced that the Commercial Geographical Society of Paris had just awarded its chief medal to M. Gouin in recognition of his valuable work in Tongking.

— April 15th, 1887: M. FERDINAND DE LESSEPS, President of the Society in the Chair. This was the first General Meeting of the year. The Chairman said he would, on the present occasion, dispense with the usual opening speech from the Chair, as there was so much business to be got through; he would therefore at once call on M. E. Cotteau, scrutineer, to announce the result of the election for the Bureau of the Society for 1887-8. This was stated to be as follows:—President, M. Ferdinand de Lesseps; Vice-Presidents, General Perrier and M. Bouquet de la Grye; Scrutineers, M. J. Renaud, and M. G. Demanche; Secretary, Dr. Henri Labonne. M. W. Huber then read, on behalf of the commission on the prizes, the general report upon the awards. The reading of the special reports upon the latter followed.—After M. W. Huber had given a *résumé* of his report upon M. Rouvier's explorations on the Congo, the Chairman presented to the representative of the Minister of the Navy, on behalf of M. Rouvier, the gold medal which had been awarded to the latter, and in doing so alluded to the great value of the astronomical determinations made by the traveller of points on the Congo, thereby completing the information given by previous explorers. A *résumé* of M. F. Schrader's report upon Dr. H. Fritsche's travels in the north of China having been read, M. de Lesseps remarked upon the fact that the traveller's work was purely scientific, and therefore perhaps less known, but not less valuable; the gold medal, he said, would be transmitted to Dr. Fritsche through the Russian ambassador. The third presentation was to M. J. Martin for his journeys in Eastern Siberia, upon which M. W. Huber reported. The Chairman in handing the gold medal to M. Martin, referred briefly to the important bearing of his work on the geography of the country between the basin of the Lena and that of the Amur. M. A. Grandidier, then read a *résumé* of his report on M. A. Aubry's journey in Shoa. The traveller was not present at the meeting, but M. de Lesseps took occasion to remind the Society of the value of M. Aubry's work in connection with the geology and geography of that part of Africa during his three years' mission

\* This paper will be inserted in the Quarterly Bulletin.

there. Comte H. de Bozumont then read an abstract of his report on Major Greely's expedition to the Polar Regions, whereupon the Chairman handed the gold medal (La Roquette Prize) to M. Vignaud, Chief Secretary of the United States Legation, adding that the Society desired thereby to express its sense of the value, not only of the discovery of new territory, but of the scientific observations made at Fort Conger during more than one year, in the highest latitude in which such observations had ever been recorded. The Chairman then presented to M. A. Germain, on behalf of M. A. Grenier, the gold medal awarded to the latter for his cartographical works, and finally handed to M. C. Forel the Jomard Prize for his biography of the French traveller, Tavernier.—In conclusion, M. Joseph Martin read an account of his travels in Eastern Siberia.

**Geographical Society of Berlin, April 2nd, 1887:** Herr W. REISS in the Chair.—A letter was read from Lieutenant Wissmann, written from Luluaburg, in which he reported that he had, in July 1886, accomplished a journey from Luluaburg to the Bushimaji, the most westerly of the three river sources of the Sankuru, and had penetrated into the centre of the land of the Baluba people. West of the Lukulla and of Tenda Mota, the character of the country changes completely; here the true Baluba is met with. The "gallery woods" along the rivers and streams disappear altogether. The grass prairie reigns supreme, only on the summits of the steep watershed are a few isolated trees to be seen. Here and there large stony plains are met with, and hills covered with rolled granite, from which an extensive view may be obtained—a rare experience in Africa. The natives dwell in farms composed of from four to ten huts in the middle of their fields. They are a fine race, nearly all of them are six feet high, and large-boned. The population is exceptionally dense, nothing but fields and farms everywhere. As regards its productive capacity, the country is much too thickly peopled, and nowhere in Africa had M. Wissmann seen such a swarm of human beings. The land is too poor for the cultivation of tropical products. Game naturally cannot exist in such a thickly peopled locality. Of domestic animals, the traveller saw sheep, goats, dogs, and fowls, but no pigs. The nights were very cold, the minimum temperature recorded being 6° to 7° C. The bearing of the natives was insolent in the extreme. They know how to use firearms, which they have obtained from the Bihé traders in exchange for slaves, and they attempted to stop the advance of the expedition. In Bushimaji, hostilities broke out in earnest. This circumstance, coupled with the fact that the time which the traveller had allowed for this excursion had nearly elapsed, induced him to return to Luluaburg, after he had had one skirmish with the natives. From this point, he started in October on a new expedition to the north-east, with the intention of crossing the Sankuru and Lukenje, then, travelling along the watershed which divides the small tributaries of the right bank of the Sankuru from those of the Congo coming from the south, he will endeavour, by keeping to the east, to strike the Upper Congo in the vicinity of Nyangwe. He expects to find in this very little known district a series of lakes similar to Lake Leopold. With regard to the Baluba people, Wissmann has come to the conclusion, that all the branches of the race, even the most strongly mixed, prefer to call themselves pure Balubas. They exhibit a contemptuous regard for their neighbours. The pure Baluba live on the Upper Lubilash. The Bashilange and Bakete, who inhabit the country to the west of these as far as the Kassai and Luluā, are, in Wissmann's opinion, a mixture of the Baluba from the east, and an aboriginal race who resemble the Batua, and apparently called themselves Bashilange. The traditions of the present Bashilange point to an immigration hither from the south-east. In consequence of mingling with the aborigines of the land

they have degenerated physically from the pure Baluba type, although they still speak the Baluba language. In their territory, the scattered remains of the original Batua are nowhere to be found, as both races became thoroughly mixed. In this respect, the Basijange differ from the tribes living to the north, such as the Bakuba, Bamonge, Waxjema, among whom traces of the Batua exist, because these tribes have always despised the Batua, and keep themselves so separate that they never enter one of their domains. According to Lieutenant Wisneman, the Baluba appear to extend as far as the south-west shore of Lake Tanganyika, and also to Urua and the Moero Lake. The ruling family of the Muta Yamvo in the country of Lunda is also of Baluba origin.

Dr. P. SARASIN, of Basle, then gave a very clear and suggestive sketch of the general geographical conditions of the island of Ceylon. During his stay of two and a half years in the island, for the purpose of making zoological and anthropological observations, he, in company with his cousin, Herr P. Sarasin, made nine excursions on foot in different directions from the centre of the island. The greater part of the island is a plain, elevated but little above the sea-level; only in the southern part a vast mountain group, composed of gneiss and granite, and crowned with rugged peaks, rises up like a gigantic wall, and divides the island, as far as its climate is concerned, into two parts—the west and south-west humid, the north and east dry. The western half participates in both the monsoon rains, while the north-eastern part, during the south-west monsoon, which inundates the south-western region and the mountains with rain, experiences almost continually a clear sky and great drought. In consequence of these conditions the whole of the south-western half of the island is thickly populated and cultivated, abounding with coco palms and rice-fields, which extend in the form of terraces, far up the mountain slopes. The higher parts of the mountains were, until within comparatively recent times, clothed with the most luxuriant tropical forests; but since it was found thirty years ago that coffee thrives here in a remarkable manner, the primeval forests have everywhere disappeared, and the animals living in them have been dislodged, so that at the present time it is only in steep ravines, and on the heights between 5000 and 7000 feet, where the cold storms prevent the cultivation of coffee, and the Government has protected a portion of the forests from destruction, that a small part of the virgin woods remains. These gloomy grey-green woods are very different from those of the low plains. The trees are covered with long white lichens and gold-brown moss. Magnificent rhododendrons and tree-ferns, 20–30 feet high, form the chief adornment of these high mountain forests. For the rest, the whole mountain range was covered with coffee plantations until the year 1870, when they were unfortunately infected with a fungus. This is the reason that to-day nearly all the coffee plantations have vanished, and in their place plantations of tea and cocoa have sprung up. These, however, are not so profitable, and, moreover, have already begun to be visited by disease. Thus Ceylon will not in the near future be so prosperous as in earlier days. The broad plains of the dry portion of the island are covered with endless leafy woods, the trees of which, as regards their exterior, are very similar to those of a European wood, with the exception of the leaves, which are hard and wanting in succulent verdure. Scattered freely about are trees strange in appearance to European eyes, such as the *Ficus indica*, of which even a small wood often furnishes a specimen. On the banks of the rivers are found gigantic trees from 25 to 60 feet in circumference, entwined with climbing plants. The greater the distance from the rivers the sparser the vegetation, and in the very dry district of the north, where no rain falls for seven months, one finds only low brushwood and prickly euphorbias, in form like chandeliers. The forest districts are now almost uninhabited, especially in the south-east, whereas formerly they were in parts thickly peopled. In the northern districts the traveller meets with

extensive ruins; large towns with temples and palaces are to-day overgrown with forests. The answer to the question, how was it possible for these dry regions to have been so densely populated, is to be found in the remains of the gigantic water reservoirs, which the Cingalese kings constructed for the cultivation of rice-fields. Some of these reservoirs date back from the first centuries of our era. When the Cingalese people retreated southwards before the invasions of the south Indian races, these immense works fell into decay and became the home of the crocodile. The attempts of the English Government to encourage rice culture by utilising the old reservoirs, and to make Ceylon as regards its supply of rice independent of India, have up to the present time been attended with but little success. Instead of human beings the animal world has taken possession of these vast solitudes. The elephant, the wild buffalo, the wild boar, the bear, and great troops of monkeys people in immense numbers this region. Although in the large towns such as Kandy, Colombo, &c., the population is very mixed, in the country districts it is strongly divided. North and east of the great forest-belt the Tamils live, west and south of the same the Cingalese, while in the woods themselves dwell the aboriginal inhabitants, the Veddas. West of the forest country we find the Buddhist religion and civilisation, and the Aryan language, while to the east the Brahman religion and Dravidian language prevail. In this connection the analogy with India is striking. For there also we find in Hindustan for the most part an Aryan territory, and in the Deccan a Dravidian, divided by the broad wooded mountain chain which runs from the Gulf of Cambay to the east. The Cingalese inhabit mostly the fertile districts of Colombo. The Tamils have their centre on the island of Faffna to the north of Ceylon, and from that point extend along the east coast and the northern part of the west coast. On these dismal sandy coasts they are very scattered. The pure Veddas now scarcely number 2000, and disease is rapidly thinning their ranks, so that in 50 to 100 years not a single pure example of this worthy race will in all probability exist. They have recently been settled by the Government in small colonies, and can hardly now be called "Rock Veddas." Until quite recently, however, they lived in hollows of the rocks; the chase was their only occupation, and leaves their only clothing. They had not even learnt to use stone for pointing their arrows. They hunted chiefly monkeys and devoted themselves to fishing. They are very low in the scale of civilisation and have hardly any wants. Their appearance compares in a remarkable manner with that of the Australian negroes.

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

### EUROPE.

**Connell, Robert.**—St. Kilda and the St. Kildians. London, Hamilton, Adams & Co.; Glasgow, T. D. Morison, 1887: sm. 8vo., pp. 170. Price 2s. 6d. [Presented by Mr. T. D. Morison.]

Consists of a series of articles which originally appeared in the *Glasgow Herald*. The author gives a general idea of the present condition of things in St. Kilda, which appear to have very little changed since the time when Martin visited it, nearly 200 years ago.

### ASIA.

[**Smith, Agnes.**]—Through Cyprus. London, Hurst and Blackett, 1887: 8vo., pp. ix. and 351, map and illustrations. Price 15s. [Presented by the Publishers.]

Contains an account of a tour round the coast of Cyprus by two English

Isles. Among the places visited are Larnaca, Famagosta, Trikomo, Kythera, Nicosia, Kyrenia, Lefka, the Monasteries of Kerkko and Chrysoroghiatissa, Paphos and Limassol. There is an account of the history of the island, also of its products. The appendix contains discussions on the climate of Cyprus.

**Temple, [Sir] Richard [Bart].**—Journals kept in Hyderabad, Kashmir, Sikkim, and Nepal. Edited with Introduction by his son, Richard Carnac Temple. Maps and Illustrations. London, Allen & Co., 1887: 2 vols. 8vo.; vol. i. pp. xxvii. and 314; vol. ii. pp. [iv.] and 303. Price 32s. [Presented by the publishers.]

The nucleus of these volumes consists of journals kept by Sir Richard Temple while Resident at Hyderabad in 1867, and during excursions which he made into Kashmir, Sikkim, and Nepal at various periods. To these Captain Temple has written elaborate and instructive introductions, containing, amongst other things, useful summaries of the geography of the various regions with which the volumes are concerned. There is a good supply of maps, and the illustrations from Sir Richard's own sketches form an attractive feature.

#### AFRICA.

**[Central Africa.]**—A Journey to Lake Nyassa, and Visit to the Magwangwara and the Source of the Rovuma, in the year 1866, by the Bishop of the Universities' Mission to Central Africa. Zanzibar, Printed at the Universities' Mission Press, Kiungani, 8vo., pp. 49.

**[De Brazza.]**—Texte Publiée et Coordonné par Napoléon Ney. Conférences et Lettres de P. Savorgnan de Brazza, sur ses Trois Explorations dans L'Ouest Africain, de 1875 à 1886. Paris, Dreyfous, 1887: 8vo., pp. ii. and 463. Price 10 francs. (*Dulau.*)

This is a collection of the various addresses which from time to time have been delivered by M. de Brazza, and of the letters which he sent home during the course of his ten years' explorations in the region of the Congo and Ogowe. The volume will be useful as giving in a handy form details concerning De Brazza's work, the letters especially being of value, as conveying observations and impressions while still fresh. The editors seem to have done their work judiciously; there are numerous illustrations and several maps. M. De Brazza's own narrative will, we are informed, soon be begun in the 'Tour du Monde,' and will ultimately be published in three large volumes by Hachette & Co.

#### AMERICA.

**Charnay, Désiré.**—The Ancient Cities of the New World; being Travels and Explorations in Mexico and Central America, 1857-82. Translated from the French by J. Gonino and Helen S. Conant. London, Chapman and Hall, 1887: royal 8vo., pp. xxxii. and 514. Price 31s. 6d. [Presented by the Publishers.]

M. Charnay gives here the results of his many years' explorations among the abundant remains of the ancient civilisations of Central America. The volume, moreover, includes many sketches of the modern aspects of town and country in these regions, and whatever opinion may be formed of the value of the text, the numerous illustrations of the remains explored by M. Charnay will be welcome. M. Charnay acknowledges his indebtedness to our Fellow, Mr. Maudslay, whom he met at work in the same field, and the detailed results of whose labours will be welcomed by those who value accurate observations and scientific deductions. While there is much to interest and instruct in M. Charnay's volume, its value as a contribution to a solution of the Toltec problem, and the early civilisation of America, cannot be regarded as high. In his preface he indulges largely in speculation on problems which many competent students deem insoluble with our present data. He believes that "the autochthones of America" came from

the East; and among the arguments adduced in support of this view is the following:—"The word 'Lacondon,' which is the name of a tribe in Central America, is also, according to Dr. Neis, that of a race in Indo-China, who spell it 'Lah-canh-dong.'" The English of this abridged translation is often extremely awkward and almost unintelligible. It is scarcely credible, and certainly not creditable, that a work like this should be published without an index.

[Collens, J. H.]—Guide to Trinidad. A Hand-Book for the use of Tourists and Visitors. Port-of-Spain, Muir, Marshall, & Co., and Ford & Co., 1887: 8vo., pp. 240, map and frontispiece. Price 4s.

The author who was for nine years a resident in Trinidad, has here brought together a deal of useful information regarding the island, including—its Early History and People; its Soil, Productions and Climate; how to reach Trinidad, Cost of Living, &c.; description of Port-of-Spain, the capital. Details are also given of excursions to various parts of the island.

#### AUSTRALASIA.

Chalmers, James.—Pioneering in New Guinea. London, Religious Tract Society, 1887: 8vo., pp. xii. and 343. Price 16s. [Presented by the Publishers.]

Mr. Chalmers's long and useful work in New Guinea is well known, and he himself gave some account of it at a recent meeting of the Society (see Proc. R.G.S., Feb. 1887, p. 71). In the present volume we have no connected narrative of Mr. Chalmers's routes and journeys, but rather a series of episodes or sketches embodying a good deal of geographical and ethnological information. The first chapter describes a trip to Oiabu and Mekeo on the west of the Owen Stanley Range, where Mr. and Mrs. Chalmers delighted the natives by singing their national song, "Auld Lang Syne," which was repeatedly encored. In the second chapter are some useful details concerning the native trade. The third chapter also deals with trade, describing a trading voyage in native boats along the Gulf of Papua, in which Mr. Chalmers took part. Chapter iv. deals with various tribal wars, and chapter v. with peacemaking. In the next chapter is an interesting account of two journeys into the south-east interior of the island. Chapter viii. contains matter of considerable ethnological value, being answers to a long series of questions on the habits, customs, and beliefs of the Motu and Motumotu tribes. In the next three chapters we have accounts of various trips made by Mr. Chalmers on board H.M. ships, one in company with Commodore Erskine, when the Protectorate was proclaimed, and another with the late Sir Peter Scratchley. Chapter xii. deals with the location of native missionaries, and in chapter xiii. we have an account of various New Guinea celebrities, while the concluding chapter describes a variety of interesting episodes. It is instructive to be told that in all Christianised islands in the Pacific, May continues to be held as a great month of feasting and rejoicing, as in heathen times, the ceremonies, however, being now adapted to Christian uses. The map from the February number of the 'Proceedings' is reproduced, and the numerous illustrations are appropriate and well executed.

#### GENERAL.

Geographisches Jahrbuch. Begründet 1866 durch E. Behm. XI. Band, 1887. Unter Mitwirkung von O. Drude, G. Gerland, J. Hann, H. Hergesoll, O. Krümmell, E. Rudolph, L. K. Schmarda, Fr. Toula, herausgegeben von Hermann Wagner. Gotha, Justus Perthes, 1887: 8vo., pp. viii. and 496. Price 12 Mark. (*Dulau.*)

The new volume of this invaluable serial begins a new series, the fresh starting-point being marked by a change of form from the old small quarto to a respectable octavo. The size, moreover, is greatly increased, the present volume embracing only what was the first part of previous issues—the separate sections of geography, or the various geographical sciences. The subject of the Physics

of the Earth is this year treated by two young Strassburg specialists, Dr. Hergesoll, and Dr. Rudolph. Professor Toula, of Vienna, brings together new data on the geognostic structure of the earth's surface in various regions. The ever-widening subject of Oceanography is dealt with by Dr. O. Krümmel, and Dr. Hann devotes 74 pages to recent advances in Geographical Meteorology. About 50 pages are given to the geographical Distribution of Plants by Dr. O. Drude, and the same space by Dr. L. K. Schmarla to the Distribution of Animals. Recent Ethnological research is dealt with in about 80 pages by Dr. G. Gerland, of Strassburg. Prof. Wagner is to be congratulated on the improvements which he has introduced into the *Jahrbuch*.

## NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

## EUROPE.

- Alpen.**—Karte der — zwischen Lech und Inn und die Umgebung von München, von L. Wennig. Scale 1 : 400,000 or 5·5 geographical miles to an inch. Würzburg, Staudinger. Price 1s. (*Dulau*.)
- Braunschweig.**—Spezialkarte vom Herzogthum — nach officiellen Quellen bearbeitet. Wolfenbüttel, Zwissler. Price 2s. (*Dulau*.)
- Deutschland und die Alpen.**—Profil durch — in der Linie des 10<sup>ten</sup> Längengrades östlich von Greenwich auf die meridionale Krümmung des Meeresniveau's aufgetragen im einheitlichen Massverhältnisse von 1 : 500,000 or 6·8 geographical miles to an inch. Der Bogen des Meeresniveau's ist mit Benützung des im gleichen Verlage erschienenen Lingg'schen Erdprofiles konstruirt. Verlag und Ausführung der k. b. priv. Kunstalt von Piloty & Loehle. München. Price 3s. (*Dulau*.)

In the construction of this profile Bessel's geodetic elements have been used. The meridian for which this section is given is the tenth east of Greenwich, and extends from 45° N. to 54° N., thus passing through Cremona, Ulm, Eibelsstadt, Bischofsheim, Northeim, and Hamburg, and showing the profile of the Alps of Bergamo, the Rhetian Alps, Bregenzer Wald, and the Algäu Alps. The projection shows the true curvature of the earth's surface when drawn on a scale of 1 : 500,000, and a chord of the arc subtended between the adopted latitudes serves further to illustrate the subject. In one corner the greatest elevations in each of the principal divisions of the world are given on the same scale, as well as the ocean depths. This section is well drawn, and should be very useful in conveying to students a correct idea of the earth's form, and the proportions which the elevations and depressions on its surface bear to the whole mass.

## ORDNANCE SURVEY MAPS.

Publications issued during the month of April 1887.

## 1-inch—General Maps:—

ENGLAND AND WALES: New Series. No. 306, with Hills, engraved, 1s.

## 6-inch—County Maps:—

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### AFRICA.

**Afrika**.—Spezial-Karte von — im Masstab von 1 : 4,000,000 or 55·5 geographical miles to an inch (10 Blatt.) entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. Zweite Auflage. 1. Lief. Inhalt: Prospectus.—Sektion Abessinien (6) nebst Bemerkungen von H. Habenicht. Sektion Congo (7) nebst Bemerkungen von H. Habenicht. Gotha, Justus Perthes, 1887. Price 3s. each part. (Dulau.)

This is the first part of a new edition of this excellent map of Africa, it consists of two sheets, and the prospectus (containing index map). Sheet No. 6 contains part of Dr. Junker's explorations, and also exhibits the boundaries of Emin Pasha's Province. On the coast of the Red Sea, the Italian territory extending from Massouah to Assab Bay is shown, and the colouring along the coast of Somali Land, which in the previous edition indicated that it was under German protection, has been removed. Sheet No. 7, boundary between the Congo Free State and the French possessions has been moved to the Mobangi, and the boundary of the Portuguese territory of Angola is also shown. In the Congo basin, the river Lukenje, the work of François, and some of Grenfell's is laid down. There are numerous other corrections and additions which bear witness to the careful revision which the original edition of this map has undergone.

**Massaua**.—Carta Speciale della Regione attorno a — tra l'Uokiro o Lava e l'Haddas, sino ad Asus, Ghinda ed Ua-a, costruita e disegnata da Guido. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Torino, 1887. 2<sup>a</sup> edizione, 1887. Price 10d. (Dulau.)

This map, which has in a great measure been compiled by Professor Guido Cora from some unpublished material, will doubtless be examined with interest by many in connection with the movements of the Italian troops in the neighbourhood of Massouah. The boundaries of the territory claimed by Italy are clearly laid down, and many of the topographical features, which do not appear in other maps, are shown.

**Suakin und Kassala**—Die Karawanen-Strassen zwischen —. Nach Itinerar-Aufnahmen von Joseph Menges, gezeichnet v. C. Barich. Scale 1 : 800,000 or 10·9 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 6. Justus Perthes, Gotha. (*Dulau.*)

## ATLASES.

**Argentine Republic**.—Atlas de la República Argentina, construido y publicado por resolución del "Instituto Geográfico Argentino" bajo los auspicios del Exmo. Gobierno Nacional y redactado por el Dr. Arturo Seelstrang, miembro del Instituto. Buenos Aires: Litografía y Encuadernación de Guillermo Kraft. 1886. (*Dulau.*)

This is the first issue of the Atlas, and contains the following maps:— Sheet V., the south-east section of the Province of Buenos Aires; sheet VIII., the province of Entre Ríos; sheet XII., the northern section of the Province of Córdoba, and sheet XIII., the southern section of the same province; sheet XXVI., the Government of Santa Cruz; and sheet XXVII., the Government of Tierra del Fuego and the Falkland Islands. From the above it will be seen that the sheets of this atlas are not being issued in consecutive order, but as soon as completed in sufficient numbers to make up a *livraison*. The maps are not accompanied by any explanatory text, neither is any information given as to the authorities or surveys from which they are compiled. This is to be regretted, as some of the sheets, especially Nos. XII., XIII., XXVI., and XXVII., contain a large amount of new work. The maps, which have been entirely produced at Buenos Aires, are very creditable specimens of work, and the Atlas when completed will be a most important and valuable addition to the cartography of South America.

**Erde**.—Die — in Karten u. Bildern. Hand-Atlas in sechzig Karten und 800 Illustrationen. In 50 Lieferungen vollständig. A. Hartleben's Verlag, Wien, Pest, Leipzig. 1. Lieferung. Price 1s. (*Dulau.*)

This is the first issue of a popular Atlas which will be completed in fifty parts, containing sixty maps, eight hundred illustrations, and copious letterpress. In this part are two sheets of maps, one containing the World in hemispheres, and on an elliptical projection, the other being a map of Norway and Sweden; both are well executed, and considering that there are twelve pages of descriptive letterpress, and twenty illustrations, it is marvellously cheap at the price, viz. one shilling.

**Royal Atlas of Modern Geography**.—The —, exhibiting, in a series of entirely original and authentic maps, the present condition of geographical discovery and research in the several countries, empires, and states of the world. By the late Alexander Keith Johnston, LL.D., F.R.G.S., F.R.S.E., &c. &c. With additions and corrections to the present date by T. B. Johnston, F.R.G.S., F.R.S.E., F.S.A.S., &c. With a Special Index to each map. A new edition. W. & A. K. Johnston, Edinburgh and London, 1887. Price, imperial folio, half-bound, in russia or morocco, with gilt titles and edges, 6l. 6s.; full bound, russia or morocco, gilt, 10l. 10s.

In the present edition of this atlas there are two entirely new maps, one of Western Canada and another of Mexico, whilst the two sheets composing the map of South America have been carefully corrected and revised that, with the

exception of the coast-line, they have been entirely re-drawn and corrected. On the sheets representing England and Scotland the names of many places which have grown to be important since the earlier editions were published have been inserted. Many corrections and additions will be found in the new maps, thus, in the map of the North Polar Regions, Major Greely's work is given; on that of Europe the boundaries of Bulgaria have been corrected; many alterations have been made in the maps of North-west and South Africa, and on the latter are shown the results of the explorations of G. M. G. and Giraud, some portion of Junker's work being also given. Sheet 42 except all the latest information we have on the subject of the Somali country. In the map of Persia and Afghanistan the boundaries of the latter country as determined by the Commissioners are given, and, generally speaking, nearly every map has received important corrections. There are, however, as might be expected in a work of this magnitude, several exceptions to this rule, foremost among which is the general map of Africa, which is certainly quite out of date.

As the Royal Atlas has now been before the public for twenty-six years and has passed through several editions, it would be needless to enter into the particulars as to the manner in which the maps have been executed, except to remark that the two new maps of Western Canada and Mexico, which are the work of Mr. W. J. Turner, who was formerly draughtsman to the Ordnance Survey Society, are quite equal to any of those contained in the previous editions, and which have gained for the Royal Atlas such a well-deserved reputation.

**North Atlantic Ocean.**—Synchronous Weather Charts of the ——— and adjacent continents for every day from 1st August 1882 to 31st August 1883. Published under the authority of the Meteorological Council. Part II. Charts from 8th November 1882 to 14th February 1883. London, printed for Her Majesty's Stationery Office by Eyre and Spottiswoode. And to be purchased either directly or through any Bookseller, from Eyre and Spottiswoode, Harding Street, Fleet Street, E.C., or A. & C. Black, Edinburgh, or H. G. Figgis & Co. Dublin. Price 17s. this part.

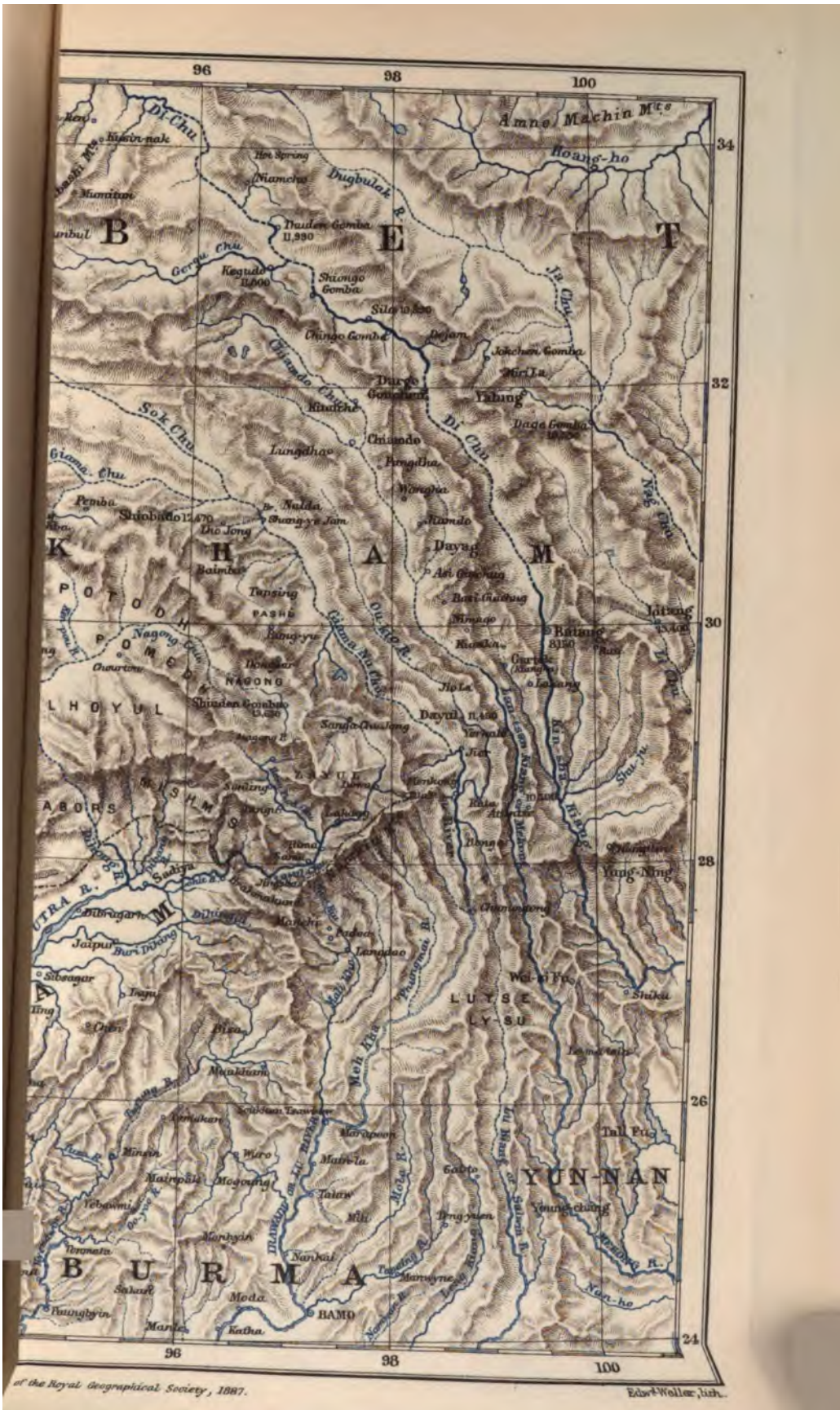
This is a continuation of the valuable series of meteorological charts, the first issue of which was noticed in the May number of the R.G.S.'s Proceedings.

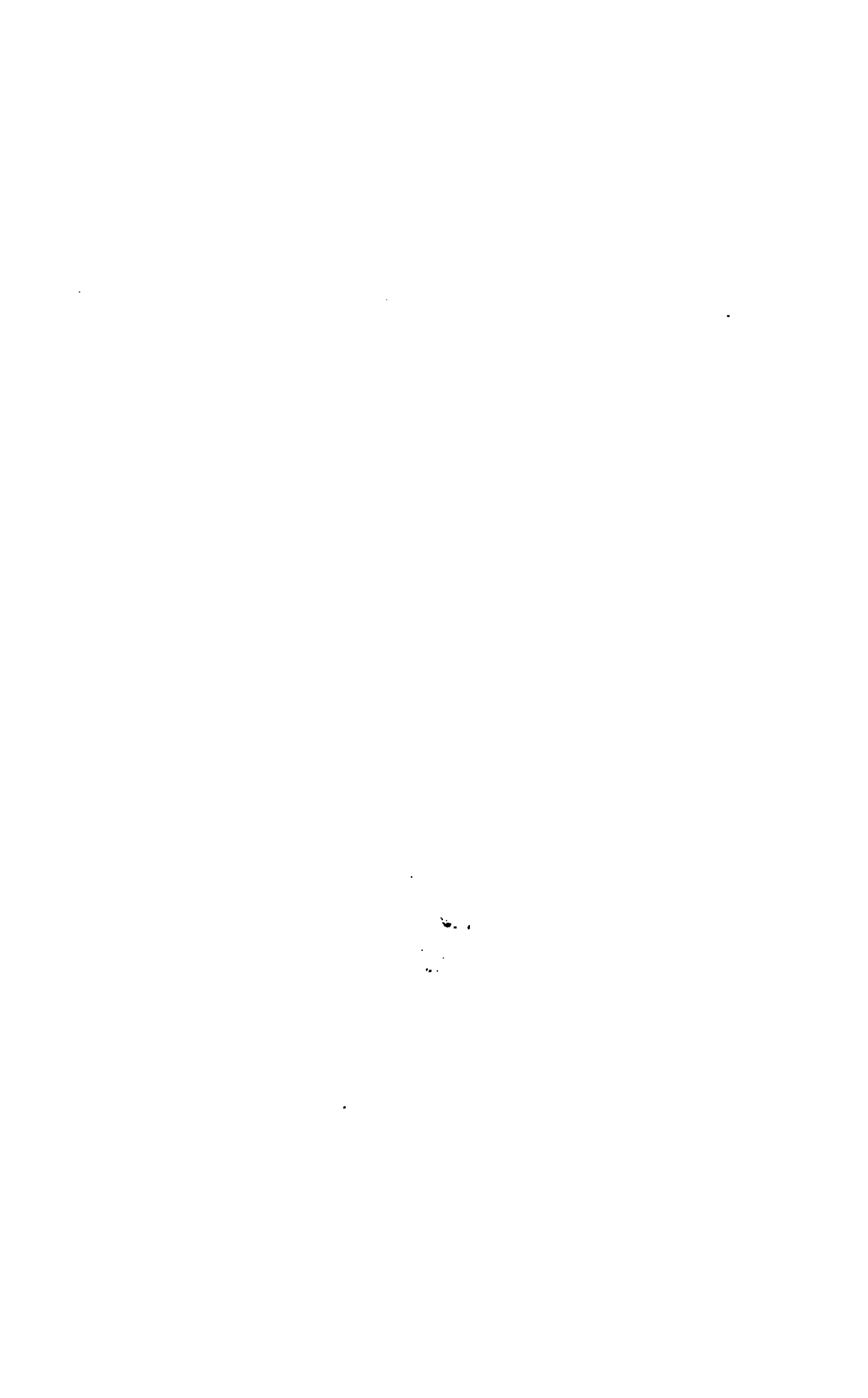
#### EDUCATIONAL.

**Kampen, Alb. de.**—Tabulæ maximæ quibus illustrantur terræ veterum, in usu scholarum editæ ab Alb. de Kampen. Tabula II. Italia. Scale 1:750,000 or 10·3 geographical miles to an inch. Gothæ, Justus Perthes, 1887. 9 sheets. Price 8s. (*Dulau.*)

——— Tabulæ maximæ quibus illustrantur terræ veterum, in usum scholarum editæ ab Alb. Kampen. Tabula III. Gallia. Scale 1:750,000 or 10·3 geographical miles to an inch. Gothæ, Justus Perthes. 9 sheets. Price 8s. (*Dulau.*)

These form part of a series of school maps in course of publication. They are drawn in a bold style, and seem in all respects well suited to the purposes for which they are designed.





PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
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*Explorations in Central Africa.* By Dr. W. JUNKER.

(Read at the Evening Meeting, May 9th, 1887.)

Map, p. 466.

ALTHOUGH I have not until now had the honour of addressing an English audience on the subject of my travels, I may take it for granted that my hearers are sufficiently acquainted with the account of my first journey, which was laid before the public in a lecture delivered in Berlin in the year 1879. In the same year I set out on my second journey, in which, after seven years' wanderings from my departure from Cairo, I reached the shores of the Indian Ocean, at Zanzibar, in December last. My purpose in claiming your attention at present is to lay before you a short account of my long wanderings in the equatorial provinces of Egypt. Through an unfortunate concurrence of circumstances, this journey covered a period of time and an extent of ground far beyond my original intentions.

In the short space of time during which I can claim your attention, I can, of course, give you but a meagre outline of my experiences during these long years, and of the results to which my journey has led. The mass of materials collected makes it quite impossible to linger over details.

Instead of expatiating on the incidents of the whole journey, and giving a minute account of the regions I have traversed, I shall confine myself chiefly to the events of the last few years. By the outbreak of the warlike troubles in the Sudan, the Equatorial Provinces were, during my residence, completely cut off from all communication with the north, which might have enlightened people in Europe as to what was going on there. While we had to remain in the dark as to what was taking place in the Sudan, you have had to remain, up to the present time, in ignorance as to the progress of events in the negro countries subject to the sway of the Egyptian Government. I believe, therefore, that I shall have a better chance of retaining your attention if I confine myself in the following account to the historical events

that occurred in those then inaccessible Equatorial Provinces during those eventful years. I shall principally treat of that region in which, at the present moment, Emin Pasha, with his soldiers and a small band of officials, is patiently holding out till the hour of deliverance arrive.

My route seven years ago was from Suez to Suakim, and thence, by a route which was new to me, to Berber. On my first journey to the Sudan, ten years ago, I had followed the Khor Baraka from Suakim by Tokar to Kassala.

On my return from my first journey I had taken the route from Khartum through the Bayuda steppe to Dongola. On my second journey a steamer took me from Berber to Khartum, where I arrived in the beginning of January 1880. As a travelling companion I had engaged a German, named Bohndorff, who was to aid me in preserving zoological specimens. A negro boy, whom I had brought with me to Europe on my first journey, accompanied me on the second, back to the negro countries. It was my purpose to explore the regions on the Welle, and to follow that stream as far as possible to the west. I hoped in this way to find a definite solution to the long open question, whether the Welle, first discovered by Dr. Schweinfurth, belonged to the Congo or to the Shari basin. At the time of my arrival at Khartum, the upper course of the Nile (that is to say, of the Bahr el Gebel) had been closed for months by grass barriers, the well-known Sudd. Several steamers were working, under the direction of Marno, at the task of freeing the stream. This circumstance thwarted my plan of reaching the Welle from Lado, through the Makaraka countries, which were known to me from my first journey to the Sudan. I therefore embarked in the course of January, the month of my arrival, on a steamer bound for the Bahr el Ghazal, and in February we reached Meshra er Rek. This was the starting point for the land journey into the country, then under the command of a Pasha, which had recently been the scene of bloody wars against Soliman Bey, son of Zibehr Pasha.

The journey by steamer up the Bahr el Ghazal was not without obstructions. We had about forty larger and smaller grass bars to force. These, however, on this river, do not acquire the thickly interwoven consistence of the bars on the Bahr el Gebel, but can generally be forced by a steamer. It was, however, hardly a year afterwards, that these obstructions in the Bahr el Ghazal brought hundreds of people to a miserable death. A steamer, returning from Meshra er Rek, drove into these grass bars with such force, that it could move neither backwards nor forwards. The steamer had, unfortunately, several barges in tow, full of people, whom Gessi Pasha, who was on board in person, wished to bring down to Khartum. All exertions to extricate themselves from the labyrinth of matted river-grass proved fruitless, and after they had been closed in several months famine set in, and carried off hundreds of wretched victims. The misery was indescribable. After

everything eatable had been consumed, the survivors supported life by devouring the bodies of the dead. A steamer sent out at a later period from Khartum, brought off all who had not previously died of famine. As already mentioned, the land journey begins from Meshra er Rek, and leads southwards, through various Dinka tribes, in seven days, to the station of Dyr Ghattas. After a somewhat lengthy stay there, I travelled west with Gessi Pasha by Wau and Ganda, formerly the Dem Idris station, to the head station of the Bahr el Ghazal provinces, Dem Soliman, formerly Dem Zibehr. My baggage was sent with my people, direct from the station Ganda to Dem Bekir, whither I followed after a short stay at Dem Soliman. The district traversed is, up to this point, known from the accounts of various travellers. On my first Sudan journey, coming from the south, through the Makaraka countries, I had already penetrated beyond the station Wau. This district was first correctly mapped by Dr. Schweinfurth, my esteemed master and friend, who after the loss of his instruments, undertook the tremendous labour of calculating the distances by counting his steps. My work of exploration, in the real sense of the term, began from Dem Bekir. From thence I travelled in the course of the following years, to the south and west on new and unexplored ground. In the south I was able to correct the route of the Italian, Miani, which had been very erroneously laid down in former maps. In the west I was able to follow stretch by stretch the route of the Greek traveller, Potagos, whose journal has apparently never seen the light, and to map it out.

My more immediate goal was the territory of the powerful Niam Niam king, N'Doruma, who, up to a short time before, had been at war with the troops of the Egyptian government in the Bahr el Ghazal province. He had formerly prohibited the passage of the ivory caravans through his country, and would suffer no station to be established in the districts under his sway. Adopting a plan followed in all my subsequent journeys, I sent messengers forward to N'Doruma to give him particulars about me, telling him to make a great point of my travelling without military escort. I never entered the territory of a powerful ruler, or even of one of the minor chiefs, without first waiting for his messengers, who generally came immediately with those I had despatched, to whom I used to give small presents for the chiefs. The negro is suspicious. N'Doruma himself, from such motives of suspicion, came to meet me in person, in order to satisfy himself about me and my people with his own eyes. Seemingly at ease about us, he hastened back into his own territories, in order, as he told me, to quiet the apprehensions of his subjects about our appearance. In the Bahr el Ghazal country I had procured several negro boys and girls to cook our food on the way. Though these were several times changed later on, I never, in all my journeys afterwards, had any other escort worthy the name than such attendants. A little



slave girl, hardly nine years of age, who had run away from her owner and found her way to me, and a little boy, of about the same age, accompanied me on all my journeys as far as Zanzibar.

At last, in the month of May, I was able to start from Dem Bekir with 250 bearers. In fourteen days I reached the huts of N'Doruma. Southwards from Dem Bekir, before we entered the territories of the Niam Niam, who call themselves A-Zandeh, we passed through scattered tribes of the Golo, Sere, and Bongo. In the first days we crossed a number of smaller streams, which, flowing to the north-east, belong to the Nile basin. Soon, however, we encountered streams flowing to the west, which are tributaries of the M'bomu. This is the most considerable of the northern tributaries of the Welle-Makna. If the Welle be, as it probably is, the upper course of the Mobangi, and a tributary of the Congo, the boundaries of the Congo Free State would touch on the Bahr el Ghazal territory. On the banks of some of these watercourses a luxuriant and variegated vegetation is met with, which, more to the east, does not occur till far to the south. Here I saw those magnificent "gallery" forests which have been described by Dr. Schweinfurth. These are narrow fringes of wood, rising one over another in the form of terraces, along the banks of the rivers, here forming deep gorges, in which the whole magnificence of a tropical vegetation lies hidden.

My real goal, as I have already said, was the districts on the Welle, particularly Mangbattu (Monbuttu). We owe to Dr. Schweinfurth our first accurate accounts of this country, who however, reached it by the more easterly route. The wearisome rainy season was at hand on my arrival at N'Doruma's. As that ruler wished me to remain for some time with him, I resolved to set up a station there for the coming months. With the help of N'Doruma's people, who were despatched to the work by hundreds, I was able to erect good, substantial dwellings. I caused my group of huts to be surrounded with a high stockade, and large branches of thorn to be piled up against this on the outside. This measure of precaution is necessary in those places, on account of the abundance of leopards. Negresses are frequently carried off by these animals, generally when fetching water in the twilight. Such an accident happened once in the neighbourhood of my station. The animal having left his victim, only half consumed, on the spot, we caught it on the following day in a large trap, the arm of the unfortunate negress serving as a bait. The leopard is in the habit of returning, in most cases, on several consecutive days, to the spot where he has found his food, before he looks out for another scene for his depredations. On this account, in order to catch the animal, the natives, immediately after a victim has been seized, build in the same place a small but strong hut of trunks of trees, in which they place a bait under a beam, arranged so as to fall whenever the bait is touched. Numbers of leopards are got rid of in this way. The lion, as is well known, will

not go into such a trap, and generally confines himself to certain districts, rich in game, in which he hunts the buffalo and antelope. There are other districts however, in which he frequently attacks man. In Dar Banda, I frequently saw the isolated grass huts of the negroes surrounded by a light network, to prevent midnight depredations by the lions, which are abundant in that district. The lion is said to avoid the network just as he does the trap. Hunting in central Africa is an unusually arduous business. Rank, high grass, sharp, cutting, and frequently growing to the thickness of rushes, covers the country nearly three-fourths of the year. For the same reason, during the whole of the rainy season, and till the grass dries up and is burnt, travelling is rendered immensely more difficult. The narrow footpaths, made use of by the negroes, and partly trodden out by wild animals (there are no other roads in Africa), are almost entirely concealed by the rank grass. The feet only, in most places, have room to move forward, while the grass, growing to the height of a man, interlaces in the middle of the path in such a way, that, on these journeys, I have frequently been unable to see a man immediately in front of me. I could only hear him rustling through the grass. For hours have I been compelled, with my lifted arm, to protect my eyes from the waving stalks. Such is the state of matters at the end of the rainy season and after it. But in December and January the grass has become so dry, that it can be burnt up. The burning of the grass is usual all over Africa. At this time, and in the first months after it, when, by means of the nightly dew, and later on, after the first new rain falls, young grass has again sprung up, hunting is considerably easier. Certain stretches of grass are preserved from the first general conflagration. The game retires into these spots. The elephant too, seeks shelter in the grass thickets. When the hiding places of the animals have been discovered, and the grass is dry enough to burn, these spots are set on fire from several sides at the same time. The frightened animals, remaining by their young from maternal affection, have their great feet hurt and singed by the burning grass, and then fall an easier prey to the spears of the natives.

Such extensive grass conflagrations present a sublime but terrible spectacle in the darkness of the night. While forcibly reminding the spectator that all things are transitory and doomed to destruction, they inspire him with strange and contradictory feelings. What an immense sum of animal life is thus uselessly destroyed! A whole insect world finds its death in the flames. Millions of grasshoppers and winged creatures of all kinds, started by the approach of the fire, rise into the air only to fall victims to their natural enemies. Insect-eating birds, flying about in the smoke above the flames, are waiting for the prey, which falls to their share in immense numbers. Flocks of birds of prey, chiefly kites, fly about in wide circles overhead, every moment picking up the large grasshoppers, or looking out behind the line of fire for field

mice, or even little snakes. In the months of drought, after the grass has been burnt, that is to say, from December to March or April, travelling in most of these equatorial countries is exposed to fewer obstacles. The tall troublesome grass has disappeared, and it is possible to move about in freedom to the right and left of the path. Later on, when the grass has again shot up to the height of several feet, the traveller, brushing off the early dew in the cool morning hours, is completely wetted through up to and above the knees. When the sun's rays exert their full power in the heat of the day, they then cause an itchy feeling in the legs, like that caused by heating bandages. The continual friction gives rise to sores difficult to heal, which at times I have had by the dozen on my legs.

After having finished the building of the station at N'Doruma's, I planted the garden with European vegetables and had the pleasure of seeing my crops sprouting up, the first to ripen being excellent radishes. My people and my baggage were now provided for. I thoroughly enjoyed the comfortable home, which I had created for myself only for a few weeks. But a quiet life would not harmonise with the plans I had laid out for myself. It was my wish to make myself acquainted with the surrounding districts in a series of excursions, leaving my companion at the station occupied in forming a collection of zoological specimens.

After two months' residence at N'Doruma's, I started, in the month of August, with only twenty bearers and the most necessary accoutrements and small presents for the negro chiefs. During my residence at N'Doruma's, I had put myself, through messengers, on good terms with various rulers and powerful chiefs of the Niam Niam countries, and received many invitations to visit them in their own territories. Only Mbio, the hereditary enemy of N'Doruma, to the east of the latter's territory, a powerful Zandeh ruler, refused me entrance into his country, and was continually threatening to surprise and burn my station. Two years afterwards his power was broken in a bloody war with the troops of the Government, and I passed through his territory on my flight before the forces of the Mahdi.

On my tour from N'Doruma I reached the Welle for the first time, crossed it, reached Mangbattu, and, turning to the east in a large curve, recrossed the Welle. Traversing the territories of various Niam Niam rulers, I again returned in December of the same year, after four months' absence, to my station at N'Doruma's. It is not in the plan of this short description to enter into details. I shall only mention how, at my first arrival at the Welle, I was involved in the hostilities of the Mangbattu and A-Barambo tribes. Though shots had already been exchanged, I was successful in my efforts to prevent an open war. I shall likewise pass over my stay at that time with Mambanga, a Mangbattu chief, and the advance of N'Doruma with his forces against the

Niam Niam chief Binsa, to release me, as he said, out of the latter's hands. This movement was occasioned by a report spread abroad that I was detained a prisoner by that chief. On this occasion, too, I was able to prevent hostilities. There were at that time several Government stations in Mangbattu. The unsatisfactory state of things among the Arabs there caused me thus early to give up my original plan of moving with my people and my baggage thither after the rainy season. Although I had not returned to my station at N'Doruma's till December, I had soon to think of another start, as, in the meanwhile, the most favourable season for travelling had approached. This time I intended to proceed, with all my people and baggage, to the country of the powerful Niam Niam chief Bakangai, southwards from the Welle.

As early as January 1881, I was on the way by a new road to the south-west, the country of the A-Madi, crossed the Welle there again, and obtained, though with the greatest difficulty, the necessary number of bearers among the A-Barambo. These bearers afterwards robbed me of a part of my goods and abandoned me, so that, for the time, I had to give up all thoughts of travelling in this direction. Nor could I find people to carry my baggage back to the Welle. There followed two months full of trouble for me, in which we had to construct huts for ourselves in the wilderness, and I was hardly able to find provisions for my few attendants. Fears of a night attack by the A-Barambo often deprived me of sleep. In the meantime I had secretly sent word to Sahsa, a friendly Niam Niam chief, who immediately came with his people to the Welle, and, in order to avoid open hostilities with the A-Barambo, through which our lives would have been endangered, caused my goods to be carried back across the Welle in small instalments. I myself followed last, and with a heavy heart. I wished however, to venture a new advance later, with only a small amount of baggage, by another road. For this reason I waited on in the country of the A-Madi.

At the end of April I sent Bohndorff with the baggage, under the care of the chief Sahsa, into the latter's country, south of the Mbomu, where he was to establish another permanent station. In the meantime great changes had been going on in the Mangbattu countries. Emin Pasha had sent regular troops to reduce them to order. Mambango, the Mangbattu chief whom I had visited the year before, was at war with the Government troops. A lately erected station on the Welle was hard pressed by Mambango's people. At the repeated request of the Egyptian officer in charge there, who had heard of my residence among the A-Madi, I afterwards resolved to act as intermediary between Mambango and the representatives of the Government, until reinforcements arrived from Emin Pasha. I visited the chief, who was favourably disposed towards me, in his camp, and according to the custom of the negroes, exchanged blood with him in token of the ratification of the bond of friendship between us. To secure the safety of the station, I remained

some months with the soldiers. At the end of November, 1881, I was able to carry out my plan of going to Bakangai.

From that time on I was almost uninterruptedly on the way, and up to June 1882, carried out all my various excursions south of the Welle and Bomokandi. My investigations and enquiries there enabled me to correct the route of the Italian, Miani, which should be laid down several days' journey more south. The territory of Bakangai, which that traveller likewise visited, does not lie directly south from the Welle, but south from its large tributary, the Bomokandi.

I found a friendly reception on the part of the powerful Niam Niam chiefs, Bakangai and Kanna, sons of Kipa. I there became acquainted with many an ancient custom of the once united Zandeh people, customs of which, among the Niam Niam tribes north of the Welle, hardly a trace remains. Among these are to be reckoned the honours they affectionately pay to their royal ancestors, to whom they render an almost religious veneration. Kanna, for instance, kept up the dwellings of his long deceased father, before whom food was daily placed, and a part of the produce of the chase. Even my presents to Kanna were carried into the cabins of his dead father, a circumstance which I had reason to regret, as I was afterwards obliged to furnish others. For three days we remained with Kanna at the huts of the dead Kipa before the chief led me to his own dwellings. Human sacrifices also, slaves taken in war, are devoted to this worship of the dead. The ruling chiefs are often moved by dreams and visions, in which their dead fathers appear to them, to engage in important acts, such as wars, &c. Immorality on the part of the Zandeh women is often punished by the husband with the death of the seducer. Instead of the punishment of death for such crimes, as well as for theft, the culprit is often maimed, by hacking off his two hands, his fingers, cutting off the ears, the nose, or the lips. While the men of many negro tribes go completely naked, I know no tribe where the women do not at least make use of the leaves of trees. In deep grief, during the time of mourning, they cast off these too.

The Mangbattu woman has a comparatively free position, and a seat in the assemblies of the men. Thus the Mangbattu chiefs whom I visited were, in their large assemblies, always surrounded by their chosen wives. The latter used frequently to come, without hindrance, with their stools to my evening fire, where they joined in the chat and laughter. Their clothing is very primitive, and consists of a piece of bark cloth which, in sitting down on their stools, they lay over their knees. The wives of the principal chiefs, however, are not satisfied with this simple covering. These people have, in consequence, become ingenious, and have succeeded in learning how to paint their bodies with geometrical lines, regular squares, or large round spots in the most various ways. The body of a Mangbattu woman of fashion is often

only to be compared with an inlaid floor, painted in three colours. As individual fancy discovers, from time to time, new and striking patterns, they are always able to produce new effects with their varying toilets. The furniture of the toilet table of a Mangbattu woman is of the simplest kind; a small pot of dark brown oil, from the crown of the oil palm; a piece of a broken dish with red, and one with black, colour, and some pieces of wood to lay the colour on. Finally, a few long hairpins, carved out of ivory, which serve as combs for their woolly hair. Besides the painting of their bodies, which takes an excessively long time, and requires the help of other hands than their own, the women spend hours in piling up their hair in artificial knots, over six inches high. In patience and perseverance at the toilet the Mangbattu women excel their more civilised sisters.

From the territories of the chief Kanna, and that of the southernmost A-Zandeh, I passed over again to the Mangbattu territory, and spent a short time with the Italian traveller Casati, at the station Tangasi. Thence I passed to the east, through the territories of the A-Bangba Momvu, crossed once more the Bomokandi to the south, and became acquainted with the tribes of the Madje, Maigo, and Mabode, and discovered there, on my southernmost journey, the river Nepoko, which I identify with Stanley's Aruwimi.

With Sanga, a Mangbattu chief living on the Nepoko, I spent the hardest time I ever had to go through in Africa. Wholly confined to negro diet, my health had suffered. Numberless sores on my legs did not heal for months. I was at that time in want of every necessary, even soap, having left all my baggage behind, on account of swamps, which were difficult to cross. On those excursions to the south of the Bomokandi, I had the satisfaction of meeting with the dwarfish race of the Akka, or Tikki Tikki, in their settlements. They form wandering colonies, and are therefore difficult to light upon, being both timid and suspicious in the extreme; they are excellent marksmen, live almost exclusively on the produce of the chase, and are very skilful in killing the elephants with their little arrows.

On my travels I was accompanied for years by two Tikki Tikki. Bakangai made me a present of a stout little fellow, together with a chimpanzee. I afterwards sent him, together with my collections, into the Bahr el Ghazal territory. Both passed into the hands of the Mahdi's people.

Weak in body, and still suffering from sores on my hands and feet, I finally returned to the Tangasi station in Mangbattu, where, in Casati's society, I allowed myself a month's repose. The last excursion had been very trying. There being no paths, we followed the elephant tracks, and had often been obliged to creep through the thicket in a stooping posture. But, at any rate, it had terminated my journeys south of the Welle. After having been separated from my baggage for

more than a year, I felt a longing to reach my station, which Bohndorff had in the meanwhile transferred from the chief Sahsa's to Semio's, a Zandeh chief, living north of the Mbomu.

In August, 1882, I left for good the countries south of the Welle. Crossing once more the Welle-Makua, I travelled by a new way to the north, through the country of the A-Madi. I afterwards passed through several districts of A-Zandeh chiefs, crossed the Uerre, a considerable northern tributary of the Welle-Makua, beyond the territory of the chief Yapati, and after traversing various territories of minor chiefs and scattered tribes, I reached the Mbomu, and beyond it, at the end of September 1882, my new station at Semio.

Amongst full chests and long missed necessaries which can make life tolerable even in those remote regions, I soon forgot all my sufferings. My companion had often been ill in the course of the year, and wished to return to Europe. I at once set to work packing up the collections which he was to take with him. In October he started for the Bahr el Ghazal territory, where, in the meanwhile, Lupton Bey had become governor. I myself intended to start on my travels again in November and explore the ground to the west. At the same time, I wished to follow the course of the Welle-Makua further. A sad misfortune at this time deprived me of a part of the valuable property of which I had hitherto been very sparing. A fire that broke out in the station burnt down three huts, and destroyed a considerable part of my goods. Before departing again from Semio, I received news from Lupton Bey that the Dinka tribes had revolted, and that the way to Meshra er Rek would therefore be closed for some time. This was in October 1882, the commencement of long uninterrupted and bloody wars in the Babrel Ghazal territory, on which finally the invasion of the Mahdi's troops followed.

My companion, Bohndorff, was therefore obliged to return to our station at Semio, not having been able to proceed to Meshra er Rek. In the beginning of December I had again started for the south, so that Bohndorff arrived too late to see me. On my last tour, which did not end till the 1st of May, 1883, I travelled first to the south-west and reached the Welle-Makua in the immediate neighbourhood of the spot where two of its principal tributaries join it, the Uerre from the north, and the Mbima from the south. On this trip, as well as still further to the west, I was traversing the broad territories of the Bandyia. According to their language they are a Zandeh tribe; but they themselves boast of an independent descent, and will admit to have nothing in common with the A-Zandeh. On the numberless islands of the Welle-Makua, I became acquainted with the A-Bassango, with a language of their own. The south bank of the Makua is inhabited in that neighbourhood by tribes of the A-Babua. It would lead me too far here to mention all the tribes and peoples that I came in contact with personally, or heard of.

On the last great advance towards the west, I once more reached the Welle-Makua, at a place where, as in the former case, it is divided into many channels by the numberless islands in its bed, whence it is impossible to estimate its breadth. The Mbomu is said to join the Welle-Makua five or six days' journey more to the west. Making a large bend to the north, I crossed the Mbomu, which at that part is a broad, navigable stream. From the north it receives the Shinko, to which, in its turn, the Gongo Lowa is a tributary. I passed through the Dar Banda, reached the station Mbanga (the former seat of Mofio as given on Schweinfurth's map), crossed the territories of various scattered tribes of the Biri, the A-Kāle, &c., and, coming from the north this time, arrived at my station at Semio on the 1st of May, 1883.

Shortly before my arrival, Bohndorff had again started for the Bahr el Ghazal territory, Lupton at that time having hopes of quelling the insurrection of the Dinka tribes. Nearly all the stations in the Bandyia territory had been called in during my last tour, and the garrisons sent by Lupton Bey to the Bahr el Ghazal province to put down the insurgent Dinka. I now regarded my travels as finished, and intended likewise in a short time to start for the Bahr el Ghazal. But it was not to be. After my return to Semio I had packed up my goods and my fresh collections, and was only waiting for better news from Lupton Bey.

But in the course of the next few months things became worse instead of better. Though he had collected all his available troops from the outlying stations, Lupton did not succeed in putting down the Dinka. These were afterwards joined by the Nuehr, the Agahr, and various tribes on the Rohl. The Dinka, as Lupton Bey then wrote to me, made an excellent use of the guns that had fallen into their hands. It was a trying time for Lupton. I frequently received communications from him from all parts of his province, according to his movements against the rebels. But he held his own with the greatest bravery. Full justice has till now not been done him by the public, and for a very intelligible reason. People were in complete ignorance of all that had been going on in his province. The eighteen months' war of the Dinka against Lupton's troops was far more bloody and exhausting for both parties than the later engagements against the troops of the Mahdi in Emin Pasha's province.

After these exhausting wars against the Dinkas, who had been finally supported by the Mahdi's forces, Lupton, betrayed by those about him, was compelled to deliver his province without resistance to the emissary of the Mahdi, the Emir Karm Allah. The chief cause of this surrender is to be sought in the fact, that Lupton had almost exclusively only irregular troops at his disposal, a rascally mob that Gessi had already begun to sweep off out of the country, after the war with Soliman Bey. These irregulars consist of Dongola people, and Arabs of all kinds, who were certainly of some use in a war against the infidel



negroes, but who very naturally abandoned Lupton Bey whenever they were asked to march against men of the same faith.

In Emin Pasha's province matters stood differently. There the regular troops formed the majority. These are drilled negro soldiers, who, besides, mortally hate the Arabs, and are always ready to fight with them. Thus the next few months were passed at Semio in anxious expectation of the issue of events. On the 1st of August, 1883, I made the following entry in my diary:—"All my hopes of reaching home this year have come to nothing. Thanks to Lupton's frequent communications, I have been kept well informed as to the state of things in the Bahr el Ghazal province. Our eyes are turned with longing apprehension to the north whence we anxiously expect help. The steamer from Khartum has not yet been heard of. What will the immediate future bring us? Lupton's last news is ominous. Hassan Muhsat killed, and sixty muskets again fallen into the hands of the rebels! The way to Meshra er Rek again closed through the insurrection, and 900 muskets despatched to open it up again. My fears with regard to the people on the Rohl and the Rumbek station have been confirmed, for Lupton writes:—'Rumbek destroyed, only six soldiers escaped.' Furthermore, Lupton's account of the disposition of the Arabs in the Mudirich, and the flight of thirty Dongola men and some leading Faki to the Mahdi! Finally, should the incredible happen, and the Arabs hard pressed from the north overrun the Bahr el Ghazal province, there would remain for us only flight to the south. Oh for help from Khartum!" I had already induced Semio, whom I knew to be a faithful adherent of the Government, to establish trustworthy outlooks on his frontiers towards the north, especially from the station Mbanga. Through spies I was continually receiving information about the attitude which the neighbouring tribes assumed towards the insurrection of the Dinka.

Lupton writes me under date of the 10th of August; "No steamer yet! If one does not come soon with ammunition for me, it will soon be all over with everybody here. Satti (Lupton's sub-governor) has set out once more with 700 men to Meshra, and I hope to God he may find the garrison there alive. I entertain grave apprehensions about them. Some thousands of negroes, Dinkas and Nuehr, attacked the station at Gohk. We lost 500 men, but the enemy far more. After three days' fighting the negroes were driven off by the reserves that hastened up from Djur Ghattas."

At last in October, I received news that a steamer from Khartum had arrived at Meshra. In spite of the unfavourable state of affairs, I was at that time about to start to join Lupton, in order to be able to avail myself of the next steamer to Khartum. For this purpose I set out from my station with all my baggage. I prudently remained to await further news in company with Semio, to hunt for several weeks in a district which we passed through on the way, where game was abundant. This

was a very fortunate circumstance for me. I should otherwise have undoubtedly had to share with Lupton and Slatin, the misfortune of now finding myself a prisoner amongst the Mahdi's people. A kind Providence protected me now, as well as afterwards, in the hard times that followed, and always pointed out the proper way out of all troubles. On the 31st of October, Lupton wrote me a few lines as follows:—"I shall write you further particulars in a few days. We have had heavy losses to suffer. I have lost Rafai (Lupton's best leader), and 400 of his soldiers were killed by the Dinka. Mudir Satti is fighting his way with 800 men to Meshra el Rek." I must add, that even thus early, Arab tribes from the north were making common cause with the Dinka, were hounding them on, and afterwards fighting in their ranks. From that time the Mahdi influence from the north became more and more perceptible, otherwise the Dinka tribes could never have held out so long.

After this news from Lupton I was again condemned to a painful period of expectation. I became more and more reconciled to the idea of making my escape, in case of necessity, by way of Lado. A few days afterwards I received further particulars from Lupton as follows: "I beg you to do your best to persuade Semio to collect about 1000 of his people with spear and shield, as well as all those who have guns, and come to my help. I now see no other way of putting down the insurrection than by the help of the Niam Niam chiefs. I am now collecting Bongo people here, who will march with us against the Dinkas. Do everything in your power to persuade Semio to lose no time, and send him to meet me as soon as possible. Bohndorff is here, but I am afraid I shall not be able to send him to Meshra."

Such were my prospects after six months of long and anxious expectation. I was, however, glad to find Semio ready to hasten at once to Lupton's help. He took the necessary steps immediately. I myself began to prepare to travel back through the broad Niam Niam country, by N'Doruma to Makaraka and Lado. But first I wanted to see Semio start with his people to Lupton. I urged him to hasten every day, but eight days passed before the people were collected and set out under his leadership.

On the 16th of November, 1883, I began my journey to the east, and reached Emin Pasha at Lado in January 1884, after 55 days' march. After my departure, having been provided with guns and ammunition by the steamer, Lupton Bey had some success in his long-continued war. Bohndorff was able to travel to Khartum with the steamer, returning thither at the end of December, but all my collections remained behind in the Bahr el Ghazal province for want of bearers, and were afterwards lost. With that steamer I received my last letters from Europe, dated May 1883. Up to March 1886, when I received, at Unyoro, the first news of the events of the last years in the Sudan, we remained nearly three years in the dark, as to what was going on. We could give no

credit to the threatening letters the Mahdi's people sent us, though, unfortunately, much of their contents turned out afterwards to be but too true.

Emin Pasha's province had been quiet up to the first months of 1884. The insurgent Agahrs had been energetically put down, and the devastated station Rumbek at once set up again in order to restore communication with the Bahr el Ghazal. In vain we waited in Lado for the arrival of a steamer. The successes of the Dinkas were too tempting for the other negro tribes, and so in Emin Pasha's province also the rebellion assumed more formidable proportions. In February 1884, Gheba Shambe, with the whole garrison, fell into the hands of the negroes. The station Bor too, had, later on, a hard struggle to sustain, and finally not only the garrison, but also the troops hastening to its help, were all put to the sword. In consideration of these circumstances Emin Pasha gave orders to give up all stations in Latuka, east of the Nile, and drew his troops nearer together. After many letters from Lupton in the first months of 1884, in which he speaks confidently of his successes against the rebels, we were without any news from him for a long time. At last, on the 23rd of May, we received letters from him, dated the 3rd, 7th and 12th of April. In the last letter he says: "The army of the Mahdi is but six hours from the Mudirieh. I shall fight to the last moment. If I fall send my last remembrances to those dear to me." Lupton enclosed the copy of a long threatening letter in Arabic to the people of Bahr el Ghazal, meant to convert the people to belief in Mohamed Ahmed the Mahdi. With heavy hearts, we spent the following days with Emin Pasha. But we were not to remain long in uncertainty. The news received at the same time of the destruction of Hicks Pasha's army could not remain a secret to the people of the province. The most various reports were already in circulation about it. The destruction of Hicks Pasha's army had now to serve us as an explanation why no steamer had been sent from Khartum, in spite of Lupton's last pressing reports in December. On the 27th of May, Emin Pasha invited me early in the morning to his divan. Full of troubled thoughts I hastened to him. Letters from the Bahr el Ghazal province lay open before him. With streaming eyes he handed me one addressed to myself. The inevitable misfortune had happened. The Bahr el Ghazal province was in the hands of the Mahdi's troops. The letters which had come in were from a certain Emir Karm Allah, representative of the Mahdi, in whose name he had occupied the province. In a long letter to Emin Pasha he demanded of the latter the surrender of his province likewise. A second letter in Lupton's name, written in Arabic, confirmed the surrender of the Bahr el Ghazal province. This letter had Lupton's seal to it, and the following words in English: "I believe all that is written above to be true. But as you are older and more experienced than I, I shall give you no advice as to what is to be done."

Various threatening letters to the officials of the province sought to convert the people to believe in the Mahdi. There was likewise a circular to the entire Mahomedan population from Mohamed Ahmed, the Mahdi.

In the letter from Emir Karm Allah to Emin Pasha, the latter was required to come immediately with his people into the Bahr el Ghazal territory, to start on his journey to Kordofan, to the Mahdi. Lupton wrote in a few words to me, that he was to set out in a few days to Mohamed Ahmed. Emir Karm Allah's letter to me was as follows:—

“29th *Djuma* Achir, 1300.

“In the name of God the All-merciful, &c., &c. The slave of God, Emir Karm Allah, Sheikh Mohamed, to Dr. Junker the traveller. After my greetings to you I give you to know, O traveller! you have certainly heard that the times have changed, and that the power of the Turks is broken, through the appearance of the successor of the Prophet of God, whom we have expected, our Lord Mohamed el Mahdi, all hail to him! You have also heard how he has repeatedly destroyed the armies of the Turks. First, at the island of Ola; secondly, the army whose leader was Rashid Bey, called Abu Kuka, the Mudir of Fashoda; thirdly, the large army under the command of Yusuf Pasha es Shelali, and with him experienced and skilful people, to the number of 9000 men; fourthly, the army under the command of Mohamed Pasha Imam, to the number of 12,000 men; fifthly, the conquest of the Mudirieh of Kordofan; sixthly, the army of the Governor-General of the Sudan, Aladdin Pasha, an officer of the Staff called Hicks, and a number of Mudirs and officers, and with them strange cannon, seven of them five-grooved mitrailleuses, and among them seven Krupp cannon, and the remainder well-ried cannon from the time of Ismail Pasha. Altogether 36 cannon, and seven rocket batteries, and altogether 36,000 men and more; and all were killed by the followers of the Mahdi, all hail to him! how in the twinkling of an eye took place the conquest of all the Mudirieh of the Sudan, and their subjection under the sway of the Mahdi; how the Mudirieh of Dongola, Berber, Khartum, Taka, Senaar, and Fashoda, and in the west, Fasher, Kolkol, Kerkebik, and others, have become friends of the Mahdi, all hail to him! And he sent me as his representative from his side, provided with orders and commands under his sacred seal, to the Bahr el Ghazal province, to bring it from the darkness into the light; and on Tuesday the 26th of the current month of this year we arrived at the principal town of the Mudirieh Bahr el Ghazal, and were received by all the authorities and the Mudir, and all subjected to the commands of the Mahdi, all hail to him! and ready to travel with me to Kordofan; and as you have goods lying here (Emir Karm Allah meant my collections lying there), and as I am afraid that the roads will remain closed to you for the future, I have addressed these directions to you, that you may start at receipt of this, and come

here and receive your goods without delay, and if not, the goods will certainly be abandoned and lost, and in conclusion my greetings.

Seal ○ KARM ALLAH MOHAMED."

Emir Karm Allah's letter about the surrender of the province received a carefully worded answer from Emin Pasha, that he was ready to deliver the province into the hands of the representative of the Mahdi in order to prevent useless bloodshed. The hostility of the negroes, however, such was the further tenor of the letter, did not permit Emin Pasha to leave the province and expose all that remained behind to the danger of destruction. Emin Pasha would therefore wait for further orders and a representative. Till then he should try to hold the province for the Mahdi.

From the great distance of the Bahr el Ghazal province, Emin Pasha gained time, which was above all things necessary. Possibly, on the one hand help might come from Khartum, on the other hand outlying stations might be called in and a defence organised. For this purpose orders were at once given. Soon after this, in order to despatch our letters to Uganda and Zanzibar, I travelled to Emin Pasha's southern stations, and remained for a considerable time at Dufi. About this time the negro tribes on the route to the Bahr el Ghazal rose and killed many Arabs, who, in various bands from Makaraka and the Rohl territory, were marching to join Emir Karm Allah. Other hordes of Arabs began hostilities against some outlying stations not yet called in, and finally, in the last months of the year 1884, besieged the fortified station of Amadi, only five days from Lado. In the hope that a steamer would at last come from Khartum, I returned to Lado in September. For months we had heard nothing more of the Mahdi's forces, and were almost giving ourselves up to the hope that Emir Karm Allah's men had withdrawn to Kordofan. The besiegers of the Amadi station had, up to the end of the year, several times received reinforcements of Arabs. Once they had been driven back with loss, till all at once, in January 1885, we heard that the Emir Karm Allah had appeared with his troops before Amadi. Once more letters came to Emin Pasha, and threatening letters to various people. At that time I had again started for the south, to the chief Anfina, in the country of the Magungos, on the Victoria Nile. During a residence of some months I endeavoured to despatch thence our letters to Uganda. In April I received news from Emin Pasha that the station Amadi was taken, and that a part of the garrison had cut their way through to Makaraka. With the help of the soldiers from Mangbattu, the pursuing Arabs were soon put to flight, after a hard struggle, at the station Rimo, in Makaraka. Makaraka was, however, evacuated, and the soldiers reached the Nile at the station Bedden, whence they were immediately

ordered to Lado to the defence of the station. Emir Karm Allah, after the fall of the station Amadi, notified to Emin Pasha that he should soon appear before Lado, and sent on this occasion, among others, the following letter:—

“12th Rabi Achir, 1302.

“Copy of a gracious order of our Lord the Mahdi—all hail to him! to his representative Karm Allah, Sheikh Mohamed, Emir of the Bahr el Ghazal, and the Hat el Estwa (Equatorial Province), dated the 12th Rabi Achir, 1302 (28th January, 1885). In the name of God, the All-Merciful! the All-Pitiful! Praise to God, our gracious Lord! and our prayers and submission to our Lord Mohamed and his! And after these! From God's devoted slave, Mohamed el Mahdi, son of Abdallah, to his dear friend and representative Karm Allah, son of the Sheikh Mohamed, whom God in His goodness enlighten and protect with the eye of His will! Amen. Receive from me many greetings, and the mercy of God, and His blessing on thee! I give thee to know, my dear friend, that according to God's infallible promise and His unchangeable goodness, the town of Khartum has been taken by the help of the Living and Everlasting One, and indeed on Monday the 9th of Rabi Achir of the current year, early in the morning, through the help of the troops of the Faith, who advanced and stormed the works, trusting in God, the Lord of the World, and in about half an hour, or less, there befell the enemies of God what was appointed for them: they were destroyed to the last man, and their fortress; though they had prepared themselves in their strength, they fell scattered at the first attack on the field, under the hands of the Army of God and the troops of the Faith, and sought safety by entering into courtyards and closing the gates. Our army followed them, and killed them with the sword, and pierced them with the lance, so that lamentations soon were loud, and weeping increased, and they were all subdued. Then they laid hold on the rest, who had shut their doors from fear of the approach of harm, and took them captive and killed them, and there remained of them only a few women and children.

“But Gordon, the enemy of God, how often soever we have exhorted him, and bidden him cease, and submit himself to God, yet he never would, and indeed, because he was a rebel and a disturber from the beginning. So he found the end of his fate, and reaped with repentance what he had sown in crime; and God banished him to the house of His wrath, his abiding place; and so the multitude of the ungodly were destroyed, and thanks be to God therefore, the Lord of the World; and to whomsoever has deserved it, may fire be appointed as a punishment, or Paradise as an abiding place, through God's appointment; and God preserve thee from the reprobate! Amen! with the consent of the Most High and Mighty, the Sender of all Good. And of our followers ten died the death of the Faith in this conquest, and of the others none

were wounded or hurt. And this is one of the mercies of God, and from Him is the victory, and we have thrown ourselves on the earth to thank Him for the victory of the Faith. And do thou likewise and receive my greetings.

*“The representative of the Mahdi in Bahr el  
Ghazal and Hat el Estwa,  
“KARM ALLAH.”*

Before this, Emin Pasha had sent the divan, with the writers and their families, the Government books and documents from Lado to Duffi, whither he then followed himself, and afterwards remained at Wadelai. After the last organisation of the concentrated troops, about 1500 soldiers were distributed among the stations, Lado, Regaf, Bedden, Kiri, Muggi, Laboro, Chor Ain, Duffi, Wadelay, and Fatiko. After the fall of the station Amadi, the insurgents were daily expected before Lado. But news soon came that they had returned to the Bahr el Ghazal by forced marches, a circumstance at that time inexplicable to us, after the advantages they had gained. Perhaps the Mahdi had given the Emir Karm Allah special orders on the advance of the English at the time of the fall of Khartum. Suffice it to say, that from this time forward, Emin Pasha's province was no longer molested by attacks of the troops of the Mahdi. Some later hostilities and attacks of the Bari negroes were repulsed by the soldiers of Lado and Regaf. I returned in November 1885, from Anfuia to Wadelai, as I had found out that all our letters to Uganda by this route were intercepted. On the 2nd of January, 1886, I left Emin Pasha and Casati, the Italian traveller, for the third and last time. Crossing the Albert Nyanza Lake, I went on to Kibiro, and to Kabrega's, king of Unyoro. Here, at last, I succeeded in learning with certainty, that there was still a missionary station at Uganda. After much trouble I managed to put myself into secret communication with them by writing. The first letters from the missionary Mackay, in Uganda, brought me Reuter's telegrams, about the events in the Sudan, gathered together in the course of two years, further, a letter from His Excellency, Nubar Pasha, for Emin Pasha, a letter from Sir John Kirk, English Consul-General, at Zanzibar, and one from Said Burghash, Sultan of Zanzibar. This joyful day for me occurred in the month of March last year. At the same time Mackay wrote me, that Muanga, king of Uganda, had caused the English bishop, Hannington, to be murdered, and that Dr. Fischer's expedition, sent out by my brother to seek me, had not received permission to pass through Uganda. Mackay advised me to use the greatest caution and patience, and not to enter Uganda rashly.

Thus, to the many sufferings I had already undergone, there was added a forced halt of some months on the borders of Uganda. During this time I was severely injured by an unfortunate accident, and, to crown all, I was deserted by my bearers. In the meantime war had

broken out between the Wa-gānda and the Wa-nyoro. Thus it was not till the month of June, after I had already been given out for dead in Uganda, that I received King Muanga's permission to enter his capital. I there found an opportunity to purchase 2000 dollars' worth of cloth from Arab dealers, for Emin Pasha to make dresses for his men, who in the last few years had only been able to cover themselves with skins. From Uganda my way led me in a month and a half over the Victoria Nyanza, a passage which, on account of violent contrary winds, lasted 26 days. I then held on southwards to Tabora, a great emporium of the Arab traders from Zanzibar. I there joined the great ivory caravan of Tippo Tip, the well-known ivory dealer of Central Africa, and reached the coast in his company. Unfortunately, the close of my journey was marked by a bloody murder. A German, H. Giesecke, representative of the great Hamburg firm, A. Meyer, for ivory, who likewise had placed himself under the protection of Tippo Tip, in order to reach the coast, was shot one night close beside my tent by hired murderers. The occasion of the crime was undoubtedly the jealousy of the Arab traders of Tabora that Europeans began to compete with them in the ivory trade. After this event there followed anxious hours and sleepless nights for me till Providence finally conducted me to the coast at Zanzibar. Stanley's expedition has now started for the rescue of my friend Emin Pasha. I am sure that you all share my heartfelt wish for its prosperous and speedy issue. I may also express the hope that we may soon have amongst us again the poor European prisoners so long in the hands of the Mahdi's followers, the brave and honourable Lupton and Slatin Bey.

Before the paper,

The CHAIRMAN in introducing Dr. Junker, said they all recognised him as one of the most persistent and successful of travellers in those regions of Africa which lie to the south of Gordon's provinces and which formed the water-parting between the basins of the Nile, Lake Tsad, and the Congo. The Society had followed Dr. Junker's travels with interest and sympathy, and he tendered him a cordial welcome in the name of the Members.

After the paper,

The CHAIRMAN said that since entering the room he had been informed by the Secretary of the Church Missionary Society, that he had that day received letters from Mr. Mackay, which showed that up to date no known harm had befallen Emin Pasha.

Mr. EUGENE STOCK (of the Church Missionary Society) said that the letters received that day from Uganda were to some extent anticipated by a Reuter's telegram from Zanzibar about seven weeks ago, which stated that Mr. Mackay and the French priests were well on the 24th January. The letters just received came down to January 2nd. They had come across the Victoria Nyanza in the *Eleanor* Mission-boat, and then were carried from the south end of the lake by the mail men who were kept running every two months a distance of 700 miles to the coast. The boat was entirely navigated by Africans and went regularly backwards and forwards between Uganda and the south end of the lake. It was evident that that



boat and the mail men brought the news from Emin Pasha which had reached Dr. Felkin. It was a great happiness to the Church Missionary Society that their boat and mail arrangements had been subservient to the cause of those great travellers whom every member of the Geographical Society delighted to honour. Mr. Mackay mentioned that there had been for a time a cessation of the massacres which took place some time ago. Although the adherents of both the English and French Missions had to be careful and more or less keep in concealment, yet they were able to meet together from time to time, and he gave a little account of the festivities which took place last Christmas. He was in some favour with the king at that time owing to a particular incident. He had on several occasions put up a great flagstaff, first for Mtesa and then for Mwanga, but that flagstaff had a habit of falling down, and he was always called in to prop it up again. He had now performed the feat again, and in consequence of that he was in favour with the king. Mr. Mackay also mentioned the supplies sent on by Dr. Junker to Emin Pasha, and stated that ivory was being brought to Uganda, and that was a key which would open many doors. That might partly account for the favour with which he was regarded. He (Mr. Stock) would take the opportunity of correcting a common mistake. Because Mr. Mackay was so exceedingly clever with his hands it was often supposed that he was an artisan, but he was an educated Scotch gentleman, a mechanical engineer by profession, who kept himself *au courant* with what took place in the civilised world, and particularly with the 'Proceedings' of the Royal Geographical Society.

Sir FRANCIS DE WINTON said that among the many instructions which he received from the authorities at Brussels before proceeding to the Congo, none were more urgently impressed upon him than that he should do whatever was in his power to ascertain the whereabouts of Dr. Junker and other Europeans who were travelling in some part of Central Africa. He need hardly say what pleasure it would have given him as Administrator-General to have received news of Dr. Junker, but that was unfortunately denied him. Between Dr. Junker's southernmost point at Sanga and Stanley Falls there was a considerable distance, which in Africa was rather difficult to overcome. He therefore had not the honour and pleasure of welcoming Dr. Junker to the Congo Free State, but he shared with all present the pleasure that they felt in seeing him among them at that meeting. It must have been noticed how very little Dr. Junker had said about himself and his doings in the interesting paper he had read, and how much stress he had laid upon the work that had been performed by Lupton Bey and Emin Pasha. The modest description that Dr. Junker had given of his own work enhanced the value of that work. To anybody accustomed to travel in Africa the tracing of his wanderings on the map meant a great deal—daily marches in the hot sun, great patience, great endurance, and the use of all those faculties which went to make up the true African traveller. They would all agree that Dr. Junker possessed all those faculties in a most remarkable degree. The routes which he had so carefully marked out would be found very valuable to the cartographer and the student of the geography of that portion of Africa. He had settled many questions with regard to the watershed between the Congo and the Nile, and had brought about friendly relations between the natives and the white men. That was a great thing in Africa. The white man following the Arab had always great difficulties to encounter, because the Arab course through the country meant the collection of ivory and slaves. Nothing was more gratifying in connection with Dr. Junker's travels than the fact that he was able to traverse the country after the Arabs had been in possession of it. It was now known that for the present Emin Pasha was relieved from any attempts that might be made against him by the Mahdi's followers. The expedition which was *en route* through the Upper Congo to Stanley Falls would then find its way across country to Wadelai,

and before the end of the present year he hoped to have some news of the meeting of Stanley and Emin Pasha. In describing the advance of the Mahdi's emissaries from the north Dr. Junker gave the idea of a Mahomedan invasion into the centre of Africa. It was well known that the Mahomedan religion more easily adapted itself to the negro of Central Africa than the Christian religion, but when it was remembered that Christianity and civilisation were advancing from the westward by the Congo, and would come from the eastward by the Victoria Nyanza, it was to be hoped that it would drive back the Mahomedan invasion, and preserve that region for the benefit of the world in future.

Mr. PAUL DU CHAILLU said that for the last few years he had been so much engaged amongst the old Scandinavians, and in studying the archæology of the north of Europe, that he was sorry to say he had not kept up the study of Africa. He had, however, heard a great deal that night which was very pleasing to him. He could quite appreciate the hardships which Dr. Junker had undergone. When he first went to Africa he was eighteen or nineteen years old and did not mind hardships, but he did now. When he first described the cannibal country, he stated that he had been told that many tribes were cannibals and that it was not known where cannibalism ended. He also stated that the dwarfs, whom he called Obongos, were a wandering tribe, and they told him themselves that they did not know how far east their people extended. Dr. Junker had also found a great many cannibals and dwarfs. They were all greatly indebted to Dr. Junker for the account he had given them of his travels, and they had great pleasure in welcoming him back safe from such a difficult country.

Dr. MURIE said that he had not been in Central Africa for twenty years, but he had seen part of the ground travelled over by Dr. Junker. It had been his pleasure to see the veritable map which Dr. Junker drew of his journeyings, and was delighted to find how much had been done towards advancing African geography. He himself had been to Meshra el Rek and had come down the same route as that followed by Dr. Junker, not far from Nambara. It appeared to him that the great point of the paper was that which concerned the watershed. Apart from the political question with regard to the various tribes, pure geographers were interested in the great point that was now left to be settled with regard to Central Africa. There were three great rivers all springing from the centre of the continent. The Nile was the best known and the most celebrated, and one of the discoverers of its source (Colonel Grant) was present in that room. Its great source was the large lakes centrally situated near Equatorial Africa. The origin of the Congo was also in the same lake region in marshy ground, but further down it took a great turn to the west; but there was still another large river whose source had not yet been settled. He alluded to the Niger. At the present moment people were very apt to regard the Congo as the greater river because of the enormous body of water which it brought down, but which was confined in a narrow bed between high ranges before it flowed out to the sea. At the mouth of the Nile there was an enormous delta, and in various parts of its course the river spread itself out such as the Bahr el Ghazal. The sources of the great rivers of Africa were no doubt lakes and morasses, but where did the lakes and morasses get the water? The rainfall of Africa was peculiar. The monsoon, if the expression might be used, extended from 10° N. to 10° S., and there was a double monsoon as the sun went backwards and forwards, so that, as Livingstone and other travellers had mentioned, there was a very great amount of moisture there. The watershed appeared to be at about 2° N. of the equator, and the Welle flowed westward. Other travellers had seen another river running north to the other side of the bend of the Congo, and very ingeniously a line had been drawn on the map bringing the Welle right into the Congo. He did not

say that it was not so, but it was not yet proved to his satisfaction that the Welle fell into the Congo: he was rather inclined to think that it went to the Niger. He wished to ask Dr. Junker what was the nature of the country at the farthest point which he had reached. From Lado (Gondokoro) down to Unyoro it was a rolling country with ranges of hills. The whole plain north of that was a more or less flat land with no great elevations, but with enormous forests. What reason therefore was there for the Welle flowing south? He wished to ask Dr. Junker what reasons he had for believing that the Welle joined the Congo. Another question he wished to ask was where would they place the origin of the Niger? For modesty of speech, for the length of time he had remained in Africa, for truthfulness in his description of the people, the Makarakas, Niam Niams, and others, for the immense natural history collections that he had made, they were all greatly indebted to Dr. Junker, and they trusted that in future they should hear a great deal more from him.

Dr. JUNKER, in reply, said that when he reached Zanzibar in December last, he had not the least idea of the discussion that was going on about the Mobangi. Since he had heard of Mr. Grenfell's journey up that northern tributary of the Congo he thought it very likely that the Welle-Makua ran into it. When he was in the region he thought that the natural thing for it to do was to go into the Shari, but as the Mobangi was 6000 or 7000 feet wide at its mouth the question was where that great supply of water came from.

A cordial vote of thanks having been given to Dr. Junker for his paper the proceedings terminated.

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*Notes on a part of the Western Frontier of British Honduras.*

By WILLIAM MILLER, Assistant Surveyor-General British Honduras.

THE portion of country shown on the accompanying map extends from lat. 17° 3' 40" to 17° 59' 27" N., a part of British Honduras concerning which all existing maps are more or less erroneous, and of which we have just completed the survey.

I am sorry that I have not time to supply the Society with a more finished map. The firm black line shown as the frontier on the plan has been cleared through the bush for the entire distance shown, and has been cut 12 feet wide. Several surveyors have been in charge of the party at different times, and had to return to Belize on account of sickness, which is caused chiefly on account of want of good water. For the last twenty-three miles I was myself in charge of the work, so I can assure you that the map is correct.

It will be seen that for a considerable distance the line runs through logwood swamp, but in all other parts fine timber grows; all the varieties common to this part of the globe being present, as mahogany, sapodilla, rosewood, &c. The portion of land available for cultivation is very small, and I found no indication of minerals, the hills being all of a limestone formation. No open country was met with, the thick bush



only giving way to the logwood swamps, which are full of a very unpleasant, tall, tough grass, about 12 feet high, called very correctly "cutting grass," which will adhere to anything which touches it, and, unless carefully put off, it will cut through thick clothing, and make a nasty gash in the flesh.

These swamps, however, are full of orchids of many species, the beauty of which takes off some of the monotony of working through these somewhat dismal swamps. The bush was so thick that with a gang of fifty men I could only cut through half a mile per day.

Chan Cheëch creek, which will be found marked, is in the dry season only a succession of pools, but in the wet season it is a rushing roaring river, and at this time the whole of the low lands are under water, whilst in the dry season no water is obtainable. This creek no doubt connects with Booth's river or the Rio Bravo, but no person has followed it up to settle this point.

The long narrow lagoon at the northern end of the line marked "Ishnoha creek" joins Blue creek at the point shown. No white man has followed this down, but we have this information from an Indian. I tried to follow it, and went so far as shown upon the map, where I was stopped by thick, prickly bamboo, armed all over with sharp spines, about an inch long, through which it was impossible to penetrate.

Although game of all kinds was met with all along the line it was not so plentiful as might be supposed. The following species were shot at different times:—Antelope, peccary and warea, gibnut, baboons, quash, armadilla, and of birds, the quam, currasow, partridge, and toucan. The only place, however, where game abounded was upon Ishnoha lagoon, where birds were met with upon every tree, and so tame that they did not fly away at our approach. There were cranes, carpenter birds, and the big barking gaulin, and the alligators were so thick that they could be seen at almost every few yards, and so bold that they attacked a rough log which I had had hollowed out to form a canoe in which to explore the river, and we had to shoot them to keep them off.

The villages shown on the map are inhabited by Indians, but Cayo (usually called "The Cayo") is an exception, as the great majority of the inhabitants there are negroes; and at Benqueviejo they are half-breeds of mixed Spanish and Indian descent.

The Indians of these villages are not savages. They cultivate the soil and grow maize, rice, and beans, and raise pigs and fowls. They are, however, to a certain extent dangerous, as so lately as 1872 they made a successful raid on, and burnt, Orange Walk, one of the chief towns of the colony, where there was a fort and a garrison. They are armed to a considerable extent with old Enfield rifles and the *machete*, a kind of cutlass, without which travelling is impossible in this country.

All the roads which I have marked are mere paths through the bush,

the majority of them so bad that even a mule could not travel on them. The road from The Cayo to Benqueviejo is, however, an exception as it is a well-cut road of about 24 feet wide, and in dry weather very good for mule traffic.

The position of Ycaiche has always been doubtful, but I think I have marked it on just about correctly as 30 miles to the northward of the head of the frontier. The doubt concerning this town is to be accounted for by the terror which the Ycaiche Indians inspire. Last Christmas, I applied for leave to visit this town, but permission was refused by the Colonial Government. The town is described to me as being of considerable size, but scattered; and there are supposed to be about 2000 fighting men there. These Indians dress in trousers and cotton shirts, and their staple food is the tortilla cake made of pounded maize baked over the fire into little round flat cakes. They have a rough idea of municipal self-government and elect alcaldes among themselves, who have powers to try and to punish offenders.

WILLIAM MILLER,

*Assistant-Surveyor General B.H.*

BELIZE, BRITISH HONDURAS, 21st March, 1887.

### *Russian Geographical Work in 1886.*

From Russian Sources, by E. DELMAR MORGAN.

#### 1. *Work of the Imperial Russian Geographical Society.*

FROM the *Otchet* (Report) of the Russian Geographical Society for 1886, we learn the losses by death of its members have been unusually severe during the past year. Among the geographers mentioned in the obituary record are those of Abich, who devoted about thirty of the best years of his life (1844 to 1877) to the study of the geology of the Caucasus, and whose name will live for ever in its annals; Abramof, whose article on the Karateghin was translated for our *Journal* (vol. xli.). He too initiated Fedchenko's expedition to the glacier named after this naturalist, and to Iskander Kul, as well as that to the Alai, Pamir, and boundaries of Kashgar, where such men as Middendorf, Mushkétof, and Sévertzof found a field for their talents. Among other well-known names lost to science is that of Poltoratski, who, together with Major-General Ilyin, founded the cartographical establishment now known under the name of his colleague. Poltoratski gave great assistance to the first Russian explorations in Central Asia, and himself led the Chatir Kul expedition in 1867, which first crossed the Naryn and brought Russian surveys to Kashgar ('*Journal*, vol. xl.). Lastly, we must not omit mention of R. K. Maack, one of the first travellers on the Amur, in the Ussuri country, which he explored in 1857, and in the Viliui district, giving to the world the results of his investigations in three separate works relating to each of these journeys.

The Report goes on to speak of recent expeditions organised by the Society. First, that of Potanin, lately noticed in our '*Proceedings*' (May 1887), in which three branches of geographical science had their representatives, viz. ethnography, in the person of M. Potanin himself; natural history, in that of M. Berezin; and

topography, in charge of M. Skassi. The *personnel* of this expedition, too, was remarkable, owing to the fact that Mme. Potanin shared its hardships and privations, accompanying her husband throughout his three years' wanderings in Southern Mongolia, Western China, and on the confines of Tibet. Another expedition explored the magnificent Khan Tengri group of mountains in the Thian Shan, whose summits soar up to a height of 22,000 and 24,000 feet. With regard to this group M. Mushkétov gives some interesting particulars. Khan Tengri is situated between 42° and 43° N. lat., and is remarkable as the point where the Thian Shan, extending eastward as a narrow, though lofty range, develops into a wider and more complicated system, affording a difference so striking as to have led some explorers to distinguish the western Thian Shan as a separate range under the name of the highlands of Turkistan.

The relation of Khan Tengri to the folded ridges of the Thian Shan, is of equal or even greater importance than that of Mustag-ata to the Pamir; its orography and stratigraphy therefore demand investigation in order to elucidate the origin and structure of the system of which it forms so conspicuous a centre. In like manner, the scientific interest attaching to the glaciers of Khan Tengri may be readily compared with that of Mount Elbruz in the Caucasus, the more so, as the Thian Shan system is generally deficient in glacial phenomena, while on the other hand, when these do occur they are on a most imposing scale. Thus the glaciers of Khan Tengri are probably quite as extensive, if they do not surpass, those of the Zarafshan and Muk-su. Lastly, the volcanicity of Central Asia may best be studied here, for though it has been amply proved in recent years, that the opinions of Humboldt and others regarding active volcanicity in Central Asia\* have no foundation in fact, there yet remain abundant indications of the presence of typical volcanic rocks, and from the scanty data yet collected, it is probable that although Khan Tengri is chiefly built up of granites and schists, analogous to those of the Terske Alatau, Musart, &c., there are nevertheless among its component rocks recent volcanic formations. These and other considerations prompted the Russian Geographical Society to organise an expedition to investigate. Travellers have hitherto admired its stupendous size from a distance, but none have approached Khan Tengri closely, except P. P. Semeonof, who in 1857 penetrated to the glaciers of Sary-jas and first drew attention to their importance. In those days, thirty years ago, travelling in Central Asia was very different from what it is at the present time. Then a journey to those regions could not be accomplished without great discomfort and some risk, now the ordinary tourist may visit them and the naturalist pursue his investigations without fear of interruption.

It had been intended to send two expeditions in 1885, but owing to the absence of its leader, J. V. Ignatief, on other duties, a start was not effected till the following year. The point of departure was Karakol,† a Russian settlement at the east end of

\* Since these lines were written a great earthquake has been reported from Verny, by which that town has been nearly destroyed, and a region about a thousand versts in extent has been affected.

† Karakol is the capital of the district of the same name, and an outpost of Russian civilisation in the Thian Shan. Its mud walls and gardens give it an Eastern appearance, but the present town is entirely modern, having been founded since the annexation of the country by Russia. The bazaar is worth seeing from the variety of types and nationalities frequenting it. Here turbaned Sarts and pig-tailed Dungsans sit in little shops and open booths selling the produce of the country. About twenty miles from Karakol the ruins of an ancient town are visible on the south shore of Issyk-kul. Its walls are imbedded in sand, but various articles, such as copper vessels, Chinese

Lake Issyk-kul, where A. N. Krasnof, a botanist of some repute, joined it. His special object was to study the flora of the high snow and ice regions of the Thian Shan, and compare this with that of the Polar regions recently worked up by Veit Brecher Wittrock\*: to determine the vertical distribution of plant-life on Khan Tengri, and compare this with corresponding zones in the better-known regions of the Trans-Ili and Kungé Alatau chains. Moreover, M. Krasnof's knowledge of the Aralo-Caspian flora would enable him to deduce some interesting comparisons between it and that of the sand and clay wastes bordering on Lake Balkhash and with the transitional forms met with on entering the mountains. From these aspects the sands of Tau-kum, the lower Ili plains, and Trans-Ili mountains possess an exceptional interest for the botanical geographer, their recent lacustrine and riverine sedimentary deposits never yet having been botanically investigated, while the oldest flora of the higher regions up to and including the snow-line affords unequalled opportunities for comparison.

With reference to this expedition J. V. Ignatief has communicated the following report:—"Starting from Karakol on the 16th(28th) July, 1886, we crossed the outlying spurs of the Thian Shan, the rivers Jerghes and Bosechuk to the Turgen-aksu which we ascended to the valley of the Sari-jas and up this to the glaciers discovered by P. P. Semeonof in 1857. We were then obliged by a heavy snowfall to retreat to the valley of the Kok-jar-karkara. The large glacier at the sources of the Sari-jas, called by P. P. Semeonof a *mer de glace*, we named after him, and another, at the sources of the Adir-tur, 'Mushkétof.' Our topographer Alexandrof made an instrumental survey of Semeonof glacier and measured its rate of movement. Mushkétof glacier was half instrumentally surveyed by Khludof. At the sources of a left tributary of the Sari-jas we discovered another glacier, the Inilchik. From the valley of the Sari-jas we descended to that of the Tekes by a new pass, Naryn-kol, on which there is an overlapping glacier, Tura-jorga. By the 16th(28th) August, we were at 'hunters' settlement,' whence we made an excursion to Borodobosup and from this point took a photograph of Khan Tengri. On the 22nd August (3rd September), I with the draughtsman Khludof, six Cossacks, three jigits and an interpreter went to Musart, while the topographer was engaged in measuring trigonometrically the height of Khan Tengri from the Baian-gol Valley, taking Hunters' Station as zero. The deduced height of the peak was found to be 24,000 feet above sea-level.

"The Musart Pass has an elevation of 12,000 feet above sea-level. We followed the defile to its southern termination at Yaman-Kurgan where the mountains end, and the road to Aksu enters the steppes. Traces of ancient glaciers were found at a height of 6800 feet above sea-level on the southern slope of the defile, which had therefore been completely filled with ancient glaciers, for the marks on the southern side, where atmospherical desintegration had taken little effect, were plainly visible, while on the northern side there was no trace of them at 6800 feet. The Thian Shan at the Musart consists of granite, sienite, gypsum, diorite, marbles and azoic schists, white marbles being predominant at the summit of the pass. The strati-

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bricks, &c., are occasionally brought to light, and I saw a number of coins with nearly obliterated inscriptions, said to date from the thirteenth century. About five miles from Karakol there are some hot springs where the water comes up boiling. The road to Musart from Karakol is divided into seven stages, and passes through Russian settlements.

\* Cf. 'Ueber die Schnee- und Eisflora besonders in den Arktischen Gegenden,' forming part of Nordenskiöld's 'Studien und Forschungen' (Leipzig, 1885), pp. 67-119. The author here quoted is the most recent authority on Arctic flora.



graphical conditions of the Musart are much involved, the layers have a strike north-east to south-west, and north-west to south-east; in the latter case, the azoic schists are uplifted by intruding diorites.

“On the 7th(19th) September, we returned to Karakol, whence we made a boat excursion on Issik-kul lake.”

M. A. N. Krasnof has communicated the following particulars with reference to his branch of the work, and the results obtained by him during the Khan Tengri expedition. He passed the spring on the lower Ili, near the rivers Kurtu\* and Kopa,† thence he went to the watershed of the Chu and Ili, to the Andrakai and Kak-tau ‡ Mountains, the sands of Tau-kum,§ and to Kaman. In the spring he also skirted the shore of the Ala-kul gulf,|| and explored the At-lesken hills.¶ In the summer he made excursions in the valleys of the Tekes, Naryn, and Khirghos. July and the beginning of August he devoted to the exploration of the highest uplands of the Thian Shan at the foot of Mount Khan Tengri and the watershed of the rivers Syr-daria and Tarim, where he discovered new glaciers in the group of Sir-tash and Sari-jas. Having visited the southern slope of the range and crossed the Bedel Pass to the Chinese town of Utch-Turfan the traveller returned by the valley of Issik-kul to Verny and thence through Tashkend, Samarkand, Bokhara, and Merv to St. Petersburg.

M. Krasnof is of opinion that the valley of the Ili once had an entirely different vegetation to that possessed by it now, and this earlier plant life has completely perished owing to the desiccation of Central Asia and the consequent change in its climate. Formerly, says M. Krasnof, the whole flora of the Ili valley was similar to that still preserved at the foot of the snowy mountains, resembling that of Central Russia with its copses of deciduous trees, where the maple, the apple, and the elm are the prevailing kinds in the midst of wide tracts of black earth steppe lands. In many places the black earth still remains distributed much in the same way as in Russia and similar in character.

At present all the lower chains are deprived of the moisture they derived from melting ice-fields and have changed their flora in the most radical way, having now only Central Asian forms. Many of these, though remarkably changed in form, owing to climatic influences, are nevertheless, according to M. Krasnof, the direct descendants of the Russian black earth flora greatly altered, however, by harder conditions of life. To such forms there have been added many immigrants from the eastern plateau of Asia. These low ridges may be considered as centres of propagation of the forms of vegetable life best adapted to the arid soil of Central Asia.

Of special interest too is the fact that in many places, owing to the dryness of the climate, granites and other hard rocks become pulverised, and the powder or dust thus formed collects in large hillocks; these again become covered with the most extraordinary forms of plants barely maintaining an existence in the snow-belts, but here in the sands suddenly deriving new life, and developing into gigantic plants.

\* The Kurtu is the last of the tributaries of the Ili, entering it on the left about 50 miles below Iliisky ferry (bridge?).

† The Kopa flows from west to east through a wide valley, dividing the so-called Alexandrofsky Mountains from an outlying range to the north, and falls into the Kurtu.

‡ The Andrakai and Kak-tau are probably native names of the range of low rounded hills mentioned in the last note. I saw them from the high road near Pishpek.

§ The Tau-kum sands form a belt about 30 miles wide, along the left bank of the Ili, from the river Kurtu to Lake Balkash.

|| The Ala-kul gulf is the southernmost portion of Lake Balkash.

¶ The At-lesken hills align the south-west shore of Lake Balkash, in lat. 45° N.

The shores of Balkash and Ala-kul are, according to M. Krasnof's description, a stony desert where plants, which under more favoured circumstances are tall enough for the scythe, attain only a diminutive size, whilst other parts again are sands, covered with Aralo-Caspian shrubs nearly bare of leaves. These sands in M. Krasnof's opinion, originated in the disintegration of old sandstones. Lake Balkash has greatly shrunk in size, compared to its former area.

The Ala-kul gulf has water of a bitter saline taste. It has shrunk so much that the Kirghiz ford that part connecting it with Balkash. The water in Balkash, however, is nearly sweet. M. Krasnof did not find one of the rivers shown on the map as falling into Balkash from the south-west, all these affluents having long since finally disappeared.

The shores of Balkash are the haunt of numerous wild animals. In the lower reaches of the Ili are tigers, wild asses, *kulans* \* which the Kirghizes take alive, and crossing them with their own horses obtain the fastest gallopers.† In July, M. Krasnof crossed to the head-waters of the Sari-jas. The glaciers here, three in number, are very dirty, water-worn, covered with pebbles and rapidly disappearing. The earlier glaciers, as evidenced by glacial marks, were larger, and descended 40 miles lower into the valley than at present. There are even now small isolated glaciers, which are the remnants of former tributaries. Near the Klinya a new glacier was discovered, and named "Friede" in honour of the governor of Semiréchia.‡ The Sir-tash group has seven glaciers, the largest of which was named "Kolpakofsky" in honour of the governor of the steppe country (Western Siberia).

Although the highlands through which flow the rivers Sari-jas and Sir-tash are above the tree belt and even upwards of 10,000 feet, their flora nevertheless does not bear an alpine character. Alpine meadows with plants mostly common to the Caucasus, Altai, and Polar Siberia, are only preserved on the northern slopes in localities moistened by the snow; wherever the warmth of the sun is felt the soil becomes so parched that alpine vegetation cannot exist, and its place is taken by representatives of the wormwood-covered steppes of the Turanian lowlands. Glacier drift of the Syrt is so dry as not to be in a condition to give a start to clayey-sandy soils; but the rains, of rare occurrence, only wash out of it the finest dust which settles in a thick layer marvellously like loess, that fertile yellow earth which sustains the whole of China. Hence M. Krasnof thinks that in many parts of Asia this soil has been formed by light rains gradually washing from the dry crumbled débris of glacier rivers, an exceedingly fine dust produced by the attrition of ice on rocks and their disintegration by weather. M. Krasnof entered Chinese territory by the Bedel Pass, one of the best in this part of the Thian Shan. The river Bedel in its lower course flows between precipitous cliffs of conglomerate before entering a stony desert very scantily clothed with vegetation. Beyond this the oasis of Turfan is reached, where notwithstanding the elevation, grapes, melons, and nuts mature. There are even rice plantations, and the lotus is cultivated. The flora of the Issik-kul valleys and of the Tekes is transitional between that of the Syrts and the northern outliers.

\* *Kulan* is the Turki word for the wild ass, the Tibetan *Kiang*.

† I was very much struck with the peculiar colour and markings of some of the Kirghiz horses. One in particular which carried me a long day's march over the mountains, had the dark stripe down the spine and across the withers, its colour being generally ashy grey. The endurance of these little horses is quite extraordinary, even when carrying a heavy man over a rough and hilly country.

‡ General Friede, chief of General Kaufmann's staff in the expedition organised to operate against China in the Kulja district in 1880. General Friede, I regret to see, is reported to have been injured by the recent earthquake at Verny.

The general conclusions of M. Krasnof may be summarised as follows:—Formerly the Thian Shan flora was intermediate between the Altai and alpine, and resembled more closely that of the central and northern Caucasus. The process of desiccation began on the south, and showed itself by the formation of detritus, retreat of the glaciers, and disappearance of lakes. It caused the formation of loess deposits, sands and pebble-strewn plains, while it diminished the areas of marshes and black earth deposits. All plants common to polar and alpine regions disappeared from the southern slopes and syrts, while coniferous and deciduous arborescent vegetation also vanished from *all* waterless slopes, those species requiring humidity having entirely died out. Wherever the snow has ceased to lie, the ancient flora has also perished, only a few species having adapted themselves to a continental climate, and assumed an Asiatic character. Barren tracts are supplied by emigrants from other arid parts of the continent, while only those kinds of the Thian Shan flora best adapted for removal are distributed over the plain. These migrants mingle with other Asiatic forms and select certain soils divisible into four steppe formations: the wormwood, sandy, saline, and stony. The high valleys in the mountains and the dried lake-beds, lacking moisture, have likewise the same typical soil, and the same vegetation as the plains, the altitude above sea-level having but little influence on the character of the flora.

The report refers then to A. V. Eliséief's journey in Asia Minor undertaken for anthropological researches among the various tribes inhabiting Anatolia.

M. Eliséief had intended reaching Kurdistan and Armenia by way of the Caucasus, but failing in this owing to an insurrection among the Kurds, he returned from Kars to Batum, and thence by steamer to Iskanderun (Alexandretta.) M. Eliséief tried in vain to discover any trace of Russian colonies on the coasts of Asia Minor. He only succeeded in visiting the well-known colony on Lake Mainos,\* and learned from some of its oldest inhabitants that offshoots were sent to the banks of the Tigris or Euphrates, but where exactly no one could say. The people of Mainos are gradually forgetting Russia, and to many of them it appears quite a foreign country. There is a church at Mainos and a resident Unitarian clergyman. The people of Mainos are generally uncouth and illiterate, many of them speak Turkish better than Russian, and the general impression made on M. Eliséief was painful, the more so when he learned that some of these people had served in the late war against Russia, and had even earned military rewards.

Having landed at Alexandretta M. Eliséief crossed on horseback the Amanus † and Kizil-dagh Mountains, descended the Amuk valley, rounded Lake Ak-tenghiz, and reached Antioch. Hence he followed a wild mountain path to Aleppo, visiting on the way a number of ruins and caves, and in one of these he discovered the bones of a prehistoric man. The cave in which he found them is opposite the ruins of Koslar-terai. From Aleppo, the traveller took the direct route to Beilan, ‡ the celebrated pass, and thence proceeded to Aintab, § having made an excursion to Biredjik || in order to visit the Arabs of the Euphrates.

\* Lake Maniyas, three hours from Aidinjik on the Sea of Marmora, in lat. 40° N., long. 28° E. The Cossack settlement here dates from 1770 and was visited by Mr. W. J. Hamilton in 1838. Cf. 'Journal R.G.S.,' vol. viii. p. 139.

† The Amanus range borders the Gulf of Iskanderun on the east.

‡ The Beilan Pass or "Syrian Gates" leads through the Amanus range from Syria into Cilicia.

§ Aintab stands on lofty heights overlooking the valley of the Tadjur, a tributary of the Euphrates.

|| Otherwise called Bir or Bir al Birat, on the Euphrates. It was here, according to

At Malatia \* M. Eliséief was overtaken by winter, and could no longer move easily, his natural history collections suffering in proportion. Having made an excursion to Kharput,† and thence across the mountains of Musher to Keban-maaden,‡ he left Malatia viâ Sivas, Tokat, Amasia to Samsun, and thence by sea to Constantinople. The results of his journey comprise 150 sets of anthropological observations; though these are far from complete they include measurements of Arabs in northern Syria, Kurds, Kizilbashes, Yezidis, and others. In the mountains of Arabistan he found a sarcophagus, a stone with a Latin inscription, several kitchen-middens, and two rubbings of stone bas-reliefs inscribed with the names of ancient inhabitants. Near Keban-maaden he met with menhirs, and at Kharput opened tombs—round pits in limestone containing enormous vessels with bones burnt and intact.

Prince Masalsky has made a botanical excursion in the Kars district for the Caucasus Section of the Russian Geographical Society, with the special object of comparing the transitional forms of the Pontine flora with those of Eastern Trans-Caucasia and Armenia, and to determine their horizontal distribution as well as the vertical distribution of arboresecent and bush vegetation. He also intended collecting observations on cultivated plants with the view of ascertaining the possibility of developing the culture of the orange, lemon, tea, coffee, and other useful plants. Prince Masalsky travelled viâ Alexandropol and Kars to Kaghizman, situate at the foot of the range bordering on Turkey and dividing the waters of the Araxes from those flowing into the Euphrates. Kaghizman was selected as a central point for Prince Masalsky's excursions in the valley of the Araxes and other mountainous districts. During these excursions, he visited the Kurdish encampments near Yagljudi Dichur and Beshkilis, known for their mineral waters and the ruins of Neren. He descended the Arpachai along its bank to its confluence with the Araxes and visited Kulpakh, one of the most ancient salt industries. From Kaghizman Prince Masalsky ascended the dividing ridge near peak Marmor, visited the rich pasture lands of Chaschaclar on the head-water of the Ak-chai, a right tributary of the Araxes. He then ascended the Araxes by Zorab-khan to Bish-keh, crossed the frontier-range near Kess-dagh, and proceeded viâ Kara-kurt to Sari-kamish on the Erzerum road at the foot of the Soganluk range. Hence he made excursions into the Soganluk Mountains, climbing one of its chief peaks, Surdy-khatch, and thence passed through Bardus in the basin of the Chordokh to Olti. Here he made researches in the Olti district and then went on to the Tortum lake in Turkey, finally returning to Olti and thence to St. Petersburg which he reached in September. The materials collected by Prince Masalsky are under examination.

V. A. Fausek received a small subsidy for zoo-geographical researches in the Kumo-Manytch lowlands,§ where he undertook a journey in conjunction with

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the Greek legend, that Bacchus threw the first bridge across the Euphrates preparatory to his march to conquer India.

\* The Melitene of the Romans, the winter town surrounded by irrigating canals which rendered it so unhealthy that the inhabitants abandoned it when the first summer heats came for Aspuzi, in a higher valley.

† Kharput is placed on an eminence and commands a view over an extensive and fertile plain. Its inhabitants apparently enjoy great prosperity and a temperate climate. Cf. 'Journal R. G. S.,' vol. vi. p. 207.

‡ Keban-maaden is situated in a ravine about 30 miles from Kharput, and derives its name "Mine of the gorge or pass," from a recently abandoned mine of argentiferous lead. Ibid., p. 206.

§ The Kumo-Manytch lowlands extend in a wide belt from the Sea of Azof to the Caspian. They are well marked throughout by a series of long pools of stagnant water

D. L. Ivanof, a geologist. Their routes lay through the Caspian depression occupied by the Turkoman and Kara-Nogai sands to the mouth of the Terek and the shores of the Caspian, a belt 40 miles in width along the Manytch Isthmus, comprising the area of the Stavropol Yegorlyks,\* the Kalmuk steppe of the great Derbetof uluss, the horse-breeding region of the Don district, and the environs of Stavropol. The materials of M. Fausek are being worked up by him. With regard to those collected by M. Ivanof, apart from their scientific value, they have a special practical interest from their bearing on the water supply of steppe lands. Among his geological discoveries reference may be made to one of a series of Miocene deposits traced eastwards to the meridian of Georgievsk.

The expedition of M. Grum-Grjimailo to the countries bordering on the Pamir, of M. Konshine to the Trans-Caspian region, and of M. Kuznetsof to the Government of Archangel, received no pecuniary grants from the Society, but only their moral support. The results obtained by M. Grum-Grjimailo's first journey to the Pamir in 1884 and 1885 led him to the following conclusions:—The lepidoptera of the Pamir and adjoining regions are distinct from those of the Thian Shan as far as this is known, but having many points of similarity with the lepidopterous fauna of the Hindu-Kush, at all events as far as types common to both would seem to indicate. The inference from this is that at the period when the lepidoptera (and therefore other orders as well) of the Pamir was established, this region was in closer connection with the countries to the south of it than with those on the north; in other words, the Pamirs were at that period detached from the Thian Shan. This may be explained in either of the two following ways: (1) a non-synchronous upheaval of the two mountain masses, or (2) if their upheaval took place at the same time there was a certain interval of time during which they were parted from one another by a wide aqueous expanse; in other words, at that period the ranges which now unite the Pamir with the Thian Shan were non-existing, and Ferghana and Kashgar formed the bed of one sea—the Tarim-Ferghanah.

M. A. M. Konshine accompanied, as geologist, the expedition of Dr. J. Radde to the Transcasian country and northern Khorasan. From Askabad M. Konshine passed through Merv to Charjui in Bokhara in order to examine the channel of the so-called Kelif Usboi and the alluvial deposits of the central Amu-daria. Returning from Charjui to Merv, M. Konshine joined M. Radde's caravan and took part in his journey up the valley of the Murghab to Meruchak; hence he proceeded along the Afghan frontier to Zulfagar (Zulfikar) whence he descended via Pul-i-khatun and Sarakhs to Kari-bend and so to Askabad. In the course of this journey M. Konshine examined the deposits of Glauber salts in the oasis of Merv, the common rock-salt *in situ* at Ak-rabat, hillocks of nitre at Imam-baba, &c.

From Askabad Dr. Radde and his companion Konshine went to Kochan, in Khorasan, thence following the head-waters of the Attrek to Keshef-rud, they descended to Meshed, recrossed the Kopet-dagh, and reached the Akhal oasis by Deregez valley.

M. Kusnetsof, whose excursion into the Government of Archangel in the spring of last year was principally for botanical purposes, undertook a series of barometrical observations for obtaining data as to the relief of the country in the valleys of the Dwina and Vaga between Vologda and Archangel.

and bitter salt lakes, indicating very clearly a former connection between these two seas. It may be worth mentioning that the idea was formerly entertained of reuniting them by means of a canal.

\* The Stavropol Yegorlyks are two rivers, the greater and lesser Yegorlyks, flowing from south to north to join the Manytch.

In conclusion the report mentions that the military topographical department of the Staff Corps has decided on perpetuating the memory of Prejevalsky's remarkable activity in exploring Central Asia by connecting his name, now so famous, with one of the mountain ranges discovered by him during his fourth journey.

The awards for geographical achievements this year have been as follows:—The Constantine medal to Grigory Nikolaievitch Potanin for his twenty-five years' labours in the cause of geography in general, and for his last journey to China in particular. The lesser gold medals to Stephen Osipovitch Makarof for his article published in the *Isvestija* entitled 'Double currents in straits,' being the results of his investigations on the flow and reflux of the waters of the Black and Mediterranean seas; to Augustus Ivanovitch Skassi for his services in Potanin's expedition into Kan-suh; to Andrei Alexandrovitch Bolshof for his cartographical works; to Adolf Georgievitch Eigner for the elaboration of the meteorological materials of the Ust Lena polar station; and to Vassili Vassilievitch Zverinsky for his assistance in compiling the Geographico-Statistical Lexicon published by the Society.

Silver medals were awarded to Alexandra Victorievna Potanina the unwearied companion of her husband G. N. Potanin in all his journeys, for her active co-operation in forming a herbarium, keeping a meteorological record, and generally for the part she took in the expedition; to the companions of N. M. Prejevalsky on his fourth journey into Central Asia, viz. to Peter Kozlof and Panteley Teleshof for their invaluable assistance to the expedition; to Dmitri Nikolaievitch Bukharof for his work, 'A journey through Lapland in 1883,' published in vol. xiv. of the *Zapiski*; \* to Franz Karlovitch Schperck for his 'Russia of the Far East,' published in vol. xvi. of the *Zapiski*; † to Nikolai Nikolaievitch Beliafsky for his article on his march across the Ust-Urt from Tsarévitch Gulf to Kungrad; to Gr. Efim. Grum-Grjmailo for his paper on his two journeys to the Cis-Pamir countries (*supra*, p. 430); to Stanislav Danilovitch Rylke for his labours as member of the Committee of the Society for deciding upon a first meridian; to Alexander Vasilievitch Elisief for his report on his travels through Arabia Petraea and the Sahara; to M. Ivanof for his map to illustrate E. S. Feodorof's article entitled "Information on the Northern Ural," published in vol. xxii. of the *Isvestija*; to Lieut.-Col. Nadarof for his MS. work on the 'Northern Ussuri Country' and others. Bronze medals were also awarded.

Among the most important communications made to the sections of the Society were, the chief results of A. M. Konshine's long continued investigation in the Trans-Caspian region, leading him to the conclusion that the so-called Kelif Usboi or Charjui Ungus which intersects the Kara-kum steppe from north-west to south-east, is only an ancient shore-line of the Caspian, and that it is a gross mistake to assume that the various "ungusses" i.e. desiccated bights, gulfs, and lakes, are old channels of the Amu-daria. The Usboi, in M. Konshine's opinion, owes its origin to a system of coast lakes, extending in a chain parallel with the Ust-Urt and the former seaboard. At another sitting of these sections M. Jarintsof read a paper on the cliff formations along the coast of the Black Sea at Odessa. His conclusions, which were at variance with those of the late M. Barbot de Marny, will be published in a forthcoming volume of the *Zapiski*. M. N. N. Beliafsky communicated the results of his investigations in the Ust-Urt and Amu-daria from Petro-Alexandrofsk to Charjui. He described the surveys that had been made from Tsarévitch Bay to Kungrad and Kunia Urgendj, and from Hazar-asp up the Amu-daria to Charjui, finally stating that in his opinion the best route for a universal Russo-Asiatic

\* See 'Proceedings R.G.S.,' 1886, p. 533.

† *Ibid.*, p. 62.

railroad would be from Saratof to Kungrad, then along the Amu-daria to Kelif, and thence to Kabul.

The Ethnographical Section held six meetings during the year at which ten papers were read on subjects relating to the ethnology of the Russian people, the southern Slavs, Lithuanians, natives of Siberia, Mongol Buddhists, and inhabitants of the Upper Zarafshan.

2. *Military Topographical Work by Officers of the Staff-Corps and Members of the Corps of Military Topographers during 1886.\**

*Reconnaissance of the Eastern Slope of the Northern Ural.*—This work was accomplished under the auspices of the Ministry of Imperial Domains by the mining engineers MM. Feodorof and Lebedzinsky in conjunction with the topographers MM. Ivanof and Koncha. The region surveyed comprises the ridge of the Ural and both its slopes from the river Vyshura on the west to the Lozva on the east. In this region 100 miles from such large centres as Bogoslofsky zavod (iron-works) and the Turinsky mines, the first steps to obtain accurate topographical and geological data have now been taken. The expedition followed for the most part river valleys where there were abundant outcrops of mountain formations, but it was occasionally necessary to cross intermediate tracts by paths only beaten by the Vogul reindeer sledges and their herds, where supplies had to be accumulated beforehand. Four hundred miles of route survey were executed in 1886, over an area of 5400 square versts along the Northern Ural, from the village of Ust-Uls, along the rivers Vingera, Chuvalka, and along a path leading to the northern praying stone. The survey was made on a scale of three versts to the inch, by means of the plane-table, and was based on the positions determined by the late Professor Kovalsky of the Kazan University (Feodorof's survey is mentioned *ante*, p. 431). Heights were ascertained by the aneroid.

*Expedition to the Bokharian dominions, organised by the Military Topographical Department of Turkistan.*—Its chief object was the astronomical determination of the geographical co-ordinates of a whole series of points in Eastern Bokhara, in order to obtain sure data for the cartography of that part of Central Asia. This work was undertaken by M. Schwartz, assistant director of the astronomical and meteorological observatory; the method adopted was that of lunar occultations; the instruments used were five pocket chronometers, a Dollond telescope for astronomical work, a Pistor circle with an artificial horizon, an inclinor, azimuth compass, and Brauer's apparatus for pendulum observations. The travelling equipments were finally arranged at Samarkand, including forty shoes for each horse and a box for carrying the chronometers. At 6 A.M. daily observations were made for terrestrial attraction, dip, and declination; at nine the chronometers were compared and solar altitudes taken. Altitudes were again taken 15 minutes before noon, followed by readings of the barometer, aneroids, and thermometer. At two the chronometers were again compared. Every computation that could be was made on the spot immediately after the observations. Bad weather accompanied M. Schwartz throughout, while the intense heat on the bare steppes burst the glass fittings of his instruments and the ivory rings of his field-glass. In addition to these misfortunes, myriads of mosquitoes on the bank of the Amu-daria, and the peculations of the Amliãkdars (tax collectors) terribly exhausted M. Schwartz's physical strength, weakened as he was by the attacks of the Shirabad fever, which obliged him to take quinine in doses of 40 grains.

\* Extracted from the Report published in the 'Russki Invalid,' and kindly communicated by our Hon. Corresponding Member, M. Venukof.

From Shirabad he proceeded viâ Baisun, Yurchi, Karatagh, Kafirnahan, Faizabad, Baljuan, to Khovalin, 10 miles from the town of Aksu, a place replete with classical memories, and now chiefly remarkable for its fortress built of stones and timbers, answering closely to the description of those mentioned by Cæsar in his campaigns in Gaul. From Aksu M. Schwartz went towards Gharm. Between Tabi-dara and Chil-dara the route follows the lofty and precipitous right bank of the Khingou along narrow cornices, some of which were so nearly washed away as to necessitate détours by the crests of the mountains through thick brushwood and along the road over the sharp ridge of Shah-Kandagh, by which Captain Rodionof passed in 1885. From Gharm the expedition continued to follow Rodionof's itinerary to Zanku along the Pitan-Kul and over the southern Bok-bash Pass. Above Kirchin the river-beds were blocked with snow, the drifts at the end of August lying 15 feet deep.

Nearly opposite the mouth of the Laisu rivulet, which falls into the Pitan-Kul, there is a pretty waterfall, Sharmarak, 150 feet high in three descents. From the valley of the Gadai-sai, one of the head-streams of the Laisu, M. Schwartz went to Kara-kaza by a circuitous route. In ascending the Bok-bash (about 11,000 feet), the road crossed a snow-field for several miles, while on the opposite slope Kirghiz summer encampments were met with, a contrast attributable to the fact that the aqueous vapours entering Turkistan from the south-west deposit their moisture in those defiles which are open in that quarter. On the 17th (29th) August the expedition rested at the foot of Kara-kazyk Pass, at a height of 14,500 feet, before commencing the very steep descent, over débris and ice; for two versts it passed over a glacier, and then followed the rocky bed of a torrent leading to the military road to Vuadil, constructed in 1878. Hence the expedition returned viâ Marghilan and Khojend to Tashkent on the 30th August (11th September).

During their 116 days' journey they fixed 34 points astronomically, 50 magnetically, and observed for altitude at 335 places. M. Myshenkov, one of M. Schwartz's companions, collected information on the naphtha springs, gold-fields, and other mineral resources of this part of Bokhara, while M. Rudnef executed the topographical work. He reconnoitred the western part of the Shahri-sebz range between Takhta Karacha and Djam, passed through the Bokharian settlement of Tutla [Tulta?] and thence back to Kitab. The late spring, constant rains, and snow-fall interfered greatly with his work, and rendered the passage of the Takhta-Karacha unusually difficult. M. Rudnef met M. Myshenkov at Samarkand on the 20th April (2nd May) and the two started together to re-cross the Takhta-Karacha pass to Kitab and Shahrshaus (a place erroneously rendered on maps as "Shahr," its native name being "Shahrshaus"). Their advance was again delayed by the impassable state of the roads in the Kashka-daria valley. The Shahri-sebz range attains its highest altitude between Takhta-Karacha pass and Djam. From this centre the mountains diminish in height, and bear more the character of tablelands covered with luxuriant pasturage and arable land. The northern slopes are less adapted for tillage, owing to their rocky nature and their steeper gradients, than the southern, at the foot of which there extends a ridge of hills forming a continuation of a northern spur of the Hissar range. The streams flowing northwards are smaller than those which roll their waters to the Bokharian settlements. One of these, Makret, has an extent of about four versts (2½ miles), while another, Kalkama, is even more populous. Four caravan passes cross the range. The direct road viâ Derbent, Yakkabagh, Tash-kurgan, and the head-waters of the Katta-uru-daria and Kichi-uru-daria being found impassable the expedition followed that viâ Yar-tiube, Kalta-minar, and Kara-khaval, crossing the above-mentioned rivers in their lower courses. From Derbent they followed the foot of the Ak-tau mountains to Shirabad, visiting the sulphur and naphtha springs of Shakarlyk-astan.



On the 3rd(15th) June M. Myshenkof returned to Samarkand, while M. Rudnef continued his topographical survey. Owing to the approach of the Mahommedan fast no guide would consent to undertake a march of 50 miles through barren mountains exposed to the fierce heat of the sun, M. Rudnef had therefore to confine himself to a reconnaissance of the western slopes of the Terekli-tau range and the waterless Tash-rabat valley. He then reached the valley of Lahur which terminates in a salt lake, visited in 1884 by another topographer, M. Petrof. On the 17th(29th) June M. Rudnef reached Baljuan. He found in the valley of the Darai-dash-tak burning schists, and in the mountains north of Baljuan traces of lead. Having crossed the Ruyut Pass near some salt-works, M. Rudnef was obliged to return to Baljuan to connect his survey with that of M. Rodionof. At the settlement of Suk-seh, M. Rudnef visited the gold-washings, said to be the richest in Bokharian territory, and employing the inhabitants of four villages, each labourer earning 60 copecks a day. He also visited the gold-fields of Khovalin, about four miles above Hazret-sultan. Having halted at Chil-dara the expedition went westward along the right bank of the Obi-Khingou, which forces its way between precipitous cliffs 1400 feet high. The path winds along cornices, supported on wooden props overhanging the rushing torrent some hundreds of feet below. Here the most experienced mountaineer dismounts and holds by his horse's tail. On the 27th June (9th July) M. Rudnef arrived at Gharm, whence avoiding the valley of Dashti-bidan, an old glacier bed, he reached Kafirnahan. The road from Kafirnahan to Ura-tiube passes along the valley over the Sardi-mion, over the Hissar, Zarafshan, and Turkistan ranges, and crosses the rivers *en route* by swinging bridges, for the use of which the Bokharians levy a toll. This is the only tolerable road for pack animals, and may be accomplished in five days from Kafirnahan to Ura-tiube, and in three days more to the Amu-daria, though the Bek of Hissar said that he could reach Ura-tiube in three days if he were obliged to run. By this route the Russian dominions are supplied with corn, asses, horses, horned cattle, and sheep. From Kafirnahan M. Rudnef turned westward by the spurs of the Hissar range; having arrived at Sarijui he took a north-westerly direction by the difficult Sangardak defile, and arrived at Karshi, his health and that of his Cossacks having suffered so severely from constant fevers that he has not yet recovered. During the last three years four-fifths of the population of the Kashka-daria valley between Karshi and Chirakchi have fallen victims to this fever. Completely prostrated by illness, M. Rudnef returned to Samarkand.

Another topographer, M. Glagolef, attached to the expedition of Captain Pokotillo, began surveying from Karatagh down the left bank of the Surkhan; he reconnoitred both banks of the Vaksh and part of the right bank of the Pandj to the defile of Chaila-kamar, where huge mountains prevent access to the Pandj. He found the pass of Valvayak to be 11,000 feet high. From Tilliakh viâ Zygar to Kala-i-khumb and beyond, the road is for the most part carried along cornices and balconies some hundreds of feet above the river which has a current of about 10 miles an hour and forms numerous waterfalls. M. Glagolef and his party travelled on foot while their instruments were carried by hand, and often erected in spots where a single false step would have cost a life. Owing to the commanding height of the right bank of the Pandj, it was possible to survey the left bank with sufficient accuracy and to trace out the boundary of the sinistral riparian possessions of the Bokharians. From Kala-i-khumb the expedition crossed the Darwaz and Peter the Great ranges to Gharm.

*Survey in the Zarafshan.*—In February 1886, Captain Pariisky, of the corps of military topographers, was ordered to the left bank of the Zarafshan, between Penjakent and the Bokharian frontier, in order to fix a base for the survey of this region,

the 1875 survey having been interrupted by the war which broke out in that year with the Khan of Kokand. Soon after the departure of Captain Pariisky from Tashkent, the fine, dry weather which had continued during the whole of the winter of 1885-6 suddenly changed to rain and frost which lasted all through March and April. The spring of 1886 was altogether an exceptional one in Turkistan; the rainfall was so heavy that the Syr-daria overflowed its banks, which had not occurred for fifty years; communications with Samarkand were consequently cut off, while at Khojend several buildings were washed away. The rains were accompanied by cold and vegetation was unusually backward. The survey operations had to be conducted beyond the Darghan canal in a steppe country almost wholly intersected by deep ravines. The bordering strip of fertile land is but thinly inhabited, but pack animals are abundant, so that the dry baulks for erecting signal stations, which could only be obtained at Samarkand, were transported by the completely spoiled roads on asses. The festival of "the holy water" and the new year also made the natives indisposed to hire themselves out as labourers for Captain Pariisky. In the twelve years that have elapsed since the interruption of the survey in the Zarafshan district many old signals have disappeared, and only traces of them could here and there be found. However, at length the object was attained, and the survey of 1886 was admirably joined with the renovated signal posts and the old survey. In all 1108 sq. versts were surveyed on either side of Samarkand. It was proved that the cultivation of the country had undergone a marked change; the number of buildings and gardens had increased, particularly in that part of Samarkand occupied by the Russians, as well as in the Miyankal valley, changes in a measure due to the altered course of the Kara-daria. This interesting phenomenon had been in a measure caused by the usual physical influences which alter river courses in Central Asia, as well as by the erection of a new dam in 1882, two versts above the old one (the fall of the Ak-daria is considerably greater than that of the Kara-daria, and the object of the dam was to divert water into this southern arm of the Zarafshan). The inhabited points in the Zarafshan district are quite different from those in Ferghana where the people live in settlements of some size with constant bazaars. The Zarafshan district, on the other hand, is covered with a network of detached huts and settlements, in which bazaars rarely occur, and these only on certain days. The nature of the country to the east of Samarkand differs from that on the west. While the former is abundantly watered by the Zarafshan, and is almost one continuous rice-field, the region to the west of Samarkand depends either on rainfall for its water supply, or on irrigating dykes led from the hills near the Bokharian frontier. Between these two tracts lies a belt of steppe land. In a hygienic sense one would have expected the rice-fields to be the most unhealthy part, but the opposite is really the case. The officers and men engaged in the survey enjoyed pretty good health in the eastern district, whereas in that on the west topographers and natives fell sick with fever, except the children of the latter, who kept their health well.

*Reconnaissance of the Syr-daria region.*—In 1886 this reconnaissance served as a continuation of similar work carried out in 1885 in the district of Khojend and the Zarafshan region in the western part of the Turkistan range, beginning at its northern outliers. Having taken in the former Ura-tiube region, the survey passed into the Kuraminsk district, intersecting the Syr-daria at two points above and below the Begovatsky rapids. Here, too, changes were found to have taken place during the last twenty years, owing to the increase of population and the greater extent of cultivated lands. The rivers Maidan-tal and Ugam, hitherto not entered on the map, owing to their inaccessibility, were found to belong to the basin of the Chirchik, and to have their sources in the snowy Karatau range. The passes, Maidan-

tal-ashu, Turpak-bel, and Kurum-jul, all above 10,000 feet, are continually covered with snow. The roads here are quite untouched; they are mere footpaths winding along steep, rocky cliffs, or in defiles obstructed by huge boulders of rock. Owing to the heavy snowfalls in the winters of 1885 and 1886, the water in the brooks and rivulets rose so high that bridges and fords were injured or swept away. The April and May rains washed away all traces of paths on the steep slopes, and added further to the difficulties of the reconnaissance.

*Survey in the trans-Caspian region.*—This was done in the districts of Tedjend and Merv, between the 15th (27th) May, and the 12th (24th) October, by five topographers, on the scale of 2 versts to the inch. In the Tedjend district 13,336 square versts were surveyed, containing mostly a sandy, waterless, and uninhabited tract. The survey was based on positions previously fixed astronomically, and accurately tested by measurement of base-lines. Five topographers also worked in the Merv district. Here, owing to the want of trigonometrical data they depended on a network of angles, taking as a base the nearest points of the instrumental survey of the Merv oasis, accomplished in 1884 on a scale of 1166 yards to the inch, and the astronomical positions of Utch-adjji, Repetek, and Charjui fixed by Captain Gedeonof of the Staff Corps. An extent of 9827 square versts of steppe were surveyed, and 1693 square versts in the Amu-daria oasis, extending for a distance of about 53 miles down the left bank of the river, between Eldjik ferry and Sakar-bazar settlement. The ground is everywhere much cut up by watercourses, and covered with detached buildings, small gardens, fruit orchards, and single trees, causing much impediment to the work of survey. From Charjui up the Amu valley to the ruins of Kuraimkala near the river bank opposite Burdalyk, and as far as Sakar-bazar, the country is thickly inhabited by Bokharian Sarts, and further up the river by Ersari Turkomans divided into four tribes,—Kara, Karabeksuli, Ulutepe, and Günesh. This population occupies a belt of land from 3 to 10 miles wide, so richly cultivated, and well irrigated from the Amu, as to have the appearance of a continuous garden for upwards of 50 miles. A similar tract of fertile soil extends to Kelif. According to the guides there are five wells along the only road between Merv and Burdalyk, 118 miles long, and only one of these, Beyur-Deshik, contains fresh water.

Besides these ten topographers, the Frontier Commission under the command of Col. Kuhlberg was at work. English engineers surveyed from Daulat-abad along both sides of the Russo-Afghan frontier, through Andkoi in a north-easterly direction as far as the Russian surveyed belt along the Amu-daria valley, on the scale of 2 English miles to the inch. The whole area surveyed by the Commission amounted to 25,909 square versts, a tract of dreary arid desert without any inhabitants, and only covered with grass in the spring, when a few nomads pasture their flocks and herds there. After the severe winter, accompanied by snow and frost (reaching  $-23^{\circ}$  Fahr.), a short spring set in followed by a sultry summer with a burning sun, and a temperature in the shade of  $113^{\circ}$  Fahr. There were several cases of sunstroke, and the members of the Tedjend and Merv sections suffered from a scarcity of provisions and water. The Tedjend topographers could only obtain supplies at Sarybend, and those of the Merv district at Merv itself.

*The Omsk Military-topographical Department.*—The geographical positions of 22 points have been chronometrically determined in a region bounded on the north by the Ishim, from the town of Akmolinsk through the Stanitza of Atbazar to the village of Chelkar; on the east, by the road from Akmolinsk to the whilom fort Aktaf; on the south, by the parallel of Ulatau; and on the west by the border of the district of Turgai and the Government of Orenburg. This region, from the Kokchetaf Mountains to the parallel of Akmolinsk, is a perfectly level plain, almost destitute of trees, but with a fertile soil well watered by the Ishim. Here

settlements are frequent and the roads are excellent. South of Akmolinsk, towards the Sary-su, the aspect changes, as the country becomes an undulating plain. From the eastern borders of the Akmolinsk district towards the centre of the tract sketched out, there occur craters of extinct volcanoes known by various names. These become more frequent towards the Turgai district and form the rocky Ulatau Mountains. Here, again, the soil is prolific, and the country well watered, though there are no settlers. The lords of these wide lands are the nomadic Kirghiz of Akmolinsk and Atbazar districts. The rivulets here are very difficult to cross.

In 1886, a series of levels was completed from the town of Petropavlofsk through Kokchetaf and Atbazar to Akmolinsk. Surveys were made—(1) In the Akmolinsk district along the borders of the Governments of Tobolsk and Orenburg. (2) In the Barlyk Mountains and in the valley of the Emel; and (3) In the Khan Tengri expedition. In the Akmolinsk 39,367 sq. versts were surveyed on the 5-verst scale. Here the nature of the ground required a large number of contour lines; thickets are frequent, serving to shelter the wintering stations of the nomads; lakes, both fresh and salt, as well as desiccated lake-beds, are numerous; and a network of roads gives access to the heart of the country.

The survey and astronomical observations in the valley of the Emel, from the frontier pillar at Manitu to Dowbuljin with the steppe lying to the south of it in the eastern part of the hilly country of Barlyk,\* and along the hitherto unknown Djair mountain range and valley of the Namyn-gol, was entrusted to Captain Zakrjefsky and topographer Bogdanof. In the hills of Barlyk there are no carriage roads, and the instruments had all to be carried on pack-horses. The 5-verst scale was adopted; the angles were measured by the Stephan compass and the distances by intersections or by the eye. Bogdanof surveyed the northern part of the valley of the Emel along its left side, the course of the Ak-su and its head-water; the western spurs of the Urkashar range, the western Djair Mountains, and the south-eastern part of the Maili Hills. Captain Zakrjefsky, besides fixing a series of astronomical points, surveyed the northern slope and eastern part of the Barlyk Mountains, the valley of the Kup, the plain of Konur-obo together with the contiguous southern slopes of Barlyk and part of the Maili Hills. About 10,000 sq. versts were mapped in this way, and this little known and interesting part of Dzungaria described.

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## GEOGRAPHICAL NOTES.

**Geography at Oxford.**—It is announced that the successful candidate for the important post of Reader in Geography, in the institution of which the Royal Geographical Society has taken such persistent interest, is Mr. Halford J. Mackinder, M.A., whose geographical lectures have attracted large audiences during the past two seasons at the chief centres of the Oxford University Extension in the north and west of England. The interests of geography as an important and definite branch of knowledge and as a necessary element in education will be safe in Mr. Mackinder's hands.

\* That part of Chinese territory, bounded on the north by the Emel, on the east by the Boglokhon road, on the south by the Maili range, and on the west by the Russian frontier, is known generally as the Barlyk hilly country.

**Jubilee Address to H.M. the Queen.**—The following Address from the Society was forwarded last week to the Home Secretary, for presentation to the Queen on the auspicious occasion of the completion of fifty years of Her Majesty's reign:—

TO THE QUEEN'S MOST EXCELLENT MAJESTY.

*The humble address of the President, Council, and Fellows of the Royal Geographical Society.*

MAY IT PLEASE YOUR MAJESTY,

We, the President, Council, and Fellows of the Royal Geographical Society, beg leave to offer to your Majesty our most respectful and dutiful congratulations on the completion of the fiftieth year of Your Majesty's reign.

Specially honoured as our Society is by the patronage of Your Majesty, and the favour of the illustrious Princes your sons, their Royal Highnesses the Prince of Wales and the Duke of Edinburgh, we gratefully take this occasion to assure Your Majesty that it has been the constant endeavour of the Royal Geographical Society to merit the honour thus conferred upon us, and to discharge the obligations arising from our position, by promoting the cause of Geographical exploration and science to the utmost of our ability.

And we venture, very respectfully, to assure Your Majesty that remarkable as has been the progress in all branches of Science which has characterised Your Majesty's reign, and which will certainly render that reign memorable in all future time, there is no branch of knowledge the additions to which have been more important than those made to Geography. Our Society, without arrogating to itself undue honour, may fairly claim to have been largely instrumental in promoting the enterprise through which these results have been obtained, and we are proud to have been furnished through the Royal favour with the means of conveying to many distinguished travellers and other persons who have rendered signal services to Geographical science and exploration, a highly esteemed and honourable recognition of their labours, by the award of the Royal Medals which Your Majesty's bounty provides.

That so large a portion of the globe has been opened up to colonisation and other civilising influences during Your Majesty's reign has in no small measure been due to such Geographical exploration; and as dutiful subjects of the Sovereign whose dominions extend into all quarters of the globe, and embrace nearly a sixth part of the habitable earth, we desire humbly to offer our congratulations on the great moral and material progress in all parts of those dominions and their dependencies, which has distinguished the fifty years of Your Majesty's reign, and on the continued loyalty and devotion to Your Majesty shown throughout

the great and glorious Empire over which Your Majesty has been called to rule.

For the maintenance of the integrity and unity of this Empire, and for the prosperous and peaceful prolongation of Your Majesty's reign, your faithful subjects the President, Council, and Fellows of the Royal Geographical Society will ever pray.

CLEMENTS R. MARKHAM,  
DOUGLAS W. FRESHFIELD,

RICHARD STRACHEY,  
*President.*

*Secretaries.*

**Diego Cam's Memorial Stone at the Mouth of the Congo.**—By a letter kindly communicated to us by Mr. R. K. Gray we learn that Baron von Schwerin, the Swedish traveller, at the close of his recent expedition\* and after his journey overland from Banana and Muanda to Boma, has discovered the celebrated "Pedra Padraõ," or inscribed stone, which the Portuguese navigator erected at the mouth of the Congo on the occasion of his memorable discovery of the river. Von Schwerin was about returning to Europe, after taking soundings on the south bank off the Congo mouth, when he learnt from Senhor Franca at St. Antonio that the natives of the locality had spoken to him of a large "fetish stone" hidden in the jungle. After several palavers with native chiefs, Von Schwerin persuaded them to show him and Senhor Franca the way to the stone, of which they stood much in awe. It was found at some distance from the beach and proved to be indubitably the remains of the Pedra Padraõ. Details of the discovery may be expected soon from Lisbon.

**A New African Lake.**—We learn from a recent official despatch of Mr. Hawes, our Consul in the Nyassa region, that a small lake has been discovered south-east of Lake Shirwa or Kilwa. Mr. Hawes' description is as follows:—Lake Limbi is a narrow sheet of water having an outlet flowing into the southern end of Lake Shirwa. Its position has not as yet been marked on any of the maps of Central Africa, but I understand from Mr. Last that he fixed it during his journey to the Namuli Hills last August. The lake abounds with wild-fowl and other birds, and is the abode of numbers of hippopotami. The water is muddy and scarcely fit for drinking purposes. The only other water in the neighbourhood is a discoloured thickish liquid obtained from pools dug in the clayey soil.

**Emin Bey.**—The last batch of letters which have reached Europe from the beleaguered traveller, are published in Petermann's 'Mitteilungen' (No. 6). They bear various dates from 10th August, 1883, to 26th October 1886, and are principally occupied with news of his position and prospects at different periods. The last of these letters, that of the 26th

\* *Vide* 'Proceedings R.G.S.,' 1885, p. 817.

October, 1886, is of geographical interest, and gives a few details of his excursions to Lake Albert Nyanza. "I send you," he says, "a report upon a tour to Albert Nyanza. Since writing it I have made two further journeys to the lake and collected a mass of new information. I could have sent you the detailed map at once, but since there are still some points which need to be cleared up, I will wait, and meanwhile give you briefly the principal results of my work. First of all is the discovery of a new river which flows down from the U-songora Mountains; it is of considerable size, and flows south into the lake. The river, which is called Kakibbi by the Wa-songora, and Dueru by the Wa-mboga, forms near its mouth a large island. It is, however, on account of its numerous rapids, very difficult to navigate, but on the other hand it pours into the lake all the year round a large volume of water. Upon its banks, at a short distance from the lake, is situated the town of Hamgurko, where a quantity of salt of excellent quality is obtainable. The Kakibbi or Dueru forms the boundary between the district of Muenge, which belongs to U-nyoro, in the east, and the M-boga country in the west. In the west-north-west and north M-boga is bounded by Leundi, a district which lies behind the mountains on the borders of the lake. Farther west I found a region peopled by races which I consider to be the Iddio (A-Zandeh). In the south-west there is, as I was told, a river, on the banks of which a colony of the curious dwarf race or Akkas, called Balia by the Unyoro people, exists, but they show themselves in their speech to be Betua. I could give here a quantity of information about the fair Wa-huma of Mruli and the Toru Mountains, and also about the Wa-kondje, &c.; for the present the above must suffice." These letters were brought from Lado on the return of the caravan which Dr. Junker had sent to Emin Bey.

**The River Mobangi.**—The latest journey up this important tributary of the Congo is that accomplished by Captain van Gele, who in October to December last navigated the river as far as the Sango rapids, which Grenfell surmounted in the *Peace* in January 1885. Captain van Gele surveyed the following tributaries of the Mobangi, which Grenfell remarked but did not navigate, viz. the Ibenga (Grenfell's Botabo) and Lobay on the right bank and the Nghiri on the left. The latter is a small river taking its rise in a swamp lying to the north-west of Bangala, and flows across the narrow tongue of land between the Mobangi and the Congo. This swamp is identical with the Nghiri Lake discovered by Lieutenant Coquilhat in 1885. In the rainy season it is connected with the Congo by numerous small watercourses.

**Geography in Russia.**—It has been decided to institute chairs of geography at the Russian Universities. One will be established at St. Petersburg University in the autumn of the present year.

The Climate of Europe as regards the duration of a certain mean temperature in different areas.—An instructive article on this subject, accompanied with maps and tables, is contributed by Herr Alex. Supan to the current number of Petermann's 'Mitteilungen.' The object is to show the length of time (the number of months) a mean temperature, low, temperate, or high, prevails in a European area, and to mark off on maps the areas in which the temperature endures, the number of months being expressed by colours. It is manifest that many geographical and biological considerations depend on such general facts of climate as Herr Supan is endeavouring to work out. The distribution of the fauna and flora of a region, for example, must depend on the persistence of a certain mean temperature for some part of the year. Supan divides temperatures into three classes: (1) 32° F. (0° Cent.) and under, which he calls the "Frost Period"; (2) 51° and over (10° to 20° Cent.), the "Warm Period"; (3) and 68° and over, or the "Hot Period." The duration of these temperatures he has noted at 471 different stations in Europe and the countries round the Mediterranean. The temperatures have not been reduced to the sea-level. The results, which he has represented cartographically in a very striking manner, may be briefly summarised as follows:—The lines of equal duration of the "Frost Period" run similarly to the winter isothermal lines, changing from a southerly direction in the west of Europe to a south-easterly and then east-south-easterly in the east of Europe. As regards the "Warm Period," it is only on the Atlantic side of Europe that the lines of equal duration run distinctly south-east; elsewhere on the Continent they approximate very nearly to the parallels of latitude, while for the "Hot Period" they show a north-easterly direction. Thus, in all three maps the contrast between the oceanic west and the continental east comes out very sharply. The climate of Norway, which is generally spoken of as exceptionally warm, is in the hill region very cold. A glance at Maps 1 and 2 explains why the Norwegian highland was in the glacial epoch the birthplace of North European land ice; the reason is not to be found in the extraordinarily low temperatures, but in the duration of the cold and warm periods. In all districts, says the writer, where a coast range of mountains interposes between the interior and the sea, or where the hills rise abruptly from the sea, the lines of equal duration press closely together, notably in Norway and the Alps. He emphasises the importance, in considering the climate of Europe, of such regions of depression as the valleys of the Rhine and Rhone, the low-lying plains of Hungary, and the country of Poland. As regards the climate of the interior of the Balkan Peninsula, the data are very meagre, but the observations of the Austrian stations permit of an interesting comparison being made between Bosnia on the one side and the Dalmatian coast territory and basin of the



Danube on the other. A careful examination of Herr Supan's tables will doubtless throw valuable light on the physical geography of Europe.

**Desert of Gobi.**—The energetic traveller M. G. N. Potanin returned to St. Petersburg in the spring, thus bringing to a termination his work of three years' exploration in Mongolia. M. Potanin, in company with his wife, M. Skassi, topographer, and M. Beresowski, left Peking in the summer of 1884. Crossing the province of Kuku-khoto, the party proceeded to Kan-su, which was in the first instance the chief field of operations. The winter (1884-5) was passed at the town of San-chuan on the road from Lan-chau to Sining. The following summer was occupied with extensive excursions to the south into the territories bordering on Kuku-nor. After wintering in the convent at Hui-bui, M. Potanin travelled in the summer of 1886 to the province of Se-chuen, whence at the end of the year he made his way across the Desert of Gobi to Kiakhta and Irkutsk. The immense and varied collections brought home by him include more than 1500 botanical specimens and 15,000 insects, together with numerous photographs and ethnographical objects. The topographical surveys of M. Skassi are spoken very highly of. He has determined by astronomical observations the position of more than sixty different points, and has surveyed 4000 miles of country. M. Beresowski will remain for another year in China. M. Potanin has reported the details of his journey across the desert of Gobi in a letter to the Imperial Geographical Society of Irkutsk. Leaving Goltai on 27th June, 1886, he followed the course of the river Ezsín, which flows across the desert of Gobi, and in summer possesses a considerable volume of water. For some distance the river is lined on both sides with chains of low hills of chalk and sandstone formation, which are covered with moving sand. In its lower course the Ezsín divides into two arms, the eastern one forming the half dried-up lake of Sugu-nor, while the western branch flows into the great salt lake Gashun-nor, situated in a veritable desert where for fifty miles neither water nor grass is to be found. M. Potanin travelled round the west shore of this lake, and then crossed to the north the eastern spurs of the Altai Mountains, which here run from west to east in four parallel chains, between which extend broad valleys containing rivers after heavy rains. In the most northerly range is the snow-peak of Ichí-Bógdo. From the latter point the party journeyed to Lake Orok-nor, and proceeding up the valley of the Tui, past Changai, reached the Pass of Kuljussai. Then travelling down-stream they found themselves at length in the vicinity of Lake Ugei-nor, near which the great route from Urga to Uliassutai passes. Between the Ezsín and Lake Ugei-nor four important caravan routes were crossed. M. Potanin reached Kiakhta on the 11th October.

**New Provinces in Chile.**—By an ordinance of March 12th, 1887, two new provinces have been created in Chile, Malleco and Cautin, thereby bringing what remains of Araucania into administrative relation with the rest of the country. The province of Malleco has for its chief town Angol, and is divided into three departments, Angol, Collipulli, and Traiguen; Temuco is the chief town of the province of Cautin, which is divided into the two departments of Temuco and Imperial. The towns which give the names to the departments and which have from 3000 to 4000 and even more inhabitants, will not be found in the last official map by Pissis, issued in 1885. Traiguen lies on the river of that name, which runs into the Rio Lumoco, a northern tributary of the Rio Cautin or Imperial; Collipulli is on the river Malleco, which joins the Regue below Angol, and so forms the Rio Vergara. Temuco and Imperial are both on the river Cautin, Imperial being at the junction of the Lumaco with that river, and Temuco about 22 miles higher up. These places will soon all be connected with the rest of Chile by rail.

**Antarctic Exploration.**—Referring to our note in the May number of the 'Proceedings,' p. 309, on the movement in Australia in favour of an Antarctic expedition, we are now able to state that still further progress has been made. The Antarctic Committee appointed by the Royal Society of Victoria, and the Royal Geographical Society of Australia (Victoria Branch), have recommended to the Premier of the Colony the propriety of stimulating Antarctic research by the offer of bonuses. They advise that a sum of 10,000*l.* be placed upon the estimates to provide for the amount of the bonuses, and for the expense of the equipment of the staff. They advise the Government to invite tenders from shipowners willing to perform the services required, the tenderers having to provide two fortified ships, each not less than 175 tons register and 60 horse-power nominal. There must be provided, free of charge, cabin accommodation in each ship for two gentlemen who will sail as the scientific staff, and who must be afforded every facility for noting natural phenomena. The chartered ships will have a special bonus (from 800*l.* to 1000*l.*) upon their entering at the Custom House a cargo of 100 tons of oil, the produce of fish caught south of 60° S. The special services expected are as follows:—A flying survey of any coast-lines lying within the Antarctic circle, and not now laid down upon the Admiralty charts; the discovery of new waterways leading towards the South Pole, and of harbours suitable for wintering in, and the discovery of commercial products. Opportunities will have to be afforded to the scientific staff to add to our knowledge of the meteorology, oceanography, terrestrial magnetism, natural history, and geology of the region. The masters of the ships must specify the bonus they demand for passing 70° S. and for each degree beyond 70°; and also for every occasion in which they succeed in establishing on shore a temporary observing camp. These are the principal points in

the new scheme of Antarctic exploration, and we are glad to know that the Victorian Premier is prepared to move for a Government grant provided the other colonies contribute, which no doubt they will do.— While on the subject of Antarctic exploration, we may state that we are informed by Baron Nordenskiöld that the rumours as to his leading an Antarctic expedition are entirely premature. He has as much work on hand at home as will keep him going till 1889, and it is extremely doubtful if even then he would undertake such an expedition were the conditions favourable.

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### CORRESPONDENCE.

#### *On the Position of Mount St. Elias, and the Schwatka Expedition to Alaska.*

DEPARTMENT OF THE INTERIOR, U.S. GEOLOGICAL SURVEY,  
WASHINGTON D. C.

May 25, 1887.

I have read with interest the entertaining article of Lieut. Seton-Karr in the last number of the 'Proceedings' of your Society. A few observations thereon may perhaps be permitted. Lieut. Seton-Karr observes (p. 272) in effect that if the shore-line be correctly mapped, the position of Mount St. Elias is, &c. It would be too much to expect of gentlemen who explore in search of sport and manly exercise such as mountain-climbing, that they should be conversant with all the literature of the subject. A few references may, however, be useful in supplementing for students of geography the observations above referred to.

The shore-line of the Alaskan coast between Yakutat and Prince William Sound is not, and never has been correctly located. The position of Mount St. Elias, however, has been well determined by the U.S. Coast Survey expeditions which I had the honour to command in 1874 and 1880. Mr. Marcus Baker, whose qualifications will not be doubted by any one acquainted with him, was on both occasions astronomer to the party, and observed a series of vertical angles on Mount St. Elias in 1874. The triangulation, however, and other vertical angles were observed by myself in person, not by my valued friend and assistant, as erroneously stated in Elliott's late compilation on Alaska. Our party was furnished with a large number of chronometers and other instruments of precision, and the results in full, together with the data and essential parts of the computation, were published in the U.S. Coast Survey Report for 1875. A separate copy of the article was furnished to your Society in advance of the volume. From this it will be seen that the position of Mount St. Elias is not a matter of controversy, within narrow limits, at most not to exceed two or three miles, and in all probability much less than one mile. Additional information gained in 1880 will be found in the 'American Journal of Science' (Feb. 1881, pp. 104-111.) The Malespina glacier, since named for Agassiz by Schwatka, is there referred to at some length. The failure of Schwatka's name for it is the less to be regretted from the fact that there is already in South-eastern Alaska a

truly magnificent glacier named after Agassiz by the Superintendent of the U.S. Coast Survey.

I am in a position to state without reserve that the map furnished to the *New York Times* by Schwatka, from the neglect to take existing knowledge into account, has Mount St. Elias placed about 30 miles out of its true position, and that any hypotheses similarly based upon the Tebienkoff shore-lines are necessarily more or less erroneous. As the distance from the shore at Icy Bay to the peak of St. Elias was not measured with any instrument of precision by the Schwatka party, the distance remains uncertain, and as the boundary is a line parallel to the windings of the coast, and ten marine leagues therefrom, the nationality of the apex is yet uncertain. I am sure that if some of your Alpine climbers should be the first to tread its virgin snow, and decide the point in favour of the mother country, American geographers will not grudge the victory.

As the Schwatka expedition was due to American liberality and enterprise I may venture to say that it is my opinion that if its leader had informed himself of what was already known in regard to the surroundings of the mountain, he would hardly have attacked the problem from the direction of Icy Bay. Any attempt from there is foredoomed to failure. The sketch of St. Elias in my report on our work there is enough to decide this at a glance, when it is remembered that the precipitous face there exhibited is turned toward Icy Bay. An attempt to climb the mountain with the slightest hope of success must be made from behind or along the range. My own observations would indicate a point on the north-west shore of Yakutat Bay beyond the limits of the Malespina glacier and its torrents. There will be a rugged region of at least 50 miles to traverse, with the snow-line (apart from glaciers) between 2500 and 5000 feet above the sea, according to the exposure of the slope. For clear weather, May or early June is the only time. The party should be sufficient unto itself, and put no dependence on Indians. It is possible that a couple of mules, used to mountain travel, might be of use in the early part of the trip. The climb is no child's play, and will require thorough training and equipment to be practicable at all in the doubtful event that the natural obstacles are not insuperable.

I am, &c.,  
W. H. DALL.

The Secretary R.G.S.

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THE ANNIVERSARY MEETING, MAY 23RD, 1887.

General R. STRACHEY, Vice-President, in the Chair.

ELECTIONS.—*Stuart Charles Francis Cumberland, Esq.; Rev. Alfred Flower; Rev. Ernest Awdry Gray; Herbert Guillaume, Esq.; Alexander Rottmann, Esq.*

The proceedings commenced by the reading of the Rules which govern the proceedings at Anniversary Meetings of the Society.

The CHAIRMAN then appointed Sir RAWSON RAWSON and Mr. DYASON as Scrutineers of the ballot about to take place.

Mr. DOUGLAS W. FRESHFIELD (Secretary) read the Annual Report of the Council, as follows:—

REPORT OF THE COUNCIL.

The Council have the pleasure of submitting to the Fellows the following Report on the financial and general condition of the Society:—

*Members.*—The number of Fellows elected during the year (ending April 30th, 1887) was 206, besides three Honorary Corresponding Members. In the previous year, 1885–86, the total elections amounted to 173, and in 1884–85 the number was 190. Our losses have been, by death 76 (besides 5 Honorary Corresponding Members), by resignation 52, and by removal on account of arrears of subscription 51; making the net increase for the year 25. In the year 1885–86 there was an increase of 16; in 1884–85 an increase of 13. The total number of Fellows on the list (exclusive of Honorary Members) on the 1st May was 3392.

*Finance.*—As will be seen by the annexed Balance Sheet, the total net income for the financial year ending 31st December, 1886 (i.e. exclusive of balance in hand and the donation from Miss Gill), was 7968*l.* 9*s.*, of which 5859*l.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1885, the total net income was 7740*l.* 11*s.* 5*d.*, and the amount of subscriptions, &c., 5625*l.*; in 1884 the two totals were 8464*l.* 11*s.* 6½*d.*, and 6246*l.* 18*s.* 4*d.* respectively.

The net expenditure for the past year (i.e. exclusive of balance in hand and the investment of the Gill Memorial) was 7767*l.* 18*s.* 0½*d.* The net expenditure in 1885 was 8053*l.* 12*s.* 4½*d.*; in 1884, 9266*l.* 0*s.* 5*d.*

The Finance Committee of the Council have held, as usual, Monthly Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on the 6th April last, the Auditors being, on behalf of the Council, Sir Henry Barkly and S. W. Silver, Esq., and on behalf of the Fellows at large, E. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

*Auditors' Report.*—“The Auditors appointed for the examination of the Accounts of the Royal Geographical Society for the year ended 31st December, 1886, beg to report that they have examined the Balance Sheet submitted, and have compared it with the Cash Book, Bankers' Book, Petty Cash Book, and other Account Books of the Society, and have found the same to be correctly stated and sufficiently vouched. They consider the Books to have been kept in a manner highly creditable to the Accountant.

“The Investments have been augmented during the year by a donation of

1000*l.* from Miss Gill in memory of her late brother, Captain Gill, R.E., and now consist of the undermentioned securities :—

	£.	s.	d.
North-Eastern Railway 4 per Cent. Debenture Stock	1000	0	0
Great Indian Peninsula Railway 5 per Cent. Stock ..	4000	0	0
Great Western Railway 4½ per Cent. Stock (Davis Bequest) .. .. .	1800	0	0
London and North-Western Railway 4 per Cent. Debenture Stock (Murchison Bequest) .. .. .	1000	0	0
Caledonian Railway 4 per Cent. Preference Stock ..	2000	0	0
Norwegian 4 per Cent. Bonds .. .. .	1000	0	0
New South Wales 3½ per Cent. Stock (Gill Memorial)	1028	0	0
India Stock .. .. .	1000	0	0
India 3½ per Cent. Debentures .. .. .	1000	0	0
Consols .. .. .	3669	2	2
Consols (Peck Fund) .. .. .	1000	0	0
Consols (Back Bequest) .. .. .	561	0	8
Consols (Trevelyan Bequest) .. .. .	510	4	0
Making a Total of .. .. .	£19,568	6	10

“The Balance Sheet may be regarded also in other respects as satisfactory, since the ordinary Receipts of the year exceed those of 1885 by 227*l.*, the Subscriptions showing an increase of 50*l.*, and the Sale of Publications with Advertisements, &c., of 82*l.*

“The ordinary disbursement, on the other hand,—notwithstanding the cost of publications was 377*l.* more—were reduced by 286*l.*, in consequence of the saving of expenditure on expeditions, which amounted to no less than 623*l.* As a result, instead of a deficit of 314*l.* as in the previous year, there was a net surplus of 200*l.*, as will be clear from the subjoined comparative statement :—

Years.	Ordinary Receipts. £	Total Expenditure. £	Excess of Expenditure. £
1885	7741	8055	314
1886	7968	7768	Excess of Revenue. 200

the balance at the Bankers, and cash in hand, which stood at 325*l.* on the 31st December, 1885, having been thus augmented on the 31st December, 1886, to 525*l.*

“Should the revenue of the present year continue to improve in the same ratio, and the cost of the Society’s publications not exceed the average, it may prove practicable to provide the 1000*l.* which the Royal Geographical Society has engaged to contribute for exploration purposes in connection with the Emin Bey Relief Expedition which has started under the command of Mr. H. M. Stanley, without having recourse to a sale of stock.

“The arrears of subscriptions, valued last year at 465*l.*, have decreased to 440*l.*

“The investments and assets of the Society, on 31st December, 1886, show an increase during the year from 39,330*l.* 4*s.* 7*d.* to 40,533*l.* 15*s.* 6½*d.*

(Signed)      HENRY BARKLY,  
S. W. SILVER,  
E. O. TUDOR,  
J. D. THOMSON, } *Auditors.*

“6th April, 1887.”

The following Balance Sheet and Statement, showing the Receipts and Expenditure of the Society from the year 1848 up to the present date, are annexed to the Report of the Auditors:—

<i>Receipts.</i>	BALANCE SHEET FOR THE YEAR 1886.				<i>Expenditure.</i>				
	£	s.	d.	£	s.	d.			
1886.									
Balance in Bankers' hands 31st Dec. 1885..	320	8	5						
Do. Accountant's do.	4	9	4						
				324	17	9			
<i>Subscriptions:—</i>									
For the current year ..	3857	0	0						
Paid in advance .. ..	564	0	0						
Arrears.. .. .	376	0	0						
				4797	0	0			
<i>Entrance Fees</i> .. ..				522	0	0			
<i>Life Compositions</i> .. ..				540	0	0			
<i>Payments made in error</i>				46	6	3			
<i>Parliamentary Grant</i> ..				500	0	0			
<i>Royal Premium</i> .. ..				52	10	0			
<i>Rent of Shop and Vaults</i>				134	14	8			
<i>Publications, sale of</i> ..	351	7	6						
<i>Advertisements in 'Proceedings'</i> .. ..	189	10	0						
Do. in Exhibition ..	44	5	0						
Catalogue .. .. .				585	2	6			
<i>Loan of Diagrams</i> .. ..				10	10	0			
<i>Payments for Scientific Instruction</i> .. ..				15	18	0			
<i>Donation from Miss Gill in memory of her late brother, Capt. W. Gill, R.E.</i> .. .. .				1000	0	0			
<i>Dividends:</i>									
North-Eastern Railway 4 per Cent. Debenture Stock .. 1000l.	38	13	4						
Great Indian Peninsula Railway 5 per Cent. Stock .. 4000l.	232	12	11						
Great Western Railway 4½ per Cent. Stock [Davis Bequest] 1800l.	73	19	0						
London and North-Western Railway 4 per Cent. Debenture Stock [Murchison Bequest] 1000l.	38	13	4						
Caledonian Railway 4 per Cent. Preference Stock .. 2000l.	77	6	8						
Norwegian 4 per Cent. Bonds .. 1000l.	38	13	4						
New South Wales 3½ per Cent. Stock [Gill Memorial] 1028l.	17	7	11						
India Stock .. 1000l.	38	13	4						
India 3½ per Cent. Debentures .. 1000l.	33	16	8						
Consols 3669l. 2s. 2d.	106	8	0						
" [Peck Fund] 1000l.	29	0	0						
" [Back Bequest] 561l. 0s. 8d.	16	5	8						
" [Trevelyan Bequest] 510l. 4s. 0d.	14	15	10						
Interest on 1000l. deposited from April 15 to November 5 ..	8	1	7						
				764	7	7			
				£	9293	6	9		
1886.									
<i>House:—</i>									
Taxes and Insurance ..	116	4	0						
Repairs and Furnishing	124	12	7						
Coals, Gas and Water	63	11	0						
Miscellaneous .. ..	8	3	0						
						312	10	7	
<i>Office:—</i>									
Salaries .. .. .	1136	5	4						
Stationery and Printing	292	1	1						
Miscellaneous .. ..	137	12	5						
						1565	18	10	
<i>Library:—</i>									
Salaries and Gratuities	300	0	0						
Purchase of Books ..	130	5	11						
Binding .. .. .	67	16	6						
Miscellaneous .. ..	10	1	8½						
						508	4	1½	
<i>Map-Room:—</i>									
Salaries and Gratuities	545	0	0						
Purchase of Maps ..	34	11	1						
Instruments and Repairs .. .. .	44	10	6						
Miscellaneous .. ..	46	8	2						
						670	9	9	
<i>Map-Drawing-room:—</i>									
Salaries .. .. .	370	0	0						
Drawing Materials ..	12	5	10						
						382	5	10	
<i>Meetings</i> .. .. .						243	16	8	
<i>Medals and other awards</i>						176	19	6	
<i>Scientific Purposes</i>									
<i>Grant:—</i>									
Scientific Instruction ..	31	5	0						
Expenses on account of Geographical Exhibition .. .. .	572	12	11½						
Payment on account of Map of W. Africa ..	25	0	0						
						628	17	11½	
<i>Publications:—</i>									
Printing 'Proceedings'	1192	4	0						
Maps and Illustrations	835	12	2						
Postage of 'Proceedings' .. .. .	318	2	1						
Payments to Contributors, Translations, &c. .. .	204	0	0						
Supplementary Papers	198	3	8						
Educational Reports ..	78	17	7						
Editor of Publications	200	0	0						
Miscellaneous .. ..	39	18	3½						
						3066	17	9½	
<i>Payments in error returned</i>						20	0	0	
<i>Purchase of 1028l. New South Wales 3½ per Cent. Stock (Gill Memorial)</i> .. .. .						1000	0	0	
<i>Expedition:—</i>									
Expenses on account of East African Expedition .. .. .						191	17	0	
<i>Balance in Bankers' hands 31st Dec. 1886..</i>	507	19	3						
Do. Accountant's do.	17	9	5½						
						525	8	8½	
						£	9293	6	9

REGINALD T. COCKS,  
Treasurer.

Audited and found correct, 6th of April, 1887.

HENRY BARKLY,  
S. W. SILVER,  
J. D. THOMSON,  
E. O. TUDOR, } Auditors.

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec., 1886.

	Year.	Cash Receipts	Cash Amounts	Deducting
		within the Year.	invested in Funds.	Amounts invested in Funds; actual Expenditure.
		£ s. d.	£ s. d.	£ s. d.
<sup>1</sup> Includes Treasury Grant of 1000 <i>l.</i> for the East African Expedition.	1848	698 10 5	.. ..	755 6 1
	1849	778 3 0	.. ..	1,098 7 6
	1850	1,036 10 5	.. ..	877 2 10
<sup>2</sup> Includes Treasury Grant of 2500 <i>l.</i> for the East African Expedition.	1851	1,056 11 8	.. ..	906 14 7
	1852	1,220 3 4	.. ..	995 13 1
<sup>3</sup> Includes Legacy of Mr. Benjamin Oliveira, 1806 <i>l.</i> 17 <i>s.</i> 1 <i>d.</i>	1853	1,917 2 6	.. ..	1,675 6 0
	1854	2,565 7 8	.. ..	2,197 19 3
	1855	2,584 7 0	.. ..	2,636 3 1
<sup>4</sup> Includes Legacy of Mr. Alfred Davis, 1800 <i>l.</i>	1856	<sup>1</sup> 3,372 5 1	533 10 0	2,814 8 1
	1857	3,142 13 4	378 0 0	3,450 19 9
	1858	3,089 15 1	.. ..	3,944 13 6
<sup>5</sup> Includes Legacy of Sir Roderick Murchison, 1000 <i>l.</i>	1859	3,471 11 8	950 0 0	3,423 3 9
	1860	<sup>2</sup> 6,449 12 1	466 17 6	5,406 3 7
<sup>6</sup> Includes Mr. James Young's Grant for Congo Expedition, 2000 <i>l.</i>	1861	4,792 12 9	1,358 2 6	3,074 7 4
	1862	4,659 7 9	1,359 7 6	3,095 19 4
<sup>7</sup> Includes 1000 <i>l.</i> 14 <i>s.</i> 6 <i>d.</i> sale of Exchange Bills.	1863	5,256 9 3	1,837 10 0	3,655 4 0
	1864	4,977 8 6	1,796 5 0	3,647 7 10
<sup>8</sup> Includes Mr. James Young's Grant for the Congo Expedition, 1041 <i>l.</i> 14 <i>s.</i>	1865	4,905 8 3	1,041 5 0	4,507 4 5
	1866	5,085 8 3	1,028 15 0	4,052 15 0
	1867	5,462 7 11	1,029 0 6	3,943 17 4
	1868	5,991 4 0	1,857 3 9	4,156 17 10
<sup>9</sup> Includes Parliamentary Grant of 3000 <i>l.</i> to Cameron Expedition.	1869	<sup>3</sup> 6,859 16 0	2,131 5 0	4,646 0 8
	1870	<sup>4</sup> 8,042 6 1	3,802 6 0	3,845 10 6
<sup>10</sup> Includes Donation of 500 <i>l.</i> by Mr. C. J. Lambert.	1871	<sup>5</sup> 6,637 3 7	1,000 0 0	3,726 4 4
	1872	<sup>6</sup> 8,119 7 9	1,999 4 6	5,871 13 2
	1873	<sup>7</sup> 7,761 18 10	2,015 1 8	6,697 12 6
<sup>11</sup> Includes Legacy of Admiral Sir George Back, 540 <i>l.</i>	1874	<sup>8</sup> 7,753 5 10	499 0 0	7,876 2 3
	1875	7,934 15 10	2,002 7 6	5,683 4 10
<sup>12</sup> Includes Legacy of Sir W. C. Trevelyan, 500 <i>l.</i>	1876	<sup>9</sup> 11,611 11 8	.. ..	6,870 13 1
	1877	<sup>10</sup> 7,950 1 11	2,538 2 0	8,940 17 11 <sup>4</sup>
	1878	<sup>11</sup> 8,124 10 0	3,000 0 0	6,361 9 6
<sup>13</sup> Includes 1005 <i>l.</i> 8 <i>s.</i> 2 <i>d.</i> , sale of Exchange Bills.	1879	<sup>12</sup> 8,979 14 10	1,551 10 10	6,990 14 2
	1880	8,599 18 4	1,567 5 1	8,454 1 10 <sup>+</sup>
<sup>14</sup> Includes 1000 <i>l.</i> received from Mr. B. Leigh Smith.	1881	<sup>13</sup> 8,809 19 5	.. ..	8,362 5 6 <sup>†</sup>
	1882	<sup>14</sup> 8,942 15 0	.. ..	8,779 10 7
	1883	<sup>15</sup> 9,599 9 0	1,001 5 0	8,624 2 11
<sup>15</sup> Includes 500 <i>l.</i> on loan from Bankers.	1884	<sup>16</sup> 8,964 11 7 <sup>‡</sup>	.. ..	9,266 0 5
<sup>16</sup> Includes 99 <i>l.</i> 0 <i>s.</i> 10 <i>d.</i> , sale of India Debentures.	1885	<sup>17</sup> 8,738 12 3	.. ..	8,555 3 10 <sup>‡</sup>
	1886	<sup>18</sup> 7,968 9 0	1,000 0 0	7,767 18 0 <sup>‡</sup>
<sup>17</sup> Includes Donation of 1000 <i>l.</i> from Miss Gill.				

\* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.  
 † This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.  
 ‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS—31st December, 1886.

	£	s.	d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library insured for 10,000 <i>l.</i> ) .. .. .	20,000	0	0
Investments (amounts of Stock, as detailed in the above Report of the Auditors .. .. .)	19,568	6	10
Arrears due on December 31, 1886, £1103 0 0, Estimated at .. .. .	440	0	0
Balance at Bank .. .. .	£507	19	3
„ in Accountant's hands .. .. .	17	9	5 <sup>‡</sup>
	525	8	8 <sup>‡</sup>
Total .. .. .	£40,533	15	6 <sup>‡</sup>

*Publications.*—The monthly 'Proceedings' have been issued with regularity throughout the year; the twelve numbers for 1886 forming a volume of 847 pages,  
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illustrated by 23 maps and 7 pictorial diagrams. The total cost of the edition of 5000 copies (including 31*l.* 2*s.* 1*d.* for free delivery to Fellows and Institutions) was 2345*l.* 18*s.* 3*d.* From this is to be deducted the amount of 585*l.* 2*s.* 6*d.* received from sale of copies to the public and from advertisements. One part of the 'Supplementary Papers' (Vol. II., Part I.) was also issued during the year; the total cost of which was 198*l.* 3*s.* 8*d.*

*Scientific Purposes Grant.*—During the past year ten intending travellers have received instructions from Mr. Coles in Practical Astronomy in the Society's Observatory, and in route-surveying with the theodolite and plane table, in the country. The total number of hours devoted to teaching during the year was 161.

Twenty-seven lessons in Photography to four intending travellers have been given during the year.

Instruments to the value of 115*l.* have been lent during the past year to the following travellers:—Mr. A. P. Maudslay, Guatemala, 80*l.*; Mon<sup>r</sup>. H. M. P. de la Martinière, Marocco, 35*l.*

The silver half-chronometer watch lent to Rev. T. J. Comber (Congo Region) in 1886, has been returned broken, and after being repaired was again lent to Mr. A. P. Maudslay.

An instalment of 25*l.* has been paid on account of the Map of Western Equatorial Africa in course of compilation by Mr. E. G. Ravenstein.

*Geographical Education.*—The sum of 572*l.* 12*s.* 11*d.* has been disbursed during the year on account of the Exhibition of Educational Appliances held in the winter of 1885-6; and 78*l.* 17*s.* 7*d.*, the cost of printing the volume of "Educational Reports."

*Map Room.*—The accessions to the Map Room Collection during the past year comprise 1554 Maps and Charts on 1947 sheets; 17 Atlases, containing 490 sheets of Maps, and 548 Photographs and Views. Of these, 44 Maps, on 306 sheets, 4 Atlases, and 146 Photographs (including 31 Magic Lantern Slides) have been purchased.

Among the most important donations to the Map Room Collection are:—748 sheets of the Ordnance Survey of the British Isles (presented by the First Commissioner of Public Works, through the Director-General of the Ordnance Survey); 244 sheets of British Admiralty Charts (The Lords Commissioners of the Admiralty, through the Hydrographer); 242 sheets of the various Indian Government Surveys (H.M. Secretary of State for India); 21 French Charts (Service Hydrographique de la Marine, Paris); 18 United States Charts (Commander J. R. Bartlett, U.S.N., Hydrographer to the Bureau of Navigation, Washington, D.C.); 22 Maps published in Petermann's 'Geographische Mitteilungen' (Herr Justus Perthes); 9 Maps published by Dietrich Reimer (the Publisher); 6 Reduced Ordnance Maps of Scotland, and 1 Map of Ireland, by J. Bartholomew (the Author); 39 Photographs of the natives and scenery of New Guinea (Capt. C. Bridge, R.N.); 138 Photographs of various parts of France and Italy (James Jackson, Esq., Paris); 192 Photographs of the natives and scenery of Kashmir and the N.W. Frontier of India (Prof. Thistleton Dyer); 22 sheets of Norwegian Government Surveys (Den Geographiske Opmaaling Kristiania); 4 sheets of the Generalstabens Topographiske Kaart over Danmark (The Danish Minister of War); 12 sheets (Part XXIX.) of Topographischer Atlas der Schweiz (Section Topograph. du Bureau d'État Major Fédéral à Berne); Facsimile of the second Borgian Map, by Diego Ribero, Seville, 1529 (Sir A. J. Adderley); Surveys of Ancient Babylon (Trelawney Saunders, Esq.); Carte Géologique du Turkestan Russe (Comité Géologique à St. Pétersbourg); Übersichts-Karte der Ethnographischen Verhältnisse von Asien und von den angrenzenden Theilen Europa's, von Vinzenz v. Haardt (the Author); Synchronous

Weather Charts of the North Atlantic and the adjacent Continents, for every day, from 1st August, 1882, to 31st August, 1883; Parts I. and II. (Meteorological Office); Atlas de la Republica Argentina: Part I. (l'Institut Géographique Argentin).

The Maps in the Society's Collection have been made frequent use of by the Fellows of the Society, public offices, and the general public. The large Maps and Views have been lent to illustrate lectures delivered at the meetings of learned societies and public institutions, as well as to private individuals. Twenty-two new diagrams have been constructed on the premises, and important alterations made in five others, while one diagram has been drawn outside the building, and tenders for the construction of two more have been accepted.

*Library.*—During the past year the presentations to the Library, by authors, publishers, and others, have been more numerous than ever.

995 books and pamphlets have been added during the year; 845 by donation, and 150 by purchase; 150 pamphlets have been put in covers by the Society's map-mounter, and 262 volumes have been bound.

The sum of 89*l.* 6*s.* 4*d.* has been spent in purchasing books, and the further sum of 87*l.* 16*s.* 6*d.* in binding for the Library.

Among the more important accessions are the following:—Schliemann's 'Tiryns'; 'Nombres Geográficos de Mexico,' with separate Atlas (the Mexican Government); the 'Encyclopædia Britannica,' 9th edition, Vol. XXI. (Messrs. A. & C. Black); Richthofen's 'Führer für Forschungsreisende' (the Publishers); Henry's 'Ling-Nam, or, Interior Views of Southern China' (the Publishers); continuation of the Reports of the Scientific Results of the Voyage of the *Challenger* (by the Lords of the Treasury); the publications of the Meteorological Office; continuation of the General Report of the Survey of India, and several volumes of Max Müller's 'Sacred Books of the East' (H.M. Secretary of State for India); continuations of the Memoirs and Records of the Geological Survey of India (the Indian Government); the Publications de l'Ecole des Langues Orientales Vivantes (the French Minister of Public Instruction); various publications of the Dépôt des Cartes et Plans de la Marine, the Chinese Imperial Maritime Customs, and the Victoria and Queensland Governments; Monographs of the United States Geological Survey, Vols. IX. and XI., Bulletin of the U.S. Geological Survey, and Fourth and Fifth Annual Reports of the U.S. Geological Survey (J. W. Powell, Director of the Survey); continuation of the Reports of the Tenth Census of the United States, 1880; the Works of Hubert Howe Bancroft, 17 vols.; Annual Report of the Geological and Natural History Survey of Canada (the Director of the Survey); the Norwegian North-Atlantic Expedition (the Editorial Committee); Radde's 'Reisen an der Persisch-Russischen Grenze' (the Publisher); 'Die Internationale Polarforschung, 1882-83,' 4 parts (the Royal Academy of Sciences, Vienna); Observations of the International Polar Expeditions, 1882-83, Fort Rae (the Meteorological Office); the publications of the Prussian Geodetic Institute; the Hakluyt Society's publications; Stübel's 'Skizzen aus Ecuador'; Verbeck's 'Krakatau,' with Atlas (the Government of the Netherlands); Legge's 'Record of Buddhistic Kingdoms'; Paulitschke's 'Ethnographie und Anthropologie der Somäl, Galla und Harari'; Nordenskiöld's 'Grönland': Justin Winsor's 'History of America,' Vols. II., III., and IV.; Bassett's 'Persia' (the Publishers); 'Twenty-one Years' Work of the Palestine Exploration Fund' (the Publisher); 'Report upon the Third International Geographical Congress and Exhibition, Venice, 1881' (Capt. G. M. Wheeler); Norman's 'Colonial France' (the Publishers); Brown & Dank's 'Dictionary of the Duke of York Island Language' [in Manuscript] (Rev. G. Brown); 'The Dawn of British Trade to the East Indies' (the Publishers); Rein's 'Japan,' 2tes Band (the Author); Woeikoff's 'Die Klimate der Erde,' 2 vols.; Bartholomew's 'Gazetteer of

the British Isles' (Mr. Bartholomew); Steinen's 'Durch Central-Brasilien'; Conder's 'Syrian Stone-Lore'; Hull's 'Mount Seir, Sinai, and Western Palestine'; Margry's 'Mémoires et Documents pour servir à l'Histoire des Origines Françaises des Pays Outre-Mer,' Tome V.; Mommsen's 'Provinces of the Roman Empire,' 2 vols.; Reclus' 'The Earth,' do. 'The Ocean, Atmosphere and Life' (the Publisher).

Admiral Sir E. OMMANNEY moved the adoption of the Report; Mr. J. THOMSON seconded the motion, which was agreed to.

#### PRESENTATION OF THE ROYAL MEDALS.

The Royal Medals for the encouragement of Geographical Science and Discovery, had been awarded by the Council as follows:—

The Founder's Medal, to Lieutenant-Col. T. H. HOLDICH, R.E.; in consideration of the services he has rendered to geographical science by the zeal and devotion with which he has carried out the surveys in Afghanistan; first in 1878-80, when he explored the Bori valley route and mapped the country near the Beluchistan border, and subsequently, as senior survey officer with the army in Northern Afghanistan, ascended the Lughman Range; in 1881-83, when in the course of his surveys of the Eastern Afghan boundary he carried his instruments to the summit of the Takht-i-Suliman; and lastly in 1884-86, when, as chief of the survey party of the Russo-Afghan Boundary Commission, he availed himself of the opportunity to extend the survey operations over an area of more than 100,000 square miles. Also, for his numerous valuable contributions since 1879 to the Society's 'Proceedings.'

The Patron's Medal to Mr. G. GREENFELL, for the extensive explorations he has carried out during his thirteen years' residence in West Africa; first in the Cameroons country, and afterwards on the Congo, and especially, for his reconnaissance surveys of the tributaries of the Congo, eleven of which he has ascended, laying down their courses in a series of preliminary charts on a large scale.

The CHAIRMAN in presenting the Founder's Medal to Lieut.-Col. T. H. Holdich, R.E., thus addressed him:—Colonel Holdich, the Council of the Royal Geographical Society have by a unanimous vote awarded to you the Patron's Royal Medal, in consideration of the great services you have rendered to geography in connection with surveys, chiefly carried out in Afghanistan, during the last eight years. In 1878-79, whilst attached to a column of the Indian Army in Southern Afghanistan, you mapped the country, then explored for the first time, north of Beluchistan along the Bori valley, from the British frontier in the vicinity of the Indus to Pishin, west of Quetta. In the following year, in Northern Afghanistan, you were the first Englishman to ascend the Paghmán range which lies between Kabul and the passes of the Hindu-Kush, and during the whole of the military operations in those years, your zeal and intelligence contributed greatly to the success of the geographical exploration carried out, which has added about 40,000 square miles to the area before surveyed and mapped.

In 1881-83, when in charge of survey operations on the Afghan boundary of British India to the west of the Indus, you reached the summit of the Takht-i-Suliman, being the first European who had ascended that mountain, and from that elevation were able to obtain much insight into the topography of hitherto unexplored regions west of the Sulimani range, and the routes between India and Candahar passing through it.

Lastly when appointed to be Chief of the Survey party attached to the Joint Commission for settling the Russo-Afghan Boundary you were able with the co-operation of the excellent staff of officers under you to complete a survey covering an area of not far from 120,000 square miles, extending from Khorassan and

South-eastern Persia to the Upper Oxus. These successful results have largely been due to your own energetic supervision.

I may add that it is with special personal satisfaction to myself that I discharge the agreeable duty of handing you this Medal, and that I recognise in you, and the officers associated with you in your labours, worthy upholders of the traditions of the distinguished Corps of Royal Engineers to which we all have the honour to belong.

Lieut.-Col. HOLDICH in expressing his deep sense of the honour conferred upon him, said, that Turkistan was far away even from India, and although no record had been published of the work of the Afghan Boundary Commission, yet it would easily be understood by geographers that to carry a connected survey from India into those seemingly endless wastes, and to establish a geodetic connection with the Indian Survey was a problem far beyond the capacity of any single officer. That he succeeded was really owing to the very able and energetic assistance he received from others. It was on the shoulders of Major Gore and Major Talbot of the Engineers that the burden of the scientific work of the Commission really fell, and although geographical map-making should be regarded rather as a large incident than the object of the Commission, and it was to the energy of those officers supported by a small staff of native assistants that such a measure of success was due as they had been able to attain. In the name of those officers as well as in his own, he thanked the Society for the honour conferred upon them, and for the high compliment that had once again been paid to the Department to which they all belonged.

The CHAIRMAN, in handing the Patron's Medal to Mr. Grenfell, said: The Royal Medals entrusted to this Society for rewarding signal services in the cause of geographical science and discovery have often been adjudicated to African explorers, but rarely have they been given to a traveller who has laboured so long and continuously and to such good purpose as yourself. It is now thirteen years since you first began that series of explorations of the rivers of the African continent, for which the Mission on which you were engaged afforded you opportunities, and the highly intelligent and persevering prosecution of which has enabled you to add so greatly to our accurate knowledge of previously unknown regions.

In your earlier journeys in the Cameroons country, between 1874 and 1881, you travelled some 1300 miles on foot, and more than 5000 miles in canoes, ascending and charting the rivers as far as they were navigable. During one of your brief visits to England you communicated to the Society an account of these explorations which was published in our 'Proceedings' for 1882. Your subsequent journeys in the large field of the Congo basin, carried out in the course of your labours for the Baptist Missionary Society, who were the first to occupy the new ground opened by the discoveries of Stanley, commenced with the arrival of the steamer *Peace* at Stanley Pool. Your first journey in this steamer, on which you and your colleague, the Rev. Mr. Comber, ascended the Bochini river, was the beginning of a brilliant succession of explorations of the main Congo and its tributaries, which continued until your departure from Africa a few weeks ago.

You ascended the great northern affluent, the Mobangi, through 5° of latitude; and most of the southern, as well as other northern tributaries of the Congo, the courses of which were previously totally unknown, were explored and mapped by you, in every case as far as they were navigable.

In all these adventurous voyages, amidst the anxieties and dangers of journeys through countries peopled by distrustful or hostile savages, you never lost sight of the need of geographical precision. Your course was plotted from hour to hour by an uninterrupted system of dead reckoning and compass bearings, corrected by frequent

observations for latitude. And when your field-books and large-scale charts shall have been checked and revised, they will supply an addition to geographical knowledge rarely obtained by one traveller in a pioneer journey through an unknown country.

Mr. GRENFELL having received the Medal, said he very highly esteemed the distinction which the Society had conferred upon him. Next to the confidence of his own Committee he should value the appreciation which the Royal Geographical Society had shown of his work. He could not say that it would inspire him to further devotion in the cause of geography, for his interest in that direction had never needed any stimulant. Ever since he was a schoolboy geographical matters had had a charm for him, and he remembered how greatly he was surprised when he found that his schoolfellows did not take the same interest in them that he himself did. This feeling of surprise in later years gave place to one of keen regret that a country like England, which was so largely dependent upon its colonies, should neglect the study of that science. While abroad he had been greatly encouraged to hear of the renewed attention which had been given in that direction by people at home. He was also greatly cheered to find that the Society had set itself to the work of popularising geographical instruction in schools, and he hoped that their efforts would be eminently successful. They had, however, awakened very late to the realisation of the importance of the matter, and not before vital interests had been put in peril. The increased attention that was now being paid to geography might yet, he trusted, result in a healthy public opinion which would save the country from threatened disaster.

#### THE AWARD OF THE MURCHISON AND BACK GRANTS AND THE GILL MEMORIAL.

The CHAIRMAN announced the following awards:—

The MURCHISON GRANT for 1887, to Mr. GEORGE BOURNE, second in command, and now sole survivor of the Landsborough Expedition which crossed the continent of Australia in 1861, in search of Burke and Wills.

The BACK PREMIUM for 1887, to SARAT CHANDRA DRAS, for his researches in Tibet.

The GILL MEMORIAL for 1887, to Mr. J. F. NEEDHAM, in recognition of his services in exploring the valley of the Lohit Brahmaputra between Assam and the Zayul Valley of Tibet.

No grant was made this year from the Cuthbert Peek Fund.

The three Honorary Corresponding Memberships for 1887 had been voted to H.R.H. KROM MUN DAMRONG RAJAH NUBHARP, Director-General of Surveys, Siam; Dr. A. KIRCHOFF, Professor of Geography at the University of Halle; and Dr. E. NAUMANN, late Director of the Geographical and Topographical Survey of Japan.\*

The Ballot for the new Council was then taken.

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\* The MEDALS for the Promotion of Geographical Education, placed by the Society at the disposal of the Syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1886. Oxford (June).—*Silver Medal*—Arthur Kent Chignell, Brockley. *Bronze Medal*—David Landale Johnston, Boston.

Cambridge (December).—*Silver Medal*—(Physical Geography)—Arthur Thomas Masterman. *Silver Medal*—(Political Geography)—Edith Appleyard.

The Prize Atlases offered by the Society for Geographical Proficiency to the cadets of the Nautical Training Colleges on board H.M. ships *Worcester* and *Conway*, were awarded, at the examinations held in July 1886, to the following:—John David Aaron (*Worcester* training-ship); John Byass Watson (*Conway* training-ship).

## THE ANNUAL ADDRESS.

The CHAIRMAN delivered the Annual Address on the Progress of Geography in the year 1886-7. (*Ante*, June No., p. 331.)

Sir H. RAWLINSON said that for over thirty years he had attended the Annual Meetings of the Society, but he did not remember that he had ever listened to a discourse from the chair which he considered more worthy of a Scientific Society. Sketches of travels and explorations were very interesting, but geography was a more serious matter than a collection of anecdotes and voyages. It had been treated in a serious manner by the President, greatly to the edification of those who had listened to him. In conclusion he proposed a vote of thanks to General Strachey, and wished him a successful presidential career.

Sir JOSEPH HOOKER seconded the vote of thanks, which was agreed to.

On the conclusion of the Address the Scrutineers announced that the List of Officers, as recommended by the Council, had been unanimously voted. The Council for 1887-8 is therefore constituted as follows (the names printed in *italics* being new Members or those who change office):—

*President*:—General Richard Strachey, R.E., C.S.I., F.R.S. *Vice-Presidents*: Right Hon. Lord Aberdare, G.C.B., F.R.S.; Sir Rutherford Alcock, K.C.B.; Sir Joseph Hooker, K.C.S.I., C.B., F.R.S.; Major-General Sir H. C. Rawlinson, K.C.B.; General Sir C. P. Beauchamp Walker, K.C.B.; Colonel H. Yule, R.E., C.B. *Treasurer*: Reginald T. Cocks, Esq. *Trustees*: Sir Barrow H. Ellis, K.C.S.I.; Sir J. Lubbock, Bart., F.R.S., M.P. *Secretaries*: Clements R. Markham, Esq., C.B., F.R.S.; Douglas W. Freshfield, Esq. *Foreign Secretary*: Lord Arthur Russell. *Members of Council*: Sir Henry Barkly, G.C.M.G., K.C.B.; W. T. Blanford, Esq., F.R.S.; Admiral Lindesay Brine; Hon. G. C. Brodrick; J. Annan Bryce, Esq.; Colonel Sir Francis W. De Winton, B.A., K.C.M.G.; Right Hon. Sir M. E. Grant Duff, G.C.S.I.; Francis Galton, Esq., F.R.S.; Major-General Sir F. J. Goldmid, K.C.S.I., C.B.; Colonel J. A. Grant, C.B., F.R.S.; Sir John Kirk, G.C.M.G., F.R.S.; Lieut-General Sir Peter S. Lumsden, G.C.B.; Colin Mackenzie, Esq.; William Mackinnon, Esq., C.I.E.; E. Delmar Morgan, Esq.; Cuthbert E. Peek, Esq., F.R.A.S.; Sir Rawson W. Rawson, K.C.M.G., C.B.; Sir Thomas F. Wade, K.C.B.; Captain W. J. L. Wharton, B.N.; General J. T. Walker, C.B., F.R.S.; Colonel Sir Chas. W. Wilson, R.E., K.C.M.G.

## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Thirteenth Meeting, June 6th, 1887.*—General R. STRACHEY, R.E., President, in the Chair.

PRESENTATIONS.—Colonel Edmund Molyneux; F. E. Joseph, Esq.

ELECTIONS.—Alfred Edward Carey, Esq.; Walter G. Gifford, Esq.; Isaac Crawford McLearn, Esq., M.D.; William Owen, Esq.; Major Power (84th Foot); John Spencer Price, Esq.; Samuel Sanders, Esq., M.A.

The paper read was:—

“A Journey through Manchuria.” By H. E. M. James, Esq.

Will be published, with map, in the August Number of the ‘Proceedings.’

## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris, May 6th, 1887:** M. W. HUBER in the Chair.—The General Secretary stated that the Society was in communication with the Minister of Commerce regarding the project for holding a retrospective exhibition of French Science in connection with the Exhibition of 1889.—The Commercial Geographical Society of Havre sent the programme for this year's Congress, to be held shortly in that town.—Among the works presented was a brochure, by M. G. Demanche, entitled 'D'Alger à Kairouan,' which gives an account of his journey and of the progress of colonisation in Tunis.—Dr. H. Labonne, in a letter of 11th of April, announced his departure upon a new voyage to Iceland. The volcanoes and glaciers will again be the object of his special study.—A note on the orthography of the word "Tibet" was read from M. L. Feer, of the National Library.—Some information as to Lieutenant-Colonel Gallieni's operations in the countries between the Senegal and Gambia was afforded in several letters which were read. It would appear from these that the two columns charged to operate against Mahmoud-Lamine at Diana, have surveyed all the country as far as the Gambia; one party of officers traversed the territory between the Bafing and the Faleme, and another, under Captain Oberdorf, pushed forward as far as Dinguiray and returned to Kita. The French Protectorate has been extended over all the provinces up to the Gambia. The Uassulu mission is now crossing the Great Beledugu. Its return will probably be effected through the countries of Amana, Balega, and Nabu. The unexplored triangle between the Bafing and the Bachoi will be surveyed and the valley of the Upper Niger more thoroughly studied. The geographical results will be communicated to the Society.—M. P. Dufourcq forwarded two letters from M. P. Cholet, Governor of the Niadi-Ludima region. The writer had arrived at Brazzaville from a journey down the valley of the Niadi. He intended to travel from Buanza to the Ogowé and then from Franceville to M'Luete.—A communication was read from Dr. Rouire on the Dolmens of Enfida.—Dr. Hamy sent a paper on the ruins of Copan, which was a reply to M. H. de Charencey.—News of M. Chaffanjon's expedition was received in two letters from the traveller himself, the latter of which was dated 25th March, from Ciudad Bolivar. He had returned from his journey to the Upper Orinoco and had achieved a great success, having very thoroughly studied the source of that river and its connection with the Amazons by means of the Cassiquiari. He had determined the course of the Orinoco by nearly 100 astronomical observations. A chain of mountains in the form of a fan surrounds the sources of the river, to a portion of which he had given the name of De Lesseps. The Guaharibos Indians, who inhabit the upper valley, are a great source of terror to the other tribes. M. Chaffanjon intended to return to France in July after he had completed the second part of his programme, which included an excursion from Coura to the sources of the Essequibo.—Some notes on M. Ramon-Lista's recent expedition to Tierra del Fuego were communicated by M. H. L'Huissier, of Buenos Ayres. The traveller is of opinion that frost is practically unknown in the island, such is the extreme humidity of the climate. Two skirmishes took place with the natives. The latter wear hardly any clothing and live in holes dug in the ground; their bows and arrows are of the most primitive description. They subsist on the produce of the chase and on the leguminous plants with which the region abounds.—A communication was read from M. Guignet, suggesting the creation of permanent subterranean stations for provisioning expeditions to the Arctic regions instead of cairns. The knowledge of the geology of Greenland and those districts could thereby be increased.—The Chairman intimated the presence at the meeting of a very

distinguished Austrian traveller, M. Ed. Glaser, late astronomer of the Vienna Observatory. He said that among other results of the traveller's journey in Yemen was the astronomical determination for the first time of the longitude of the town of Sanaa. He hoped that M. Glaser would at some future time lay an account of his expedition before the Society.—The General Secretary announced that M. H. Coudreau was on the eve of departure to Guiana, to continue his researches there. His principal object of exploration was the Tumuc-Humac range, which Dr. Crevaux crossed.—His Highness Prince of Monaco then gave a *résumé* of the results of his second scientific voyage in the North Atlantic on board the *Hirondelle*. He detailed the movements of the various floats placed some time previously in different spots. The zoological information obtained is very valuable. The temperatures were taken at different depths along a line from Brittany to Galicia.—In conclusion, a paper was read by M. Decazes, from the Congo, giving some interesting information of the countries traversed by him during the last four years. He ascended the Ogowé in a canoe. The Pahuins will, according to him, in a very few years have extended over the whole valley of the river. Although very quarrelsome and warlike, these people have a taste for work and trade. The last Pahuin villages are now found a little above the Lolo. After this point the Chebos and Adumas are met with. The traveller visited the country of the Batekes and gave a very instructive account of the manners and customs of the natives. He navigated most of the tributaries of the Ogowé and the Alima. The Apfurus inhabiting the banks of the latter river trade chiefly in manioc.

— May 20th, 1887: M. W. HUBER in the Chair.—The Scientific Association of France announced that the date of the opening of the year's Congress had been fixed for September 22nd. The Congress would be held at Toulouse, and would close on the 29th September.—A letter was read from Dr. Labonne, dated 6th May, from Reykjavik (Iceland), according to which he was about to attempt to double Cape Nord, if not prevented by icebergs.—From Tashkend, on 14th March, M. E. Muller, a member of the Society, wrote, announcing the departure of MM. Capus and Bonvalot from Margilan. The writer had received a letter from M. Capus, according to which M. Bonvalot was at Osh, endeavouring to ascertain whether the pass of Alai was practicable. The latter had just telegraphed to his companions to move forward. The perils of this enterprise were, according to the writer, very great. M. Maillet informed the Society that he had received a letter dated 15th March, from M. Bonvalot, who was then at the camp of Ak-Basoga, at the foot of the defile of Taldyk, and four days' march from Lake Kara-kul.—The Marquis de Roche-monteix stated that M. A. de Barnel, an engineer in the service of the Argentine Republic, was making some useful explorations in Chaco.—The Chairman announced the presence of Dr. Junker, to whose valuable geographical work he referred in graceful terms. Dr. Junker then gave a rapid sketch of his travels, which will appear in the next number of the 'Compte Rendu.' M. Dutreuil de Rhins asked the traveller a question as to the connection between the Welle-Makua and the Mobangi, to which Dr. Junker replied that he was unable at present to say anything definite on the subject.—The Chairman stated that His Highness Prince of Monaco had started for Newfoundland.—The General Secretary announced that an exhibition would be opened at the Trocadero Museum on 23rd May, of the collections and objects brought home by M. J. Martin from Eastern Siberia.—M. Jacottet presented on behalf of the publishers the third volume of the 'Dictionnaire de Géographie Universelle,' the entire work would be complete in five volumes, and the Secretary laid on the table two Memoirs, by Roland Bonaparte, one entitled 'Notes on the Lapps of Finmark,' and the other 'Le fleuve Augusta' (New Guinea).—Dr. Delisle communicated an extract from a letter from Dr. Hamy, who is fulfilling a scientific



mission in Tunis. He had reached the south of Tunis after considerable fatigue, and had obtained some interesting anthropological information.—In conclusion, M. H. Duveyrier gave a *résumé* of the results of his mission of exploration in the unknown part of North Morocco.\*

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

### EUROPE.

- Baddeley, M. J. B.**—Thorough Guide Series. The Northern Highlands (Scotland Part II.) containing a full description of Aberdeen, Inverness, Loch Maree, and Gairloch, and of the Mainland north of those places in the counties of Aberdeen, Banff, Elgin and Nairn, Inverness, Ross, Cromarthy, Sutherland, and Caithness. Third edition. London, Dulau & Co., 1886: 12mo., pp. xxx. and 138, maps and plans. Price 3s. 6d. [Presented by the Publisher.]
- and **C. S. Ward.**—Ditto. North Wales (Part I.) Chester, Rhyl, Llandudno, Bangor, Llanrwst, Bettws-y-Coed, Carnarvon, Llanberis, Beddgelert, and Ffestiniog Sections. London, Dulau & Co., 1887: 12mo., pp. xxxiii. and 218, maps and plans. Price 3s. 6d. [Presented by the Publisher.]
- Baedeker, K.**—The Rhine, from Rotterdam to Constance. Handbook for Travellers. With 30 maps and 22 plans. Tenth revised edition. Leipzig, Karl Baedeker; London, Dulau & Co., 1886: 12mo., pp. xxiv. and 410. Price 6s. [Presented by Messrs. Dulau & Co.]
- [**Italy.**]—Annuario Statistico Italiano. Anno 1886. Roma, Tip. Eredi Botta, 1887: 4to., pp. cclxxxv. and 1102.
- Leyst, E.**—Katalog der meteorologischen Beobachtungen in Russland und Finnland. Vierter Supplementband zum Repertorium für Meteorologie, herausgegeben von der K. Academie der Wissenschaften. St. Petersburg, 1887: 4to., pp. xxii. and 435.
- Rykatschew, M.**—Über den Auf- und Zugang der Gewässer des Russischen Reiches. Zweiter Supplementband zum Repertorium für Meteorologie, herausgegeben von der Kaiserlichen Academie der Wissenschaften. St. Petersburg, 1887: 4to., pp. 103 and 309, maps.
- Wahlén, E.**—Wahre Tagesmittel und Tägliche Variation der Temperatur an 18 Stationen des Russischen Reiches. Dritter Supplementband zum Repertorium für Meteorologie, herausgegeben von der K. Academie der Wissenschaften. St. Petersburg, 1887: 4to., pp. xxi. and DXXXVI.
- Ward, C. S.**—Thorough Guide Series. The Eastern Counties, their Watering Places, their Cathedral Cities, and other places of interest, together with the approaches from London. Second edition revised. London, Dulau & Co., 1886: 12mo., pp. xvi. and 131, maps and plans. Price 2s. 6d. [Presented by the Publisher.]

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\* Will be published in the 'Quarterly Bulletin.'

## ASIA.

[India.]—Trigonometrical Branch, Survey of India, Spirit-Leveled Heights. No. 1, Madras Presidency. Seasons 1869–85. Prepared in the Office of the Trigonometrical Branch, Survey of India, Colonel C. T. Haig, R.E., Offg. Deputy Surveyor General, in Charge. Published under the orders of Lieut.-Col. H. R. Thuillier, R.E., Offg. Surveyor General of India. Dehra Dun, printed at the Trigonometrical Branch Office, Survey of India, 1886: 8vo., pp. xviii. and 188, diagrams.

— Do. Nos. 2 and 3, Bombay Presidency and Nizam's Dominions. Seasons 1877–80. Revised edition. Prepared, &c. Dehra Dun, printed at do., 1886: 8vo., pp. xix. and 112, diagrams.

**Klements, D.**—*Drevnosti Minusinskago Muséya. Pamiatniki metallicheskih epokh.* Tomsk, 1886: pp. 185, 21 plates in separate cover.

This little work, presented by the Public Museum of Minusinsk, through N. Martianof, a member of the Committee, contains a description of prehistoric antiquities discovered in the district of Minusinsk on the Upper Yenisey in the south-west of Eastern Siberia. The objects described and figured in the plates are in bronze, copper, and iron. They comprise a variety of arms and implements such as daggers, knives, wedge-shaped and spade-shaped tools, masks, mirrors, horse-harness, bracelets, pottery, &c. Some of these relics are superior in design and execution to anything one could have expected from such a rude age. The handles of two of the mirrors represent animals—the horned sheep and the horse. Among other monuments mentioned by M. Klements in the introduction to his book are the runic inscriptions and hieroglyphs on the rocks bordering the rivers of that country, copies of which have been sent to the Imperial Archæological Society at St. Petersburg. These are said to bear a strong resemblance to the writing of the savage Lolo tribes described by Mr. Colborne Baber (see 'R. G. S. Supplementary Papers,' vol. i. p. 126).—**[E. D. M.]**

**Morse, Edward S.**—Peabody Academy of Science. *Memoirs.*—Vol. II. Japanese Homes and their Surroundings. Salem, Mass., Peabody Academy of Science, 1886: large 8vo., pp. xxxiii. and 372, illustrations. [Presented by the Peabody Academy of Science.]

This work is mainly architectural. There are descriptions of the Japanese House, its construction, &c.; the Types of Houses; Interiors; Entrances and Approaches; Gardens; the Ancient House; and the Neighbouring House, including that of the Aino, the Bonin Islander, the Loochooan, the Korean, and the Chinese.

**Van der Stok, [Dr.] J. P.**—*Regenwaarnemingen in Nederlandsch-Indië. Zevende Jaargang, 1885.* [Rainfall in the East Indian Archipelago, Seventh Year, 1885.] Batavia, Landsdrukkerij, 1886: 8vo., pp. xii. and 408.

## AFRICA.

**Butler, [Colonel Sir] W. F.**—The Campaign of the Cataracts, being a personal narrative of the Great Nile Expedition of 1884–5. London, Sampson Low & Co., 1887: 8vo., pp. vii. and 389. Price 18s. [Presented by the Publisher.]

The important part played by Sir William Butler in the great Nile expedition for the relief of Khartum is well known, both in getting the boats built in this country and in guiding them up the river with the aid of his Canadian *voyageurs*. He tells the story of the unfortunate expedition with the power and picturesqueness familiar to readers of the 'Great Lone Land.' Of course no new ground was passed over, but Sir William Butler's description of the various stages of the river journey and of the features on its banks have a geographical value. The work is an important contribution to the story of this great campaign. There is a good map, and several illustrations by Lady Butler.

**Payne's** Lagos and West African Almanack and Diary for 1887. A Book of General Reference and Information. With illustrations. The Fourteenth Year of Issue. London, printed by T. G. Johnson: large 8vo., pp. 200. [Presented by John A. Payne, Esq.]

**Zabala, Amado Osorio.**—Vocabulary of the Fan Language in Western Africa, South of the Equator. With Spanish Interpretation prepared on the spot. London, Society for Promoting Christian Knowledge, 1887: 12mo., pp. vi. and 34. [Presented by R. N. Cust, Esq.]

#### AMERICA.

[**America, United States.**]—Department of the Interior, United States Geological Survey, J. W. Powell, Director. Mineral Resources of the United States. Calendar Year 1885. Division of Mining Statistics and Technology. Washington, Government Printing Office, 1886: 8vo., pp. vii. and 576. [Presented by the Director of the United States Geological Survey.]

**Andrews, C. C.**—Brazil, its Condition and Prospects. New York, D. Appleton & Co., 1887: cr. 8vo., pp. 352. Price 7s. 6d.

Describes the present condition of things in Brazil, including its Situation, Resources, and Climate; a description of Rio and its People, their Life and Manners; American-Brazilian Relations; Public Instruction; Parliamentary Government; Agriculture and Stock-raising; Public Lands and Immigration, &c., &c.

**British Guiana:** its Past History, Present Position, and Future Prospects in relation to Venezuela. A Lecture delivered by Hugh Watt, M.P., at Exeter Hall, on the 25th April, 1887. 1887: 8vo., pp. 31.

[**Chili.**]—Sinopsis Estadística y Geográfica de Chile en 1886. Oficina Central de Estadística. Santiago de Chile, 1887: 8vo., pp. 54.

— Anuario de la Oficina Central Meteorológica de Chile, publicada por la Comision de Meteorología. Tomo 18º, correspondiente a 1886. 5º Cuaderno, Setiembre i Octubre. Santiago de Chile, Imp. Nacional, 1887: 8vo., plate.

[**Guatemala.**]—Informe de la Direccion General de Estadística, 1886: Guatemala, Tip. de Pedro Arenales, 8vo., pp. 40.

[—]—Directorio de la Ciudad de Guatemala, compilado por la Direccion General de Estadística, Año de 1886. Guatemala, Tip. de Pedro Arenales, 8vo., pp. 296.

**Karr, H. W. Seton.**—Shores and Alps of Alaska. London, Sampson, Low & Co., 1887: 8vo., pp. xiv. and 248. Price 16s. [Presented by the Publishers.]

In the paper which Mr. Seton Karr read before the Society ('Proceedings,' 1887, p. 269), he described the leading results of his visit to Alaska, so far as Mount St. Elias is concerned. But Mr. Karr saw much more of Alaska, and in this volume gives a considerable amount of information on the places visited by him, and the condition of the inhabitants among whom he sojourned. Mr. Karr crossed Canada by the Pacific railway in June 1886, proceeded up the coast to Sitka, and thence in company with Lieutenant Schwatka and others he ascended Mount St. Elias by Yakatat and Icy Bay; this attempt he describes in this volume, and in the paper above referred to. After leaving St. Elias, Mr. Karr proceeded westwards to Kaiak Island, and thence by the delta of the Copper river, which he describes, to Nuchuk Island. While waiting here, Mr. Karr saw a good deal of the Copper River Indians, and has much to say about them. After having made up his mind to winter at Nuchuk, Mr. Karr obtained

a passage in October in the schooner *Kodiak* to St. Paul, Kodiak Island, and thence to San Francisco, after about four months' sojourn in Alaska. Besides the large map reproduced from the 'Proceedings,' there is a small general map of Alaska, and a sketch-map of Mount St. Elias. The illustrations are of the cheap "process" kind, and not very satisfactory.

**Martin, K.**—Westindische Skizzen. Mit 22 Tafeln und einer Karte. Leiden, E. J. Brill, 1887: royal 8vo., pp. vii. and 186. Price 16s. (*Dulau.*)

In 1884-5, Herr Brill, in company with several colleagues, undertook a visit to the Dutch West Indies for the special purpose of studying their geology. The present publication is the first section of a work in which Herr Martin will describe the complete results of his travels. The present part is devoted to the general aspects of the countries and peoples visited; the subsequent volume will deal mainly with the geology.

**Minnesota.** The Geological and Natural History Survey of. The Thirteenth Annual Report, for the year 1884. N. H. Winchell, State Geologist. St Paul, The Pioneer Press Co., 1885: 8vo., pp. 196, plates.

— The Fourteenth Annual Report, for the year 1885. St. Paul, J. W. Cunningham & Co., 1886: 8vo., pp. 353, plates.

[These Reports were presented by N. H. Winchell, State Geologist.]

**[Radford, Alfred.]**—Jottings on the West Indies and Panama. London, printed by W. Whiteley, 1886: 12mo., pp. 103. [Presented by the Author.]

An account of a voyage to the West Indies and Central America, during which the author visited St. Thomas, Barbadoes, Grenada, and Trinidad; Caracas, Curaçao, Baranquilla, Carthagena, Colon, Panama, Greytown, and New Orleans. Appended are a few remarks on Panama, the Canal, Colon, the Nicaraguan Canal, the Taking of Carthagena, and the Gulf of Mexico.

**Roberts, Morley.**—The Western Avernus, or Toil and Travel in Further North America. London, Smith, Elder & Co., 1887: 8vo., pp. 307. Price 7s. 6d.

**Francis, Francis [junr.]**—Saddle and Mocassin. London, Chapman & Hall, 1887: 8vo., pp. xi. and 322. Price 12s.

**Conn, William.**—Cowboys and Colonels: Narrative of a Journey across the Prairie and over the Black Hills of Dakota. From 'Dans les Montagnes Rocheuses' of Baron E. de Mandat-Grancy, with additional notes not contained in the original edition. London, Griffith, Farran, & Co., 1887: 8vo., pp. xi. and 352. Price 10s. 6d. [All presented by the Publishers.]

These books are all of the same stamp, and cover to some extent the same region. The first tells the story of the author's adventures over the Western States and in the Canadian West and North-west, mainly in search of work. He gives a good idea of the life which such men have to lead in America, and his book will be useful to those who contemplate following his example. There is a small map of North America, showing the author's tracks.

The second volume is by the son of the late Francis Francis, the well-known authority on angling. His frequent visits to America were chiefly for sport, and mainly to the Yellowstone region and New Mexico, especially the Animas Valley. Several chapters also deal with Northern Mexico. Mr. Francis gives a graphic account of his adventures and of his life among the hunters and cowboys of the West. At the same time he describes with much clearness the character of the various regions in which he travelled, though his book contains no map, and there is a great lack of dates.

Like Mr. Francis's volume, Mr. Conn's adapted translation from Mandat-Grancy's book is sparing in dates; indeed, we have not discovered one, so far as the year is concerned, though the day of the month is ostentatiously placed here and there, diary fashion, at the head of sections. From internal evidence the Baron's journey seems to have been made in 1882. He describes in very readable fashion his experiences among miners and ranchers, and gives a good idea of that phase of life in the "wild West" which is rapidly passing away.

## GENERAL.

**Beloch, [Dr.] Julius.**—Die Bevölkerung der Griechisch-Römischen Welt. Leipzig, Duncker & Humblot, 1886: 8vo., pp. xvi. and 520. Price 11s. (*Williams and Norgate.*)

This is an attempt to estimate the population of the ancient Greek and Roman world at different periods by a scientific investigation of the scanty and uncertain material which has come down to us. The author points out that estimates have frequently been made of the populations of mediæval cities and small areas in the ancient world, but the task has never before been undertaken for great areas and extended periods. The author is aware that his results can only be approximative, and that considerable modifications in the details might reasonably be made by other inquirers. His estimates as a whole, however, he thinks should be near the truth. In his first chapter the author deals with sources of information—birth-registers, mortality lists, certificates of citizenship, military lists, censuses; methods of transmitting statistics; military service; estimates of areas; production and consumption of grain; discussion of modern investigations. The second chapter deals with population according to sex and age; while succeeding chapters treat in detail of Attica, the Peloponnesus, Central and Northern Greece, the Hellenic East, Sicily and Greater Greece, the Roman Census, Italy, the Latin West, the Town Population. The last chapter traces the history and progress of population in the ancient world. Dr. Beloch appends two tables, giving the area and population of Greece b.c. 432, and of the Roman World at the death of Augustus. The area of Greece he estimates at 40,360 square miles, and population at 3,051,000, of whom 1,005,000 were slaves and bondsmen; this is in the proportion of 75 per square mile. The density was highest in Central Greece, where it was over 150 per square mile; in Attica Dr. Beloch makes the density to have been about 260 per square mile. The total area of the Roman Empire at the death of Augustus he gives as 1,289,440 square miles, and the population 54 millions, or a density of 42 per square mile. The area of Roman Europe at that date was, according to Dr. Beloch, 861,420 square miles, and the population 23,000,000, or about 26.7 per square mile, the greatest density being in Italy, where it was about 64 per square mile. The area of Roman Asia was 256,960 square miles, and population 19,500,000, or 76 per square mile, the greatest density being in Syria, where it was nearly 140 per square mile. The area of Roman Africa is given as 171,060 square miles, and population 11,500,000, or a density of 67 per square mile; the area of Egypt being 10,850 square miles, and population 5 millions, or 450 per square mile, a little less than the average density of England at the present day. Of course, as Dr. Beloch admits, these figures must be taken as only roughly approximate.

[**India.**—Report to the Secretary of State for India in Council on the Records of the India Office. By Frederic Charles Danvers. Vol I. Part I. Records relating to Agencies, Factories, and Settlements not now under the Administration of the Government of India. London, printed by Eyre and Spottiswoode: 8vo., pp. 189 and xxxvii. [Presented by the Secretary of State for India.]

This is the first of what promises to be a valuable series of reports. So far as the early history and geography of the East are concerned, the present instalment deals with Java, Sumatra, Borneo, the Straits Settlement, St. Helena, and the Cape of Good Hope. There is also a section relating to the French in India, and a list and location of places referred to in the Report, with maps of Malaisia, the Cape, St. Helena, and Mauritius. Among the other valuable features of the volume are lists of books and publications relating to the various regions dealt with, and classifications of the records referring to them.

## NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

## EUROPE.

- Deutschen Reiches.**—Karte des —. Scale 1:1,100,000 or 1·3 geographical miles to an inch. Sheets: 152. Neubrandenburg. 588. Rastatt. Herausgegeben von der kartogr., Abtheilung der Königl. Preuss. Landes-Aufnahme 1887. Price 1s. 6d. each. (*Dulau.*)
- Deutschlands.**—Übersichtskarte der Eisenbahnen — bearbeitet im Reichs-Eisenbahn-Amt. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Berlin, 4 sheets. Price 5s. (*Dulau.*)
- Deutsch-Französische Grenzländer** mit genauer Einzeichnung der französischen Befestigungs-Anlagen. Scale 1:400,000 or 5·5 geographical miles to an inch. Verkleinerte Ausgabe der Algemmissen'schen Spezialkarte von Elsass-Lothringen (1:200,000). Metz, 1887. Kartographische Verlagsanstalt von Georg Lang. Price 1s. 6d. (*Dulau.*)
- France.**—Carte-itinéraire des voies navigables de la —, d'après le Guide officiel de la navigation intérieure. Paris, Baudry et Cie. (*Dulau.*)
- Carte de —, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, Hachette et Cie., 1887. Sheets: VI.—13, Paimpol; VI.—17, Pluvigner; VI.—18, Vannes; VII.—17, Ploërmel; XIII.—27, Brantôme; XVI.—4, Ste. Synthe; XVI.—6, St. Omer; XVI.—7, St. Pol; XVII.—8, Doullens; XVIII.—17, Châteaurenard; XVIII.—18, St. Fargeau; XXIV.—36, Toulon. Price 7d. each sheet. (*Dulau.*)
- Italia.**—Carta d' —, da Carlo Cerri. Milano, 1887. Scale 1:564,000 or 11·8 geographical miles to an inch. 8 sheets. Price 8s. (*Dulau.*)
- Leipzig.**—Plan von —, von G. Hetzel. Scale 1:7000 or 10·4 inches to a geographical mile. Leipzig, Heinrichs. Price 1s. (*Dulau.*)
- Mecklenbourg-Schwerin et Strelitz.**—Carte du —, par V. A. Malte-Brun. Paris, J. Rouff. et Cie. (*Dulau.*)
- Mittel-Europa.**—Topographische Spezial-karte von —, herausgegeben von der kartographische Abtheilung der k. preuss. Landesaufnahme. Scale 1:200,000 or 2·7 geographical miles to an inch. No. 352, Boulogne. 380, St. Valéry-en-Camp. 409, Bayeux. 411, Aumale. 441, Rouen. 532, Montargis. 562, Gien. Berlin, Eisenschmidt. Price 1s. each. (*Dulau.*)
- Rostock, Environs de —,** par V. A. Malte-Brun. Paris, J. Rouff. et Cie. (*Dulau.*)
- Russland.**—General- und Strassenkarte von West — und den angrenzenden Ländern bis Wien und Budapest, mit besonderer Berücksichtigung der Eisenbahnen und mit Angabe aller russischen Stationen. Bearbeitet von G. Freytag. Scale 1:1,500,000 or 20·4 geographical miles to an inch. Eigenthum u. Verlag von Artaria & Co. in Wien, 1887. Price 2s. 6d. (*Dulau.*)
- Russlands.**—Die Eisenbahnen — (Les Chemins de fer de la Russie d'Europe.) Scale 1:6,000,000 or 82·2 geographical miles to an inch. Ausgabe von 1887. Verlag von Artaria & Co. in Wien. Price 1s. 6d. (*Dulau.*)
- No. VII.—JULY 1887.]

## ORDNANCE SURVEY MAPS.

Publications issued during the month of May 1887.

## 1-inch—General Maps:—

ENGLAND AND WALES: New Series. Nos. 86, 96, 238, 254, 358 (outline), 1s. each.  
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## Town Plans—10-foot scale:—

ENGLAND AND WALES: West Bromwich, LXVIII. 14, 5; 2s.

(Stanford, Agent.)

## AMERICA.

**Guayaquil (Ecuador).**—Plano de —, por Dr. Theodoro Wolf. 1887. Scale 1:4800 or 15·2 inches to a geographical mile. Price 12s. (Dulau.)

**Nicaragua-Kanales.**—Specialkarte des —. Nach der Karte der Vern. Stn. Vermessungs-Expedition unter A. G. Menocal, u.s.n., 1885. Scale 1:600,000 or 8·1 geographical miles to an inch. With a Section. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Tafel 8. Gotha, Justus Perthes, 1887. (Dulau.)

**Terre de feu.**—Carte ethnographique de l'archipel de la —. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Paris, Gauthier-Villars. (Dulau.)

**Vancouver Island.**—Die Indianerstämme von —, und an der Küste von Britisch-Columbia. Nach eigenen Forschungen gezeichnet von Dr. Franz Boas. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Tafel 7. Gotha, Justus Perthes, 1887. (Dulau.)

## CHARTS.

**Admiralty.**—Charts and Plans published by the Hydrographic Department, Admiralty, in March and April 1887.

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240	m =	14·0	England, south coast, Plymouth:—Hamouaze. 2s. 6d.
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267	Albemarle sound to Cape Fear:—Plans added, Hatteras inlet, Ocracoke inlet.		
1328	Anchorages in Chonos archipelago:—New plan, Port Lagunas.		
1810	River Zambesi to Mozambique harbour:—Plan added, Infusse bar (river Muite).		
50	Diu head to Goapnath point:—Plan added, Mandwa bay.		
2576	Sulu archipelago:—Plan added, northern entrance of the channel between Lapac and Siassi islands.		
2578	Sulu sea, eastern part:—plan added, Cuyo Island anchorage.		
970	Anchorages in Philippine islands:—New plan, San Jacinto.		
2432	Tumen Ula to Strelok bay:—New plan, Expedition and Novgorod bays.		
2532	Ninety miles beach to Otago:—Plan added, Oamaru harbour.		
2169	Midway island:—Plans added, Pearl or Hermes reef. Ocean island.		

(*J. D. Potter, Agent.*)

## CHARTS CANCELLED.

No.		Cancelled by	No.
2206	Odessa Bay .. .. .	New plan, Odessa bay .. .. .	2206
2221	Plan of Soujak bay on this sheet	New plan, Novorossisk bay .. .. .	162
228	Belbek river to cape Khersonese	{ New plan, Cape Loukoul to Balaklava bay .. .. .	964
2862	Ocracoke inlet Hatteras inlet		
608	River Gambia, Sheet 1 .. .. .	New plan, River Gambia entrance	608
2126	Port Moresby and Fairfax harbour .. .. .	{ New plan, Port Moresby .. .. .	2126
987	Plan of Allier bay on this sheet		
529	Plan of Pernambuco on this chart.		

## CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1828. England, east coast:—The Downs. 2256. Baltic, Gulf of Riga:—Dvina river, from the roadstead to the town of Riga. 1238. South Atlantic Ocean:—South Shetland and South Orkney islands. 903. North America, east coast:—



Gouldsbrough bay to Little Spoon island. 2893. Gulf of Mexico:—Cedar cays and approaches. 1098. Gulf of Mexico:—Lower Maticumbe cay to Boca Grande cay. 2145. Central America, west coast:—Gulf of Nicoya to cape Elena. 2146. Central America, west coast:—Cape Elena to cape Desolado. 599. Africa, west coast:—Cape Verde to cape Roxo. 643. Africa, south coast:—Port Natal. 216A. Bay of Bengal, Mergui archipelago:—Iron island to Sayer island. 2577. Philippine islands:—St. Bernardino strait and adjacent islands. 1962. China, south coast:—Hong Kong to Chelang point. 1963. China, south coast:—Chelang point to Chauan bay. 651. Japan:—Bungo channel. 2759A. Australia, northern portion. 1063. Australia, south coast:—Western approach to Bass strait. 1695B. Australia, south coast:—Bass strait, western part. 2763. Australia, north-east:—Coral sea and Great Barrier reefs, sheet 1. 2764. Australia, north-east coast:—Coral sea and Great Barrier reefs, sheet 2. 2350. Australia, north-east coast:—Double point to cape Tribulation. 2614. New Zealand, North island:—Kiapara harbour.

(*J. D. Potter, Agent.*)

**United States Charts.**—No. 1027. Juanilla Bay, West Coast of Costa Rica, Central America. 1887. Price 1s. 3d.—1036. El Rincon Harbor (Gulf of Dulce) west coast of Costa Rica. Price 1s. 3d.—Pilot Chart of the North Atlantic Ocean. May and June 1887. Published at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

#### ATLASES.

**Bartholomew, J.**—Pocket Atlas of England and Wales, by J. Bartholomew, F.R.G.S. With Index and Geographical Statistical Notes.

— Pocket Atlas of Scotland, by J. Bartholomew, F.R.G.S. With Index and Geographical Statistical Notes. London, John Walker & Co., 1887. Price 1s. each.

These are two very handy little atlases; the maps, which are the work of Mr. Bartholomew, are drawn on various scales, the districts most visited by tourists and the environs of towns being drawn on a much larger scale than those which are less frequented. Each contains an index, constructed, however, on different plans, that for England and Wales giving the latitude and longitude of each place, while in that of Scotland the scheme followed of indicating positions by letters is identical with that adopted in Johnston's Royal Atlas. The geographical and statistical notes which each of these little atlases contains appear to have been compiled with care from the best sources.

**Belgique.**—Atlas des villes de la —, au XVI<sup>e</sup> Siècle. Cent plans du géographe Jacques de Deventer, exécutés sur les ordres de Charles Quint et de Philippe II., reproduits en fac-similé chromographique par l'Institut national de géographie. Bruxelles, Livs. 1 to 6. Price 3l. (*Dulaeu.*)

**Philip, G., & Son.**—Handy-volume Atlas of the World. A series of 64 plates, containing 110 maps and plans. With complete Index and Statistical Notes. By J. Francon Williams, F.R.G.S. George Philip & Son, Liverpool and London, 1887.

This atlas is so small in size that the maps of necessity contain but few names of places; such, however, as have been given are well chosen, and all the principal physical features, together with the political boundaries, are as correctly laid down as the scale of the maps permits: it also contains a large amount of statistical information, and as it is furnished with a copious index, is likely to be useful as a gazetteer to those who do not possess larger and more detailed works of the same sort.



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PROCEEDINGS  
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ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*On the Society's Expedition to the Namuli Hills, East Africa.*

By J. T. LAST, Commander of the Expedition.

(Read at the Evening Meeting, June 27th, 1887.)

I HAVE the honour to lay before you this evening an account of some of the chief points of interest connected with the expedition into South-east Africa, which the Society entrusted to my charge, reserving my full report, with scientific details and map, for a future occasion. The principal objects of the expedition were to fix the position of the confluence of the rivers Lugenda and Ruvuma, and to study their resources for the advancement of commercial enterprise. Thence I was to proceed to and examine the mountainous districts in the vicinity of the Namuli Peaks (the remarkable hills brought to our notice by Consul O'Neill, and said to be snow-capped), fix the chief points of interest, and report upon the country, after which the river Lukugu was to be traced from its source to the coast in order to learn how far it could be used in the interests of civilisation and commerce.

On the 2nd of September, 1885, I embarked on board the P. & O. steamship *Ancona* for Aden, continuing thence by the British India Steam Navigation ship *Abyssinia* for Zanzibar. On arriving at Zanzibar I found the ready help and kindness of Sir John Kirk most useful. Through him I was able to make up my caravan very quickly, and he also obtained for me, from the Sultan of Zanzibar, letters to the chiefs on the coast and inland, which I found very useful.

Having finished my preparations in Zanzibar, I hired a native dhow, embarked with my men and goods, and after fifteen days' sailing amongst the beautiful coral islands off the East African coast, arrived at Lindi on the 22nd October, whence, after making my final preparations, I started inland on the 28th October. Our first object was to reach Ngomano, the district lying about the confluence of the Lugenda with the Ruvuma. The best road to this place was by way of Newala, a station of the Universities' Mission. On arrival at this place I was

most kindly and hospitably welcomed by the Rev. Chauncy Maples, Bishop Smythies, and other members of the Mission. After staying two days at this place, we resumed our journey, and on the second day reached the left bank of the Ruvuma. We then ascended by its left bank to within 15 miles of its confluence, crossed over to the right bank, and reached Ngomano at the junction of the rivers on the 15th November. We stayed here six days, making observations to fix the position of this important point, the results of which give long.  $38^{\circ} 01' 55''$  E. and lat.  $11^{\circ} 25' 25''$  S.

All the country along the Ruvuma, from near Newala to Ngomano, was formerly well populated, as the sites of the old villages show, but now there is not a house to be seen, the district having been overrun by the Makwangwara and other marauding tribes, and is now become the home of a great variety of game. One night when camped on the left bank of the Ruvuma, a pair of lions made an attack on one of the grass huts in which our people were sleeping, and carried off a man. The men shouting and firing their guns caused the lion to drop his prey, who was afterwards brought into camp. The poor fellow was very much bruised and clawed about the neck and shoulders. After I dressed his wounds, I had to leave him on one of the islands inhabited by the Matambwi people. To these I gave a present of cloth on the consideration that they should take care of the man till his recovery. This they promised to do, and I afterwards learnt that he fully recovered. There are several small islands in the Ruvuma inhabited by the Matambwi. These are only occupied during the dry season; in the rains they are covered by the waters of the Ruvuma, and the people go and live in temporary villages on the right bank.

From Ngomano we proceeded up the valley of the Lugenda, crossing from side to side, by fords or by canoes, as the windings of the river and road compelled us, until we reached the three lakes, Amaramba, Chiuta, and Shirwa. We passed along the eastern shores of these, and then crossed over the open forest by way of Kiladzulu Hill to Blantyre, which we reached on January 13th, 1886. Whilst in the neighbourhood of the lakes I had an attack of dysentery and fever, which compelled me to be carried the last five or six days of my journey. On reaching Blantyre I was received with the most kindly welcome by Consul Hawes, who put himself to no inconsiderable trouble to make me as comfortable as possible.

The journey up the valley of the Lugenda was, with the exception of a break here and there, through a long string of gardens. Some parts of the country are very fertile, and would grow European vegetables well, whilst there is but little that is not well adapted for growing native grain. The common cereals of the country are maize, millet, and beans, besides which, ground-nuts, potatoes, pumpkins, and other vegetables are grown, also a little rice in places. The inhabitants are chiefly

Yaos, whose principal chiefs are Mtarika, Nyangwali, Kandulu, Msuza, and Chipili. All the minor chiefs are more or less subject to these. The coast Mahommedans have been for many years passing up and down this valley, but their influence seems to have little power to induce the natives either to embrace Mahommedanism or to give up some of their most heathenish practices. Cannibalism is but little practised by the Yaos, still there are some of the great chiefs, as Mtarika and Nyangwali, who indulge in such orgies. I have been frequently told by Yao men, who are well acquainted with the habits of the chiefs, that feasts of human flesh are frequently made in secret by the chiefs, and partaken of by them. Mtarika has been known to make feasts of this kind, and then to invite Mahommedans and other strangers to partake of it, telling them that it is goat's flesh, of which the coast people are very fond.

The savage practice of burying living persons with the dead is in more or less common practice with some tribes of the Yao family. As for instance, when I was at Nyangwali's town, the chief would not allow me to proceed, because they were busy performing the rites of burial to a sub-chief who had died the previous day. I asked permission to be allowed to be present at the burial, but was refused. My men, however, went to fire their guns at the grave, as a mark of respect to the dead, and being coast men they were allowed to stay. On their return, they told me that two girls and a young man had been buried alive with the body. There is a custom that should one of the poor unfortunates, who is about to be buried alive, happen to sneeze, the sneezing is taken as a sign that the dead man does not wish that person to be buried with him. He or she is therefore released and sent back to the village. The burial place is generally away from the village, and often alongside the main road.

The river Lugenda varies considerably in width: at its confluence with the Ruvuma it is about a mile wide, and at the point where it receives its waters from the lake Amaramba it is some 80 yards. But this is full of water only during the wet season. At other times the river is fordable at many places. Islands, beautifully wooded, are scattered all the way up the river, some of which are three or four miles in length. They are not submerged during the wet season, and therefore they form the permanent homes of the people. Some of these islands are very beautiful, covered with large forest trees, whose branches are hung everywhere with garlands and festoons of graceful creeping plants. Under the trees are to be seen little clusters of rather small huts enclosed by reed fences. Each of these clusters is a household group. The children are playing about on all sides, and every here and there are seen groups of frisking kids with their dams. It appears a bright and peaceful scene, and yet what misery and suffering is often there! what uncertainty of life and liberty!

Through the kindness of Consul Hawes and Dr. Milne, of the Blan-

tyre Mission, I quickly recovered from my fever, and intended to proceed on my journey, but the wet season set in so very heavily, that it was next to impossible for a caravan to travel over the boggy country. I therefore accepted the invitation Consul Hawes had so generously offered me, to stay with him until the wet season was over. During this time, as weather permitted, we made several excursions to the principal hills and villages in the neighbourhood. We also paid a visit to the Makololo people on the lower Shiré, and made a more extended journey to the Angoni people in the country to the south-west of Lake Nyassa, an account of which is given in the March number of the 'Proceedings' of this year.

On July 12th, I left Blantyre, and proceeded by an almost easterly course, to the block of hills from which the Namuli Peaks arise, which we reached on August 3rd. The soil of the country passed through is in most parts fairly good, and many places are so fertile that green corn can be grown all the year round. The people of this line of country are Yaos and Makuas, the former of whom live near to Blantyre. The Makua country is entered after passing the northern spur of the Milanji group of hills. Of these Makuas there are three sub-tribes in the country crossed, namely, the Alolo, the Mahivani, and the Lomwe. These are all very similar in customs, language, and dress. In language there seem to be but a few dialectic differences, and in dress they copy each other by all trying to wear as little as possible. The most distinguishing mark is in their head-dress arrangement. The Alolo simply allow their hair to grow, and shave it off when it becomes troublesome; the aim of the Mahivani is to excel in arranging their natural hair into the most fantastical head-dresses; while the Lomwe exercise their skill in making very curious artificial head-dresses, but seldom work up their own hair. I had no particular difficulty in making my way through the country, though the natives all looked upon us with the greatest suspicion, for they could not understand a stranger passing through their country and not buying anything except the food wanted for the caravan.

On arrival at the Namuli district, I was well received by the principal chief, Ana Guruwe, and arranged with him to make his village my head-quarters during my stay in the district. This was done by an exchange of presents, and then the chief conducted me to a quarter of his village, where he gave me houses for the use of my men, and an open space on which to set up my tent. I remained in the district for about three months, during which time I made several excursions up the hills and into the country on all sides, taking observations and collecting general information. Ana Guruwe's village is built at the foot of the south side of the block of hills on which the Namuli Peaks stand. It is situated in long.  $37^{\circ} 02' 20''$  E. and lat.  $15^{\circ} 27' 30''$  S., and is nearly 2000 feet above sea-level. There is no name in use amongst the natives

to denote the entire block of hills, but each spur, cliff, prominent part, or peak has its own distinctive name. On the south side of the mountain several low spurs strike out, and then it rises very abruptly to an altitude of 2500 feet above the plain. The whole side is covered with the densest vegetation, in which large trees, indiarubber and other vines, tree-ferns, palms, bamboos, and a great variety of shrubs and bushes, all combine to add beauty to the scene. The ground, wherever it is not covered with bushes and creepers, is thickly carpeted with ferns, flowering plants, and grasses. In some places deep gorges have been cut away by the ever-rushing torrent, and small streams come skipping and sprinkling down on all sides. In one place there is a beautiful double waterfall of some 500 feet over the clean rock, and on each side of it large beds of gently waving maidenhair ferns. The mountain sides can be scaled in several places, but the way generally used is up the bed of a rough rocky watercourse. In summer it is dry, but in the wet season the tumbling torrent makes a series of most beautiful cascades and waterfalls. On reaching the top of the mountain mass, one sees a large extent of deeply undulating country, gentle valleys, mountain ridges gradually rising and culminating in abrupt peaks, very deep gorges caused by some enormous force and the continual flowing of the larger streams. In other places may be seen a large and almost level boggy flat, having all the appearance of a dried-up lake. One of these is about a mile across, and contains the head-waters of the river Lukugu. There is just sufficient soil and grass bound together on it to make it safe walking, though many parts are very shaky when walking on it. A large stream is always issuing from under this boggy flat, into a deep gorge, down which the Lukugu flows. Nature seems to have especially exerted herself in the formation of this mountain mass. On all sides high conical peaks may be seen raising their heads from 1000 to 3000 feet high, above the common level of the mountain mass. Look a little away and you see gently rising ridges with one on both sides forming fearful precipices, from one to two thousand feet deep. Along the depths of these gorges and precipices the rivers may be seen, like so many silvery lines, wending their way to the green valleys beyond.

The principal feature of this mountain district is the double-crested Namuli Peak. This stands at the extreme end of a ridge which gently rises and extends towards the north from the southern edge of the mountain mass. On the west side of this ridge is a very deep gorge, from the depths of which Namuli rears up its head quite 5000 feet. From the north, east, and south sides of Namuli, at a distance of 2500 feet from its summit, extensive spurs extend. The remaining part of the peak is an almost perpendicular mass of white stone; all the surface of the upper part of the peak is guttered with innumerable small watercourses, which shows the effect of the elements during the ages it has raised its head on



high. The top of the peak has a slight indent running across it from east to west, which makes it appear to be double crested, one of which is a little higher than the other. In this indent a small group of trees is visible, from which flows continually a small stream of water down the east side of the peak. The position of Namuli is long.  $37^{\circ} 04' 15''$  E., and lat.  $15^{\circ} 20' 12''$  S. Its height is 8000 feet.

There are a number of peaks near to Namuli, each having its distinctive name, of these Pilani and Pesani are the chief. Pilani is nearest to Namuli, and is within 300 feet of being as high. The two principal peaks within a few miles of Namuli, are Mruli to the west, and Mresi to the east. All these peaks are more or less cone-shaped and have streams coming down from near the top. It was impossible to ascend Namuli, the sides are so steep and smooth, but most of the others have rougher watercourses, by which I was able to ascend, and secure altitudes and observations.

If the mountain be considered as a whole, its south side is the highest, and the whole mass gradually drops towards the north. The only river of importance on the mountain which flows to the south is the Lukugu. To the north flow three comparatively large rivers, the Malema, the Ludi, and the Lusi. The Malema rises from the east side of the ridge which extends between Namuli Peak and the southern edge of the mountain mass. Streams are to be seen rushing down from all parts of the sides of the ridge, into the elevated mountain valley, forming most beautiful waterfalls and cascades. Thence it flows and receives streams, large and small, from all sides, till it enters the valley to the north, and then flows on to the Luli with which it joins. The scenery in the mountain valley of the Malema is very beautiful, and in great variety. Here you may see a large plot of soft green grass, as smooth as a lawn; there there is a bed of aloes in full flower; a little further on is seen a belt of tall trees, covered with creeping plants and parasites, orchids, and ferns in great variety. Underneath there is the clear sparkling brook, gaily rushing along to add its quota to the main stream. Nature here seems to have used all her power to make the place a lovely spot, a feast for human eyes.

The Ludi and Lusi rivers rise in the hills near to and on the west side of Namuli; they move on amongst the hills by different paths, till they reach the valley, where they join their waters, and then flow on into the Luli.

The sources of the river Lukugu are in a boggy lake-like hollow, almost surrounded by hills and peaks. On the east side of this basin the peak Pilani raises its head, and is separated from Namuli by a valley almost 5000 feet deep. The waters of the Lukugu, issuing from the bog, rush down into a deep gorge, which is thickly wooded on one side, and the other is a bare precipitous rock. On it rushes, tumbling over a huge mass of rock, and then dashing over and among the boulders and

rocks, until it approaches the villages of Ana Moche. It passes here with a more quiet, but still rough descent, and dances along until it passes between the Chali and Malisani Hills, and thence flows into the valley on the south side of the mountain. On its way amongst the hills it receives the waters of several small streams, and one larger than itself which rushes down Chali Hill. This stream, the Volo, is one of the most beautiful pieces of scenery on the whole mountain. The sides of the gorge through which it passes are clothed with thick forests which overhang the river and form a complete canopy. Tree-ferns and palms are abundant, and the ground is covered with quite a carpet of ferns and other plants in great variety. Here there is an open flat of quiet water, a little further on the sparkling river dashes along over rocks and boulders, giving fresh life and vigour to the whole scene.

There are but a few villages on the mountain now, but formerly it was well populated; this is shown by the partly cleared spots, and scattered groups of banana trees, which indicate the position of former villages. The natives still living on the mountain are at the greatest variance with each other, continually fighting and carrying off each other to sell as slaves, so that I found it impossible to induce natives living on the east side of Namuli to accompany me to the west. Everywhere the soil is of the greatest fertility, so that rice and native grains can be raised in large quantities. All kinds of European vegetables would succeed. Among the hills, on the banks of the Lukugu, are the scattered hamlets of part of a small tribe of Makuas, called Maua, who are cannibals. They keep themselves quite separate from the other Makuas, seldom being seen at any distance from their gardens or villages. Whilst tracing the Lukugu to its source, we had to pass through their district, and, on arrival at the villages, we found all the people engaged at a drinking bout, in a village on the opposite side of the stream. As we went along the people came out with a great noise, and the chief sang out that he wanted my helmet to wear, and my skull to use as a drinking cup. I did not agree with him on that subject, so we kept marching steadily on till we reached a piece of rising ground beyond the villages, where we made a halt.

I then sent a guide back to the chief with a small present, and to ask him to come and see me after I had returned to Ana Guruwe's village. The natives seemed to be rather taken aback by the appearance of our arms, and our steadily marching forward. A few days after my return to Guruwe's a headman from Ana Moche's village arrived, saying that he had been sent by that chief to see me. After salutations, he said that the people of the village had intended to attack us, but our guns frightened them. I then asked him about their man-eating propensities, and he told me that it was true that they did sometimes eat slaves and the bodies of those killed in war. A common practice was

that when it had been privately determined to kill a certain person, a public beer-drinking would be convened, and the intended victim invited to the festival. As soon as he was fairly intoxicated, the men told off for the purpose would seize and carry him off to the bush and spear him; then a feast would be got up, of which all would partake. Ana Guruwe had previously told me how that some of his own people and friends had been carried off by these people, mutilated by them, and then devoured. Guruwe also told me that these cannibals even eat their own dead.

During the three months I lived about Namuli the average mean temperature was 75° Fahr. The general maximum reading was about 95°, and minimum 55°. On the mountain my men were much affected by the cold, the minimum thermometer being frequently at freezing point, and on August 25th, at our camp at the foot of Peseni, at 4 A.M. the thermometer was at 26°, and a thin sheet of ice was formed on a pail of water which had been left outside all night. As the month of September is the beginning of the hot season, it seems highly probable that very strong frosts may be experienced on the mountain during the cold season. It will be understood by reference to the height of Namuli, that it cannot be snow-clad, nor could I get any information from the natives to show that they were acquainted with snow, though they are frequently visited with hailstorms. Strong whirlwinds are very frequent on the mountains, rushing along with great noise and force. The natives call it *inyupuru*, which word is also used to denote a bad spirit.

After completing my observations in the Namuli district, I gave a parting present to Ana Guruwe, who had, on the whole, been very kind to me, and commenced my journey along the river Lukugu to the coast. On the 23rd October we left Guruwe's village, and reached Quillimane on 16th November following.

We struck the Lukugu near the ford at the village of Ana Wahiwa. Here we were received by the chief and by him conducted over to the right bank, where we camped for the night. The Lukugu here is about 80 yards wide, and full of rocks. The banks are some 20 feet deep, and there was then an average depth of one foot of water. In the rains, the river overflows its banks, and becomes impassable.

On the second day after leaving this place, we crossed the Uлуу river, called Lukotokwa on O'Neill's map. I could not find any one who knew this latter name, but all spoke of it as Uлуу. It is nearly as wide as the Lukugu, and had more water where I crossed it. Its sources are in the hills around Namusula's, and it receives all the water from the hills Katani, Zaje, Mrupa, and others.

Just below where the Uлуу enters the Lukugu on the right bank, the Mtetele enters it on the left bank. This is about thirty yards wide. Thence we went on to the junction of the Lumanana, or Luu, as it is called by the natives, which we reached on October 28th. After

receiving the Uluu, or Lukotokwa, and numerous small streams on either side, the Lukugu widens out, and several large islands are formed in its course. These are inhabited by the natives only in times of danger. They are generally well wooded, and are sufficiently large, with good soil, to be suitable as a permanent residence. This part of the country is very thickly inhabited, the people being of the same tribe as those living near Namuli.

In passing through the villages, great numbers of men, women, and children, escorted the caravan for miles, hoping to get if only the smallest piece of cloth or a few beads. It was well for my men, as a native would carry a load all the morning for a piece of calico a quarter of a yard wide. Further on, we came to a place where there were some hippopotami; I quite delighted the natives by shooting two, thus giving them the means of having a good feast. This kind of thing I was able to do several times, and so secured the friendship of the chiefs, who all wanted me to shoot some hippos for them. Generally, the soil of the country on both banks of the river is very good, but as almost everywhere else, the natives only grow for their own wants.

After crossing the Lumanana or Luu river, which is some 200 yards wide, we entered an almost depopulated country. Excepting a large village recently built just at the crossing of the Lumanana, there are only a few scattered villages, till the Portuguese plantations and trading stations are reached. The sites of deserted villages on both banks of the river show how thickly the country was formerly, and even till lately, inhabited. The land is good in most places, and would produce almost any amount of corn, if well cultivated. On November 5th we crossed the Lugera, another large affluent of the Lukugu, which rises on the east side of Milanji Hills. This is a river as large as the Lumanana, but is useless for commercial purposes on account of the rapids all up the river. On the 13th November we reached the coast at the mouth of the Lukugu, having thus followed it from its source to its outlet. The Lukugu is quite useless for commercial purposes, it being a series of rapids along nearly all its course. A few canoes are met with on the river, but they are chiefly used for crossing, and making small journeys from village to village, wherever it is possible to pass between the rocks. There is plenty of land between the coast and the mountain ranges of which the Namuli district forms a part, which is undoubtedly suitable for growing coffee, perhaps tea and cocoa; cotton in many places is grown by the natives, and tobacco everywhere. The two great hindrances to successful planting are want of labour, and an easy means of transport of goods to and from the coast.

From the village of Maroda, which is near the coast at the mouth of the Lukugu, we went across the country to Quillimane. Here I rested for about three weeks, and then commenced my return journey, leaving Quillimane on Saturday, December 11th. The road we followed led about

halfway between the usual road to Blantyre and the road I had followed down the Lukugu. On the 14th January, 1887, I again reached Blantyre.

In the limited time allotted to me for this preliminary account of my expeditions it is impossible to give the particulars of this journey and they must be deferred to a future occasion. The people through whose country we passed were a tribe of Makuas called Atakwani. They are in most respects very like the Mahivani tribe of Makua, and are perhaps more closely allied to them than to any other tribe. The country is in many places good and fertile, especially alongside the frequent streams. There is but little difficulty in travelling through the country. The natives, as soon as they see that the traveller is amicably disposed, receive him kindly, and at a fair rate will provide him with whatever he may need. Of course, all are not disposed alike, but invariably I have been able to overcome all our difficulties without having recourse to arms.

At Blantyre I was very kindly received by Mr. Moir, the Manager of the African Lakes Company. Here I stayed till the 28th of January, and then started on my final journey to the coast, intending to come out at Ibo. Leaving Blantyre I went to Zomba, at which place Mr. Hawes has lately established the Consulate. After a few days' stay with the Consul I resumed my journey, going round the south end of Lake Shirwa, and ascending its east side, thence to Chiuta and Amaramba Lakes. On leaving Che Chikweo's at the south-east end of Amaramba, we were told that we should have three days of forest to pass, and then we should come across a road leading to the Medo country. So the men bought food for that time, and we went on our journey. On we went for three days, four days, and there was no sight of villages. Still we went on, and the men finished their food, and mine was finished too. Fortunately there was plenty of mushrooms all over the country; these, with some roots and flowers of a certain kind of bean, had to satisfy our wants for three days, at which time we came to a small hill having a village on the west side. As we were on the east side we camped, and the men went off for food. As soon as we got food, the troubles of the road were forgotten, and we went on to the villages under the chiefs Mpwina and Che Chikweo. Here we stayed for a day or two, and then began our journey to Ibo, which lies almost direct east. Che Chikweo gave me two men to act as guides as far as the Luleko river, and then they were to return. Here again we were attacked by hunger, with much more serious results. Che Chikweo told us that we should reach the Medo villages in five or six days, so we took food for eight. After we had crossed the river Luleko, we found ourselves in a pathless forest, and had to push our way as best we could through the tangled bushes and tall grass. We went on this way for six days, and the men's food was finished; again they had to take to eating whatever they could find in the forest. I had to make use of the same diet, with the exception of having a few beans, which I used with the mushrooms; coffee

I always had. So we went on for three days further, and the men became so weak that they could not carry the loads. We had a consultation over our affairs, and it was decided that we would go on to a hill in the distance, climb it, and see if there were any villages or cultivated gardens in sight, and if so to send on some men to get food; if not, we would hide the things on the hill and go on all together till we either fell or reached a village. The hill was ascended, and nothing could be seen but the whole country covered with thick forest, and every here and there cone-like hills cropping up. The things were hid, as I had hoped safely, and we resumed our journey.

At 4 o'clock on the third day we were rejoiced by seeing the green fields of corn belonging to a village hid in the forest. The sight of this gave us new vigour, and we were not long before we had reached the village and were satisfying our hunger. The next duty was to go back for the things, for I had only brought what was really necessary in instruments, with my books and papers. I sent the men off the next day. They would not hear of my going with them, and as soon as they reached the place they found some one had discovered our things and carried off everything excepting my tent, and the empty tin boxes. The instruments I had left behind were all smashed up; these included all my own and several belonging to the Society. Besides these I lost my clothes, the cloth which I wanted for the journey, and nearly all my natural history collections. They only left me the empty tin boxes and my tent, which they could not carry off, the men being probably few in number. It was impossible to say who had carried off the goods. It might have been a party of hunters who came across our track and followed us, or it might have been people of the village where we had arrived. They behaved very well to us whilst we were there, but it is not easy to say whether their kindness was the result of a naturally good disposition, or used as a cloak to hide their theft.

We were now reduced to great straits, not having either cloth or other articles to make use of, and we were still some fifteen days from the coast. Fortunately I had given the men four yards of cloth each, just before we left the things in the forest, and this served us till we reached the district of a great chief, named Mveli. To him we stated our case, and he very kindly took us in hand, supplied our wants, and after keeping us for eight days in his village, gave us all we needed to take us to the coast, and also four men as guides to take us to Ibo. For this kindness I had to send Mveli some things from Ibo, by the men he had sent with me. The whole of the country crossed, from Che Chikweo to the coast, has been thickly populated; the ground is the best I have seen, and was formerly well cultivated. The people who lived here were chiefly Lomwe Makua. They were surrounded on all sides by marauding tribes who completely drove them out, and made them take to the mountains in the south. Now the land, except the strip inhabited

by the Medo Makua, is a dense forest, the home of the elephant and buffalo. The Portuguese look upon all this valuable country as theirs, and profess to have lately made treaties with Mveli and Mtarika (whom they call the Prince of Mtarika), by which they have acquired a right over all their lands. Mveli was very strong in his assertions to me that the Portuguese had not been able to make treaties with him, though they desired to do so. By the chief Che Chikweo I was told that Lieut. Cardozo had tried to induce Mtarika to sign a treaty putting himself under the protection of the Portuguese Government, but Mtarika would not consent.

On arrival at Ibo, the Portuguese authorities were very kind to me: the Governor, Senhor De Palma Velho, gave me an audience at once, and provided me with a house and money. Both he and the new governor who came into office whilst I was in Ibo, showed me much kindness, especially in regard to the expedition, which was allowed to pass from the place free of all passport or other dues.

From Ibo I went to Zanzibar, and thence to Aden, reaching England on Tuesday, June 14th.

In introducing the subject of the evening—

The PRESIDENT said that about two years ago Mr. Last was entrusted by the Council of the Society with a mission to explore the region midway between Mozambique and Lake Nyassa, into a portion of which Consul O'Neill had penetrated a short time before. He was especially desired to investigate a remarkable mountainous tract, the Namuli Hills, that had been seen by Mr. O'Neill, and which was originally reported to that traveller to be covered with snow. Mr. Last's instructions were to proceed first to the junction of the Lugenda and Ruvuma rivers, and then fix the course of the Lukugu. Mr. Last returned to England only a few days ago, and had not yet had an opportunity to complete a detailed report; the paper he would read must be taken, therefore, only as a preliminary general account of his expedition. We should look forward with great interest to Mr. Last's full description of the geography and natural history of the country. It was evident that the vegetation was most luxuriant, and the scenery beautiful, and no doubt the animal life would be equally abundant.

After Mr. Last's paper,

Mr. JOSEPH THOMSON said that Mr. Last, before undertaking the present expedition, had done important work in Usagara and the neighbouring regions of East Central Africa, contributing largely to our knowledge of the natural history of that region. The country which had just been described was one of very great interest. The Namuli Mountains appeared to be a peculiar mountain district in that part of Africa, and it would be well to know something about their geological formation. Consul O'Neill had referred to them as, in his opinion, volcanic. If Mr. Last could give the Society any information on that point, it would be most interesting. He had much pleasure in moving a cordial vote of thanks to Mr. Last for his paper.

*A Journey through Yemen.* By Major-General F. T. HARG.

(Read at the Evening Meeting, June 27th, 1887.)

THE following paper has been compiled from rough notes of a tour through Yemen made in the month of January last. It may be useful to future travellers, and also as furnishing some information respecting a country in which we have certainly a deeper interest than any other nation, but about which we have hitherto been content to know very little. It is forty-seven years since we took possession of Aden, and established a protectorate over some of the Arab tribes around it, tribes numbering 130,000 souls, and occupying a tract of country 200 miles in length by 40 in breadth. With these tribes we have distinct treaty engagements; we subsidise them so long as they are of good behaviour, that is to say, pay them blackmail to the extent of 12,000 dollars a year, and trouble ourselves no further about them than occasionally to interfere to put down a disturbance, or to decide some disputed question of succession.

Their territory not being divided from that to the north of it by any mountain range or physical barrier of any kind, one would have thought that some explorations of Turkish Yemen would have been made, and some interest in its condition displayed by us. On the contrary, we are mainly indebted to an enterprising Italian, Renzo Manzoni, for what information we possess respecting it, and the map made by that officer is the only one of any value that we have. This map, which is published by Stanford, was my sole guide during my own tour, and I found it to be exceedingly accurate along the route which I took until, on my way southward from Sanaa, I entered British territory. There it is full of mistakes; Manzoni probably filled it in from information obtained in Aden.

My own object in visiting Yemen (the ancient Arabia Felix) was to see what the country was like, and to learn something of the condition of its inhabitants, with a view to ascertaining whether it might be possible to do anything for their Christianisation. The route I marked out for myself, and which I was enabled to follow, was from Hodeida on the western coast to Sanaa, the capital, a distance of 140 miles, and from Sanaa due south to Aden, 260 miles. Including a week spent in Sanaa, the journey occupied in all thirty-one days. I was accompanied by Ibrahim, the Bible Society's agent at Aden, a very worthy man, who, though he knows no English, understood my bad Arabic sufficiently to put it into good and intelligent Arabic for me, and so acted as interpreter. I had a Somali servant, an exceedingly active, intelligent, energetic fellow, who proved himself quite equal to any travelling servant I ever had in India. Mules were the animals selected to carry us, as being on the whole more comfortable to ride



than either camels or donkeys, though a little dearer. The Yemen mules are small, sturdy, compact animals, capable of any amount of fatigue, and seemingly of climbing wherever a goat can climb, while to my astonishment I found that the camels would go wherever a mule will. Including the two muleteers we were a party of five. The charge per mule was 4 dollars, which, according to Arab custom, I had to pay down in full before starting. Before describing our journey I may here give a few particulars about Hodeida, our starting-point.

I had previously visited Jeddah, Suakin, and Massowah, and was surprised to find Hodeida the busiest place of the four. There was more life and movement in the streets and crowded bazaars than I had seen elsewhere, more signs of trade and business generally. Being the principal port of Yemen, most of the coffee and hides which are the staple exports of the country are shipped from here. The population may be from 25,000 to 30,000, including that in the suburbs outside the walls. Within the walls the houses, which are mostly from three to four stories in height, are crowded together, the streets being mere narrow lanes six to nine feet in width. The bazaars are extensive, and roofed over with poles and mats laid across to keep out the sun. The town is no cleaner than most Arab towns, but superior in this respect to Jeddah. The water supply is poor, derived from wells at some distance from the town. The market is fairly supplied with fruit and vegetables. There are about half-a-dozen English and Americans resident, and a good many Greeks and other Levantines. There is no harbour, but simply an open roadstead, the steamers lying a mile and a half off the shore, but there is a pier, in somewhat rickety condition, at which goods are shipped and landed. There is a vice-consul, a Mahomedan gentleman on the Bombay Medical Establishment, from whom I received much kindness, and who is also inspector of the quarantine arrangements at the island of Camaran, to the north, during the season of the Haj.

We started for Sanaa, a party of five, on the evening of the 29th January. We had no guard of any kind, all the information I received at Hodeida tending to show there was no necessity for such a precaution. There may, no doubt, have been so in former times, but the iron rule of the Turks has at least rendered this, the most frequented and important line of communication in the country, comparatively safe for travellers. For the first twenty-five miles the road lies across a gently undulating plain, covered with low thorny bushes and tufts of coarse grass. This is the Tehama, and no doubt intensely hot in summer. Then, as a low line of hills is approached, signs of cultivation begin to appear, fields of *dharra* and *dokhn* (kinds of millet), and three or four small villages are passed, the name of one of these, "Deir el Hoonood," the monastery of the Hindus, suggesting the idea that there may be truth in the tradition that there was formerly a considerable body of Indians in this part of

Yemen. The plain, though somewhat narrowed by the approach of the hills on both sides, continues on to Bajol, a place of some importance, about a fourth the size of Hodeida, with a somewhat dilapidated fort, very solidly built with cut stone, and a large population of weavers and dyers.

At this point the hills rise to the proportions of mountains, the valley between, up which the road runs, turning to the south-east, its surface gravelly in most parts, but having a good deal of cultivation, and trees such as acacias, dotted here and there over it. This is its character for the next ten miles, after which the road enters and winds among low spurs, but passing frequently through cultivated lands and patches of forest of considerable height, and gradually becoming rougher and more hilly until finally El Hujjela is reached, at a distance of about seventy-five miles from Hodeida.

We reached this place long after dark, and put up at the Kahwa (coffee-house) or travellers' rest-house, a large open thatched shed, which was brilliantly lighted up by a good kerosine lamp, which seemed strangely out of place in such a situation. Large quantities of kerosine are, however, imported into Yemen. Much of it is sent to Sanaa, and the kerosine cans are commonly used for carrying water at Hodeida and elsewhere, as the taste of the water sometimes makes very plain. Hujjela I found by aneroid to be 1780 feet above sea.

At this point the road enters the mountains, which towered grandly above the little town situated near their foot. And here not only the character of the scenery changed, but also that of the towns and villages. In the plains they are built of mud, with thatched roofs. Throughout the mountainous country they are all built of solid stone, the houses being often of two to three stories in height, clustered closely around the *burj*, or tower, which rises in the centre to a considerable height above its surroundings. The *burj* has usually been the residence of the Sheikh, and would serve the purpose also of a watch-tower. Hujjela was the first of this kind of villages that we came to, and I found, on rising in the morning and taking a survey of the place and the surrounding country, that we had now indeed entered Yemen proper.

A mile or two outside of the town the road enters the mountains, following the bed of a torrent strewn with enormous boulders, having many fine trees along its banks, but dry at the time of our visit. The mountains rose steeply on both sides several thousand feet in height, but with little vegetation on their lower slopes. Higher up we saw terraces, and higher still large patches of coffee clustering in the ravines. As we advanced the torrent bed became steeper and more difficult. The toilsome ascent was, however, relieved by the magnificence of the scenery. Openings in the mountains on both sides revealed other ranges rising up to 6000 and 7000 feet, their rugged tops crowned at many points by villages, while other villages, surrounded by coffee plantations, nestled

on their slopes. One of these views I shall never forget, where a pile of mountains rose steeply up, one above the other, like a huge pyramid, on the top of which, through the clear air, we could distinctly see, at a height of 8000 feet, the invariable village, its burj standing clearly out against the sky, the exquisitely soft and rich colouring of the whole being beyond description.

After following the torrent bed some miles further, the road, or rather pathway (for it must be understood that there is no such thing as a made road in the country) turned suddenly out of it and followed a zigzag up the steep mountain side, every bit of which was terraced and cultivated. Far above us, at a height which I afterwards found to be 4660 feet, we could see the village, burj, and kahwa (coffee-house), where we were to rest a while. We reached this about noon, and after a cup of coffee, commenced the ascent once more. Here I began for the first time to form some conception of the meaning of the magnificent scene around me. The village was perched, as the villages always are, on top of a precipitous mass of rock at the end of a spur, and from it I looked down 2000 feet into the torrent bed below, and 4000 feet up to the top of the mountain, and everywhere, both above and below, to the right and to the left, I saw nothing but terraces. The whole mountain side, for a height of 6000 feet, was terraced from top to bottom. The crops had all been removed; only some lines of coffee trees here and there were to be seen, but everywhere, above, below, and all around, these endless flights of terrace walls met the eye. One can hardly conceive the enormous amount of labour, toil, and perseverance which these represent. The terrace walls are usually from five to eight feet in height, but towards the top of the mountain they are much higher, being sometimes as much as 15 and 18 feet. They are built entirely of rough stone, laid without mortar. I reckoned on an average that each wall retains a terrace not more than twice its own height in width. So steep, in fact, is the mountain, that the zigzag continues almost the whole way to the top. It has been made with considerable care, and though its surface is often rough and broken, the wall which retains it is generally in good repair. This was indeed the most striking characteristic of the whole mass of terrace walls, the excellent condition in which they are maintained. I do not think I saw a single breach in one of them unrepaired. It is impossible not to feel that a race which has erected such a marvellous monument of human industry as this one mountain side displays, possesses capacities fitting it not only for a far higher civilisation, but for no mean place in the scale of nationalities. The whole of the crops are grown on these terraces, wheat and barley, coffee and indigo, fruits and vegetables. We reached the top of the mountain, which we crossed at its lowest point, about sunset, when it was wrapped in clouds and mist. Its height by aneroid was 8000 feet. We then descended the other side to Menakha, which is situated at a height of 7610 feet, and

86 miles distant from Hodeida. Here we found ourselves in quite a pleasant climate, the temperature about 65°.

Menakha may have a population of 4000. It has a Turkish garrison, and is an important strategical position. It is commanded from more than one point on the mountain, and there forts have been erected. I was imprudent enough to make a sketch of it from a neighbouring hill, which led to some polite inquiries by the Commandant, and a telegraphic message to the Governor-General at Sanaa, but not to any very serious difficulty. It may be mentioned here that there is a telegraph line from Hodeida, viâ Menakha, to Sanaa, which appears to be kept in pretty good order, though merchants at Hodeida say it is sometimes quicker to send by post, though that is only once a week.

Leaving Menakha the road descends the eastern face of the mountain for 2700 feet by a far steeper and rougher path than that on the opposite face. It is in fact for much of the way simply a steep pile of boulders, down which one wonders how the little mules contrive to keep their feet. Here, however, and in worse places further on, it is still more surprising to meet or overtake strings of loaded camels pursuing their way with as much composure as if they were simply crossing a plain. The descent is down the end of a ravine, into a torrent leading out into broken hilly country at a general level of 5000 to 5500 feet, with but little cultivation. The trees and shrubs were here, as indeed almost everywhere else, scanty, and at that season for the most part leafless. Mefaq was the halting-place for the night, the khan where we stopped being 5860 feet above sea, and the town and fort some 500 feet higher.

We were late in starting next morning, and halted for an hour at noon at Suk el Khamis, 7740 feet above sea. We were now steadily rising as we proceeded. It was very cold, and though wrapped in my warmest clothes, I could hardly keep myself warm. After leaving Suk el Khamis, the path rises by exceedingly steep inclines up the almost precipitous side of a mountain, growing worse and worse as we proceeded, the mules climbing over great boulders and trotting over smooth rocks on the edge of terrific precipices. At last we reached the highest point of the pass, 10,010 feet, the hills on each side of the path being about 400 feet higher. Here a great extent of terracing was in sight. Then there was a rapid descent to a stream, the bed of which was 9600, and this continued to be about the average level of the country for several miles on to Selim Basha, a small village where we passed the night, sixteen miles distant from Sanaa. The views this day were indescribably magnificent, especially from the highest part of the pass. Far away on the horizon westward were ranges which seemed quite as high, while all between was an endless succession of mountains, ravines, valleys, precipices, and rocky heights crowned by villages, the whole lit up by a brilliant sunshine, the rich and varied tints of the nearer hills gradually passing into the soft misty purples of the more distant ranges.

After crossing the stream above-mentioned, a few hundred feet below the highest point of the pass, the road lay through a country of quite a new character; a succession of steppes, gently sloping valleys, generally terraced and cultivated, from half a mile to a mile in width, between low hills of trap, each steppe separated from the next by a short sharp descent. This is the character of the whole highlands of Yemen, as far as I was able to judge. It continued up to a point a few miles from Sanaa, where a sudden turn brought us within sight of the town lying 2000 feet below in a broad flat valley some miles in width, and extending in a north-east and south direction as far as the eye could reach. The descent into the plain is rapid, and in another hour or two I was resting beneath the hospitable roof of the Messrs. Caprotti, two Italian gentlemen, who received me with the utmost kindness and made me their guest during the six days I spent in Sanaa.

It will thus be seen that to reach Sanaa I had to surmount an elevation of 10,000 feet. The map seems to show that by a more southerly route this may be avoided, and that a practicable road might be made with far less serious obstacles. My aneroid made the height of Sanaa above the sea 7700 feet. Mr. Glaser, an Austrian savant who has recently been exploring the antiquities of the country, I was told, makes it 7281 feet, a difference of about 6 per cent.

The town of Sanaa is entirely surrounded by a wall, partly earthen, partly brick, of some miles in circuit, and enclosing a space which evidently once contained a population very much larger than the present, which is roughly calculated at 30,000 to 35,000 souls. The large Jewish quarter, with a population of 5000, is separated from the Mahomedan parts of the town by a broad space of 150 yards in width. The houses are from three to four stories in height, built of stone in most cases, quite destitute of any architectural beauty, but with a good deal of ornamentation of a peculiar kind on the walls and around the windows. An objection was made by the Wali, or Governor-General, to my sketching, and I could obtain no photographs. I was therefore obliged to leave without bringing away with me any illustrations of a style of architecture differing much from anything I had seen elsewhere. The bazaars are poor, and the whole aspect of the town corresponded to the social condition of its inhabitants as described to me, an Arab population intensely hating the few thousand Turks by whom it is held down, heavily taxed, and generally obliged to furnish gratis the supplies required for the large garrison of Turkish soldiers. The latter are not allowed to go into the narrow streets for fear of assassination. They seemed to be well fed, but often badly clothed. There is a citadel at one part of the walls, with its guns turned significantly not to the outside, but upon the town. Large barracks are being constructed, and there is a large military hospital, which I gathered from an application I made, it was not wished that I should see. The water supply is good,

being derived from wells sunk to great depths in the rock. Vast heaps of rubbish here and there show where extensive buildings must once have stood, and I was shown the few and scarcely distinguishable ruins of a Christian church of pre-Islamic times. I called upon the Governor-General, and must do him the justice to say that, in spite of the suspicious circumstances in which I was first brought to his notice, and of my having neither letter of introduction, passport, nor even a printed visiting card, he received me graciously, and granted me permission to proceed direct to Aden, instead of returning to Hodeida. He had much to ask about Egypt and the Soudan, and especially about India, wishing to know if any part of it corresponded in its physical characteristics to Yemen. I told him of the Himalayas and of Darjiling, which, though situated at a similar height, 7000 feet, to Sanaa, is connected with the plains and Calcutta by rail. There appears to be no reason why Sanaa should not be similarly connected with the port. Probably, it would not be necessary to surmount any greater height than 8000 feet, and the peculiar steppe formation of the highlands would greatly facilitate the extension of the line in two or three directions.

The Jewish population of Sanaa appeared to be generally well-to-do. Their quarter was clean, their houses models of neatness and cleanliness. They have twenty-three synagogues, and twenty schools with 700 boys in them. The whole male population can read, few of the females. They are the masons and artificers, and are preferred to the Mahomedans as servants by the few Europeans, as being both cleaner, more intelligent, and more trustworthy. They reckon their total numbers in Yemen at 60,000. We found them in almost every town and village that we stopped at.

Before describing the road southwards to Aden I may here give some information as to the climate and productions of high Yemen.

There are two rainy seasons, in spring and autumn. No measure of the rainfall has ever been taken, but the rain is said to come down in torrents, generally falling every day, but only for a few hours. I was shown one part of Sanaa where the drainage flows in a perfect river at such times. The temperature in winter often falls below freezing-point during the night, and in the hottest season the thermometer does not rise above 80° in the open air in the shade. The temperature in the houses, which have thick walls, remains at about 62° all the year round. Last year was one of almost total failure of rain. The country consequently, when I passed through it, had an exceedingly parched, dried-up appearance, and the temperature was higher than usual at that season. The thermometer was about 45° in the open air in the early morning, but never rose above 62° in the house in Sanaa. This failure of the rainfall leads me to remark upon what is probably the chief cause of it, viz. the almost total deforesting of the mountains above the 6000 feet level. The utter bareness of the soil,

the almost total absence of either trees or bushes, was a marked and painful feature of the greater part of the highland plateaux which I traversed. The people themselves seemed to have no traditions of there ever having been more vegetation on the surface, but looking at the fact that below the level I have mentioned both trees and shrubs were certainly much more numerous, though the soil was inferior and the rainfall must be less, while the population is less numerous, I think there can be little doubt that the denudation of the mountains is simply due to the reckless destruction of the forests by an ignorant and yet numerous population, and the neglect of any efforts to replace them by fresh planting. If so, the seasons have no doubt deteriorated, and the rainfall is scantier and more precarious than formerly. Still there are evidently springs in all directions all over the mountains; it is impossible that under any other conditions could the villages be perched, as they always are, upon the highest and most inaccessible points.

All the streams we passed had fish in them. In the large Wady Bauna there were shoals of fish as much as six inches in length, and I was told that in Sanaa fish can sometimes be bought up to 12 lbs. in weight.

Irrigation is universally practised, the available water supply being distributed by the hour to the lands entitled to it, the Arabs being very clever at judging the time by measuring, foot by foot, the length of the shadow. The task of distribution does not always fall upon the sheikh of the village, but more commonly upon some one of the elders having a reputation for honesty and fairness. The soil is rich; two crops a year appears to be the rule everywhere, and with irrigation three and four. The tillage is excellent. The plough, though it only turns up the soil to the depth of a few inches, is often followed by a large sort of hoe, something like a street-scraper, by means of which the loosened soil is turned over transversely, one man holding the scraper and two others dragging it by a rope attached to it. Land is freely bought and sold within each tribe, and is inherited from the father in equal portions by the children, except that a daughter's share is only one-half the son's.

The Yemenis appear to be a prolific race. We saw everywhere great numbers of children. The woman in charge of the khan in one village that we passed through had ten children. On my expressing surprise I was assured that that number was not uncommon, and was told of another woman in the village who had had fifteen sons, every one of whom, it was added, died on the battle-field.

In spite of all their toil and labour, and the wonderful industry with which they terrace and cultivate the land, the people generally looked poor, often miserably so. Their clothing is of the meanest; a sheepskin coat, the wool turned inside, is the most important garment of the men. The taxation is, I fear, heavy and capricious. It is constantly collected only by military force. A Turkish official told me

that defaulters are sometimes tied to the muzzle of a loaded field-piece. If the threat never goes further than this, one can hardly suppose it likely to have any effect, while yet one shrinks from imputing even to the Turks, in the absence of positive evidence, such horrible barbarity as the consummation of the threat would imply. But passion and hate run high on both sides. Whole villages are sometimes razed, and the Turks have more than once marched back to Sanaa with the Arabs' heads on the points of their bayonets. It is needless to say that not one farthing of the taxes taken from the people is returned to them in any shape or form whatever.

The productions of Yemen are numerous. Coffee, indigo, and other dyes are the most important. Vegetables of all kinds are abundant; some, such as cabbages, cauliflowers, &c., growing to an enormous size and weight. There is a profusion of fruit—grapes, figs, walnuts, peaches, apricots, pears, &c. Grapes, I was told, are to be had during half the year, and of large size and excellent flavour.

The principal exports are coffee and hides. There is a nominal export duty of only 1 per cent., but actually the amount levied is nearer 20 or 25 per cent. The fiscal system of the Turks, if it were really carried into effect, would be by no means bad, but like every other department of the Government, it is ruined by the utter corruption that prevails in every branch of the administration from top to bottom. No more eloquent expounders of the evils and hopelessness of their whole system are to be found than the Turks themselves, as I found from conversations with two or three of their own officials.

The road from Sanaa to Aden runs at first for many miles in a nearly southerly direction, but a Greek having been murdered on it, one or two marches from Sanaa, a few days before I started, I was taken by a more circuitous route, viâ Walan and Ma'abar. For the first twenty-five miles the road runs through a broad valley, slowly rising until at length the hills enclosing it are crossed at a height of 9600 feet. There is then a steep descent by a broad zigzag path, which still has some remains of the massive paving which covered it in the times of the Arab dynasties. This leads to a great plain at least twenty miles in length, and from three to five miles in width, cultivated in parts, many wells being in use for this purpose, and having a few villages scattered over it. Ma'abar, which is one of these, where we stopped for the night, is 8080 feet above the sea. The plain extends some miles further, and the road then rises on to a vast flat plateau of trap, quite bare for a mile or two, then disintegrated into a soil which is extensively cultivated. The highest point in this plateau was at the village of Darrab, 8510 feet. Dhamar, an important town of some thousands of inhabitants, and having a Turkish garrison, is situated at the southern end of the plateau. It bears throughout the marks of Turkish rule—decay, poverty, and squalor. There are some mosques, and two or three minarets, all, like most of the



minarets in Sanaa and elsewhere, out of the perpendicular. One had been nearly brought down by a shot from a Turkish cannon during some *émeute*, when the Arabs took refuge in the mosque, and the Turks fired upon it.

Proceeding southwards from Dhamar, the road lies over great sheets of trap for some distance, and through a very broken mountainous country to Yerim, an important town about the size of Dhamar, 9260 feet above the sea. Yerim is 80 miles from Sanaa, and 170 miles from Aden. Here we met for the first time with quarter rupees and two-anna bits in the bazaar, marking the limits to which British coinage has penetrated. Elsewhere the Austrian dollar and some copper coins were the only coins to be seen, and these are in fact, as a rule, the only kind of money in which the Arabs believe. When I paid off my camel-men in Aden they refused to take rupees, and insisted on having dollars instead.

After leaving Yerim, the road ran for many miles through a series of broad valleys, well cultivated, with a good deal of irrigation. Then a sudden descent of several hundred feet took us into the bed of a torrent, which led out into a much larger valley between high mountains, scarped and precipitous at the top, but their lower slopes beautifully terraced and irrigated, and dotted over with numerous villages. We found we were in the valley of the Wady Bunna. The road, which was only a few feet in width, ran along the steep side of a mountain at a giddy height above the river at its foot, but about sunset we descended into the Wady and crossed the stream, which was flowing with a rapid current about thirty feet in width and eighteen inches deep. Its bed I found to be 7110 feet above the sea.

The whole road south of Yerim lay through a country much greener than any we had yet seen; there was much grass and turf, and small bushes covering the hill slopes gave them quite an appearance of verdure. All the way south of Sanaa we found bushes and trees along the margins of the streams, but south of Yerim the country looked as if there must be a more abundant rainfall. Certainly there was a marked change in the appearance of verdure everywhere.

The next day's journey was one of great fatigue. The road lay through a very wild country, and at length towards evening gradually ascended to the top of a mountain range which we crossed at its lowest point, 8610 feet. We then descended 1900 feet down the other side by the steepest and most difficult path we had yet traversed. It was wonderful how the mules kept their feet at all. The difficulty was increased by our meeting strings of loaded camels and donkeys carrying up tobacco, cloth, and other things from Aden to Sanaa.

A march of 30 miles next day through mountains more wooded than any we had seen before brought us to Qataba, the frontier customs town of Turkish Yemen. We crossed the frontier the following day at El Gelile and entered the territory of the protected tribes, which is here

at an elevation of 4000 feet above sea. In the first part of the 80 miles between this point and Aden the descent is rapid. The hotter plains are then reached, but these furnish no subjects of any interest for remark. I sent off my camels with my servant to Aden, but myself, with Ibrahim, struck off on foot in a south-east direction through the Abian country to Shugra on the coast, where we found a boat and by it made our way back to Aden, some 60 miles, by sea.

The country which I have described does not appear to be the finest part of Yemen. I was told that the finest country in point of population and productions lies to the north of Sanaa. The mountain region extends quite 300 miles north of that place into Assir. The watershed would appear to be some distance to the east of the meridian of Sanaa, but the country there has been very little explored. Enough has, however, perhaps been said to show that the whole of this part of Arabia is deserving of greater attention and more careful investigation than have yet been bestowed upon it. Much of it possesses a climate quite suitable for European colonisation. In addition to coffee, which is indigenous, and the cultivation of which is probably capable of considerable extension, Yemen is said to possess mineral riches. I was told by two Europeans that they had themselves seen coal, and that there is much sulphur as well as iron ore. The Turks of course do nothing for it; under their rule its capabilities are kept down to their lowest possible point. But they hold it with difficulty. They have already once been expelled from Sanaa, every man of them having been put to the sword. If the time should come that they would be obliged to evacuate Yemen, there can be no doubt that English rule would be welcomed. Aden is visited by Arabs from all parts of Yemen, and the spectacle of a wise, firm, and just rule there presented has made a deep impression upon the whole population. There can be little doubt they would gladly see it extended to their own country. Meantime the Turks are quietly endeavouring to push their frontier further east into Hadramaut, a country in its western part very similar apparently to Yemen, and so completely to hem in on all sides the little strip of British territory around Aden. The Kaimakam of Qataba, the frontier town, an old Turkish officer, was full of a project for annexing the Yafa country to the east, and spoke to me about it more than once. How far it is wise to allow Turkey thus to extend and surround our own territory on every side, this is not the place to discuss. Certain it is that such extension brings no good to races possessing very considerable natural capabilities, and quite capable of appreciating the benefits of a wise and enlightened government.

After General Haig's paper,

Sir F. GOLDSMID agreed with General Haig that it was most desirable to learn something more about Yemen. The neighbouring Hadramaut also was an exceedingly interesting region about which very little was known beyond the line of coast. It was not, perhaps, generally realised that Hadramaut was the mother country of

the Dutch Arab colonists in Java and the Eastern Archipelago. Recently the Government of the Netherlands had published a work on those colonists, and in that there was the usual lament that so little was known about the interior of Hadramaut. The thanks of the Society were due to General Haig for having brought forward this subject of the exploration of Yemen.

The PRESIDENT said that General Haig had by this journey opened up a field for further investigation and inquiry, and it was to be hoped that some enterprising travellers would follow in his path, and obtain further details of the condition of the people and the natural productions of these regions. He agreed with General Haig that some discredit attached to the British Government for not having done a great deal more towards the exploration of mountain districts which were within easy reach of Aden and Muscat. Considering the beautiful climate that prevailed within a short distance of Aden in these mountains, he thought that something might be done towards forming a settlement in them which might be visited by the British occupants of Aden.

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*Recent Changes in the Map of East Africa.\**

Map, p. 530.

THE accompanying map shows the political boundaries in Eastern Equatorial Africa resulting from the agreement arrived at by the British and German Governments in October last. The movement which has led to the acquisition of territories in the Zanzibar region by Germany, originated with Dr. K. Peters, who founded in April 1884, a "Society for German Colonisation" at Berlin, similar in plan to an older "Kolonialverein," but bent upon the realisation of more ambitious schemes. The society at first intended to acquire land near Humpata, at the back of Mossamedes in Portuguese Western Africa, upon which German colonists might be settled, but Count Joachim Pfeil, who had some knowledge of the country, pointed out the superior advantages of Eastern Africa, and Mr. Stanley's glowing account of Usagara, finally determined the direction of the enterprise. Dr. Peters, Dr. Jühlke, and Count J. Pfeil were therefore authorised to acquire land suitable for the establishment of German agricultural and commercial colonies. Their intention, however, owing to the indiscretion of one of the directors, became known, and to prevent being forestalled, a report was spread that the party of colonisers were bound for the Congo, instead of which the three adventurers quietly embarked for Zanzibar, under assumed names, and as steerage passengers.

They reached that place on November 4th 1884; on the 12th of that month they left Saadani for the interior, and on November

\* Based upon the *Kolonial-Politische Korrespondenz*, a weekly paper, published by the "Society for German Colonisation," J. Wagner's 'Deutsch-Ost-Afrika,' and other publications of the "German East African Company."

19th signed their first treaty, and hoisted the German flag at Mbuzini. Count Pfeil remained behind at Muinyi in Usagara, whilst Drs. Peters and Jühlke hastened back to the coast, arriving at Bagamoyo on December 17th, having within that short space concluded treaties with eight chiefs, by which they claimed that all Uzeguha, Nguru, Usagara, and Ukami had come into their possession.

Peters then returned to Berlin, and on February 12th, 1885, founded the "German East-African Company," to which the rights he and his colleagues had acquired were ceded, and which received an Imperial "Schutzbrief," or letter of protection, and was subsequently granted a Charter. The present capital of the Company is 250,000*l.*

The newly-formed Company lost no time in pushing forward its prospecting expeditions in Eastern Africa, for it was thought politic to acquire territories in all sorts of places, in order that on the day on which conflicting claims were settled, something should be left worth keeping.

Dr. Jühlke, who had remained behind at Zanzibar as Agent-General, was joined on March 22nd 1885, by a first reinforcement, headed by Lieutenant Weiss, and on April 3rd by Mr. Hoernecke, the leader of a second detachment. Four more parties arrived in the course of the year. It was at first intended to send exploring parties as far as Lake Tanganyika and the Victoria Nyanza. This plan, however, was ultimately given up, and Dr. Jühlke and Lieutenant Weiss were instructed instead to proceed to Mount Kilimanjaro. They started from Pangani on May 10th, 1885, ascended the valley of the Rufu, making treaties with Simboya, the leading chief of Usambara, and with others. On approaching Taveta they met people belonging to a detachment of Zanzibar soldiers returning from Moshi in Chagga, whose leader, General Matthews, had succeeded in persuading the chief Mandara to hoist the Sultan's flag. Dr. Jühlke, however, persevered in his object. He arrived at Moshi on June 15th, and on June 29th, 1885, Mandara put his mark to a treaty, by which he placed himself under German protection, and ceded the whole of his rights as a sovereign to the German Company. He declared at the same time, that the Sultan's flag had been hoisted merely as a sign of friendship. Dr. Jühlke, after this, hurried back to the coast, and Mandara has seen no representative of the German Company since.\*

It is hardly to be wondered at that these German agents came occasionally into conflict with the authorities of the Sultan at Zanzibar,

\* The Rev. E. A. Fitch and Mr. J. A. Wray, of the Church Missionary Society, who arrived at Moshi on July 1st, 1885, immediately after Dr. Jühlke's departure, found the Zanzibar flag flying, and were assured subsequently by Mandara that no treaty with Germany had been signed by him. Mr. Buchanan, of the Manchester Chamber of Commerce, arrived at Moshi on June 29th, 1885. ('Church Missionary Intelligencer,' 1886, p. 559.)

who not only claimed the whole of the coast, but also the interior, as far as Lake Tanganyika and beyond. These claims, however, were not recognised by Germany, and when a powerful German squadron put in an appearance at Zanzibar in August, 1885, the Sultan, on the 14th of the month, recognised Usagara, Nguru, Useguba, Ukami and Wito as German protectorates, and consented to the conclusion of a commercial treaty and to the demarcation of the boundaries by an international commission. A Commercial Treaty with Germany was signed at Zanzibar on December 20th, 1885, and the political boundaries were settled by a joint British and German Commission, and embodied in the London Convention of November 1, 1886.

The attempt of Dr. Jühlke to obtain a footing on the Jub and in Southern Somal Land ended disastrously for that energetic agent of the Company. On November 10th, 1886, the *Isolde* appeared off the mouth of the Jub. The whale-boat was sent to examine the bar of the river, but was swamped, and Lieutenant Gütter and two sailors were drowned. Dr. Jühlke immediately sailed for Kismayu, whence, notwithstanding the obstacles placed in his way by the Sultan's Vali, he proceeded by land to the scene of the disaster. Whilst at Kismayu, he entered into communication with Ali bin Smail and other Somal chiefs, and having been closeted with them for three hours and a half during the night from the 15th to the 16th November, he succeeded in persuading them to place themselves under the protection of Germany. Ali received 3*l.* in acknowledgment of his good-will, but he begged Dr. Jühlke to keep the knowledge of this pecuniary transaction from his brother chiefs, as otherwise they might cut his throat. This does not look as if these negotiations had been popularly approved of, and Mr. G. Denhardt does not hesitate to ascribe Dr. Jühlke's murder on December 1st to political motives.\* Robbery, at all events, was not the object, for Dr. Jühlke's valuable property was not touched. The murderer has since been executed by the Sultan of Zanzibar's orders.

Whilst these events took place in the Somal country the process of annexation went on in the south within the limits of the territory since declared to be under German influence. Count J. Pfeil, in the course of his explorations in the Lufji basin, 1885-6, concluded treaties in Uhehe, Ubena and Mahenge, as also with the Wamachonde and Wangindo, which established claims over a vast territory.

The first stations in the newly acquired German possessions were founded in March and April 1886, in the valley of the Kingani, and the development and extension of these stations has been the principal aim of the Company since the period of annexations has come to a close. With a view to furthering this object, Dr. Peters, with a staff of twenty-three persons, including engineers, surveyors, agriculturists, and medical men, left Germany in April and arrived at Zanzibar on May 17.

\* 'Allgemeine Zeitung,' 1887, p. 175.

The territorial areas in the region, roughly estimated, are as follows :—

The Sultan of Zanzibar's dominions (Zanzibar Island, 614 sq. m.; Pemba, 372 sq. m.; Mafia, 210 sq. m.; mainland, 8000 sq. m.)	Eng. sq. m.	9,190
German Protectorates (Wito-land, 5200 sq. m.; Usagara, &c., 20,700 sq. m.)		25,900
Remaining territories over which Germany is allowed to establish Protectorates		122,800
Territories over which England is allowed to establish Protectorates		72,000

Wito-land, under Sultan Ahmed Simba, accepted a German Protectorate on April 8th, 1885, and the coast abutting upon Manda Bay has been assigned to it. The neighbouring islands, with the exception of Lamu, have been relinquished by Zanzibar. Wito-land, which is in part inhabited by Galla, is described as a generally level country, well adapted to agriculture. The territories ceded within it to the brothers Denhardt were transferred by them, in June 1886, to the "Deutsche Kolonialverein."

A commencement has been made in the occupation of the route which leads up the Pangani or Rufu-river into the Masai country and to Mount Kilima-njaro. Korogwe, the first station, lies about 53 miles up the river, on a hill, and was founded in May 1886 by Mr. W. Braun. The surrounding country is described as delightful. The natives cultivate durrah, maize, and manioc, and there are not wanting shady spots well adapted for the cultivation of coffee. The coco-palm is met with as far as Maurwi, 10 miles beyond Korogwe. Later in the year, Mr. Braun founded a station at the foot of Mount Mafi, 30 miles further up the Pangani, and quite recently he has been authorised to push ahead, and to establish himself at the foot of Kilima-njaro. The customs administration of Pangani is to be intrusted by the Sultan of Zanzibar to the German Company.

The important caravan route which leads inland from Saadani has likewise been occupied. Saadani itself is an insignificant place, with an open roadstead. The Wami, which enters the sea to the south of it, and which in the hill country of Usagara is known as the Mukondokwa, has not yet been fully examined as to its navigability.

Petershöhe, the first station on this route, lies about 52 miles inland, and was founded by Lieut. von Anderten in July 1886. It occupies the slope of a hill, by the side of the Rukegura rivulet, not far from the village Mbuzini, where the German flag was first unfurled in Eastern Africa. The station buildings occupy about 1500 square yards, and are raised upon stone foundations. The live stock includes cattle, sheep, goats, and asses, and about ten acres of land, by the river side, have been brought under cultivation, and bananas and other fruit trees have been planted.

Proceeding up the valley of the Wami we pass Kondoa, for years the residence of Capt. and Mrs. Bloyet, who treated Count Pfeil with great kindness when he was stricken down by disease, and at length reach

Muinyi, the residence of the principal chief of Usagara, in whose vicinity Count Pfeil, in March 1885, founded the Simba station. Mr. Carl Schmidt, a practical agriculturist, speaks highly of the soil, and states that the distribution of the rainfall throughout the year is favourable. About ten acres have been planted here with food-plants, ground-nuts, red pepper, kueme (a creeper yielding oil), and tobacco. It is proposed to introduce the Cape vine. The live stock includes cows, sheep, goats, pigs, fowls, geese, and pigeons. Kiora, in the same part of the country, is an out-station, founded by Mr. Rhodes in November 1885.

The stations which have been founded in Uzaramo, along the route which leads from Bagamoyo up the Kingani river, appear to have made most advance. At Bagamoyo itself, well-known as the headquarters of the French mission, with whom excellent relations have been established, the Company maintain a store from which the inland stations are supplied. The Kingani is navigable for small steamers for a considerable distance into the interior, and a steam launch has been placed upon it. The river inundates its valley for a considerable distance, and has not inaptly been called a miniature Nile. The bottom-lands are well adapted for the growth of cotton, sugar-cane, sesamé, indigo, and rice. The hills bounding the valley are partly wooded. The company's stations have been placed upon bluffs commanding the valley below. Dunda, the first among them, stands about 22 miles from Saadani, and was founded on March 5, 1886, by Lieut. Krenzler. It occupies the edge of a bluff, rising 160 feet above the valley, and has been fortified by Lieut. Bülow, and armed with two guns. Commodious dwelling-houses, a smith's shop, a store, and stabling for cattle, sheep, goats, and asses have been erected, and a hospital is in course of construction. By November 1886, 122 acres had been planted with manioc, maize, beans, sugar-cane, cotton, tobacco, &c. The soil is good. There is no tsetse, but the grass is too coarse for working cattle, and for the most part sour, and it is proposed to introduce French lucerne, red clover, and English rye-grass. Already two German colonists have established themselves near the station, at Barkenfelde, and, to judge from their letters, they are well content with their lot. A hospital, under the direction of Baroness Frieda von Bülow, is in course of organisation.

About 22 miles higher up the river we reach Madimola, founded by Lieut. Saint-Paul-Ilhaire. Samples of cotton forwarded from this station in October 1886, were declared by Bremen experts to be superior to middling Orleans.

The third station, Usaungula, stands 75 miles from the coast, and was founded on April 25th, 1886, by Lieut. Zelewski. It occupies the edge of the plateau, about 300 feet above the river, and is backed by wooded hills attaining a height of about a thousand feet. About 6400 acres of land are available here for agricultural purposes, and

4½ acres have been planted experimentally with tobacco, ground-nuts, &c. The soil, a brown loam, is well adapted for Egyptian wheat. Formerly this district was much exposed to the predatory incursions of the Fituli, a tribe of Ukami, but Lieut. Zelewski has organised a native militia, and these raids have since ceased.

Dar-es-Salaam, to the south of Bagamoyo, lies within the territory assigned to the Sultan of Zanzibar, but its custom-house is to be placed under German administration, on behalf of the Sultan. Preparations have been made for planting stations in the valley of the Rufiji.

Looking back at the work which has been accomplished since Dr. Peters first planted the German flag at Mbuzini, it must be admitted that considerable progress has been made. The Company is very reticent as to the system of administration which it is proposed to introduce into these African possessions. We have, however, this emphatic declaration on the part of Dr. Peters, that it is not their intention to found "a State like that founded by Mr. Stanley in Western Africa." The German East African Company may in the meantime be described as a trading company, like the Royal Niger Company, and arrangements have virtually been made with two German firms at Zanzibar, Messrs. Hansing and O'Swald, to act as its agents.

The development of the resources of the country is to be left to other agencies. There is no talk now of diverting a stream of German emigrants to Eastern Africa, although a few experimental settlements may possibly be established in promising localities. It is thought, however, that Eastern Africa might yield at least a portion of the colonial produce upon which Germany annually expends about forty millions, and that this produce might be paid for with German manufactures. It is more especially intended to cultivate tobacco, coffee, and cotton, and for this purpose a "Plantation Company" has been founded with a capital of 100,000*l.* An agent of the Company, Mr. Schroeder, formerly a planter in Sumatra, arrived at Zanzibar on March 6th, of the present year. A survey for a railway is about to be commenced, and mining operations have been heard of.

The labour question has hitherto presented no difficulty, although it is admitted that the natives frequently leave their work after a month, and only return when their wages have been expended. At some of the Company's stations between 60 and 80 natives are employed daily on agricultural and other work, and they have generally given satisfaction, three negroes doing the work of two Germans. The wages paid vary between three and five rupees a month with five or six pesos *posho per diem* in lieu of board. The total monthly wage thus amounts to only from 11*s.* 7*d.* to 15*s.* 7*d.*, reckoning the rupee at two shillings. The Company only punishes breaches of contract; and men who desert, after having received their wages, are set to work until the amount



has been made up, and are then dismissed. It has not hitherto been found necessary to employ compulsion. Mr. Hoernecke very fairly points out that slavery, as well as the arbitrary proceedings of certain ruling tribes, demoralised the native. He recommends to employ the slave-labour of the locality, but not to permit the introduction of slaves from other districts. A plot of land is to be allotted to each labourer, as part of his hire, and by steadiness he is to be enabled to procure his emancipation. Mr. Hoernecke strongly recommends co-operation with the missionaries.\*

A German Missionary Society for Eastern Africa was established at Hersbruck in Bavaria, in January 1886, and has already despatched two missionaries, who have for the present taken up their quarters near Rabbai, but will ultimately penetrate into Ukanba. Another missionary society was established at Berlin, by members of the Company, and will confine its operations to the German territories. A third society was founded at Neunkirchen. These three societies have already despatched seven missionaries and three ladies to Zanzibar. It seems too, as if the French Fathers of the "Congrégation du St. Esprit," who work at present so successfully, are partly to be superseded by missionaries supplied from the College of Reichenbach. The Holy Congregation's consent to this change is stated to have been obtained by Dr. Peters during a recent visit to Rome.

Scientific work has not been neglected by the agents of the Company. Count Joachim Pfeil's journey in 1885-6 has very materially increased our knowledge of the Lufji valley; † the expedition to Mount Kilimanjaro, under Dr. Jühlke and Lieutenant Weiss, has yielded some useful results; ‡ and Dr. K. W. Schmidt, a geologist, has just returned to Berlin with a valuable mineralogical collection, and is preparing an account of his explorations. It is gratifying to notice that these reports are not withheld from the public from a mistaken and shortsighted notion of their being used to the prejudice of the Company.

\* On the Training of the Negro to Labour, see the essays by Dr. Merensky and Herman Bibo, recently published at Berlin. They were awarded prizes offered by the German Company.

† † 'Proceedings R.G.S.,' *ante*, p. 47.

‡ Weiss, 'Meine Reise nach dem Kilima-Ndscharo-Gebiet,' Berlin, 1886; and K. Jühlke, 'Die Erwerbung des Kilima-Ndscharo-Gebiets,' Cologne, 1886.

*Journeys in the District of Delagoa Bay, Dec. 1886—Jan. 1887.*

By H. E. O'NEILL, Esq., H.M. Consul, Mozambique.\*

IN December last Mr. O'Neill left Mozambique on an official mission to Delagoa Bay, and reached that place on the 23rd of the month. He reports as follows on his journeys in the neighbourhood, and on the present condition of the Portuguese colony:—

There are two routes now in use from Delagoa Bay to the Transvaal, both sketched on the accompanying map. The first-established, but longer one, is that which leads from the lowest "drift" or ford upon the Temby river, through Swazi-land into that State. It was this road that was selected by the Portuguese Engineers, employed in 1878 and 1879, for the survey of the projected line of rail to Pretoria. The second, along which for some distance the railway now being constructed will run, leads from the town of Delagoa Bay, crosses the Lobombo range at the Matala "Poort," or pass, and descending into the valley of the Incomati river, follows the course of that river until within a day's journey of Barberton.

My desire was to give both these routes a trial. Starting on the first, I planned to pass through Swazi-land, returning to Delagoa by the second, which is generally known by the name of the Incomati route. These two routes compete, in a measure, one with the other for the gold-fields trade, as well as with their great rivals passing through the Cape Colony and Natal. I regret to say that I have failed to carry out these plans. Although I travelled some distance on both of these roads, I nowhere crossed the Portuguese frontier.

On the morning of the 27th December I left the town of Lorenzo Marques, and after a drive of about six hours encamped at a point upon the head-waters of the Matolla river, a small affluent of the Temby. This portion of the road is over a very soft, yielding sand, and gives such heavy work for waggon traffic that the Boers who come down in the winter rarely bring their waggons into the town. Goods are conveyed by boats a short distance up the Temby and Matolla rivers, and taken up by the waggons at a point called Malbenbaan. Thence, if for Swazi-land, they proceed by the route followed up by me to the Umbelosi drift, cross that river and join the Temby drift road. If they are for Barberton they almost invariably go by the Incomati valley.

On Tuesday, after an early start, we reached a station kept by an Englishman called Sheppard, at which the Incomati and Umbelosi roads diverge, and, outspanning here for breakfast, pushed on in the afternoon to Malbenbaan. On Wednesday, a drive of seven hours over a lightly timbered country of sandy soil brought us to the river Umbelosi, and I encamped at the ford which the transport waggons usually cross.

\* Communicated by the Foreign Office.



As you enter the Umbelosi valley the aspect of the country changes very markedly, the broken outlines and precipitous faces of the Lombombo range coming suddenly into view at a distance of only 10 or 12 miles, whilst the valley itself with its vivid green pasturage, its winding river, and well wooded banks, presents a sharp and pleasant contrast to the country we had just passed over. Its reputation for sickness and death, more especially in the rainy season, is the very worst, and I began at once to feel its evil effects. The acute form of what is called "horse sickness" broke out amongst my team, and before I had been three days camped in the valley two of my mules were dead. A slight delay there was unavoidable on account of the condition of the stream, which was in flood, and not expected to be passable for several days. But if I was to get on a stronger team became necessary, and I wrote back at once for a reinforcement of mules. When a third, however, began to sicken, it was clearly time to turn back and strive to get into a healthier locality. I therefore turned, and on my way back to Malbenbaan received the disappointing reply that three of the six remaining mules belonging to the Transport Company were also dead. It became very plain then that it would be folly to attempt the journey with such transport at this season, and I reluctantly decided to return to Delagoa Bay.

I need not give a detailed description of our return, which was made with some difficulty, as the half-team to which we were now reduced could only drag a lightened cart, and we all had to trudge alongside, now and then "putting shoulder to the wheels" to help them out of the soft deep sand-pits into which they sank. A short delay was necessary at Sheppard's station, and it was not until the evening of the 4th that we again reached the town of Lorenzo Marques.

I had seen enough to convince me that no team of mules was capable of travelling, in this season at least, in the low country. Others, however, were not easily convinced, and a week after my return, a fresh supply of animals being procured from the high veldt, another waggon was despatched with twelve mules by way of the Incomati for Barberton.

This venture was even more disastrous than mine, for before they had got 30 miles on their journey five of their mules were dead. Nor need I describe the sickness which caused this mortality, for it is too well known. It was the horse or lung sickness, that every year carries off thousands of horses and cattle even on the high veldt of the Transvaal and our South African Colonies, and which during the Transvaal war baffled the skill of our regimental veterinary surgeons to cure, or prevent, or even discover the cause, as to which there are numerous theories. It works most rapidly, and six hours is generally sufficient to carry off an apparently healthy animal.

Two days after my return I began to feel myself the ill-effects of the low, swampy, and unhealthy localities through which I had been

passing, and I was attacked by a sharp fever which confined me to my room for five days. Recovering from this, and finding that the time left me was not sufficient to carry out a journey into the interior, I decided to visit Inyack Island and see for myself the nature of the Portuguese occupation there; an occupation which was not effected for some years after the case referred to the arbitration of Marshal MacMahon had been given in their favour. Reports have often reached me of the claim still made over the island by the Queen of the Amatongas, and quite recently I had heard of an objection raised by her to the construction of a lighthouse upon it, a work much wanted in the interest of the shipping visiting Delagoa Bay.

From the 15th to the 20th January was taken up by this visit. I found the island effectively occupied by a detachment of about twenty soldiers, commanded by a lieutenant in the Portuguese army. They were well housed in small but substantial barracks, situated upon an elevated and healthy site overlooking Port Melville and the bay. A couple of small guns, mounted on field carriages, commanded the anchorage. Nevertheless, the occupation is a purely military one, and it is pretty clearly felt that the neighbouring Amatongas are not to be trusted. A strong proof was given to the authorities of their independence some months ago, by their refusing to permit the marking off of the fanciful boundary given in Marshal MacMahon's award. The frontier line then fixed as  $26^{\circ} 30'$  S. lat. runs through the centre of Amatonga territory, passing very near the Queen's kraal, and it is not unnatural that they should raise some objection to it. Except so far that it excludes the British the award has remained a dead letter, and the Amatonga Queen exercises a practical jurisdiction up to the mouth of the Maputa river.

Upon Inyack Island there are, perhaps, a couple of hundred natives, who subsist by fishing and furnishing supplies of fresh food to the military detachment. Regular communication is kept up with the latter by a schooner from Lorenzo Marques, and the commandant informed me that they were relieved every three months.

On the 20th I returned to Lorenzo Marques, and on the 24th I embarked on my return to Mozambique, where I arrived on the 2nd February.

In summing up the general results of my observations, the first point to which I may call attention is the rapid extension of British interests in the district and their growingly permanent nature. Hitherto they have been only commercial and transitory; the first, owing to the influx of British goods for the Transvaal through Delagoa Bay; the second, due to the passage of British subjects—diggers, storekeepers, speculators, and the like—flocking to the mining districts of the Transvaal.

Nothing, indeed, is more curious than the manner in which this

district is becoming Anglicised. It is the first point at which actual contact has taken place between the British and Portuguese in South Africa, and it will be interesting to see how the inert life of the latter—which has confined them for more than three centuries to the shores of the bay—will resist or adapt itself to the push and vigour that characterises the former.

This Anglicising process is being carried on on all sides, and even by others than Englishmen. From the immediate neighbourhood of the town of Lorenzo Marques and onwards towards the Transvaal—upon both routes—you find Englishmen and their dependents establishing themselves. Upon the eastern slopes of the Lobombos, a little south of the Umbelosi and therefore in Portuguese territory, there is a small English colony arising, partly giving itself to cattle-raising, but chiefly bent upon securing the trade of the Swazi country, to which Delagoa Bay is the readiest inlet. Here English enterprise has strikingly asserted itself. Upon this, the old route to the Transvaal, there was one short stage of low country between the Lobombos and the Temby, of the unhealthiness of which the Boer transport riders were always afraid. To seize upon that link in the line of communication was the work of a small group of Englishmen, who seem now to have fairly possessed themselves of it, and reap good profits by a charge of 5s. per cwt. for goods they carry over it and deliver to the Boers on the high veldt. Storehouses are now being planned at both ends of this stage, on the Lobombo and at the Temby drift, so that goods may be properly housed and protected whilst waiting for wagon transport.

The only steamer regularly plying upon the Temby river is the property of a Scotchman, settled on the Lobombos, and the steamship *Somtseu*, of the African Boating Company, was making the first trip of what it was hoped would become a regular service, when I left Delagoa Bay. On the Incomati route also, on the only three habitable spots, in a country almost deficient in water, Englishmen have planted themselves.

But it is the strong, eager rush for gold that promises to draw over the inner frontier into Portuguese territory, the largest number of a class made up in South Africa almost entirely of men of the Anglo-Saxon race. Pioneering prospectors from Barberton are stretching away far from the banks of the Kaap river, and are already thick in the Incomati valley. Both north and south of that river prospecting goes on actively upon the Lobombo range, and many claims have already been registered in the Secretariate of the Government of Lorenzo Marques to gold-bearing reefs upon the eastern slopes of those hills. Perhaps the most promising of the mineral claims lately registered is one to a deposit of coal near the Umbelosi river, and within 14 miles of carriage by water—by that river and the Temby—to Delagoa Bay. If it prove to be of good quality, and the specimens brought down are

very favourably reported on, this coal-field will be exceptionally well placed for competing with Natal coal, which lies 200 miles from the coast at Newcastle.

As to the probable rush of gold prospectors into Portuguese territory, the experience already gained appears to show that the richest gold-bearing strata extend north-east and east-north-eastward from the mining centres about the Kaap river, and parties are, I hear, now preparing at Barberton to prospect the Gaza, Manica, and Mashona countries in the coming cool season.

It is when really payable reefs are found in these countries (reported the richest of South Africa in gold), and companies are being formed to work them, that the question of Portuguese sovereignty will be first seriously raised, and the true relations of the Colonial authorities with such powerful chiefs as Gungunhana of the Gaza country be really tested.

I should like to point out here that the independence guaranteed the Swazi king by the Convention of the 3rd August, 1881, and upheld chiefly through the influence of the British Government, has done something towards weakening, if not dismissing, the fears of the surrounding native chiefs to gold prospecting in their territories. They have seen Swazi-land almost overrun with English prospectors, and seen also that the invasion is a purely peaceful one, and that their rights have been rigidly respected. For every grazing license given, or gold concession made, the king has been well paid. Every "claim" marked out has brought him 50*l.*, and on more than one occasion, upon a company being formed to work a claim, and machinery being set up, 3000*l.* in hard cash were paid for the concession.

I do not say this state of things is free from future evil, or does not threaten danger to Swazi independence, but those dangers are not yet apparent to surrounding chiefs, who only see the immediate wealth and strength that accrues to that country from the discovery of gold, and influx of whites there. Much will depend upon the manner in which the first prospecting parties are received by such chiefs as Gungunhana. If their reception be favourable, then certainly something like a rush will follow, and some serious questions as to territorial sovereignty will arise, and have to be placed upon a less vague and undefined footing than they are at present.

The natives themselves form one of the chief channels for the spread of English influences throughout this district. For more than ten years past there has been an unceasing circulation of blacks between the district of Delagoa Bay—and to a smaller extent that of Inhambane—and our South African Colonies, and the great centres of industry, such as Port Elizabeth, Durban, and Kimberley, are well known to members of every native family. Every young black who wishes to acquire a little wealth at once starts off for one of them, and so great is

the confidence now felt that they wait for no emigration agent, but often travel singly or in couples overland or by the mail-steamer, returning with well-lined pockets in two or three years.

Struck by the uncultivated appearance of the country, and the comparatively large trade done in it, I said once to a trader, "Where are the exports or produce by which all these imports are to be paid?" "The produce of this district," he replied, "is English gold; the native pays for everything here in hard cash." And this is strictly true; the natural produce of the district is almost *nil*; its wealth consists in the savings of the natives from their earnings in one of our South African Colonies.

Thus, English money has become the currency of the country. It is not too much to say that Portuguese money is unknown outside the public offices. Even there it has been found necessary at times to use English coin. An amusing story is told, how when the Public Works Department attempted to pay the Kaffirs employed on the railway works in Portuguese silver, they refused in a body to accept it, saying "This no money," and would not work until they had received the British shilling. A knowledge of the English language, or rather a miserable corruption of it, is also by no means uncommon amongst the natives of this district. It is by all these means that the Anglicising process I spoke of above is being gradually worked out.

I have now to say a few words upon the railway works. At the present rate of progress there can be no doubt the railway to Barberton will take years to construct, if, indeed, it would ever be completed. It is not easy to believe that the effort being made is a serious one, and one is inclined rather to think that the intention is only to spur the flagging energies of those who are striving to form a company to undertake its construction, and perhaps to check the Transvaal Government from encouraging any rival schemes.

The work was commenced last June, and though 9 kilometres are said to be ready for the laying down of sleepers and rails, there is much work to be done yet upon the first two miles.

The line commences at the harbour jetty in Lorenzo Marques, and runs across the swampy tract which divides the town from the hill, keeping a course so close to the river's bank that at every spring tide the waves wash up to within a couple of feet of the level of the rails. Consequently, the destructive action of the sea upon this portion of the embankment has already necessitated a strengthening, almost a reconstruction, of the original work. As far as the tidal wash acts upon it, it is now being faced with a wall of solid masonry, about 7 feet thick at the base and 3 feet at the top, made of a hard red sandstone, dug out from Reuben's Point and carried up the river in lighters. When this is completed the first part of the work will be, I think, tolerably secure.

The advance working parties are clearing and levelling at a distance



of 9 kilometres from the town, but there again the work is very slow-paced, the staff small, and labourers few in number. No rails for the permanent way, sleepers, or plant of any kind has yet arrived for the line. A bad sign, too, was the uncertain uneasy ring in the tone of all residents, officials as well as foreigners, whom I spoke to about the prospects of the work. All declared that unless a great change was made in the rate of progress and in the expenditure allowed, its ultimate construction was very doubtful. I believe I am correct in saying that 6 contos per month, or about 1330*l.*, is the outside limit allowed at present to the Public Works Department for this work.

The recent action of Natal in reducing her tariff has undoubtedly struck a heavy blow at the trade of Delagoa Bay. Cargo consigned to forwarding agents at that port is now being stopped and landed at Natal for transmission *viâ* that colony to the Transvaal.

In concluding these remarks upon the state of the district of Delagoa Bay, I should not omit to point out the improvements that have been made in the town of Lorenzo Marques by the Public Works Department of the province. Most of the public buildings of the place are new, and have been erected within the past five years. Chief amongst them are the custom-house, offices of the local government, treasury board, and post-office, and a fine magazine outside the town for the storage of powder, which is landed here in large quantities for the purposes of trade. Upon the hill overlooking the town is a large hospital and a handsome church.

A work of great utility to shipping is proposed in the extension of the present landing-wharf or pier to such a length that steamers shall be able to go alongside it to discharge. A Natal firm is prepared to carry this work out if it can secure a monopoly of the landing charges, and has made a proposal to the Lisbon Government to this effect. Fairly successful efforts have at last been made to drain the swamp surrounding the town, to which its unhealthiness is generally attributed, and hundreds of eucalypti have been raised upon it, which are already 12 and 15 feet high, whilst thousands more are being planted. Thick groves of bananas in the swampy flat also relieve its former bare and neglected appearance.

These last-named improvements are mostly due to the efforts of the residents in the town, who have formed a "Botanical Society" amongst themselves, and are laying out a really respectable garden upon the slope of the hill.

If the municipal authorities of the place properly seconded the efforts of the private residents and the Public Works Department, and the streets of the town were properly cleaned and paved and lighted, there would be even less justice than there is now in the complaints of the "misery and desolation of the town of Lorenzo Marques" to which the English South African press periodically treats us.

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*Expedition of Mr. George P. James from the Chanchamayo in Peru to the Atlantic.\**

MR. GEORGE P. JAMES, who has a sugar estate on the banks of the Chanchamayo river, undertook a journey to explore the region between that position and the Perene. His estate is near the village of La Merced on the Chanchamayo. He set out on the 17th of July, 1886, accompanied by an Italian named Bogo, who could speak the language of the Chunchos, and was reputed to have a certain influence over them. But both these qualifications appear to have been much exaggerated. Mr. James resolved to follow up the right bank of the Paucartambo, and thence to reach the famous Cerro de la Sal.

In the hamlet of San Luis, which is situated on the Cerro de la Sal, they found a missionary named Sala. The good Father arranged that the travellers should be accompanied by a lay brother, who turned out to be an energetic and courageous comrade. The party took leave of the good Father, and set out in the direction of Palcazu, that is to say, they entered an unknown tract of country.

James was armed with a repeating rifle, a revolver, and a well-sharpened wood-knife (*machete*). Bogo was also well armed, and the lay brother was provided with a machete, an indispensable companion in that forest region. They pushed valiantly on, slipping through the dense undergrowth, or opening a way with their wood-knives, the compass being their only guide. At length they came in sight of the river Palcazu, which had been described to them as navigable. This, unfortunately, was not the case, at least in the dry season, and it was necessary for them to march along its right bank, following the course of the stream, and wading across the small tributaries, during three days, when they reached a point where the river was really navigable in *balsas*.

Between the Paucartambo and the Palcazu they only met with one river of little volume, which they easily crossed. It is one of the tributaries of the Perene.

At the point where the Palcazu became navigable, as well as at other places along the banks, they came upon habitations of wild Indians. These people appeared to be hostile at first, but as soon as they saw the cordiality with which the Englishman and the Italian drank their *masato*, and took part in their dances and noisy amusements, they forgot their suspicions and treated the strangers as old friends. When the drinking bout was over the chief of these Indians was very useful, and it was due to him that they procured three small balsas, one for each traveller, and an Indian in each to guide them. They embarked in the morning, taking care to fasten all their traps to the poles of

\* Communicated by Mr. C. R. Markham, C.B., F.R.S., Secretary. From *El Comercio de Lima*, 3rd May, 1887.

the balsas, and at about noon, being carried down by the rapid current, they reached Chincheros, a place situated at the point where the river of the same name falls into the Palcazu. This station appeared to have commercial relations with Huancabamba.

Proceeding on the voyage, the navigators stopped at a hut for the night, and during the hours of sleep the three Indians escaped in one of the balsas and were not heard of again, but they did not take anything. This accident caused them to lose all the next day, for the Indian who owned the hut refused to go with them. At length he yielded to their promises. They made one balsa out of the two which the fugitive Indians had left, and embarked once more.

After two hours the Indian, either by accident or design, lost his paddle and, on the pretext of making another, he went into the forest and also disappeared. There was nothing left for the three adventurers but to continue the voyage alone, and this they determined to do. Nothing occurred during the following day. The current took them down the river with moderate speed, and no natives were seen on its banks. In the evening they selected a beach on which to pass the night, continuing the voyage on the following day. But at ten o'clock in the forenoon the balsa struck upon a rock and capsized. When Mr. James came to the surface the lay brother was already on the capsized balsa, and Bogo was swimming with one hand on it. Mr. James soon reached it also. Half an hour afterwards, swimming down the river with the help of the balsa, they succeeded in beaching her just at the point where the river Lagarto falls into the Palcazu.

The things which were on the balsa had all been well secured, and with the exception of Mr. James's boots nothing was lost in the shipwreck. The afternoon and night were passed without food, but next morning an Indian came to their help, lighted a fire, and enabled them to appease their hunger with boiled yucas. Having dried their clothes, refreshed themselves, and righted the balsa, they continued the descent of the river, and arrived next day at the junction of the Pichis with the Palcazu, when the united stream is called the Pachitea. Here they had the pleasure of meeting the Peruvian indiarubber collector Davila, who was on a voyage with a small supply of that product, and conducted them to a place called Santa Isabel, the residence of a German indiarubber merchant.

They remained at Santa Isabel for a whole week, waiting for another indiarubber collector. At length he arrived, accompanied by two monks who said they were going to the Pozuzu, though it afterwards turned out that they were on their way to the Pichis. The lay brother joined them, so that Mr. James was left with the Italian Bogo as his sole companion. They made the voyage down the Pachitea in a canoe, guided by the indiarubber merchant. It was prosperous down the whole course of that great river, but on arriving near its junction with

the Ucayali, owing to having started before dawn, the canoe struck upon the trunk of a tree half covered by water and capsized. This time the travellers lost everything they had with them.

The position where this accident befel them was a mile above the confluence of the Pachitea with the Ucayali. The canoe was not stove in, so that they were able to right her again and to reach a place where they fell in with the small steamer *Mayo*, which took them down to Iquitos. After a forced residence of five weeks at Iquitos, Mr. James continued his voyage to Pará; proceeding thence to Barbadoes and Trinidad, he returned to Peru by way of Panama. On May 7th, 1887, he left Lima on his way back to his estate on the Chanchamayo.

During the whole of his journey Mr. James only saw two snakes, and one puma, which walked past his camp at night without doing any harm. Mr. James has thrown light on the geography of a part of the forest-covered montaña of Eastern Peru which was previously unknown. The practical results of his voyage are not without interest. The Palcazu is not really a navigable river, but the Pichis is suited for navigation. The latter river is therefore the point to which attention should be turned by those who desire to open a practicable route from the central regions of Peru to the Ucayali. At present 5000 men from Tarapoto, machete in hand, are occupied in felling the caoutchouc trees on the hills overlooking the Pichis. The *caucho* (*Castilloa*?) indiarubber tree is felled, while the *jéve* (*Hevea* or *Siphonia*?) is merely cut across the bark of the trunk, to obtain the caoutchouc juice. Hence the mischief that is being done by these 5000 men from Tarapoto is considerable, although the *caucho* trees increase and multiply with comparative rapidity. Another army of depredators comes up the Ucayali, and another up the Yavari, for the exclusive benefit of Brazilian trade.

Mr. James does not think that it would be of immediate utility to open a road from Chanchamayo to the Pichis, because, by the time it was finished the 5000 *caucheros* would have completed the work of destruction. It would be useless to open such a road for purposes of exportation so long as a heavier freight is paid for goods from Iquitos to Pará than from Callao to Europe. As regards the export of timber on a large scale, there already exists a North American colony at Santarem occupied entirely in the timber trade.

In Mr. James's view the most useful measure, as regards the Peruvian forest region, which is very fertile and enjoys a healthy and agreeable climate, would be its colonisation. When that is effected the construction of good routes to the Ucayali will become necessary.

Mr. James is an enthusiastic traveller, and is willing to take part in any other exploring expedition which may be undertaken by the Peruvian Government.

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## GEOGRAPHICAL NOTES.

**Expedition to the Highlands of New Guinea.**—The expedition under preparation at Melbourne for the exploration of the Owen Stanley range, to which our President alluded in his recent Anniversary Address,\* is to be placed under the command of Mr. Cuthbertson; the Council of the Geographical Society of Victoria, who have the management of the expedition, being in doubt whether the Rev. J. Chalmers's other engagements would admit of his undertaking the journey during the present year. Mr. Cuthbertson has had considerable experience as a surveyor in New Guinea and North Borneo, and is acquainted with the Malay language and some of the dialects of New Guinea. The objects of the expedition are to be purely scientific, the chief aim being to ascertain the nature of the elevated land of the interior. A naturalist (Mr. Sayer) will be attached to the exploring party, and the Government of Victoria have granted 1000*l.* to defray the expenses.—It is reported that Mr. H. O. Forbes is about to undertake, under the direction of the Special Commissioner of New Guinea, a journey overland direct from Hood Bay to Dyke Acland Bay, crossing the lower elevations to the south-east of Mount Owen Stanley.

**Chinese Turkistan.**—A correspondent of the Geographical Society of Paris has transmitted to that Society an extract of a letter from M. Bonvalot giving a brief account of the important work accomplished by Captain Grombchevski in Chinese Turkistan. This Russian officer was charged in the year 1885 with a mission to determine the frontier line of Ferghana on the borders of Chinese Kashgaria as far as the Russian fortress of Irketchtam. In the course of his mission the traveller explored the whole region of Kashgaria. He has executed surveys of the routes followed by him, viz. those leading from Kashgar to Ladak, and from Ferghana to the northern border of Kashmir by the Pamir plateau. The detailed account of his journeys, of which only a limited number of copies have been published, contains important information on the military forces of China in that region, and also on the commerce and natural wealth of Kashgaria. Captain Grombchevski encountered great difficulties, chiefly owing to the hostile attitude of the Chinese. Throughout the whole of his journey he experienced heavy rains which rendered the ordinary routes impracticable. He arrived at Kashgar on the day on which a mutiny had broken out among the Chinese soldiers, and it was only by a miracle that he escaped with his life.

**New Russian Expedition into Central Asia.**—An important expedition started in May last from Irkutsk for the purpose of exploring the Sayan Mountains, Lake Kossogol, and the sources of the Yenisei. Colonel Bolyr is in command, and the party includes several topo-

\* 'Proceedings R.G.S.,' *ante*, p. 344.

graphers and an astronomer. M. Makeroff, the geologist and naturalist, has charge of the geological part of the work. Important results to the cartography of this region are expected from the expedition.

**MM. Capus and Bonvalot.**—These courageous travellers have succeeded in their hazardous enterprise of crossing the Pamir and Hindu Kush into British India. M. Bonvalot wrote to us from Chitral on May 28th, stating that his party had arrived there nearly destitute of resources and were threatened to be turned back on the ground that they were Russians. The Indian Government has since intervened to extricate them from their difficult position. It will be remembered that, according to the last news\* recorded by us, they were on the eve of departure from Marghilan, intending to reach British India across the plateau of the Pamir. Since then the news received in Europe has been of a fragmentary description. It appears they left Marghilan about the beginning of March, and travelling westwards to Ush entered the Alai Pass, which M. Bonvalot had by a march in advance found to be practicable. On the 15th March they were in camp at Ak-Basoga at the foot of the defile of Taldyk and four days' march from Lake Kara-kul. Since then nothing had been heard of them until the news of their arrival at Chitral. It is evident that they were compelled to diverge from the route originally laid down, which after leaving Lake Kara-kul lay south-south-east to Kundjut, whereas that actually followed was to the south-west.

**The French Expeditions in the interior of Senegal.**—A preliminary sketch of some of the results of these expeditions, to which we recently referred,† has been sent to the Geographical Society of Paris by Lieut.-Colonel Gallieni, the governor of the French Possessions of the Senegal. The operations of the two military columns, which proceeded against the marabout Mahmadu Lamine at Diana, resulted in the ignominious flight of the latter. The topographical work of these detachments includes surveys of the valley of the Nieriko, the upper Gambia and the hitherto unexplored parts of the Taleme. Two special missions of officers had quitted Diana, one had surveyed the country between the Faleme and the Tankisso, the other, under Captain Oberdorf, had crossed the Gambia at Badu, and the Faleme at Erimana, and had penetrated to Dinguiray, which had never before been visited by a European. The whole region had been placed under the protectorate of France. The Uassulu mission had succeeded in concluding a most advantageous treaty with Almanay Samory, by which the Niger and the Tankisso from their sources constitute the boundary between the French Sudan and the dominions of Samory, who, furthermore, has agreed to place all his possessions on the right bank of the river under French protection. The country, therefore, now under the protectorate of France, extends

\* Proceedings R.G.S.,<sup>1</sup> *anté*, p. 307.      \* *Ibid.*, p. 240.

on the right bank of the Niger from Segu to Sierra Leone and the Republic of Liberia, thus including the whole of Futa-Djallon.

**Region of the Upper Niger.**—Dr. G. A. Krause, to whose journeys on the Volta river we have had occasion to refer,\* has within the last year accomplished an important journey in the unknown country lying in the great bend of the Niger. Although unsuccessful in carrying out his original intention of reaching Timbuktu from Salaga, he has nevertheless achieved a great success, having traversed regions unknown before and penetrated to within 156 miles of Timbuktu. We have received two letters from the traveller, one dated October 23rd, 1886, the other 27th April, giving a brief outline of his route. He begins by stating that he left Berlin on his present journey on the 21st March, 1886, arriving at Accra on the Gold Coast on the 22nd April, and leaving that place for the interior on the 12th May. From Salaga he proceeded to Woghodogho (Waga-Dugu), the chief town of the Mosi country, and travelling northwards through the provinces of Tema and Yadega, arrived at Ban, the first point within the kingdom of the Sheik Tidjani, one of the sons of El-Hâdj Omar, who for a long time caused the French so much trouble in Senegal. On 15th November he reached the large town of Duensa, the centre of the salt trade, whence he made an excursion across a high plateau to the south-west for a distance of 75 miles to Ban-Djagara, the seat of Tidjani, in order to get permission to continue his journey northwards. Armed with the necessary authority, he returned to Duensa and set out for Timbuktu on the 7th December, under the protection of the chief. On the following day, however, he received a command to return to Mosi. The farthest point reached was 23 miles north-north-east of Duensa, about 1½ days' march westward of the village of Bone, indicated on Barth's itinerary. From the first the conduct of the chief towards him was equivocal. He could have continued his journey to Timbuktu at the price of apostasy. The country between Salaga and Mosi is a plain watered by many streams belonging to the Volta system and clothed with scattered trees. Between Mosi and Duensa there were no rivers, only depressions which are filled with water in the rainy season; and he was unable to find the sources of the Eastern Volta. Retracing his steps to Mosi, he set out from Woghodogho on 22nd January on an excursion south and south-west to Sinsani Gasari, which he calls the greatest den of thieves in the world. Thence by way of Funshi, Wa, and Bole he marched to Kintimfo in Ashantee, first visited by Captain Kirby in 1884, crossing on his route a western arm of the Volta. He eventually returned down the Volta to Salaga, where he arrived at the end of April, having exhausted all his stock of goods. He had accomplished all his exploration with the most limited resources, having had on landing on the

\* See 'Proceedings R.G.S.,' 1886, p. 722.

Gold Coast only a little over 51., as sole means for the long journey to Salaga. Unable, from lack of means, to further pursue his travels, he was about to return to Europe, which he hoped to reach about September. He intended to return to the coast by a new route, marching for twelve days eastward to Sognede, and then south to the coast. Throughout his travels Dr. Krause had excellent health.

**The Coast Region of South-Western Africa.**—The current number of Petermann's 'Mitteilungen' contains a map of the Lower Kuisip valley, in the Walfish Bay region, embodying the surveys and explorations made by Dr. F. M. Stapff in the course of a complete exploration of the country executed from December 1885 to May 1886. The traveller also contributes a paper dealing in detail with the geology and physical features of the district, which forms a contribution well worthy to rank with the admirable observations of Mr. Francis Galton in the same region, thirty-seven years ago. "Great Nama Land," as Dr. Stapff terms the country, may be divided, he says, as regards its natural formation into three parts, (1) the stony desert or Namieb in the north, (2) the valley of the Kuisip, and (3) the sandy dunes in the south. The Namieb is an extensive plain, rising with an almost imperceptible ascent from the sea until, at about 60 miles from Walfish Bay, the traveller finds himself at an elevation of nearly 2000 feet above the sea-level. The plain is broken by mountains, isolated or in small groups, whose dark crags contrast sharply with the grey-yellow plain. Not a tree or bush interrupts the prospect of limitless desert. These apparently isolated mountains, however, belong to chains running north-east to south-west. The rounding-off and perforation of the cliffs is due to the wind-driven sand. The rain-water collects in pools or "vleys," and evaporating, leaves increasing deposits of salt and sand. In these and in the sandy river-beds grow deep-rooted trees. Other vegetation springs up rapidly after the rains, but soon withers. The prevailing wind is south-west, but from May to July it frequently blows from the north-east. The dunes between the Namieb and the sea-coast form a belt of sandy desert, which between the Orange river and the Kuisip is 100 miles broad. Dr. Stapff does not support the theory that these dunes have been formed by the sand blown inland by the south-west wind. He regards them as upheaved sea-banks, which have been moulded to their present form by the action of the wind. In the heart of the sandy desert he frequently found odd fragments of polished and perforated sea-shells, even at a height of 1000 feet above the sea-level, which may, however, have been carried thither by the sea wind. The banks of shell-fish along the route from Riet to Fredriksdam and round Walfish Bay clearly point to an upheaval of the land in ancient times, which probably extended to the whole of the South-west African coast. As regards the river valley, there is good reason for supposing that the course of the Kuisip



formerly ran more to the north-east, and that on its left the sandy dunes have encroached upon the river. This is no doubt to be explained by its small volume of water. Hahn's theory of an arm of the river formerly running through the dunes to Sandfish Bay is, according to the writer, untenable. The dying away of tree vegetation in the river valley appears to point to a diminished flow of water. Many ancient or partly withered ebony, wild fig, and other trees are to be seen, but no new wood. After the heavy rains the river in its lower and broader reaches overflows and bears away in its yellow flood tree-trunks and the huts of the Hottentots. The overflowing water quickly percolates the sandy dunes. The writer gives much interesting information as to the level of this water underground, which could be utilised for cultivation, as in the Algerian "chotts."

**Meteorology in the Argentine Republic.**—The Government of the province of Cordova, acting on the initiative of Professor O. Doering, has granted the necessary funds for the establishment of a network of meteorological stations over the province. It is proposed to erect nearly forty stations. Professor Doering, who has made many valuable contributions to our knowledge of the meteorology of the Argentine Republic, has been appointed head of the service, and the private station erected and fitted up by him will form for the present the central post. Pending the arrival of the requisite instruments from Germany, observations will not be commenced until February next. The east and extreme south of the province have hitherto remained unknown because of the lack of qualified observers in these thinly peopled districts. The scientific value of this undertaking is enhanced by the great diversity of the positions of the stations, e. g. pampas, wooded plains, mountains, and salt lakes, and in their elevation, e. g. that of Tortugas at a height of only 240 feet, whereas Champagui peak is 9425 feet. In any case this series of meteorological stations will be the most complete and important system in South America, and the practical results cannot fail to be of great service to geographers in studying the climate of the country.

**Patagonia.**—The results of a journey made in Patagonia by Lieutenant A. del Castillo have been communicated to Petermann's 'Mittheilungen' (No. 7). The object of the traveller was to explore thoroughly the stretch of country lying between the rivers Gallegos and Santa Cruz, and to survey the harbours on the Pacific coast mentioned by Captain Moyano on his last expedition. The journey, which was begun early in January last, was undertaken at the expense of the traveller and of a few private individuals. The following are some of the chief results of the expedition. A navigable waterway was found to exist between the two oceans along the Santa Cruz and canals connected therewith. In these southern districts the line of highest elevation

presents some remarkable curves, as the Cordilleras are broken by different canals. The harbours of the Gallegos pampas were ascertained to be deep, spacious, and completely sheltered; the zone of pampas lying to the east of these harbours is consequently inhabitable during the winter, and well suited for cattle. There are beds of sea-coal of incalculable value covering a belt of 20 nautical miles. The traveller ascended the Gallegos in an improvised canoe up to its source, and concludes that the river is navigable without difficulty at certain seasons of the year. The course of this river was carefully determined. He ascertained that the Rio Turbio, a northern affluent of the Gallegos, rises in a ravine formed by the Latorre and Coronel Ramirez chains lying to the south-east of the valley of the Guerrico. He is of opinion that the Gallegos could be connected by canals with the harbours of the west coast at a comparatively small cost.

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## REPORT OF THE EVENING MEETINGS, SESSION 1886-7.

*Fourteenth Meeting, 27th June, 1887.*—General R. STRACHEY, R.E.,  
President, in the Chair.

ELECTIONS.—*Alfred Edward Ann, Esq.*; *Lieut. Arthur Goffin, R.N.R.*; *Affleck Fraser, Esq.*; *Wm. Henry Knight, Esq.*; *Colonel Edward Pemberton Leach, v.c., C.B., R.E.*; *James E. Mason, Esq., C.M.G.*; *Wm. George Motley, Esq.*; *John Lambe Rigden, Esq.*; *George Simpson, Esq.*; *Benjamin Taylor, Esq.*

### THE JUBILEE ADDRESS TO THE QUEEN.

The President announced that an Address to Her Majesty the Queen, on the occasion of completing the fiftieth year of her reign, had been prepared on behalf of the Council and the Society and had been forwarded to the Home Secretary for presentation. The Secretary, Mr. Douglas Freshfield, read the Address to the meeting (vide 'Proceedings,' July No., p. 438).

The papers read were:—

(1) "Preliminary account of his Mission to the Namuli Hills, East Africa." By J. T. Last, Esq., commanding the Society's Expedition to South-east Africa. *Ante*, p. 467.

(2) "Journey through Yemen." By Major-General F. T. Haig. *Ante*, p. 479.

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## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris.**—June 3rd, 1887: M. JANNSEN, of the Institute, in the chair.—Among the works presented was a translation of a report which the author, M. Jules Popper, had read before the Argentine Geographical Institute on the expedition made under his direction in Tierra del Fuego. The paper was accompanied by a series of 43 photographic views. The following information concerning the progress of geography in Russia was communicated by

M. Venukoff:—The works for the enlargement of the canal between the basins of the Obi and Yenisei had been commenced after the breaking up of the ice in the rivers. A sum of 24,000*l.* had been placed at the disposal of the engineers. The Sayan Mountains, the sources of the Yenisei, Lake Kossogol and its vicinity, would be explored this summer by Colonel Bolyr, who would have under his orders several topographers. A naturalist, M. Makeroff, was attached to the expedition. The observations necessary for determining the coefficient of desiccation of the lakes of Central Asia would be commenced this year under the auspices of the Geographical Society of Russia. M. Potanin had given before the same Society the details gathered by him regarding the inhabitants of Amdo, in the north-west of China. The population amounts to 100,000, for the most part Buddhists. M. Prejevalsky gave them the name of Dalde, but M. Potanin that of Chirandole; they are the Si-fans of the Chinese authors.—On the 3rd March the Emperor of Russia made his annual inspection of the topographical, hydrographical, and geodetical works executed in the Russian Empire during the year 1886. Among the most interesting, geographically, were the topographical surveys of the region separating Russia and Bokhara from Afghanistan, and the explorations made in the eastern part of Bokhara by MM. Schwartz, Rudneff, and others. The geography of the country watered by the sources of the Amu-Daria was at last established upon solid astronomical and topographical bases. M. Grum-Grjimaïlo would continue this year his zoological and botanical studies in the region of the Pamir. MM. Bunge and Toll had commenced the publication of the results of their recent journey in the New Siberian Archipelago.—Several notes on different subjects were sent by M. R. du Caillaud, including one on the department of Lim-Chau.—A letter, dated 3rd May, from Ras Sabun (Sahara) was read from M. Teisserenc de Bort, giving some account of his work and stating that he had not been able to penetrate into the interior. The letter having been read, the Chairman announced that the author had just returned home from his third journey in the Algerian Sahara. His travels, he said, had resulted in the preparation of a magnetic map of country, which would prove a valuable contribution to our knowledge of North Africa.—M. Lagrange explained to the meeting the mechanism of the "Cosmographe," an apparatus of which he is the inventor.—Some historical notes on the island of Socotra were read by Baron d'Avril.—In conclusion, M. Edmond Ponel gave an account of his travels in the Congo basin and along some of the northern affluents of that great river. In August 1884 he was attached to the French West African Mission. He made a reconnaissance of the river N'Kheni during August and September 1885, where he established the station of Fua-N'tche-N'tche. In the following November he was appointed to the station of N'Kundjia, on the left bank of the Mobangi, which he ascended to a point 2° north of the Equator. During a sojourn of two and a half years in the midst of the savage tribes of the interior, M. Ponel made numerous observations. The domestic life of the Ba-Bangi was vividly depicted to the meeting. The feast of the rains, the return of the canoes, the complicated style of hair-dressing, and the barbarous ceremonies accompanying the death of the chiefs were successively described. He also gave much information of commercial interest.

— June 17th, 1887: M. JANSSEN in the chair.—M. G. Rolland, mining engineer, forwarded a copy of his recent communication to the Academy of Sciences on the "Régime des eaux artésiennes de l'Oued Rir." In this note he gives some new information regarding the artesian basin of the Oued Rir, and expresses his belief that notwithstanding the sounding operations which have been going on for the last thirty years, the limit of the supply of spring water is still far from being reached.—A communication was presented by M. A. Woeikoff on the total eclipse of the sun on the 19th August next and the best means of

observing it.—M. G. Marcel, of the Geographical Section of the National Library, addressed a letter to the Society with reference to the ancient geographical documents existing in the various libraries of Paris, together with a list of the same.—An extract from a letter of M. Bonvalot relating to the work of Colonel Grombchefski in Kashgaria, was sent by M. Maillet.—A letter was read from Lieut.-Colonel Gallieni, chief-in-command of the French Sudan, giving an account of his work down to April last.—M. H. Duveyrier forwarded the translation of a letter received from M. G. A. Krause on his travels in the neighbourhood of Salaga.—A communication which had been addressed by Dr. Emile Hassler to M. E. Wenz, was sent by the latter to the Society. The author gives an account of several interviews which he had with M. de Brettes at Asuncion. M. de Brettes and his companion M. Boiviers, a hydrographer, started in July last from Buenos Ayres on a mission to Gran Chaco. The Argentine Government had promised them a military escort, but on arrival at Villa Formosa, the Governor, Colonel Fotheringham, made excuses for not affording them the assistance promised. They proceeded therefore to Corrientes and made a two months' excursion up the Parana and the Paraguay as far as Asuncion, in the course of which they took numerous astronomical observations and corrected the hydrographical map of these two rivers. They had now determined to accomplish their mission, relying on their own resources alone, and intended to reach Tarifa with an escort of Indians.—The Chairman intimated that M. Morisot, who had accompanied M. Chaffanjon on his recent expedition up the Orinoco, was present at the meeting. He afterwards announced that Dr. Hamy was also present, having returned from his important travels in Tunis in company with M. Errington de la Croix. The object of this mission was to ascertain the exact nature and geographical distribution of the native monuments, known in Tunis as "dolmens." After visiting the Djebel Debbeh chain, Sahel, and Enfida, with this object, the expedition terminated with an exploration of the peak of Cherichera.—The General Secretary called attention to two beautiful collections of photographic views, one relating to South Algeria, the other to the Orinoco.—M. Virlet d'Aoust laid on the table a memoir for publication in the Bulletin, entitled "Notes historiques concernant l'action de l'huile sur les vagues de la mer," and added a few verbal explanations on the subject.—A paper was then read by M. de Rochemonteix on the results of the census of the population of Egypt. The paper was principally occupied with the consideration of the native inhabitants and their history.—In conclusion, the Secretary stated that this meeting brought the session to a close, and urged upon the members to endeavour to increase the numbers of the Society, which were not satisfactory. The Chairman announced that one of the members of the Society, M. Pierre de Balaschoff, had placed at the disposal of the Society the sum of 240*l.* to be used in assisting MM. Capus and Bonvalot in their travels in Central Asia, the two intrepid explorers having been plundered of all their goods by the natives.

**Geographical Society of Berlin, June 4th 1887:** Herr W. REIZES in the chair. Dr. Kuckenthal, lecturer on zoology at Jena, gave an account of the voyage made by him last summer in Spitzbergen waters on board a small whaler of Tromsø. The object of the journey was principally zoological. He left Tromsø about the end of April, and as it was still too early in the year for an advance to Spitzbergen, the whaler was engaged in hunting the *Hyperoodon rostratus*, which is only met with on the high seas between Spitzbergen and East Greenland. The brown-green colouring of the water in these parts is produced by minute one-celled algæ, which serve as food for small red *copepoda*, upon which, in their turn, the fish feed. The presence of this wealth of fish-food in those high latitudes permits apparently of an explanation, if the immense shoals of fish which annually make their appearance off the coasts of Norway and Scotland come from the north. The hills of Spitzbergen were sighted

on the 13th June, but it was not till the 23rd that the ship was able to run into Ice Sound. Here the crew set to work to capture white whales, which are caught in herds. A stout net, more than 100 yards long, is spread out in the form of a semi-circle in shallow water; the fish are driven into it and speared. The blubber of this species of whale is of a superior quality; its skin furnishes the finest leather. The traveller took the opportunity of making a boat journey to explore the almost unknown interior of Ice Sound, the results of which will rectify very considerably our maps of the Sound. In Sassen Bay there is one of the most remarkable mountain formations in the world, viz. the Temple Mountain. A wall of rock, about 6 miles long and 3300 feet high, rises perpendicularly out of the water. It is composed of a confused mass of lofty pillars and columns, with arches and windows between, which are grouped together, and form three distinct series, one above the other. The whole, shining with a yellowish-brown colour in the distance, gives the impression of a gigantic temple structure. A level snow-plain, from which rushing streams precipitate themselves into the depths below, forms the roof. From North Sound the traveller also visited Nordenskiöld's winter quarters of 1872, which he found in a good state of preservation. The door of the house, however, was wrenched off, and the interior was in a condition of wild disorder, books, flasks, &c., lying scattered about on the ground. This confusion was the work of eighteen sailors who wintered there in 1872-3, and all died from scurvy. The formation of North Sound is quite different from that shown on Duner's map; both arms are in reality twice as long as broad. After capturing fifty white whales, worth together about 300*l.*, the ship returned to Tromsø on 3rd September.—Lieutenant Kund gave a sketch of the general geographical features of the Congo basin, and bade farewell to the Society, as he was on the eve of departure upon his new journey to Cameroons.—Some brief notes were communicated by Professor Ascherson on his travels in the Delta of the Nile. He has visited particularly the coast lake (Arabian, *behērah*), Brullus (the only pronunciation of the word which he heard). The lake is exceptionally rich in fish, and much spawn (Arabian, *butargh*) was recently obtained there. The fish are salt-water fish, for the water of the *behērah* is strongly saline. The western of the two peninsulas which separate the lake from the sea is named Aglīm-el-Brullus. A particular town called Brullus, marked on the maps, does not exist; indeed, the cartography of the whole region needs great alteration. On the map of J. Wyld nearly half the names of the places visited by Ascherson are wrongly spelt. The district of Brullus contains about 15,000 inhabitants and 100 towns, the principal of which is Baltim, with a population of 6000. It is the seat of the Mamūr. Besides this, there is only the harbour town of Burg-el-Brullus, with a few forts, situated on the Boghāz. Fresh water cannot be obtained; the drinking water is brackish everywhere. Agriculture is consequently in a very backward state. Besides fishing, the cultivation of the date-palm and water-melon is the chief means of livelihood for the people. The wild vegetation is very similar to that of the environs of Alexandria. On the heaps of ruins of the old settlements—in ancient times the population of this region was more numerous and prosperous than now—a superior vegetation is found. The inhabitants hold the tradition that in former days the “*behērahs*” were cultivated lands, and that in consequence of the dams being neglected they became lakes. Even now it is possible that under a permanent and well-regulated government they might be reclaimed in a similar way to the Harlem Lake. From this region Ascherson proceeded to the Suez Canal. In Ismailia the malarious fevers have become as bad as the most notorious fever spots in Asia. From El Bantarāh the traveller followed the great Syrian caravan route to El Arīsh, and then returned to the west along the coast to the now dried-up Lake Sirbius. This territory east of the canal is a steppe

rich in vegetation, which, botanically speaking, forms the transition region to the fertile cultivated lands of Palestine. The further east the traveller proceeds, the greater becomes the variety of the species. The rainfall in winter is by no means inconsiderable. On the 30th April and 1st May Ascherson experienced heavy showers of rain. In the flora there are many species corresponding with those of the Sinai Mountains. They are to be found along the Wadi el Arish, which in winter is very full of water. The inhabitants are a curious mixture of Turkish, Syrian, and Arabian immigrants. Fair hair and blue eyes are not uncommon. The political boundaries of this region are very inaccurately shown on the maps. The Egyptian territory lies along the coast in a fairly broad belt as far as Kafa, midway between El Arish and Ghazah. South of this extends a tract of Turkish country, the breadth of which is uncertain, as far as the meridian of the oasis of Qatiah on the Syrian caravan route. The insecurity of this region, since the murder of Professor Palmer, is so great, that the traveller was only able to travel for three hours up the Wadi el Arish, that is to say, within the limits of the authority of the Egyptian garrison in El Arish.

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

### EUROPE.

**Bergner, Rudolf.**—Rumänien. Eine Darstellung des Landes und der Leute. Breslau, J. U. Kern, 1887: 8vo., pp. 412. Price 10s. (*Dulau.*)

Herr Bergner writes from his personal knowledge of Roumania; at the same time he has brought together information from other sources, and his volume will be welcome as a fairly complete account of a country about which there is a lack of accessible literature. There are numerous fine illustrations and a good map.

**Dennis, George.**—The Cities and Cemeteries of Etruria. Third edition. Two vols. London, John Murray, 1883: vol. i. pp. cxxviii. and 502; vol. ii. pp. xv. and 579. Price 21s.

This classical work will be found of the greatest value by the student of the ancient geography of the region to which it refers.

**Riley, Athelstan.**—Athos, or the Mountain of the Monks. London, Longman, 1887: 8vo., pp. xiv. and 409. Price 21s. [Presented by the Publisher.]

To most readers Mr. Riley's brightly written volume will be a complete novelty. Athos, the most northerly and mountainous of the three long tongues that jut out from the Salonica Peninsula, is perhaps the most holy of all the holy lands of the Greek Church. Mr. Riley was fortunate enough to be able to spend several weeks in the peninsula, visiting its many monasteries, communing with the monks, studying antiquities, architecture, history, and a little geography; the results he gives in this novel and instructive volume.

**Piat, Alfred.**—Projet de création au moyen de ressources d'exécution à tirer de l'œuvre même d'un Port de Guerre et de Commerce en eau profonde à Cabourg (Calvados) pour suppléer à l'insuffisance irrémédiable de Cherbourg et du Havre. Paris, Alcan-Lévy, 1887: 4to., pp. 33, map and plan.

**Schrenck, L. v., and Maximowicz, C. J.**—Beiträge zur Kenntniss des Russischen Reiches und der angrenzenden Länder Asiens. Dritte Folge. Auf Kosten der

Kaiserlichen Akademie der Wissenschaften. Herausgegeben von L. v. Schrenck und C. J. Maximowicz. Band ii. St. Petersburg, 1887: 8vo., pp. 350.

This volume contains two articles. The first is by E. Büchner, on the Birds of the St. Petersburg Government. The second is by Count D. A. Tolstoi, on the Town-schools during the reign of the Empress Catharine II., translated from the Russian by P. v. Kügelgen.

#### ASIA.

**Berg, L. W. C. [Van den].**—Le Hadhrāmout et les Colonies Arabes dans l'Archipel Indien. Ouvrage publiée par ordre du Gouvernement. La Haye, Nijhoff: large 8vo., pp. viii. and 292. Price 6s. 6d. (*Dulau*.)

This is a work of much interest, and adds greatly to our knowledge of the geography of South-eastern Arabia and the character of its inhabitants. The author treats his subject under three heads: (1) the Hadhrāmout itself, on the original reports of native travellers; (2) the Arab colonists of the Hadhrāmout in the Indian Archipelago; and (3) the language spoken by the Arabs, both in the mother country and in the colonies, from personal experience and investigation.

Now this Hadhrāmout—not impossibly connected with Hazarmaveth, son of Joktan, great-grandson of Shem—shown in the map which Gifford Palgrave attached some twenty-five years ago to his narrative of travel in more northerly latitudes—is, roughly speaking, comprised within 46 and 54 meridians of longitude. Its most southern point is to be found in the coast-line westward of Aden, but of its extent inland we have no definite information. M. Van den Berg reminds us how little we know of the interior of this interesting but unexplored tract. That little has, with the exception of a few items of instruction afforded by the Arab geographers of the Middle Ages, been obtained from Niebuhr, Wellsted, Fresnel, and de Wrede. The last wrote from the experience of an actual visit, but his book did not appear until 1873, or thirty years after he had seen the country described, and his description has more the character of a reminiscence than of a record taken on the spot.

**Eckert, R. [von].**—Der Kaukasus und seine Völker. Leipzig, Froberg, 1887: 8vo., pp. vii. and 385. Price 12s.

The author of this important contribution to our knowledge of the Caucasus had many opportunities during a two years' residence in the country on official duty, of traversing it in many directions, and visiting regions rarely sought after by modern travellers. The results of his observations he has brought together in a series of chapters on various aspects of the country. Herr Eckert's notes refer very largely to the people in the various branches, and his classification is based on a large number of head-measurements combined with the languages spoken. He has plotted the results of his ethnographical investigations on a map which embraces the whole region between the Caspian and the Black seas and between the Sea of Azoff and the river Araks. He has also exhibited in a series of tables a selection of words from the various languages spoken. After his introductory sections, the author devotes a chapter to the level country lying on the north of the Caucasian range. In the two following chapters he deals with Kalmuks, Turkomans, Nogais, and Cossacks. The next chapter treats of the country on the left bank of the Kuban, and following chapters of the Karachis, the Caucasian Steinbok, the Cherkess, the Ossetians, the Chechenyis. Some 150 pages are devoted to Daghestan and its people (Lesghians), and two shorter chapters to the people of the Coast region and the Trans-Caucasians.

**[India.]**—Account of the Operations of the Great Trigonometrical Survey of India. Vol. IV. A. General Description of the Principal Triangulation of the Jodhpore and the Eastern Sind Meridional Series of the North-West Quadrilateral, with the Details of their Reduction and the Final Results. Prepared in the office of the Trigonometrical Branch, Survey of India, Col. C. T. Haig, R.E., Offg. Deputy

Surveyor-General, in charge. Published under the orders of Col. G. C. De Prée, s.c., Surveyor-General of India. Debra Dun, printed at the Office of the Trigonometrical Branch, Survey of India, 1886: 4to., charts and plates. [Presented by the Secretary of State for India.]

**Tchihatchef, P. [de].**—Klein-Asien. Leipzig, G. Freytag, 1887: 8vo., pp. viii. and 188. [Presented by the Author.]

This is one of the series of handbooks being issued by Freytag under the title of "Das Wissen der Gegenwart." It consists of a very complete and useful sketch of Asia Minor by M. Tchihatchef, who has for so long been an authority on that region. The various sections treat of geography and hydrography, topography, climate, vegetation, fauna, geology, and a miscellaneous section on history, antiquities, and people.

#### AFRICA.

[**Cape of Good Hope.**—Statistical Register of the Colony of the Cape of Good Hope for the year 1886, containing also Agricultural Statistics for 1887. Cape Town, W. A. Richards & Sons, 1887: folio, pp. viii. and 224. [Presented by the Colonial Secretary, Cape Town, Cape of Good Hope.]

**Duveyrier, Henri.**—Liste de Positions Géographiques en Afrique (Continent et Iles). Premier fascicule A—G. Paris, Société de Géographie, 1884: 4to., pp. 102. [Presented by the Paris Geographical Society.]

There are about 1600 positions in this part, arranged alphabetically, with altitudes, latitudes, longitudes, and authorities. Its value to cartography is evident, and we hope our enterprising sister Society will lose no time in giving M. Duveyrier the means of completing the undertaking.

**Mackinnon, [Rev.] James.**—South African Traits. Edinburgh, James Gemmell, 1887: 8vo., pp. vi. and 301. Price 7s. 6d. [Presented by the Publisher.]

Mr. Mackinnon opens up no new ground in this volume, but it will be found both interesting and instructive. He spent three years and a half from 1881 in South Africa, mainly in connection with the College at Stellenbosch, and his volume deals largely with that town and the country round about it. He gives much information as to the present social, economical, and educational condition of the part of the Colony with which he is personally acquainted. He made excursions elsewhere, into the Drachensberg, to the east of the Colony, into Natal and the Transvaal; some of his experiences in these excursions he describes. He has also from various sources compiled some instructive chapters on certain episodes in the history of the Colony. The volume, as a whole, gives a fair and useful picture of the present condition of development of Cape Colony generally.

**Moloney, Alfred [C.M.G.]**—Sketch of the Forestry of West Africa, with particular reference to its present principal commercial products. London, Sampson Low & Co., 1887. Price 10s. 6d. [Presented by the Publisher.]

Mr. Moloney's official connection with the Government of Lagos has given him special opportunities of becoming familiar with the actual condition of the forests of our West African possessions, while his botanical knowledge has enabled him to make good use of his opportunities. However, Mr. Moloney's book covers more than British West Africa, and he has brought together much useful information as to the actual condition of the forests in the whole region. His aim is to show that there are vast resources of useful industry in West Africa which are unworked, and he goes over the various trees and useful plants in great detail, gives information as to the supplies which exist, commercial value, methods of culture, &c. The volume may be regarded as an important contribution to what is known as Commercial Geography.



**Pajot, Elie.**—*Simple Renseignements sur L'Ile Bourbon.* Paris, Challamel Aine, 1887: 8vo., pp. 344. Price 3s. 6d. (*Dulau.*)

This little volume contains a useful account of the history of Reunion, with many notes on its resources and progress.

#### AMERICA.

**Baillie, Alexander F.**—*A Paraguayan Treasure: the Search and the Discovery.* With route map and plans. London, Simpkin, Marshall, & Co., 1887: 8vo., pp. 368. Price 6s. [Presented by the Author.]

**Billinghurst, Guillermo E.**—*Estudio sobre la Geografia de Tarapacá (páginas de un libro) trabajo escrito para el ateneo de Iquique.* Santiago, Imp. de 'El Progreso,' 1886: 8vo., pp. 113. [Presented by the Author.]

[**Cayo Arenas.**]—*Sociedad Mexicana de Geografia y Estadistica. Apuntes sobre Cayo Arenas formados por órden de la Sociedad de Geografia y Estadistica por su segundo Secretario Juan Orozco y Berra y publicados por acuerdo de la misma corporacion.* México, Ofic. Tip. de la Secretaría de Fomento, 1886: 12mo., pp. vi. and 66, 2 maps.

**Cumberland, Stuart.**—*The Queen's Highway from Ocean to Ocean.* With numerous colotype illustrations and two maps. London, Sampson Low & Co., 1887: 8vo., pp. 431. Price 18s. [Presented by the Publishers.]

Describes the country traversed by the Canadian Pacific Railway, from the Atlantic to the Pacific Oceans. The opening chapters refer to the "Province of the Midnight Sun," British Columbia, including its mainland, islands, cities, climate, and general resources. In chapter iii. Esquimaux as a naval centre, and its bearing upon Russia's position in the Pacific is discussed; the remaining chapters describe the various points of interest along the route of the "Queen's Highway," from the Pacific to the Rockies, and across the open prairie to Winnipeg (the half-way house), thence round the north shore of Lake Superior, and by Ottawa, Montreal, and Quebec to the Atlantic terminus at Halifax. Many of the illustrations are from photographs exhibited in the Canadian Court at the Indian and Colonial Exhibition.

**Martin, K.**—*Bericht über eine Reise nach Niederländisch West-Indien und darauf gegründete Studien.* I. Land und Leute. Leiden, Brill, 1887: large 8vo., pp. 186. Price 17s. (*Dulau.*)

This is the first part of what promises to be a complete and most detailed study of the Dutch West Indies. The work is brought out under the auspices of the Dutch Geographical Society. The present part deals with land and people, the former being investigated in all its aspects, geographical, geological, biological. The work abounds with well-executed illustrations, lithographic and photographic, and in future parts we are promised four maps.

**Rumbold, Sir Horace [Bart.]**—*The Great Silver River: Notes of a Residence in Buenos Ayres in 1880 and 1881.* London, Murray, 1887: 8vo., pp. [14] and 330. Price 12s.

It was not to be expected that Sir Horace Rumbold should be able to tell us much that is positively new about the Plate region. The record of his experiences of life in Buenos Ayres and its neighbourhood will, however, be found useful by those who may have to reside there. He has much to tell about the politics of the Argentine; and his remarks on the country as a field of immigration deserve serious attention. Sir Horace made a trip up the Uruguay and touched the country of that name as well as Paraguay and Brazil. What he has to say concerning the life and scenery of the Brazilian borderland will be new to many. There are several good illustrations, but no map.

**Sievers, [Dr.] W.**—Reise in der Sierra Nevada de Santa Marta. Leipzig, Gressner & Schramm, 1887: 8vo., pp. [10] and 290. [Presented by the Author.]

Dr. Sievers was a pupil of Baron von Richthofen, and by a lengthened visit to South America, at the cost of the Karl-Ritter Stiftung, and under the auspices of the Berlin Geographical Society, he sought to gain some practical experience as a geographer. The results of his travels in Venezuela have appeared in the Journal of the Hamburg Geographical Society. The present volume, which unfortunately has no map, is devoted to the very interesting Sierra Nevada range, and the region around, on the north coast of Colombia, where Dr. Sievers spent some time in the beginning of 1886. He gives a narrative of his journeyings, full of information on country and people, especially the native Indian. Apart from the value of the work as a contribution to geography, it is an excellent sample of what can be produced by a young man who has had a thorough training in geographical science and methods of geographical observation.

Smithsonian Miscellaneous Collections.—Vols. xxviii.—xxx. Washington, published by the Smithsonian Institution, 1887: 8vo., pp. (xxviii.) xxv. and 747; (xxix.) x. and 773; (xxx.) x. and 523, vi. and 559. [Presented by the Smithsonian Institution.]

Vol. xxviii. contains—"Tables, Meteorological and Physical," by Arnold Guyot, P.D., LL.D. Fourth edition, revised and enlarged. Edited by William Libbey, jun.—Vol. xxix. "A Catalogue of Scientific and Technical Periodicals (1665 to 1882), together with Chronological Tables and a Library Check-List." By Henry Carrington Bolton.—Vol. xxx. "Scientific Writings of Joseph Henry," with illustrations.

[**United States.**]—Annual Report of the Chief Signal Officer of the Army to the Secretary of War for the year 1885. In two volumes. Washington, Government Printing Office, 1885: 8vo., pp. (part 1) 609, (part 2) 440, maps.

Part 2 of this Report contains a treatise by Prof. William Ferrel on 'Recent advances in Meteorology, systematically arranged in the form of a Text-book, designed for use in the Signal Service School of Instruction at Fort Myer, Va., and also for a Hand-book in the office of the Chief Signal-Officer.' It is divided as follows:—Chapter I. The constitution and physical properties of the atmosphere. II. Temperature of the atmosphere and earth's surface. III. The general motions and pressure of the atmosphere. IV. Cyclones. V. Tornadoes. VI. Meteorological Observations and their Reductions. VII. Ocean Currents and their Meteorological Effects. The Appendix contains Hypsometric and other tables, and a list of Books and Papers referred to in the work.

— Department of the Interior, United States Geological Survey, J. W. Powell, Director. Monographs of the United States Geological Survey. Vol. x. *Dinocerata*, a Monograph of an Extinct Order of Gigantic Mammals, by Othniel Charles Marsh. Washington, Government Printing Office, 1886: 4to., pp. xviii. and 243, plates. [Presented by the Director of the United States Geological Survey.]

— Fourth Annual Report of the Bureau of Ethnology of the Smithsonian Institution, 1882-83. By Washington, Government Printing Office, 1886: im [Presented by the Smithsonian Institution.]

Besides the report on the general work of the Bureau, there is a preliminary paper of great interest, *Amplification of the Ethnology of the North American Indians*, by Colonel Richard H. Holmes contributes three important memoirs.

Pueblos, on the Ancient Pottery of the Mississippi Valley, and on the Origin and Development of Form and Ornament in the Ceramic Art. The volume concludes with a paper, by Mr. Frank Hamilton Cushing, on Pueblo Pottery, as illustrative of Zuñi Culture-growth.

— Report on the Mining Industries of the United States (exclusive of the precious metals) with special investigation into the Iron Resources of the Republic, and into the Cretaceous Coals of the North-west. By Raphael Pumpelly, Special Agent. Washington, Government Printing Office, 1886: 4to., pp. xxxviii. and 1025. [Presented by the United States Government.]

This forms volume xv. of the valuable series of the United States Census publications. Apart from its importance as containing a detailed account of the mineral resources and mining industries of the United States, it will be found of special value by the student of economic geography, especially as the statistics are graphically illustrated by 102 excellent maps and diagrams.

#### ARCTIC.

[**International Polar Observations.**—Die Internationale Polarforschung 1882–83. Die Beobachtungs-Ergebnisse der Deutschen Stationen. Band I. Kingua-Fjord, und die Meteorologischen Stationen II. Ordnung in Labrador. 4to., pp. 30 and liv. and 736. Band II. Süd-Georgien. pp. 12 and lvi. and 523. Herausgegeben im Auftrage der Deutschen Polar-Kommission von Prof. Dr. Neumayer und Prof. Dr. Bergen. Berlin, Ascher & Co., 1886. Price 5*l*. [Presented by the German Polar Commission.]

Beobachtungen der Russischen Polarstation an der Lenamündung. II. Theil. Meteorologische Beobachtungen, bearbeitet von A. Eigner. I. Lieferung. Beobachtungen vom Jahre 1882–83. Herausgegeben unter Redaction von R. Lenz. 1886. 4to., pp. xxvii. and 157.—Beobachtungen der Russischen Polarstation auf Nowaja Semlja. II. Theil. Meteorologische Beobachtungen. Bearbeitet von K. Andrejef. Herausgegeben unter Redaction von R. Lenz. 1886. 4to., pp. xvii. and 159. [Published and presented by the Russian Geographical Society.]

We have here two more important instalments of the valuable series of observations taken round the two Poles during 1882–3. Of course, like the observations already published in this series, these observations are in the main meteorological: as such they are an important contribution to physical geography. But in both publications there is much information on the general geography of the regions in which the stations were located. Kingua Fjord is at the head of Cumberland Gulf in Davis Straits, and the report contains a sketch of the region with accompanying maps, besides a few notes on the Labrador stations. The geographical information on South Georgia is much fuller, including sketches of its topography, geology, and botany, besides detailed maps from surveys of the region around Royal Bay. The reports of observations on Novaya Zemlya and at the mouth of the Lena are in Russian and German. The maps included in the reports add something to our knowledge of the geography of both regions.

#### AUSTRALASIA.

**Hobarttown** oder Sommerfrische in den Antipoden. Prag, H. Merzy, 1886: 4to., pp. 284. [Presented by the Author, H.I.H. Prince Ludwig Salvator of Austria.]

This is a handsomely illustrated work, giving an account of Tasmania in its various aspects, including the Climate, Geology and Minerals, Fauna and Flora, Population, Industry and Trade, &c. There is a map of the Environs of Hobarttown.

**Pratt, [Rev.] George.**—A Comparison of the Dialects of East and West Polynesian, Malay, Malagasy, and Australian. [Read before the Royal Society of N.S.W.]

2nd June, 1886.] [Sydney, Charles Potter, Government Printer, 1887]: 8vo., pp. 24. [Presented by Rev. G. Brown.]

[New Zealand].—New Zealand Industrial Exhibition, 1885, Wellington. The Official Record. Wellington, George Didsbury, Government Printer, 1886: 8vo., pp. xii., 230, and 123, plan.

A full account of the New Zealand Industrial Exhibition, 1885. Appended are the three Exhibition prize essays on the Industries of the Colony.

## OCEANIA.

**Penny, [Rev.] Alfred.**—Ten Years in Melanesia. London, Wells Gardner and Co. [no date]: 8vo., pp. [6] and 232. Price 5s. [Presented by the Publishers.]

Mr. Penny spent the last ten years in Melanesia as a missionary in connection with the Melanesia Mission. Most of his time seems to have been spent in Florida Island and the Solomon group, and concerning that island and its neighbours and their inhabitants he gives us the very valuable results of his own observations. He spent some time also in Norfolk Island, and in cruising about among various groups, so that his observations cover a wide area. Mr. Penny sums up the results of his experiences in a series of interesting chapters, full of information, much of which will be appreciated by the geographer. After a general sketch of Melanesia and of Norfolk Island and its history, Mr. Penny deals with heathen superstitions, native customs, the progress of Christianity, traders, and island phenomena. In the last chapter his observations on the physical geography of the islands with which he is acquainted, well deserve careful reading. Neither pictures nor map are equal to the text.

## GENERAL.

**Den Norske Nordhavs-Expedition, 1876-1878.**—[The Norwegian North-Atlantic Expedition, 1876-8.] XVII. Zoologi, Alcyonida. Ved D. C. Danielsen. Christiania, Grøndahl & Søn, 1887: imp. 4to., pp. viii. and 169, map and plates. [Presented by the Editorial Committee of the Norwegian North-Atlantic Expedition.]

———. XVIIIa. and XVIIIb. Nordhavets Dybder, Temperatur og Strømninger ved H. Mohn. With 48 plates and maps, and 3 woodcuts. Christiania, Grøndahl & Søn, 1887: imp. 4to., pp. 212.

This part contains minute details respecting the Depths, Temperature, and Circulation of the North Ocean. Part XVIIIb. contains the maps and plates.

Emigration and Immigration.—Reports of the Consular Officers of the United States. Washington, Government Printing Office, 1887: 8vo., pp. iv. and 748. [Presented by Worthington C. Ford, Esq., Department of State, Bureau of Statistics.]

Contains valuable statistics of emigration, concerning Austria-Hungary, Belgium, France, Germany, Greece, Italy, Malta, Netherlands, Norway, Portugal, Russia, Spain, Sweden, Switzerland, and the United Kingdom.

**Gibson, John.**—Great Waterfalls, Cataracts, and Geysers, described and illustrated. With 32 illustrations. London, T. Nelson & Sons, 1887: post 8vo., pp. 288. Price 2s. 6d. [Presented by the Publishers.]

This little work includes descriptions of some of the principal and grandest of waterfalls, &c., among which may be mentioned the Falls of Niagara; Falls of Yosemite Valley; Falls of the Yellowstone Region; Kaieteur Fall; Cataracts of the Orinoco and Parana; the Falls of the Zambesi; the Falls and Cataracts of the Nile; the Falls of the Senegal; the Cataracts and Rapids of the Congo; the Geysers of the Yellowstone Region; the Geysers of Iceland; and the Geysers of New Zealand.

[**International Geodetic Association.**]—Verhandlungen der vom 27. October bis zum 1. November 1886 in Berlin abgehaltenen Achten Allgemeinen Conferenz der Internationalen Erdmessung und deren Permanenten Commission, redigirt vom ständigen Secretär A. Hirsch. Zugleich mit den Berichten der Vertreter der einzelnen Staaten über die Fortschritte der Erdmessung in ihren Ländern, von 1884-6, herausgegeben von der Permanenten Commission der Internationalen Erdmessung.—Comptes-Rendus des séances de la Huitième Conférence Générale de l'Association Géodésique Internationale et de sa Commission Permanente réunies à Berlin du 27 Octobre au 1<sup>er</sup> Novembre 1886, rédigés par le Secrétaire perpétuel A. Hirsch. Publiés en même temps que les Rapports des Délégués des différents États sur les progrès des travaux géodésiques accomplis dans leurs pays de 1884 à 1886, par la Commission Permanente de l'Association Géodésique Internationale. Berlin, Georg Reimer, 1887: 4to., pp. xviii. and 248, maps. [Presented by the Association.]

Journal of the College of Science, Imperial University, Japan. Vol. I., Part II. Published by the University, Tôkyô, Japan, 1887: large 8vo. [Presented by the Imperial University, Tôkyô, Japan.]

Contains the following paper: "Beiträge zur Theorie der Bewegung der Erdatmosphäre und der Wirbelstürme," by Dr. Phi. Diro Kitao, illustrated with a plate.

**Keane, [Prof.] A. H.**—Eastern Geography. A Geography of the Malay Peninsula, Indo-China, the Eastern Archipelago, the Philippines, and New Guinea. With a map. London, Stanford, 1887: 8vo., pp. xii. and 190. Price 5s.

The present volume is to some extent compiled on the basis of a smaller treatise which appeared at Singapore in 1884. It is issued, we understand, under the auspices of the Government of the Straits Settlements, and is meant primarily for use in the schools of that colony. The book will, however, be found useful by all desirous of having a pretty full and trustworthy account of the region with which it deals. In the treatment (especially of the physical and biological sections, Mr. Keane has made an attempt, pretty successfully, "to break away from the crude methods still lingering in our schools, and to bring the matter more into harmony with the views of the Ritters, Peschels, Reclus, and the other illustrious exponents of the scientific method." Mr. Keane has taken advantage of the researches of the most recent explorers, and his treatment of the whole subject is systematic, clear, and fairly full. He has divided the Eastern Archipelago into three, instead of two divisions,—Asiatic, Oceanic, and Australian, a division for which he advances satisfactory linguistic reasons. His double pagination of the contents, we should say, is no substitute for an index. The map is too small to be of much practical service.

[**Malet, H. P.**]—Sunlight. Second edition, with alterations and additions. London, Trübner & Co., 1887: 12mo., pp. xii. and 180. [Presented by the Author.]

**Markham, Clements R.**—Famous Sailors of Former Times: The Story of the Sea Fathers. With frontispiece. Second edition. London, &c., Cassell & Co., 1886: cr. 8vo., pp. viii. and 221. Price 2s. 6d.

**Martins, Charles.**—Du Spitzberg au Sahara; Étapes d'un Naturaliste au Spitzberg, en Laponie, en Écosse, en Suisse, en France, en Italie, en Orient, en Égypte, et en Algérie. Paris, Baillière et Fils [1886]: 8vo., pp. xvi. and 619. Price 7s. 6d.

This is a new edition of a collection of papers by M. Martins, which appeared several years ago, after having been first published through various media. M. Martins discusses various questions in physical and botanical geography, partly from his own observations, and partly on the basis of the writings of others.

Report of the Royal Commission for the Colonial and Indian Exhibition, London, 1886, to the Right Hon. Henry Matthews, M.P., &c. London, W. Clowes & Sons, 1887: 8vo. pp. lxxiii. and 373, plan.

**Rogers, William A., and Winlock, Anna.**—A Catalogue of 180 Polar Stars for the epoch of 1875.0, resulting from all the available observations made between 1860 and 1885, and reduced to the system of the Catalogue of Publication XIV. of the *Astronomische Gesellschaft*. [Memoirs of the American Academy of Arts and Sciences. Centennial volume, vol. xi., part iv.—No. v.] Cambridge, John Wilson & Son, 1886: 4to.

**Semeonof, P.**—*Geographicheskoi-Statisticheskii Slovar Rossiiskoi Imperii*. (Geographico-Statistical Lexicon of the Russian Empire.) Vols. ii.—v. St. Petersburg, 1863–85. [Presented by the Russian Geographical Society.]

This work, issued under the auspices of the Imperial Russian Geographical Society, is completed with the fifth volume, the first of the series having been published as far back as 1863. Its scope and object has been to collect and condense in a form readily accessible to students and the general reader the vast mass of materials contained in books, pamphlets, magazines, monographs, &c., relating to all parts of the Russian empire. It is in fact a valuable topographical summary of every town, village, range of mountains, river, lake, sea, province, district, and tribe contained in that vast extent of the earth's surface. A list of authorities follows each article.—[E. D. M.]

**Stephen, Leslie.**—*Dictionary of National Biography*. Vol. xi. Clater—Condell. London, Smith, Elder, & Co., 1887: 8vo., pp. vi. and 470. Price 12s. 6d.

**Stevens, Thomas.**—*Around the World on a Bicycle*. From San Francisco to Teheran. With over 100 illustrations. London, Sampson Low & Co., 1887: 8vo., pp. xvii. and 547. Price 16s. [Presented by the Publishers.]

The journey, of which this volume is a record, was made in 1884–85. Mr. Stevens left San Francisco on the 22nd of April, 1884, and reached Boston on the 4th of August, the journey across the Continent having occupied 103½ days. In the following April the author resumed his journey, embarking at New York for Liverpool. On arriving at Newhaven, he crossed to Dieppe and travelled through France, Germany, Austria, and Hungary; Slavonia and Servia; Bulgaria, Roumelia and European Turkey. From the Ottoman capital he took steamer to Ismid and from thence traversed Asia Minor by Angora, Yuzgat, Sivas, Erzingan, and Erzeroum. He next crossed the northern part of Kurdistan and entered Persia, visiting Tabreez, and Kasveen, arriving at Teheran on the 30th of September. The volume has neither an index nor a map.

The *Encyclopædia Britannica*. Ninth edition. Vol. xxii. Edinburgh, A. and C. Black, 1887: 4to., pp. 856. Price 30s. [Presented by the Publishers.]

There is an unusually large proportion of important geographical articles in this volume. Among them may be mentioned *Siberia* and *Syr-Daria*, by M. Krapotkine; *Sicily*, *Spain*, and *Syracuse*, by Mr. G. G. Chisholm; *Sind* and *Sistan*, by Sir Frederic Goldsmid; *Sokoto*, by Mr. Joseph Thomson; *Solomon Islands*, by Baron von Hügel; *Soudan*, by Professor Keane; *South Australia*, by Mr. James Bonwick; *Sumatra*, by Mr. H. A. Webster; *Sweden*, by Profs. Hildebrandsson, Cleve, and Kjellman, Dr. A. Wirén, and F. J. Nyström; *Switzerland*, by Rev. W. A. B. Coolidge and Mr. Webster; *Syria*, by Prof. Socin. The article on *Strabo* is by Prof. William Ridgeway, and on *Surveying* by General J. T. Walker. The volume contains eleven plates, all maps.

The *Journal of the Bombay Branch of the Royal Asiatic Society*. Extra Number. Prof. Peterson's Report on the Search for Sanscrit MSS. in the Bombay Circle, 1884–86. Bombay, Society's Library; London, Trübner & Co., 1887: 8vo., pp. xxx., 47, and 407.

The following works have also been added to the Library:—

- Asta-Buruaga, Francisco Solano.**—Diccionario Jeográfico de la República de Chile. Nueva York, D. Appleton & Co., 1867: sm. 8vo., pp. viii. and 421, portrait. [Presented by the Author.]
- Blosseville, [Bénigne] Ernest [Poret, Marquis] de.**—Histoire des Colonies Pénales de l'Angleterre dans l'Australie. Paris, Adrien le Clere and Co., &c., 1831: 8vo., pp. 596. [Presented by M. James Jackson.]
- [Cornwall].**—An Unsentimental Journey through Cornwall. By the Author of 'John Halifax, Gentleman.' With illustrations by C. Napier Hemy. London, Macmillan & Co., 1884: 4to., pp. x. and 144. Price 12s. 6d. [Presented by the Publishers.]
- Ernst, A.**—La Exposicion Nacional de Venezuela en 1883, obra escrita de orden del ilustre Americano General Guzman Blanco. Caracas, Imp. de 'La Opinion Nacional,' 1884: folio, pp. 704, plan and plates. [Presented by Dr. A. Ernst.]
- Level, Andres A.**—Nomenclator de Venezuela contentivo de su censo en orden Alfabético. 2 vols. Caracas, Imp. 'La Opinion Nacional,' 1883: 4to., pp. (vol. i.) 720, (vol. ii.) 435. [Presented by Dr. A. Ernst.]
- Passarge, Louis.**—Aus Baltischen Landen. Studien und Bilder. Glogau, Carl Flemming, 1878: 12mo., pp. viii. and 551.
- Villavicencio, [Dr.] R.**—La República de Venezuela bajo el punto de vista de la Geografía y Topografía médicas y de la Demografía. Caracas, Alfred Rothe, 1880: 8vo., pp. 137. [Presented by the Author.]

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#### AFRICA.

**Afrika.**—Spezial-Karte von — im Massstab von 1 : 4,000,000 or 55·5 geographical miles to an inch. (10 Blatt.) Entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. Zweite Auflage. II. Lieferung. Inhalt: Sektion Zentral-Sahara (2) nebst Bemerkungen von B. Domann. Sektion Seengebiet (8) nebst Bemerkungen von Dr. R. Lüddecke. Gotha, Justus Perthes, 1887. Price 3s. (*Dulau.*)

The most noticeable feature in this issue is the changes that have been made in the delineation of the political boundaries. In the first edition of this map the Sultan of Zanzibar appeared to have been deprived of nearly all his territories, but in the present map he has a narrow strip of coast-line assigned to him extending from 2° 40' S. to 10° 45' S. and from the sea-coast for about 10 miles inland, with the exception of some ports which are coloured as belonging to Germany. With the exception of the alterations in these boundaries, and some minor corrections, the two sheets comprising part ii. of this map of Africa are reproductions of sheets 2 and 8 of the original edition.

**Khuseb Thales.**—Originalkarte des Unteren —, von F. M. Stapff. Reduktion der Originalzeichnung im Massstab 1:100,000 auf den Massstab 1:225,000 or 3·1 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 11. Gotha, Justus Perthes, 1887. (*Dulau.*)

**Lagos.**—A Sketch Survey of the Inland Water Communication in the Colony of —, lying between the French Protectorate of Kotonu and the British Niger Protectorate. Executed by command and under the personal supervision of C. A. Maloney, Esq., c.m.g., Administrator, by William Speeding, Harbour Master. 1886. Scale 1:63,360 or 0·86 geographical mile to an inch. 7 sheets. Stanford's Geographical Establishment, London.

This appears to be a very complete survey of a portion of the inland water communication extending between the Benin river and Porto Novo. The soundings are given in feet, and all important villages laid down.

**Yoruba Country.**—Route Survey through —, by Harbour Master William C. Speeding, who accompanied the Special Commissioners H. Higgins and O. Smith, from the Government of Lagos to Tribes interior of Lagos. Between 17th August and 10th November, 1886. F. Evans, Esq., c.m.g., Acting Administrator.

In this map the author's route through the Yoruba Country is indicated by a brown line, the positions of places fixed by him from astronomical observations are marked with a red cross, while those obtained from missionaries and natives are given as being only approximate. The number of inhabitants at each village or town through or near which the author passed appears to have been estimated by him, and placed in brackets beside its name.

#### AUSTRALIA.

**Süd-Ost-Australien.**—Oro-hydrographische Skizze von —. Scale 1:3,750,000 or 51·3 geographical miles to an inch. Showing the routes of Dr. R. v. Lendenfeld 1880-85. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 87, Tafel 1.

Karten-Skizze von Dr. R. v. Lendenfeld's Route in das Bogong Gebirge. Scale 1:500,000 or 6·8 geographical miles to an inch.

Mount Bogong. Nach Dr. R. v. Lendenfeld's Aufnahme. Scale 1:100,000 or 1·3 geographical miles to an inch.

Original-Skizze des Kosciusco Gebirges von Dr. R. von Lendenfeld. Scale 1:250,000 or 3·4 geographical miles to an inch.

Müller's Peak. Scale 1:100,000 or 1·3 geographical miles to an inch.

Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 87, Tafel 2.

#### CHARTS.

**United States Charts.**—No. 1030. Port Culebra, West Coast of Costa Rica. Price 1s. 3d.—No. 1032. Piedra Blanca Bay, West Coast of Costa Rica. Price 1s. 3d.—No. 1034. Gulf of Nicoya, West Coast of Costa Rica. Price 1s. 8d.—Pilot Chart of the North Atlantic Ocean, July 1887. Published at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

#### ATLASES.

**Berghaus' Physikalischer Atlas** (begründet 1836 von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mit-

wirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel herausgegeben von Professor Dr. Hermann Berghaus. Zehnte Lieferung. Containing maps Nos. 32, 51, and 72. Gotha, Justus Perthes, 1887. Price 3s. each part. (*Dulau.*)

Sheet No. 32 contains a Mercator's projection of the World on which is laid down the mean annual barometric pressure, and three inset maps are given showing the isobars for Europe on an enlarged scale, the mean daily range of the barometer for the World, and the mean of the lowest readings. Sheet No. 51 contains two maps of the World on the elliptical projection, on which are shown the different regions where food-producing plants exist. Sheet No. 72 is an ethnographical map, showing the original locations of the tribes of Indians in North and South America. The maps, as usual in this atlas, are beautifully drawn; the symbols and colours used are, however, so numerous that great care and some previous study are necessary to avoid mistakes.

**Japan.**—Atlas von ——. Sieben Blätter im Massstabe von 1:1,000,000 or 13·6 geographical miles to an inch, und eine Übersichtskarte im Massstabe von 1:7,500,000, or 102·7 geographical miles to an inch, entworfen und gezeichnet von Bruno Hassenstein. Zweite (Schluss-) Abteilung in 4 Bl. (Sekt. V.–VII.); Nord-Nippon, Yesso u. Kurilen. VIII. Übersichtskarte im Massstabe von 1:7,500,000. Gotha, Justus Perthes, 1887. Price 12s. (*Dulau.*)

This issue completes Herr Hassenstein's admirable Atlas of Japan. In the preface the author acknowledges the sources from which his information is drawn, and in turn gives an historical sketch of that portion of Japan which is represented on each sheet. Sheet V. includes all that portion of Nippon north of the thirty-eighth degree of north latitude, and part of southern Yesso. Sheet VI. includes the whole of the Island of Yesso, with the exception of its eastern extremity, which with the Kuril Islands is given on sheet VII. Sheet VIII. is a general map of Japan on a reduced scale, on which political divisions and all means of communication are laid down. The maps are beautiful specimens of cartography, the hill-work being shaded in brown, and the lowland coloured green; the lettering is very clear, heights are given in English feet, and soundings in both metres and fathoms. In the projections the longitude is given from Paris and Greenwich.

**Stanford, E.**—London Atlas of Universal Geography. London, E. Stanford, 1887. Price 12l.





PROCEEDINGS  
OF THE  
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*A Journey in Manchuria.*

By H. E. M. JAMES, of the Bombay Civil Service.

(Read at the Evening Meeting, June 6th, 1887.)

Map, p. 594.

I THINK it may interest the Society to know that my companions and I have to thank one who is well known here, I mean Mr. Archibald Colquhoun, for the first suggestion of Manchuria as a field for travel. We had originally planned an expedition in southern China, but we chose Manchuria on learning that it was but little known, that the climate and chances of sport were alike good, that the people were pleasant to deal with, and also because we hoped to see something of the Russians on the frontier. I fear my observations will not have that scientific character which befits a paper read in this place, but none of the observations taken on the journey have yet been worked out, so I must necessarily confine myself to a simple account of our doings.

Manchuria is that part of Tartary which occupies the north-eastern corner of the Chinese Empire, being bounded on the north and east by Russia, and on the south by Korea, the Yellow Sea, and the Gulf of Liau-tung. The name signifies the country of the Manchu Tartars. It has, however, never been applied in the extensive sense that foreigners use it, either by Manchus or Chinese. Occasionally the term Shing-king, which is, properly speaking, merely the translation of the Manchu word Mukden,\* the southern capital of Manchuria, is applied by the Chinese to the whole country from the sea to the Amur, but the ordinary name is Tung-san-shêng, or the three eastern provinces: that is to say, the province of Liau-tung in the south, of which Mukden is the capital; Kirin in the centre with a capital of the same name; and the province of Helung-kiang, or Black Dragon river (the Chinese word for the Amur), in the north, with capital Tsitsihar. Liau-tung, which is more generally known as Fêng-tien, or "Heaven ordained" (as it has been "ordained" as the source of the present ruling

\* i. e. Flourishing Capital.

dynasty), is densely populated, and is computed to contain twelve or thirteen millions of people. Kirin contains probably eight millions, and Tsitsihar perhaps two millions. I base these figures on calculations made by a former British Consul at New-chwang, who went into the question with a good deal of care, and a missionary, whom I consulted, comes to much the same conclusion. The total area of Manchuria (inclusive of a patch of Mongolia on the north-west, which is included in Tsitsihar) is about 380,000 square miles. It is therefore larger than the Austrian Empire and Great Britain and Ireland put together. In India it would be called non regulation territory. Though the law administered is the same as in China Proper, and in the more settled parts there is the same civil organisation, yet the administration is essentially a military one, and the chief appointments are all held by Manchu military officers. Originally the governor, or Tartar general of each province, bore the same title, viz. Kiang-kun (Chiang-chün), but a few years ago the exalted Chinese title of Tsung-tu, or governor-general, was conferred on the governor of Mukden, and the other two governors are now subordinate to him. He used also to be commander-in-chief as well as head of the civil administration, but in November 1885 a special commander-in-chief named Mu was appointed to reorganise the forces in Manchuria, who is independent of the governor-general. In the province of Fêng-tien the titles and grades of officials, magistrates, and the like are precisely the same as in China Proper. It is only in the outlying districts of the centre and north that military and civil functions are found united in the same persons.

Fêng-tien actually adjoins the province of Chihli in which Peking itself is situated, and has always been comparatively civilised, bearing much the same relation to the wild hilly tracts in the north and east that Bengal does to Assam and Bhutan. For centuries it was subject to Korea, then a warlike and powerful state, but since the eighth century it has, except during one brief interval, been incorporated with China. The other two provinces did not come under the direct control of Peking till 1644, when the Manchus conquered the Chinese Empire. With a very sparse indigenous population of Tartar hunters these two provinces were reserved until comparatively recent times, partly as a nursery for Tartar soldiers, but mainly as a place for the transportation of criminals, and it is only since 1820 that colonists have been permitted to settle there. For a long time after that date life and property were so insecure that the development of the country has been very slow, but during the last twenty years great progress has been made. Kirin and Tsitsihar are, however, still used as a kind of Botany Bay, not only for criminals properly so called, but for ill-behaved mandarins. In consequence the administration is feeble and corrupt, and the country swarms with a multitude of evil characters.

Manchuria (for I will continue to use the name adopted by Westerns)

is essentially a highland country, a land of mountain and river, forest and swamp. The whole of the south and east is occupied by considerable ranges of hills, the tops and slopes of which are covered with dense woods, and which geographers have christened Chang-pai Shan, literally, Long White Mountains, or else Shan-alin, which is part of the Manchu word for the same thing. The mountaineers, however, give each separate ridge or conspicuous hill a separate name, and confine the title of Long White Mountain to the principal peak in the region. The ranges appear as if they had come into existence on the most incoherent system, running in one part from north to south and elsewhere from east to west. They form part of a series of low volcanic hills from three thousand to six thousand feet in height, which extend on the south far into Korea, and on the west into the Russian maritime province as far as the Sea of Okhotsk. The only really plain country is found in a fertile alluvial tract in Fêng-tien, which is watered by the river Liau, and again to the north and west of Kirin, where the Nonni drains a vast area of undulating Mongolian steppes. North of the lower reaches of the Sungari, the hills form part of a separate system also volcanic, and which are in fact outlying spurs of the Khin-gan range. The principal rivers are the Liau, Yalu or Ai Chiang, the Sungari or Sung-hwa Chiang, the Nonni, and the Hurka or Mutan Chiang. The Liau rises in Mongolia and flows into the Gulf of Liau-tung, close to the treaty port of Newchwang. The next three rise within a comparatively few miles of one another in the most remote recesses of the Chang-pai Mountains. The Yalu flows west into the Yellow Sea; the T'umên flows into the Japan Sea, and the two together form part of the boundary between Manchuria and Korea. The Sungari—which is by far the largest, being navigable by large junks as far as Kirin—is one of the most considerable tributaries of the Amur. The Nonni, flowing due south, and the Mutan Chiang, due north, are its main affluents.

On the map are marked two barriers of palisades, one commencing at the Great Wall and passing by Yu-shih-tung-tzu and Kuan-chang-tzu to Fa-ta-ha-man, and the other starting from Fung-whang-chang on the Korean border, and meeting the first not very far from Kai-yuen. These palisades were built by the Ming dynasty about four centuries ago. They consisted of long lines of wooden chevaux de frise, in the shape of a St. Andrew's cross, and made it difficult for men, and especially for cavalry, to pass, except through gates at various intervals. They were intended to protect Liau-tung from the Mongols on the north and the Manchus on the east. At the present day they have disappeared entirely, though a mound or row of trees occasionally marks the place where they stood. The gateways, however, are still maintained as customs posts, at which transit duties are levied.

Manchuria has a history of its own, though space allows but a brief allusion to it. I daresay most people are aware Manchuria is the



cradle of the existing dynasty of China; but it is not equally well known that China has been conquered twice before by Tartars from this region. About one hundred years before our William the Conqueror, a tribe called the Ketan invaded China, and took possession of the throne, adopting the title of Liau, it is said, from the river in Fêng-tien. In less than two hundred years they, in their turn, were driven out by the Neu-chin, another tribe from the same neighbourhood, who called themselves the Kin, or golden dynasty, and who were upset in the thirteenth century by Ghenghis Khan, the Mongolian "Scourge of the World." The Mongols were overthrown by a Chinese rebel towards the end of the fourteenth century, who founded the Ming dynasty; and when that had lasted nearly 300 years, came the present Tartar dynasty.

It will thus be seen that during six out of the last nine centuries China, at any rate North China, has been ruled by foreigners. The history of China, in fact, is the history of most Oriental monarchies: a powerful tribe under a powerful head conquers the country, and for one or two generations rules it wisely and firmly. Gradually luxury creeps into the court; the princes become dissolute and effete; the administration falls into a state of degradation and inefficiency; and then the collapse of the dynasty is only a matter of time. Such was the case in the year 1643, when the last Ming emperor was on the throne. A common brigand, named Li-tsu-chung, headed a successful rebellion and took Peking. The emperor committed suicide, and the rebel proclaimed himself in his stead. Then came the opportunity of the Manchus. About sixty years before the fall of the Mings a chief had arisen who had conquered and consolidated into one powerful state all the miscellaneous Tartar clans who inhabited the country outside the palisades. His name was Nurh-ho-chih, and he lived in a remote valley on the Su-tzŭ Ho, about 90 miles east of Mukden and 60 from the then Chinese frontier. Only six or seven small villages owned him as lord. It happened that his father and grandfather were betrayed by another Manchu to the Chinese, and Nurh-ho-chih resolved to avenge them. He collected a few followers and attacked the tribes with whom the traitor took refuge one after the other. Eventually he succeeded in his vengeful quest, but the delights of victory led him on to further conquests till he had made himself master of the whole of Manchuria outside the Chinese boundary. He spent some time organising a good administration, in the course of which he gave his countrymen, for the first time, a written alphabet. At last he felt himself sufficiently strong to attack China, and before he died, in the year 1626, he had made himself master of the Chinese province of Fêng-tien. His successor continued harassing the Chinese till the downfall of the Ming dynasty, when Wu-san-kwei, who had been appointed by the Emperor to command on the Manchurian frontier, sent over to his quondam enemy inviting him to come and avenge his deceased lord. Overjoyed, the Manchu accepted the

offer, marched on to Peking, and in the year 1644 the present dynasty was proclaimed in the person of Nurh-ho-chih's grandson, a boy of six.

The story cannot fail to remind a student of history of the rise of Sivajee, the Mahratta hill robber, who undermined, and whose successors destroyed, the Mogul Empire of India. Naturally, ever since the capture of Peking, Manchuria has been (and it was so in the case of the two previous Tartar dynasties) the great recruiting ground for the Imperial army. Thus, it has always been in a state of depletion of its best blood and suffered greatly in consequence. But of recent years, as I said before, Chinese cultivators from Shang-tung, Chihli, and other northern provinces of China, have flocked into it in large numbers—so much so, that for one Manchu that is now to be seen, there are probably twenty Chinese. Nearly all special Manchu customs have disappeared; except in the army, the Tartar hat has disappeared like the hat of the old women in Wales, and the language itself is now only spoken in a few remote valleys; in fact, two teachers of Manchu had actually to be imported from Peking to Kirin two years ago on the express ground that the few Manchus who had any knowledge of their own language were all wanted as official clerks. Imagine the getter-up of a Welsh Eisteddfod sending to London for a couple of bards to speak Welsh, and the parallel is complete. With the language, the alphabet also is disappearing, and the clumsy barbarous Chinese hieroglyphics are replacing it. It is the old story over again, "Græcia capta ferum victorem cepit." So much so, that the late Consul of New-chwang, Mr. Meadows, a gentleman of keen observation, declared it was impossible to distinguish Manchus from Chinese by their features or general appearance; but in this I think he went a little too far. When a large body of them are seen together the difference of race can, if I mistake not, be seen at once, as Manchus look more like the Newars or the Ghoorkas of Nepal than typical Chinamen. They are generally short and good-looking, brown as Italians or Sikhs, with high cheek-bones, dark rosy cheeks, and large brown eyes, which are but little oblique. Nevertheless, looks apart, they are to all intents and purposes Chinamen.

I am bound to say the discovery caused ourselves a little disappointment. We expected to see a fine wild savage race, picturesquely dressed, riding furiously on gallant horses, the *beaux-idéals* of barbaric manliness, instead of a population of ordinary stolid Chinamen. In one point, however, Manchus do maintain a distinction which puts them far above the Chinese: they do not mutilate their women's feet, and to this day no woman with crushed feet may enter the Imperial court. When they took China they ordered the men to shave their foreheads, to plait their back hair in pigtails, and also to wear narrow instead of wide sleeves to their coats, and they ordered the women not to torture their little girls by cramping their feet. The men meekly submitted, but the ladies indignantly refused. And I need scarcely say

that then, as since, it was found hopeless trying to reform barbarous female fashion when the ladies had made up their minds about it.

Manchus still enjoy certain privileges. Every male who arrives at the age of puberty, as soon as he can draw the bow, is enrolled in one of eight corps of militia, called Banners, from each corps carrying a distinctive flag. This entitles him to receive a retaining fee of 1 tael, say 5s. 6d. a month. He is given land to cultivate rent-free, which he generally sublets to a Chinaman, and if he is employed on active military service he gets from 5 to 7 taels a month. The result is, the Manchus, instead of taking to honest work, are mostly hangers-on about *yamêns* (or public offices), picking up odd bits of work, and trying for permanent official employment. They take to dissipation and gambling, and become disreputable members of society. General Mu is, however, now converting a large number of these idle militiamen into regulars; and the race has produced, and produces, as good civil officials every whit as the Chinese. I have brought a Manchu bow and arrows for those to see who are curious about such things. It is singular that a race which is wise enough to manufacture repeating rifles and to buy Krupp cannon should still employ a considerable number of archers. The bow and arrow drill is very amusing to see.

One word more about the history of Manchuria. Until the year 1858 a line running for about 1000 miles north of the Amur river at a distance of from 500 to 1000 miles from it, and continuing down the coast as far as the Corean frontier, marked the boundary of the Chinese possessions as fixed by treaty with Russia, and the navigation of the Amur by the Russians was not permitted. During the Crimean war, however, they were obliged to use that road for victualling their settlements in Kamstchatka, so numerous expeditions were sent down the river, and posts established all along its bank. In 1858, China being then in the throes of the *Tae-ping* rebellion, Russia called on her to legalise what had been done, and the whole of the country on the left bank of the Amur was ceded to her. Two years later, in 1860, when in addition to the *Tae-ping* rebellion the English and French armies were before Peking, Russia, anxious to obtain an outlet for her Siberian trade less liable to be closed by the ice than ports in the Sea of Okhotsk, requested the Emperor Hien-fung to make her over the tract between the river Usuri and the sea. The country was then practically worth nothing to China, and she gave it up quietly. History will yet show whether Russia acted wisely in overstepping such a capital boundary as the Amur. Some people indeed think that Russia would not mind taking another slice of Manchuria if the occasion offered: others believe that the Chinese, having been successful in recovering Kuldja, might, if opportunity offered, try and recover the sea-coast strip. And even though both sides may desire peace, the best friends are liable to fall out when crowded too close together.

Manchuria certainly is a most delightful country. In the summer the climate is delicious, that is when it does not rain. It is occasionally hot, but we never felt anything worse than 87° in the shade. The winter is certainly severe. In the south the thermometer goes down to - 15° Fahr., and in the north to - 48° Fahr., but the cold weather is extremely bracing and healthy, and at that season the frozen roads make admirable highways for a vast amount of traffic. During the rest of the year they are miry and impracticable. It is very fertile, but I need not give a list of all the crops that are grown, as they differ but little from the crops of northern China generally. I may, however name three, the bean, the small millet, and the poppy. Of the first there are innumerable varieties, and the oil extracted from them forms the staple export of the country. The *hsiau-mi* or small millet has a tiny grain like canary seed, and when boiled makes first-rate porridge, as I can gratefully testify. The poppy grows luxuriantly, and the native grown opium has almost completely ousted the Indian drug. The imports of the latter into Manchuria in the year 1866 amounted to 572,000*l.*; in 1885 they amounted to only 31,300*l.*, and opium is grown not only for local consumption, but for distribution in parts of northern and central China. This fact will show that the opium question, which has exercised so many philanthropists in the past, is in a fair way of settling itself, though not in the precise way perhaps that the philanthropists wish. The Chinese are openly growing the drug for themselves, and the taste for Indian opium is disappearing in favour of the home article, just as in India Trichinopoly cheroots have of late completely ousted Manillas. So now that the Che-fu Convention has come into force, which has in fact, though perhaps not in name, imposed an additional duty on the Indian article, it is almost safe to prophesy that in a short time the Indian trade will be seriously affected, and the use of the Indian drug will be confined to a few wealthy *gourmets*. The Indian ryot will suffer, having to make good a deficit of some millions sterling, while the whole population of China, instead of as now only a part of it, will in future enjoy the luxury of opium smoking. Admitting that there are many evils connected with opium, I may add that I can only remember meeting two persons who had ruined themselves in health by it, and that some experienced foreigners whom we met were of opinion that taken in moderation on a full stomach it is no worse than tobacco.

The mineral wealth of Manchuria is very great. In one spot we found iron and gold within a few miles of one another, and we were told that there was also a silver mine close by. There is also abundance of very good coal and peat. A good deal of gold is exported, but mining is strictly contrary to the law, and the day before we arrived at Sansing a man was executed for it. Notwithstanding, in remote parts where the mandarins dare not go, a great deal of mining, or rather washing, is carried on.

The forests also are very valuable, the pine trees, walnuts, oak, and elm being conspicuous for their size. The trees are floated down the rivers during the rains, and from the mouth of the Yalu alone vast quantities are exported over the whole of China.

Minor products, of great value in the eyes of the Chinese, are furs, ginseng, and deer-horns. The hills yield a great deal of very fine sable, and the tiger and lynx skins are magnificent, the severity of the climate making the fur grow far longer than in a tropical country like India. The root of the wild ginseng is a medicine very highly esteemed, and sells for about 10*l.* to 20*l.* an ounce. In the interior of the Ch'ang-pai Mountains we saw companies, twelve or fifteen young men in each, scouring the valleys and glens in search of the plant; one or two roots will repay them for a season's labour. A great deal of cultivated ginseng is grown, but the value of it is very small, only 5*s.* or 6*s.* a pound. Extraordinary virtues are attributed to this plant, and I am not sure they are altogether moonshine. A friendly innkeeper once gave us a little chopped into fine shreds, of which we made tea, and certainly it proved very useful in case of stomach-ache. Lastly, the deer-horns, which form an important article in the Chinese pharmacopœia, may be mentioned. If secured a short time after the horn has sprouted, that is to say, when it is only about a foot long and full of blood, the Chinese are ready to pay almost any price for it. One pair was shown to us for which 50*l.* had been refused.

It is time, however, that I should give some account of our journey itself. I was accompanied from India by Mr. Younghusband, whose taste for travel is hereditary, as he is nephew to Mr. Shaw, the first English explorer of Yarkand and Kashgar. We were joined in China by Mr. H. Fulford, a young officer in the Consular service, to whom the Chargé-d'affaires kindly gave leave. He spoke Chinese capitally, a fortunate thing for us. On the 19th May we started from Ying-tsü, known in official language as New-chwang, the name of a town 30 miles further up the Liau river. New-chwang indeed was the port originally, but owing to the rapid accretion of land at the mouth of the Liau the shipping gradually moved down the river. Still, as Lord Elgin's Treaty contains the name New-chwang, that name has been applied ever since to the town where the British Consul resides. We first went to Mukden, 120 miles to the north, a large walled city containing 200,000 inhabitants. After the conquest of Liau-tung, Nurh-ho-chih fixed on this as his capital. It contains an Imperial palace, where the relics of the hero are said to be kept. On two hills in the neighbourhood, surrounded by sombre groves of pine, and adorned with fine triumphal arches and monuments of various kinds, the Great Ancestor, as the dynasty rightly calls him, and his son are buried. Before the conquest of China, Nurh-ho-chih had, in imitation of the Mings, created various Boards or departments for the conduct of the administration, and the fiction is still kept up, though nowadays Mukden is only a provincial town, and

has not been honoured with an Imperial visit for upwards of forty years. The Manchu Emperor constructed also Temples of Heaven and Earth in imitation of those at Peking, but these, though still existing, have been allowed to decay. At Mukden we hired twenty mules, to which we had afterwards to add six more, for in the hills it was necessary to reduce the loads to the smallest dimensions. We carried a small Kabul tent which was very useful occasionally when camping out in the forests, though we generally succeeded in finding a hunter's hut, while in the cultivated country wherever there were farms there were inns—of a kind. The Chinese resemble the Americans in this respect—wherever they make a new settlement the first thing they do is to establish an inn, which fulfils the joint purposes of a saloon, a grocery, and a dry goods store; and though I will not say the accommodation is luxurious, still travellers may be thankful for it.

From Mukden we turned due east up the valley of the Hun, a large affluent of the Liau, through a most beautiful and well-wooded valley. The second day we passed Fu-shun-chang, formerly the frontier town of China, and the first which the Manchus attacked. We then followed the Su tzü Ho, a tributary of the Hun, passing Sarhu, the scene of the greatest and most decisive battle between the Manchus and the Chinese, an account of which in Manchu and Chinese is inscribed on a fine marble slab erected on the spot. About 16 miles further we passed an ancient palace, and then Yung-ling, a village filled with soldiers, who guard a hill on which are situated the tombs of Nurh-ho-chih's ancestors. Three or four miles beyond stands Yenden or Hing-King, the "capital of prosperity," now a pretty village, with decaying gates and walls, containing an insignificant yamèn or government office. This was Nurh-ho-chih's second but most celebrated capital; from which he went out to fight at Sarhu. Two miles south are the remains of Lao-chêng, his first capital.

Settlers are now taking up their abode in great numbers in the adjoining valleys, and the forests are rapidly falling before the axe. The scenery in the neighbourhood is marvellously beautiful—woods and flowers and grassy glades—and to the lover of nature it is simply a paradise. The first day I began to collect I found no less than five kinds of lilies of the valley, and it was common to see whole hill-sides covered with masses of that delicious flower, which is such a favourite in England. Beautiful mandarin ducks haunted every pool and stream, and from the mountain tops the cock-pheasant's crow was heard on all sides. We had, however, started just a little too late, for the spring rains were even then beginning, and the roads were becoming difficult. We followed the Su-tzü Ho to its source in the hills, crossed the watershed, and on the ninth day after leaving Mukden arrived at T'ung-hwahsien, the seat of a resident magistrate; it is situated on the Hun Chiang, an affluent of the Yalu, which came down in flood and stopped

our progress for some days. Hardly had we succeeded in passing it before we were again detained by one of its tributaries, and it was not till nearly a month after leaving Mukden that we reached Mau-erh Shan, which is the farthest Chinese outpost on the Yalu, and garrisoned by 200 men. We had intended following, if possible, the Yalu up to its source, crossing the watershed and descending the valley of the T'umên, but we found this was quite impracticable. Above Mau-erh Shan, the river passes under a succession of lofty and precipitous cliffs, and though a few colonists have penetrated into the valleys beyond to cut wood, communication is almost entirely cut off, except in the winter, when the river is frozen over. We learned, however, that by crossing the mountain chain on our left, we should find a path practicable for mules, which would take us to the head waters of the Sungari, and then across another range into the T'umên valley, so we turned our faces northwards. We followed Number Two of the upper affluents of the Yalu (the Chinese number them instead of giving them distinct names), and two days brought us to the top of the Lao-ling, as the range is called which separates the Sungari basin from the Yalu. The pass was 3000 feet high, and on the far side we came on the head waters of the Tang Ho, a fine affluent of the Sungari. The path here, and indeed all the time we were in the mountains, was very narrow, and in places difficult. Occasionally it passed along hill-faces where the earth had fallen away in a landslip, and it looked as if the next step would bring the whole hill-side down together. At other times, torrents of sufficient depth and violence to sweep a mule off its legs, had to be crossed fifteen or twenty times in a morning; but these were trifles compared with the swamps. Frequently we have had half the mules down at once, rolling their packs and themselves in the mud. While all hands were turned to assist the first that fell, the others would feel themselves getting bogged, and when struggling to get free would tumble themselves in the mire. The good temper and patience of the mule drivers, however, were quite imperturbable, and we always got through somehow. The only real accident we had was caused by the ground giving way under a mule, and tumbling it and one of the men into a swollen river. The man was a good deal hurt, but he recovered, and only a few stores were damaged. Constantly we had to halt in narrow places while the path was being enlarged with axe, pickaxe, or spade to enable the mules to get along at all. One very hot day a mule, carrying a great deal of silver, got tired of waiting, and plunged into the swollen Yalu, there 350 yards wide. He swam some distance from the shore, but fortunately returned, and the pack, which was, after Chinese fashion, merely slung across the mule's back and not fastened in any way, tumbled off in shallow water; a few yards further out, and our loss would have been considerable.

The fourth day from Mau-erh Shan brought us to the main stream of the Sungari, at its junction with the Tang Ho. We were now within the precincts of the Long White Mountains. In theory they are supposed to be sacred to the ancestors of the reigning dynasty, and it is sacrilege to trespass in them. Only a few months ago the official *Peking Gazette* published a report from the Governor of Kirin, that in obedience to standing orders he had carefully searched all the ravines in the Ch'ang-pai Shan to see if any wicked people were seeking for ginseng, and he had found the country quite quiet and free from intruders. As a matter of fact, the mandarins never dream of going into the mountains, and settlements are being founded rapidly. The colonists form themselves into associations or guilds, with presidents, vice-presidents, and councils, who legislate for the community, and exercise powers of life and death. The existence of these guilds is known to the authorities of Kirin, who occasionally call on them, and not unsuccessfully, for assistance in hunting robbers; yet theoretically, as I have said, they have no existence before the law. Some items in their legislation are peculiar, but practical. One proclamation which we saw warned people not to harbour certain bad characters, whose names were given. A second forbade Koreans to fish. The Koreans, be it noted, are employed in large numbers as agricultural labourers by the settlers, who want them, so they said, to labour in the fields, and not waste their time in sport. A third was for regulating the trade in ginseng, and forbade any person buying or selling it before a certain date. The penalty for transgression of that law is, in the case of a rich person, a fine to the guild of one pound of rice (a luxury in the hills), ten taels in money, and two pigs, weighing at least seventy-five pounds each. If the offender be an outsider, and therefore moneyless and unable to pay the fine, he is to be beaten to death with sticks. This law was for the protection of zealous ginseng seekers, who sought the more remote valleys, and occasionally found the market forestalled by hunters returning before the season was fairly over. The guilds are most efficient institutions, and the only place within Manchuria where life and property may be said to be really secure is within their limits; although, from the configuration of the country and the vast area of forests with which it is covered, robbers would, under ordinary circumstances, find there a safe refuge.

It was now time to search for the snowy peaks, which, we understood from the map attached to the Rev. Alexander Williamson's book, 'Journeys in North China,' from Mr. Ravenstein, and other sources, must be in the neighbourhood—snowy peaks from 10,000 to 12,000 feet high. Alas, the vice-president of the guild told us that there was not such a thing in Manchuria. There was, however, he said, a very celebrated mountain, the Lao-pai Shan, or Old White Mountain proper, about ten or twelve days' march off, from the top of which sprang the Yalu, the



T'umén, and the Sungari. If we liked he could guide us there, but the road was very difficult to find, and he must come himself. We accepted his offer, loaded two mules very lightly and started, taking only one servant with us, and a boy to lead the mules over the bad bits. The track led over a succession of ranges covered with forest, so dense and so continuous, that it was quite a relief when we came to the Sungari or one of its affluents and got a breath of fresh air. At intervals of 15 miles would be found the hut of a ginseng cultivator, or a hunter of deer-horns and sable. Two such were situated in the craters of ancient volcanoes, which time has now clothed as thickly with trees as any part of the region. We found the mountaineers exceedingly hospitable and friendly, as real sportsmen invariably are, though their huts were so small that we found it a tight fit at night. We were obliged to sleep cheek by jowl with them on the little *kang* or brick platform, which is heated by the fire that cooks the food, and serves the purpose of stove, drawing-room, dining-room, and bed-room. Really, sometimes we were packed just like sardines, but unless a Chinaman got his foot in one's eye, as happened sometimes, we slept peaceably enough. The weather was hot, and occasionally we had to carry the mules' loads for them over bad places, but we found plenty of wild strawberries, and a kind of delicious bleaberry or barberry growing in great quantities, which was very refreshing.

The fifth day after leaving T'ang-ho-ko we had to dispense with the mules, as the bogs beyond were absolutely impassable for any beast of burden whatsoever. We reduced our necessaries as much as possible, and the rest we made up into packs, which we carried ourselves with the aid of a hunter, a very good fellow, who volunteered to come and help us. It may be thought we should have brought more attendants, but the huts would not have held them, and besides, supplies were so scanty in the hills, that, although the hunters were extremely generous in giving us dried deer's flesh and other trifles, a larger party could not possibly have obtained food. We now came to a swamp pure and simple, and boggy glens, where first we saw extensive groves of larch. At last, on the ninth day after leaving the guild, we began the ascent of the long-wished-for mountain. The lower slopes are covered with forests of birch and pine, but these gradually grew less dense, until we emerged on a most delightful grassy plateau dotted with trees. To us it was like being transported into the Garden of Eden. The forests had certainly not been devoid of flowers, and some fine turn-cap lilies and orchids and bluebells had lit up their gloom; but now we came upon rich, open meadows, bright with flowers of every imaginable colour, where sheets of blue iris, great scarlet tiger-lilies, sweet-scented yellow day-lilies, huge orange buttercups, or purple monkshood delighted the eye. And beyond were bits of park-like country, with groups of spruce and fir beautifully dotted about, the soil covered with short mossy grass, and

spangled with great masses of deep blue gentian, columbines of every shade of mauve or buff, orchids white and red, and many other flowers. One gem of a meadow was sprinkled with azaleas bearing small yellow flowers, which looked at a distance like gorse. Now for the first time, and up above us through the trees, we could see the ragged needle-like peaks of the Old White Mountain. As we marched along the plateau we heard the sound of subterranean streams rushing madly underground, and in one place we crossed a deep gully by a natural bridge, the banks of which approached so closely that we could almost jump across, while peering over we could see the mountain torrent roaring far below like the river Beas at its source. It would be very easy for a careless walker to slip into one of these hidden watercourses and lose his life.

Finally we arrived at a cottage called T'ang-shan, at the base of a grassy hill which slopes down from the final heights of the Pai Shan. A short distance there are two splendid cascades not very far apart, each about 150 feet high, one of which is called by the natives the real source of the Sungari proper. A mile or two away it forms a burn about ten yards across, on the edge of which is a fine hot spring, 142° Fahr. The evening we arrived we climbed a hill 700 feet above the plateau, from which we had a grand view of the peaks. From this point of view there appeared in sight two sharp peaks, with a saddle between them, and the whole steep side below was shining white, but not with snow, for there were only a few patches of it to be seen in clefts, but of wet, disintegrated pumice stone, large lumps of which we had noticed on the banks of the Sungari on our road through the forests. The westerly peak looks slightly the higher, but after ascending the saddle we found it was lower than that on the east, which is a splendid object—bold, sharp, and jagged. Beyond it, further to the east, on a rock-broken sky-line, stands another conspicuous pinnacle, shaped like a serpent's tooth, and from there the shoulder of the mountain slopes gradually down till it reaches the plateau where the hut is situated.

The first day of our halt it rained, and we made the ascent the next. We climbed the slope behind the house, up to our waists in luxuriant wet grass, full of tiger-lilies and other gorgeous flowers, and across a stretch of moorland perhaps two or three miles broad, covered with a dwarf white rhododendron, a lovely little pink flower like an azalea, a pink heath, and other flowers. Then we commenced the slope leading up to the saddle. Even here, on the naked pumice, were clumps of wild yellow poppies, dwarf saxifrage, a vetch, and other botanical treasures. It was a steep climb, reminding one somewhat of Vesuvius, except that the rain had consolidated the loose pumice. At last we got to the top and looked over the edge, and lo! at the bottom of a crater on whose brink we were standing, about 350 feet below us, we saw a beautiful lake, its colour of the deepest, most pellucid blue, and though the wind was howling above, its surface as still as Lake Lemman, reflecting the crown of fantastic peaks

with which the rugged top of the mountain was adorned. It was indeed a superb spectacle. We judged the lake to be about  $1\frac{1}{2}$  mile broad, and six or seven miles in circumference.

After enjoying the view for some time Mr. Fulford and I attempted to descend the crater. The hunter guide refused to accompany us, because he said it was too steep, but he pointed out a place down which, he said, deer occasionally found their way to feed on the grass, of which there was a narrow fringe in one place between the water and the base of the cliff. We succeeded in getting down to about 60 feet from the bottom, through loose pumice and stones, but we were suddenly stopped by finding that, under the action of water, the cliff which we were descending had crumbled away, and left some 15 or 20 feet of sheer perpendicular rock in front of us. If we had had a rope we might have got to the bottom without difficulty, but the descent was too risky without it, as the friable stone and the pumice it was embedded in gave no secure foothold. Mr. Younghusband, in the meanwhile, had been boiling his thermometer in a cleft filled with snow, the only place where he could escape from the wind, and then he commenced the ascent of the eastern peak. It was very steep, and not unaccompanied with danger, as the foothold was very uncertain, and had he slipped he might have rolled over the edge and dropped five or six hundred feet into the lake. However, he succeeded better than we did, and got up to the highest pinnacle, and crawled out to the very edge of a peak of rock which projects over the lake like a bowsprit, and waved his hat to us. From below it looked as if nothing but an eagle could find a resting-place in such a position. He calculated the height to be 7525 feet, but allowing for an error in the reading of the boiling-point thermometer, which we subsequently discovered, 500 feet must be added on to that. The view, even from the saddle, of the surrounding country, was very fine. Far away in Korea we could see forest-clad peaks which looked as if they might almost be as high as the Pai-shan, but all the hills in the immediate neighbourhood, including the Lau-ling, that is the range we crossed after leaving the Yalu, seemed pigmies in comparison. So farewell to the idea of snowy peaks 10,000 or 12,000 feet high.

From the north end of the lake there issues a small stream which is the source of the Erh-tao-chiang, or Second river, the eastern branch of the Sungari, whose confluence with the main stream we visited a few weeks later. The source of the Yalu was said to be about ten miles off, that of the Tumen thirty, but we could not visit them, as our supplies were almost at an end, and had it not been for Mr. Fulford's skill in shooting partridges we should have had very little to eat. Whenever we heard a shot fired we used to ask if it was an old one or a young one, the old ones had so much more meat upon them. The birds used, when flushed, to fly up into the trees, and it required a very quick eye to distinguish them in the boughs.

The journey to the Pai-shan would have been perfectly enjoyable had it not been for a plague which former writers on Manchuria have alluded to—I mean the midges and gadflies. The misery caused by insect pests is a stock theme with travellers, too common perhaps to call for sympathy. And yet if there be a time when life is not worth living I should say it was summer in the forests of Manchuria. The midges are worst at night and in the early morning, though they by no means object to the middle of the day also. Clouds of them almost darken the air, and they bite like fiends. Mules and cattle are picketed at night to the leeward of fires, so that the smoke may protect them. At sundown all the doors and the windows of houses are shut tight, though the smoke and summer heat are stifling. Often a fire must be kindled as well on the floor, to fill the house with smoke, and when full of Chinamen also the atmosphere in the early morning can be better imagined than described. Men at the plough carry circlets of iron on their heads, on which are stuck pieces of burning touchwood, and pieces of it in their hands as well. Fortunately we had provided ourselves with green gauze veils, which were invaluable when we went to bed or when marching in the early morning, and at meals we enveloped ourselves with smoke. The gadflies were less annoyance to ourselves than to our beasts, as they invariably selected any that were sick or tired. They did not appear till seven or eight in the morning, and retired at sundown, so by marching before daylight a little respite was obtained from their attacks. They were huge fat insects, and at this distance of time they seem to me to have been as big as stag-beetles. There are several kinds, one striped yellow and black, like a giant wasp; and the rapidity with which they can pierce a mule's tough hide is inconceivable. In a few moments, before one could go to its assistance, I have seen a wretched beast streaming with blood. Fortunately the gadflies are very stupid and slow, and easily killed. I remember once Mr. Fulford and I had to stand over a mule which had tumbled several times down hill, and was quite exhausted, smashing the gadflies as they settled with slabs of wood, until night came on. I have no idea how many hundreds we killed, but we saved that mule's life. They did not often bite men, but occasionally a busy, curious, thirsty gadfly would try how a "foreign devil's" blood tasted, and then that "foreign devil" jumped and made remarks.

We had intended to shoot big game in the hills, but we soon found that sport and travel were not compatible. We saw tiger's "pugs," but the jungle was far too thick to go after them. The hunters trap them in cages, though some, as in India, worship them and will not hear of their being disturbed. The preparations for the sable season were just commencing. When the snow is on the ground, the sable, which is a species of weasel, likes travelling along the trunks of dead trees to keep his feet dry. So the hunters choose fallen timber or fell trees for the

purpose, and drive a row of sharp pegs on each side along the top, the pegs being a few inches apart, so as to make a kind of little avenue for the sable to pass through. In the middle is placed an ordinary figure of four trap from the top of which a long sapling is suspended, which falls and crushes the unfortunate animal. The deer are caught in pitfalls, beautifully hidden, into one of which Mr. Fulford tumbled one day. It was 16 or 18 feet deep, and he might have been seriously hurt. The black bears, exactly the same beast in appearance as that of Kashmir, do a great deal of damage by pulling the deer out of the pitfalls and devouring them. We found one in the act and article of finishing a magnificent stag, with ten points to his antlers. It is a very serious matter when the bear munches up a pair of horns worth 30*l.* or 40*l.* Unfortunately, when we commenced carrying our kit, we had to leave our rifles behind, or we might have had good bear-shooting.

A good many of the names in this region are Korean, and the hunters told us that it is not many years since the last Koreans were ejected, not without bloodshed.

After our return we looked at Du Halde and found the following account of the Pai Shan, which, it will be seen, our visit corroborates almost exactly. I quote the English translation :—

“The mountain from which the Sungari derives its source is likewise the most famous in Eastern Tartary. It lies much higher than the rest, and may be seen at a vast distance. One part of it is covered with wood, and consists only in a soft gravel which looks always white. Therefore it is not the snow that whitens it, as the Chinese imagine, for there never is any, at least in summer. On the top are five rocks, which look like so many broken pyramids exceeding high, and are always wet with the perpetual fogs and vapours that condense around them, and in the middle they enclose a deep lake, whence issues a fine fountain that forms the Sungari. The Manchus, to make the mountain still more wonderful, have a curious saying that it is the mother of their great rivers, the Toumen, the Yaloo Oola, and Cihou Oola, which having coasted the borders of Corea, unite and fall into the sea of that kingdom.

“But this is not exactly true, as may be seen in the map, nor can the origin of the rivers be attributed to the Chang Pei Shan, unless you include the neighbouring mountains that separate the kingdom of Corea from the ancient city of the Manchus.”

This description is quoted from Père Regis, who with Pères Jartoux and Fridelli surveyed Manchuria for the Emperor Kanghi in the year 1709. It is difficult to say whether it has been written by an eye-witness. The three Fathers began their work on the 8th of May, and went to survey Pechili on the 10th of December, and I am inclined to think they could not have had time in the interval to go to this remote mountain as well as to visit tracts so widely apart as the country to the north of the Amur, the Usuri, and Hunchun, which they mention doing. Certainly they could not, if they travelled together, as some expressions used would imply they did. They necessarily had to trust much to hearsay,

and it is scarcely accurate to describe the circle of peaks as "five broken rocks." Moreover, the lake and mountain are not specifically marked on their map. Still, whether the old Jesuits ever looked down on the blue waters of the Lung Wang Tan or not, we may be sure it was not the fault of their want of enterprise, and to them belongs the honour of first revealing the existence of the lake to Europe. I may add that the mountaineers talked of a boundary pillar not far away on the Korean frontier, dating from the fifty-first year of the emperor Kanghi (1711), just two years after the survey was finished, and that Pere Regis alludes to this frontier as if it had been duly demarcated.

We returned to T'ang Ho Kou, the confluence of the river Tang with the Sungari and the head-quarters of the guild, by the way we came, without adventure, unless I may count a snake story as one. Our followers and ourselves had been sleeping in a deserted Korean hut, and on getting up in the morning, one of us saw the head of a snake peering out between a bit of matting on which we had been sleeping and the wall. We lifted up the matting, and there lay four big brown adders. They were sluggish brutes, and made no attempt to escape, so we killed them, and found all of them had poison fangs in their jaws. If they had crawled over us in the night, one of us might easily have been bitten.

By this time it was raining nearly every day, and the rivers were in high flood. The vice-president of the guild, Mr. Yen, told us it was impossible to find our way to the valley of the T'umén by the route we had contemplated taking. I believe myself if supplies had been available we might just have succeeded in doing it, but the guild being short themselves would give us none, and there was a risk of our being caught between two rivers and starved. Mr. Yen then offered, if we liked, to guide us through the mountains to Kirin, and as the season was advancing we thought it best to accept his offer and go to Tsitsihar. The track was difficult both to find and to follow, and I am bound to say that Mr. Yen proved himself a good guide. We crossed, as before, a seemingly endless succession of forest-clad hills and swampy valleys, with occasional settlements. One valley in particular, that of the Sung Ho, not far from our starting-point, was several miles across, covered with the most magnificent crops of millet and Indian corn I ever saw: but places like this were oases in the desert. Three of the rivers could only be crossed in dug-outs, the owners of which tried to extort extravagant sums for the accommodation. In one instance we evaded the enemy by taking a circuitous and very difficult route over a ridge, from which we had a final and magnificent view of the peaks of the Pai Shan, shining sixty or seventy miles away on the horizon. At another place we agreed with one of the people for a handsome donation, but when our baggage was across, another man tried to stop us, and threatened to send our things back again if we did not give more. He soon saw, however, that we would stand no nonsense, and we went on unmolested.

After a week's journey we came upon the Sungari again at a place called Yu-si Ho Kou-tzü, a short distance from the place where the Erh-tao Chiang, or eastern branch, joins it. It is here a splendid stream, 300 yards broad, and the scenery at the confluence is grand. The Erh-tao Chiang rushes down a narrow ravine with lofty precipitous sides, crowned with forests, and a tall cliff, or rather rock—for it is an isolated mass 800 feet high—hangs frowning over the meeting of the waters. The Erh-tao Chiang, though shown in the maps as the main stream of the river, is, as its name implies, the second. It is not very much more than half as broad as its fellow, though very deep. Beyond this point we came on extensive gold-washings, where we were warned to look to our guns, as the diggings were situated in a kind of no-man's land, out of the jurisdiction and protection both of mandarin and guild, and upwards of three hundred outlaws had assembled there to wash the sand for gold. However, though we spent a night quite close to them, they did us no harm.

At last we crossed the Hwa-pi Ho, the Khuifa river of the maps, one of the finest tributaries of the Sungari. Beyond this it was comparatively plain sailing. The country was settled, and the roads wide enough for carts. We emerged from the perpetual gloom of the forests and the everlasting chop, chop, of the axe clearing away trees from the path was heard no more. One unmistakable sign soon announced that we were out of the safe protection of the guilds. All important shops had high walls and small fortifications to protect them against brigands, and we crossed one low pass, called the Ching-ling, which was a favourite haunt for these gentry. Not very long before three carts laden with valuables—opium, deer-horns, and the like—were looted in open day, and nine persons in charge of them were murdered.

During our progress from Mukden to Kirin we made a collection of flowers and plants, the preservation of which was a source of some difficulty and anxiety, owing to the constant rain. The Director of the Royal Botanic Gardens, Kew, has kindly favoured me with the following note upon it:—

“It comprises upwards of 500 species of Flowering Plants, 32 Ferns, and 10 Lycopods and Horsetails (Equisetum). Unlike the vegetation of the mountains of the Peking region and the neighbouring provinces, this specimen of the flora of Manchuria contains a very small endemic element, and less than half a dozen absolute novelties. Among the genera characteristic of the flora of North-eastern Asia, *Stenocalium*, *Eleutherococcus*, *Platycodon*, *Glossocomia*, *Metaplexis*, *Brachybotrys*, *Siphonostegia*, and *Funkia* are represented; but with few other exceptions the genera are dispersed all round the north temperate zone, and many of these have a very much wider range. In short, it is a part of the same floral region to which the British Islands belong, and no fewer than 160 of the species collected, or nearly a third of the total, are identical with the species inhabiting these islands. These species are almost all herbs or very dwarf alpine shrubs. As in temperate North-eastern Asia generally, the proportion of arboreous and shrubby species to herbaceous

species is relatively high. They include three limes, six maples, one pear, one mountain ash, one cherry, one bird-cherry, two thorns, one elder, one dogwood, one ash, five conifers, three willows, two poplars, two hazels, and one oak.

"The predominant Natural orders are:—Compositæ, 65 species; Rosaceæ, 30 species; Liliaceæ, 28 species; Ranunculaceæ, 27 species; and Leguminosæ, 20 species; and conspicuous genera are *Aquilegia* (columbine), *Pæonia*, *Dianthus*, *Potentilla*, *Lathyrus*, *Spiræa*, *Aster*, *Artemisia*, *Senecio*, *Saussurea*, *Adenophora*, (*Campanula*), *Polygonum* (knotgrass), *Lilium*, &c.

"Otherwise noteworthy plants:—*Papaver alpinum*, *Vitis vinifera*, *Trifolium lupinaster*, *Saxifraga* (a new species with large peltate leaves), *Linnaea borealis*, *Phyllodoce cærulea*, *Utricularia intermedia*, *Pinus mandshurica*, *Lilium* (various species)."

A supplementary collection was also made in the autumn on the Mongolian steppes. We also preserved a small number of bird-skins, though the rapidity of our movements and the obstacles we met with greatly impeded our ornithological efforts. Dr. Bowdler Sharpe, of the British Museum, has obliged me with the following observations on our specimens:—

The collection comprises the following interesting species:—*Tetrao tetrix*, *Lanius sphenocercus*, *Otis Dybowskii*, *Acridula caudata*, *Sitta villosa*, *Turdus naumanni*, *Perdix barbata*, *Emberiza castaneiceps*, *Ninox scutulata*, and *Accentor erythropygius*. A black woodpecker is identical with a species found in the Tyrol.

A week's journey from the Hwa-pi Ho brought us to Kirin. It is probably the filthiest town in China, which is saying a good deal, and we were detained by the rain for three weeks in the filthiest inn in the place. Our room was situated on one side of a large quadrangle, which, during our stay, was one lake of mixed mud and sewage, as a large open drain ran through the centre of it.

The situation of the town is undeniably fine. The Sungari, on emerging from the hills, low spurs of which extend even beyond Kirin, sweeps round from west to east in a great bend for about four miles, and then turns northward again. The town, which contains, I should estimate, from 75,000 to 100,000 inhabitants, extends for about two miles along this bend, so close to the bank that the street along the river front is constructed of wooden flooring raised on piles, in many places rotten and most unsafe. A circle of low hills springing beyond the west end of the town curves right round behind it, and so that with the river in front and rising ground behind, it might be made a very strong place. The only thing of interest is the arsenal, which has recently been established under the management of a gentleman named Sung, who received his training under foreigners in the arsenals of Tientsin and Shanghai. He was exceedingly courteous and friendly, and not only showed us over the arsenal, but asked us to dinner twice, and feasted us like princes. It was extremely interesting to see a large establishment like



the arsenal filled with foreign machinery, some German, and some English, with boilers and engines and steam hammers, just such as one might see at Woolwich or Elswick, all erected and managed by Chinese without foreign assistance of any kind. It would open the eyes of those Europeans who think that Western nations have a monopoly of mechanical and administrative ability. And you may like to hear the Chinese verdict on English, compared with German machinery. The latter was considered to work more quickly and did light work better, but the English was more solid, and could be depended upon for accuracy. Amongst other curiosities, Mr. Sung showed us a machine gun invented, perhaps it would be more correct to say adapted, by one of his foremen from a Western model. It was so portable that two men could carry it about and the tripod on which it worked with the greatest ease. We were shown it at work, and it can fire eighty shots a minute smoothly and without any symptom of obstruction. On the opposite side of the river to the arsenal a powder factory has also been put up, in which gunpowder is being manufactured on the most approved principles. The fact that one of the first uses to which the Chinese are putting the mechanical knowledge they learn from foreigners is the construction of machines for destroying their fellow-creatures, affords food for reflection.

At Kirin we changed our pack-mules for carts to get over the ground faster, but our start did not augur well. The road through the great northern gate of the town, the capital of the province, was so much out of repair, that the carts stuck in it for a couple of hours, and one was upset in a lake of black mud. That, however, is not an uncommon sight at the entrance even of Peking. We followed the left bank of the Sungari for about 24 miles, and then crossed it at a place called Wu-lu-kai, where stand the remains of giant walls, said to be those of a city which flourished a thousand years ago. Père Verbiest went there with the Emperor Kanghi in 1682, and it was even then described as the first city in all the country, and formerly the seat of the Tartar Emperors.

About twelve miles beyond this we crossed a fine stream 120 yards wide, called the Shih-chia-tzū, which has apparently escaped the notice, I do not know how, of previous travellers. Our onward journey followed the track taken by the Archimandrite Palladius in 1870. As far as Petuna the country was richly cultivated, and the crops were very fine, principally the tall millet, beans, and hemp, the last-named taller than I ever saw it before. The rivers were still in flood, and the whole country at the junction of the Sungari and the Nonni was under water, forming a lake ten miles from shore to shore. The day we arrived a storm came on, and the ferryman refused to start. There was no shelter on the river bank, and we could not get back, as the marsh we had just crossed was by that time like a sponge and quite

impassable; so we were in a dilemma. We tried sending one cart back, but it stuck in the mud, and took two hours to extricate. Eventually, after a wretched day spent in the rain and wind, the ferrymen were persuaded to start, and shortly after nightfall we came to a tiny fisherman's hut, on an island in the ocean, the owners of which had pity on us, and took us in. I regret, however, that the exposure gave Mr. Fulford an illness from which he did not recover for some time.

Beyond the Sungari we came for the first time on the Mongolian steppes. Great parts of the country were inundated, and lakes were to be seen on either hand, stretching far away into the distance. We could not, therefore, follow the Archimandrite's route exactly, but made numerous diversions. The steppe is so bare, that a single tree forms a conspicuous object for many miles round. At intervals there are small villages adjoining the Government postal stations, and occasionally some Mongol houses are to be met with.

In this region the Mongols have almost entirely abandoned their nomad life, and we only saw two youarts, both of them in course of construction. Great herds of ponies and sheep were grazing on the plain, and occasionally there was a little cultivation, but the Mongol is a bad farmer, and the crops were very poor. We were thankful, however, to get from them excellent milk, and what is more, *ghee*, the existence of which outside India we had not before suspected. They also, such is the abundance of cream, manufacture a kind of cheese called *naphi*, or milk skin, which is very good. It is made by simmering a bowlful of milk for hours together till the residuum is left in the shape of a cake about half an inch thick. When fresh and soft it is very good, something like Devonshire cream, and when dried it will keep for a long time. In this region the houses cease to have gabled roofs, having flat terraces instead, as in Egypt and other Oriental countries. The explanation is that wood is scarce in the north, and flat roofs can be constructed with a smaller quantity of timber.

Tsitsihar is about 360 miles north of Kirin, and we did the journey in 18 days. We might have done it in less, but unfortunately the only agreement we could make with our carters was one for a daily wage, so, like true Chinese, they purposely delayed our progress. I strongly recommend any one travelling in China never to make an agreement of that kind. It will be far cheaper in the end, and far more satisfactory, to agree even to exorbitant terms for piece-work.

We had contemplated going as far as Aigun and Blagoveschensk, but except for an occasional Buddhist monument, exactly like those of Ladakh, the country was not very interesting, so we determined to visit the settlements north of the Sungari, which have been springing up in this region with great rapidity during the last few years. So we turned towards the south-west, and a journey of about 170 miles over entirely

bare steppe brought us to the flourishing town of Hulan. The steppe was like an undulating sea of grass, the crest of each wave being about four miles apart, and almost entirely uninhabited. In some places the soil is strongly impregnated with alkalies, from which by lixiviation various preparations of soda and saltpetre are made. The process is very rude, exactly akin to what may be seen any day in Ladakh and in Sind. Vast flocks of antelopes, *huang-yang*, were occasionally met with, as well as large flocks of bustards, some of which we secured. Numerous varieties of cranes and wildfowl were also observed, but with the exception of the bustard they were all too shy to allow of our obtaining specimens.

The steppe comes to an end about 30 miles from Hulan, and the contrast between the uncultivated prairie which belongs to the Mongol dukes and the rich reclaimed tract beyond, which is in the jurisdiction of the Chinese, was very abrupt and very striking. The district we now entered has only been settled in comparatively recent years. It lies between a branch of the great Khingan range, which extends northward up to and beyond the river Amur, and the river Sungari. It is from 70 to 100 miles broad in the widest part, but proceeding eastwards the spurs approach nearer and nearer to the river till but a narrow strip is left. The immigration for some years past has been annually increasing. The principal towns are Hulan on the river of the same name, Pe-tun-lin-tzū 50 miles to the north-east, and Pa-yen-shu-shu about the same distance to the south-east of Pe-tun-lin-tzū. All these places offered a great contrast to the more ancient towns of Manchuria. The streets are crowded with shops, spacious, elegantly decorated, and full of goods of a better class than are seen in towns further south; building operations are going on as rapidly as in a London suburb, and everything bears evidence of growing and prosperous communities. It may be called the Manitoba of China. Unfortunately, the administration is still very imperfect, and the country is infested with banditti, who find an asylum in the mountains to the north. It is not fair to say that the authorities are blind to the existence of the pest, or that they fail to do anything towards putting it down. The greater part of the garrison of Tsitsihar itself is employed on outpost duty against the brigands, and at the large village of Chao-hu-wo-pu there was an officer on special duty with a flying column. Some French missionaries situated at Pa-yen-shu-shu and the vicinity told us that the number of robbers executed was very great, amounting in the last year or two to no less than 500 or 600; but all mandarins are not energetic, and all Manchu soldiers, especially those who have taken to gambling and dissipation, are not brave. One mandarin we heard of as conniving with the brigands at sacking an important town, and several instances were told us of soldiers who had surrounded brigands ignominiously letting them escape. In India these malefactors would be pursued into their

fastnesses, or the passes into the hills would be blockaded, and they would be starved out; but the mandarins reserve all action till the enemy actually come down to raid. It may be wondered therefore that colonisation should continue extending, for both life and property are most insecure. But if settlers were deterred by dangers of the kind, Red Indians would be masters of North America to this day. They sack towns, villages, isolated distilleries and pawnbrokers' shops, and occasionally, as in Italy, they carry away men whom they suspect to be possessed of wealth; a ransom is then demanded, failing which the brigands invariably keep to their word, and send the victim's head back to his friends. Occasionally they try what the cutting off of an ear or nose may do to extract money when sending for it in the first instance. We ourselves, towards dusk one evening, met with a party of five, all armed with rifles, on the high road to Pe-tun-lin-tzū, but we saw them at a distance and displayed our guns. Our carts were going at a trot, and they did not attempt to molest us. One of the missionaries told us afterwards that it is thought unlucky to interfere with "foreign devils." The towns and large villages, and all important places of business are as strongly fortified as possible, even to the mounting of small cannon on the tops of the walls, and most travellers carry arms of some kind. One kind of life-preserver was new to us. It consists of a series of heavy links of iron, with a piece about six inches long at the end, the whole attached to a short wooden handle, somewhat resembling a dog-whip. It gives a tremendous blow, but of course would be useless if the assailant closed. From Pe-tun-lin-tzū as far as San-sing, and even as far as Ninguta and Hunchun, the authorities sent an escort of soldiers with us, but they would not have been of much use had the brigands attacked, as they were always loitering behind or had cantered on ahead to secure themselves good accommodation.

There are three French missionaries established at Pa-yen-shu-shu and in the neighbourhood, all worthy specimens of their race and sacred profession. They received us with the greatest cordiality, and treated us to home-made claret and *eau de vie*, prepared by themselves from the wild grapes of the mountains, and very good liquor it was. Their congregations are not very large, but they are extending, and here, as elsewhere, it was evident these good Fathers enjoyed the thorough affection and confidence of their people; not that this is surprising, for they have devoted their lives to their work, and never contemplate returning to their native country. A few years ago a fourth missionary attempted to establish himself at Hulan, but he was attacked by a number of ruffianly soldiers, at whom, with great want of judgment, he fired a pistol and killed a mandarin. The result was, he himself was nearly beaten and tortured to death. It might have been expected that this incident would have led to the position of the other three missionaries becoming untenable, but it is creditable, both to the Chinese

and to the missionaries themselves, that they have suffered nothing in consequence.

The missionaries told us that the Solon Manchus who inhabit the hills to the north are still as savage as they were two hundred years ago, when even the women were described as riding and hunting exactly like the men. While we were at Hulan, three Chinese returned from the hills where they had been searching for a medicinal root, the survivors of a party of thirteen, nearly all of whom had been murdered by the Solons.

A march or two beyond Pa-yen-shu-shu the cultivation begins to fall off. The low ground is somewhat swampy, broken by a series of low undulations of gravelly, poor soil, and the price demanded by the Government does not offer sufficient inducements. Between Pei-yang-mu, the place at which the high road from Kirin crosses the Sungari, and San-sing, about 120 miles, cultivation is scanty and bad. Still, a great deal of good land is still left.

The next place of importance was San-sing, which is situated on the right bank of the Sungari, on a spit of land between the two rivers the Hurka or Mutan Chiang, and the Wu-kung. The first is about 150 yards broad, and for a mile below the confluence its clear blue waters can be seen flowing side by side with those of the muddy Sungari. The Wu-kung joins the Sungari about a mile further west, flowing along the base of a precipitous range of hills. It is about 50 yards broad, and at the time of our visit was ten feet deep, though occasionally it is shallow enough to ford. San-sing is about 150 miles above the place where it joins the Amur, and 300 from Khabarofka, the capital of the Russian Maritime Province. There is no road along its banks, but the stream is very deep, and navigable by large craft. The authorities do not permit immigrants from the south to settle below San-sing, and trade between that place and the Russian stations on the Amur is discouraged, which is a pity. The Amur is the natural outlet for the fertile districts north of Kirin, and were the Russian and Chinese officials, or perhaps I ought to say, the Russian and Chinese Governments, on a thoroughly friendly footing, a commerce valuable to both countries might easily be developed. To guard this great waterway into their country, the Chinese have erected a fort about seven miles below the town, at a point where the Sungari is very narrow. The fort is armed with five great Krupp guns, and the newest and most expensive sort of shells. A number of soldiers were hard at work in the fort, but most of the garrison, so we were informed, are kept out of mischief at a gold-mine, which is worked on behalf of the Government, a little distance off.

At San-sing we tried to make the acquaintance of the Yü-p'i-Tatzü, or Fish-skin Tartars, who wear clothes made of salmon-skin. They have now retired 100 miles down the Sungari, and only come up to

San-sing in the winter to make purchases, so we could not see any of them.

From San-sing we proceeded up the right bank of the Mutan Chiang as far as Ninguta, about 170 miles to the south. The scenery down this river must be very lovely in summer. It winds about in a deep valley between hills covered with dwarf oak, and which in most places come down to the water's edge, while on the east rises a chain of fine mountains, the tops of which are covered with lofty pine forests, and form the watershed of the Hurka and the Usuri. The fall of the river is very gradual, nor did we notice any rapids during the whole length of its course. Its average width is about 100 to 150 yards, the depth varying from five to ten feet, so that there are no fords. Occasionally it divides into three or four channels, the islands formed by which are covered with willows, which add greatly to the picturesqueness of the valley. The road, which was constructed about seven years ago, I believe, for military purposes, follows the old mule-track, and is in consequence barely fit for wheeled traffic. It crosses a constant series of spurs, some of which are extremely steep, and we had several accidents in crossing them. Between the spurs lie swamps which have been causewayed and bridged in places, but many of the bridges are broken down, and the quagmires have occasionally swallowed up the roadway. In addition to this the hill-sides themselves frequently form one connected morass, owing to the vast number of springs which rise high up on the mountain sides. Had not the first frosts of winter begun and the surface become hard, we should have found this road very difficult.

Forty miles from San-sing we stopped at Wei-tzu Ho, from which place the mule-track starts that was taken by the heroic M. Venault in his memorable journey to search for the murdered M. de la Brunière in the year 1850. At the present day even carts find their way across the mountains as far as the junction of the Moli with the Usuri. Up to Wei-tzu Ho cultivation is pretty general, but south of it the valley narrows, and population almost ceases. For upwards of 100 miles almost the only houses are those occupied by military outposts, each manned by from fifteen to twenty soldiers, whose duties are to carry the post, and, if necessary, capture brigands. They are garrisoned half from San-sing and half from Ninguta.

Those who have read Mr. Ravenstein's work, 'The Russians on the Amur,' may remember the following passage from M. de la Brunière's letter:—

"Towards the end of September, at the approach of winter, another kind of fish, called tamaha, appears in the Amur and Usuri. It comes from the sea in shoals of several thousands, and weighs from 10 to 15 lbs. in weight; the shape, and especially the flavour of its flesh, gave one reason to suppose it a kind of small salmon. God in His paternal providence, mindful even of those who do not glorify Him, gives it to the poor inhabitants of this country as an excellent preservative against the

rigours of winter. I state what I found by experience, without wine and without flour, supported by a very little millet and a morsel of the dried fish, I have suffered less from a continual cold of  $51^{\circ}$ , and which during many days exceeded  $65^{\circ}$ , than I did in the south of Liao-tung, with better food and temperature of some 4 degrees below zero."

It so happened that the season for catching these salmon was at its height when we passed up the valley. The principal tributaries of the Mutan Chiang were dammed with weirs of wickerwork, on the far side of which were coops connected with the weir by small openings. When a shoal of fish is going up, these coops fill in a short time with almost a solid mass of salmon, and they are hauled out with a gaff as fast as the implement can be inserted. In a few minutes we saw a whole boat-load landed. The eaves of all the houses in this region are at this time hung with thousands of fish split open and drying in the sun, which when cooked are not at all bad eating.

At the eighth stage from San-sing, about twenty miles north of Ninguta, we halted a day at Yeh-ho, where the Ninguta garrison is stationed, Yeh-ho being the place where the road across the mountains to Lake Hinka and the Russian settlement of Nikolsk commences. There is a little trade between the two places, which shows signs of increasing. About thirteen miles further on the Mutan Chiang makes a sweep to the west, and the road crosses it. Seven miles further stands Ninguta, on the left bank of the river.

San-sing, as might be expected from the discouragement given to settlers, is not a very thriving town. Ninguta, on the contrary, is making great progress. The valley of the Mutan Chiang widens considerably from Yeh Ho, so that Ninguta is really in the centre of an extensive plain, connected with which are numerous fertile valleys, drained by affluents of the main river. There is little trade between San-sing and Ninguta, though the river is navigable for large boats the whole of the summer. Only three or four boats a year, we were told, come from San-sing laden with earthenware and fragile articles, and they return laden with melons and fresh vegetables. With Hunchun, on the other hand, the Ninguta trade may be called considerable, as there is not much cultivation about the latter place, and it depends for flour, wine, and other bulky necessaries of life almost entirely upon Ninguta.

At Ninguta we found one civilised institution, such as would hardly be expected in so remote a place—I mean a telegraph office. More for military than for commercial and general purposes, the Chinese are now busy connecting all their frontier stations with Peking by telegraph. An office was opened at Hunchun only a few days before we arrived there, and the posts were lying ready for erection this season between San-sing and Ninguta. We met an officer of the Department between Kirin and Tsitsihar, surveying a line between Kirin and Aigun on the Amur, which also will be opened, I believe, in the course of

the present season. It seems rather like putting the cart before the horse, having telegraphs before the post-office, but from the Chinese point of view that circumstance is all in the telegraph's favour, as merchants use the line more than they otherwise would, and help to pay its expenses.

Hunchun by the road is about 180 miles south of Ninguta. We crossed to the right bank of the Mutan Chiang, a few miles below the city, on the 28th October. The season was by all accounts a very mild one, but from this time the weather got colder and colder. Leaving on October 29th, the thermometer at starting was 11° Fahr., and from that date onward till we had almost got back to Mukden, it varied from that to - 14° Fahr. The days were very short, so we had to rise before daylight and commence our march even before the first streak of dawn. It was cold, but healthy work. We dressed ourselves like our carters, in long sheep-skin robes, reaching down to the heels, with fox-skin caps that covered our ears and necks, and when riding on the carts we pulled on over our boots and trowsers a gigantic loose pair of top-boots, also made of sheep-skin. Fortunately we had very little snow, or we might have suffered serious detentions. It took nine days to march from Ninguta to Hunchun. The road on the whole is a good deal better than that from San-sing. About 55 miles from Ninguta we crossed the range which divides the valley of the Mutan Chiang from the basin of the T'umên. It is 1460 feet in height, and covered with dense forest, principally birch and pine; amongst the latter a tree bearing an edible nut was conspicuous. After crossing two more ridges, steep but not very high, both under 800 feet, we came upon the Kaya-ho, one of the principal affluents of the T'umên, here about 50 yards across. Leaving that on our right, we went up an affluent called the Wang-ching Ho, across three more spurs, after which we found ourselves on the bank of the T'umên, a little below its confluence with the Kaya Ho, just in the centre of its great bend.

The place where we first struck the T'umên, or, as the Chinese call it, the Kauli Chiang, is a basin several miles in diameter, completely surrounded by mountains, which bears the appearance of having at one time been a lake; for around the base of the hills are to be seen the remains of an ancient beach, as in the Jhelum valley in Kashmir, and little, isolated, elevated patches in the middle look as if they had been islands. The river has found its way out of this basin through a low range of hills by a narrow rocky defile. So close does the cliff approach the water that there is barely room for a cart to pass. Beyond, the valley again widens, and cultivation becomes general. On the opposite side of the river is Korea, and we could see a good deal of cultivation and a town called Ta-wen-chang, surrounded by a wall of considerable pretensions. The Jesuit Fathers have recorded their sensations on reaching the banks of the T'umên, "with nothing but woods and wild beasts on one side, while the other presents to the view all that art and labour



could produce in the best cultivated kingdom. They saw walled cities, and determined the situation of four of them, which bounded Korea on the north."

A few miles below the defile the road leaves the river on the right and passes the affluent called Mi Chiang, and the village of the same name. Twenty miles further on stands the town of Hunchun. It consists of an enclosure about 800 yards long by 400 yards broad, surrounded by a lofty stone wall, inside which is the General's yamen, and some inns and shops. The barracks are all outside, and so is the principal part of the bazaar. We recognised with pleasure that we were now within a measurable distance of civilisation, for the shops were full of foreign goods imported from Russia, such as kerosene lamps, clocks, glycerine soap, comfits, biscuits, chintz, English teacups, American canned fruit, and a quantity of miscellaneous goods. Three parts of them, I am glad to say, were English.

Hunchun is essentially a garrison town, though there are a few dealers in seaweed, toadstools, and medicinal roots, large quantities of which are sent to Ninguta and Kirin, and thence to all parts of China. There is also a considerable trade in deer-horns. Shortly after arrival we went to call on the General—an officer of distinguished service in the Tae-ping war. He received us with the greatest possible politeness and cordiality, and sent us a dinner which for excellence of cooking could not be surpassed by any restaurant in Europe. Perhaps we appreciated it the more, because from the time we left Pa-yen-shu-shu we had lived exclusively on a diet of pheasants, only occasionally varied by a wild goose or a blackcock. Throughout the whole of Eastern Manchuria pheasants swarm to an extent that is scarcely credible. Towards the end of harvest they collect from the mountains in the stubble, and I have seen occasionally 200 or 300 at a time rise from a single field. They lie very close, but are very strong on the wing, and they gave us very good shooting. In some parts too, wild geese swarmed in myriads. They generally kept high in the air, but occasionally flew low enough to allow of our securing one or two. As for the black game, they were as tame as barn-door fowls, perching in large flocks on the willow trees, and occasionally were good enough to allow us to go under the trees and pick out the finest of them sitting.

A considerable garrison is kept at Hunchun; the barracks are surrounded by trees, and the streets are cleaner than any Chinese town I have seen. One does almost think the General had attended a Sanitary Commissioner's lectures in India. Some of the troops are still armed with such antiquated weapons as gingalls (huge muskets, each of which takes two men to carry) and old Brown Bess smooth-bores, while a vast number of fighting men are wasted in carrying banners, which though very picturesque, are not likely to prove of practical use against modern rifles.

The Russian frontier, which has only recently been demarcated afresh by a Chinese and a Russian Commission, is not more than 8 or 10 miles from Hunchun. The road passes for five or six miles over an open plain, on which the Chinese have recently built two forts, and ascends a low range, an outwork of a lofty chain forming the watershed between the Tumen and the Suifun, which last river runs into the sea a little beyond Possiet harbour. Scarcely a mile from the crest of this ridge there is a brass pillar, with archaic Chinese characters recording the fact that the boundary was fixed there by Imperial command under Commissioner Wu a few months before we arrived; and about three miles beyond that the Russians have constructed an outpost for 200 or 300 Cossacks. We were not provided with passports, as we had no intention of travelling in Russian territory, but we wrote to the officer commanding, asking leave to pay him a visit, to hear the news from Europe, and to buy some stores and provisions. We received a most courteous answer, offering us the cordial but frugal hospitality of a Cossack. Accordingly we rode across, and found Colonel Sokalowsky busy with the construction of the new outpost. The whole place was like a bee-hive, for the Cossacks have to house themselves, and a fine barrack-room, together with subsidiary buildings, such as stables, hospitals, bakery, married quarters, officers' houses, and last, but not least, a great Russian bath were under construction. We were told the amount of the grant made for the entire work, and I am sure a British Royal Engineer would consider it ridiculously inadequate. The Colonel was himself his own architect, engineer, and clerk of the works, and his house was an arsenal *in petto*. On one side were ranged the carbines of his men, and around the room were nails, hinges, rope, twine, stirrup-irons, leather, in fact every kind of miscellaneous article required by his men for their houses, their horses or equipments. He showed us everything, and then gave us a capital dinner and a shake-down on the floor.

Next morning we rode off to the principal military station, Novaviyesk, fifteen miles further on, on the north shore of Possiet harbour. In summer it must be a lovely spot, surrounded by lofty mountains, with the ocean close by, but in winter it is desolate in the extreme. It bears a strong family likeness to a small Indian station, the shops, barracks, offices, and picturesque Greek church being located promiscuously, with quite the Indian want of system. The shops were quite as good as the ordinary Parsee shops, and we got all the luxuries we wanted. Possiet itself, a settlement of only thirty houses, is about two miles off as the crow flies, on the seaward side of the harbour, but by road round the head of the harbour the distance is ten miles. Novaviyesk is situated on the edge of a small stream. Two or three miles to the north, up a valley, is a colony of farmers, but they were not doing very well. The colonel informed us they did not grow enough food to support them-

selves, and the Government had to import flour to save them from starvation. A good many Koreans have taken up land in the vicinity, and the Russians consider them docile, industrious, and well behaved. We watched a party of young Cossacks being drilled, and others being instructed in gymnastics, and it was difficult to realise one was not back again in India. West of the harbour, at the point near the mouth of the T'umên where the Korean, Chinese, and Russian frontiers join, is another Russian outpost. On our return to the frontier we dined again with the colonel, meeting the Russian Imperial Commissioner, M. Methuen, who spoke English. He told us of the failure of the Home Rule movement in England, of the expulsion of the Orleans Princes and Prince Alexander of Bulgaria, and other things which were news to us, though ancient history to the rest of the world.

On our return to Hunchun the party divided. Mr. Younghusband and Mr. Fulford went back to Ninguta by the road we came, to pick up our servant whom we had sent from Kirin to the coast for letters, and to see the remarkable plain of stone, described by a former Consul in Manchuria, Mr. Adkins, while I went alone by a mule-track which leads across the hills to Omoso on the Kirin and Ninguta road. This route follows the course of an affluent of the Kaya Ho till it reaches the main range of the Chang-pai Shan. The road branches off at Liang-shui-chien-tzû, 30 miles from Hunchun, on the Ninguta road, and after about 50 miles of alternate ridge, valley, and swamp, it descends on the Wei-tzû Ho, at a place called Nan-kang-tzû, where are three barracks garrisoned by about 1500 men. It follows a valley, about 4 or 5 miles wide, which is now being settled, for about 25 miles. After crossing two spurs, it rejoins the river bank, and follows the valley for about 30 miles further, to the foot of the main chain of mountains. Here is an easy pass called Ha-la-pa-ling, and the road then descends upon a plateau much higher than the valley just left, in which the Mutan Chiang and its tributaries take their source. This plateau is intersected by vast morasses, over some of which causeways have been recently constructed, but there is also a good deal of arable land, and settlers are to be found every few miles. The plateau I spoke of is divided into sections by numerous low spurs jutting out from the main chain, and occasionally singular isolated hills like islands are to be observed.

For about thirty-five miles the road keeps along the left bank of the Sha Ho, which falls into the Mutan Chiang not far from Tung-o-kang-tzu, a fair-sized village, where a small mandarin resides. About sixteen miles to the south-west of this place stands the town of Autun, now called Tung-hwa-hsien, a walled town with a small garrison, which I conceive may be identical with the place marked on the maps Odoli, from which place a mythical history relates that the Manchu dynasty originally sprang. Unfortunately I was unable to visit it. I was travelling with a long train of pack mules, the owners of which refused

to wait for me. Some modern authorities believe the existence of Odoli to be entirely imaginary. Père Du Halde, however, describes it in considerable detail, as being very strong, accessible only by a narrow causeway, which rises in the middle of the water, where may be seen great staircases of stone, with other remains of a palace; so that it yet remains to be seen whether this account was merely recorded by the Fathers who surveyed Manchuria from Chinese hearsay, or whether the ruins really exist. I enquired of everybody for Odoli, but the name was entirely unknown to them. This, however, is not surprising, as even the Manchus have forgotten the old Tartar nomenclature, and invariably call places by their Chinese names.

Sixteen miles beyond Tung-o-kang-tzu the road crosses the Mutan Chiang, there about 60 yards wide, at its junction with a stream called the Chu-erh-tao Ho, following the course of which the Kirin high road is struck at the large village of Omoso, six or eight miles further on. This highway crosses the watershed between the Sungari and the T'umén by the Ch'ang-tsai-ling, a lofty and steep pass, about 20 miles to the west of the village. A special guard of soldiers was given to protect me while crossing, as in spite of a number of soldiers being posted near the top, the forest-clad slopes of the range are the home of a band of brigands, the pursuit of which gives the soldiers perennial employment. A day or two before I arrived, the guard had penetrated the hills, and found the brigands' house, but the occupants were away, so the house was burned, and the soldiers returned. In 1871, when a Consul (Mr. Adkins) crossed this pass, he saw the dead bodies of some merchants, who had been killed by brigands, still lying on the side of the road.

About 20 miles from the foot of the pass the mule-track again left the main high road on the right, and crossed another range called Hai-ching-ling, almost as high, but not as steep, as the Ch'ang-tsai-ling, and another march beyond that brought me to Kirin. I was glad when this portion of the journey was over, for the mules went so slowly that we never started later than two in the morning, with the thermometer below zero, and continued marching till four or five the next afternoon.

Two days after I got to Kirin my companions, by hard marching, rejoined me. When returning to Ninguta, they had made the last two marches through the fertile valley of the Malan Ho, an affluent of the Mutan Chiang, and they had visited the remains of an old city called Tung-ching-chang. They describe it as having been a very large place, with lofty stone walls and good stone houses. The people have a tradition that it is of Korean origin, but others hold that it was the capital of the Bo-hai\* State, which about the 8th century A.D. was recognised by the then reigning dynasty of China, and was the capital city of the Kin dynasty before they established themselves as Emperors

\* Or Fei-hai.—[Ed.]

at Pekin. Monsignor Boyer, the coadjutor Bishop of Manchuria, who has been in the province more than thirty years, believes that this is the real site of the ancient Odoli, although the description does not correspond with that quoted above.

My companions had crossed the Plain of Stone, passing by Lake Piltan. The so-called Plain of Stone is a broad valley, formerly filled by a morass, over which a stream of lava has flowed, so that it bears the appearance of a solidified sea of molten metal. In some places the crust is deeply cleft by fissures at the bottom of which the water can be heard gurgling, which has given the Chinese the idea that there is a subterranean lake below. A good description of the Plain of Stone and of Lake Piltan may be found in Consul Adkins's report, published in the China Blue Book for 1872. West of the Ch'ang-tsai-ling, my two companions had followed the main road over the Lau-yeh-ling, which is about 10 miles shorter than the Ha-ching-ling, but not so easy to climb.

From Kirin we went to Kuan-chang-tzū, the most important commercial city in Manchuria, containing about 100,000 inhabitants. The cold weather traffic had begun, and there was as much life and bustle as in the city of London. We then went to Hsiau Pa-kia-tzū, the residence of Monsignor Boyer, and two of his colleagues, and stayed a day to see the college, schools, and church. The brigands were at work in this neighbourhood also. We saw a party of them that had just been captured, and heard of another which had visited an inn close by only the day before we arrived.

We then turned our faces southward, making for Mukden and Yingtzū with all the speed possible. Numerous high roads, in winter as hard and level as a billiard table, connect northern with southern Manchuria, and the traffic is very great. One day we counted upwards of 900 carts which we passed, most of them huge vehicles carrying upwards of a ton of goods, drawn by eight or nine mules or ponies.

During this part of the journey we saw the greater part of Liaotung. Though it suffered recently from great floods it is very carefully cultivated, and covered with flourishing towns and villages. Whatever the merits or demerits of Chinese rule, this province certainly has improved enormously in the last two centuries. In 1682 Père Verbiest wrote that only "a few houses had lately been built within the inclosures of the old cities; few of brick, and most thatched, and in no order," and that "there remained not the least mark of a multitude of towns and villages that stood before the (Manchu-Chinese) wars," and in 1709 the Jesuit surveyors recorded, "The towns are of little note and thinly peopled, and without any defence except a wall either half ruined or made of earth, though some of them, as Ichow and Kinchau, are very well situate for trade." It is evident that the walls have since been repaired

—as there are now cities with really splendid walls and in tolerably good preservation, while inside and out they swarm with a prosperous population.

At Mukden we spent a few days with our friends the Presbyterian missionaries, who are doing a very fine work in that neighbourhood. At Yingtzü we separated. Mr. Younghusband and Mr. Fulford went due west to Tientsin and Peking by land. I myself was obliged to leave China without delay, and the river at Yingtzü being closed by ice, I proceeded southward to Port Arthur, which is open all the year round. Its Chinese name is Lu-shuan-kou and it is situated at the southern extremity of the promontory known on the Admiralty charts as Kwan-tung.\* I reached it after eleven days. In the neighbourhood of Yingtzü the country is low and flat, so much so that sea water is led over it at high tide, from which salt is manufactured. Further south the country is extremely hilly, and the land on the banks of the many streams are so liable to floods that the cultivated area bears but a small proportion to the whole.

One of the principal industries in these parts is the growth of Tusser† silk. The worms are fed on the dwarf oaks with which the hill-sides are covered, and the cocoons are gathered and wound off in winter. At one filatory there were upwards of thirty or forty young men engaged in winding silk. They were crowded together in the most insanitary way, some of them working by candlelight during the day-time. At Sha Ho, which has the honour of being the first mission station in Manchuria, the resident missionary accompanied me to a mountain called Hsien-jên Shan, the Mountain of the Sages, a fine, craggy hill, partially covered with pine trees. A road winds for some distance up a fine wild glen, the bottom of which is filled with fine oaks, and ultimately ascends the mountain by stairs cut out of the solid rock to a curious cave high up on the face of the cliff. In this recess have been constructed several Buddhist temples, and two or three priests are always on duty. The view around of crags and precipices and pine-clad ravines is superb.

My next point was Ta-chiang Ho, a small port on the Yellow Sea, from which I followed a route previously described by Dr. Williamson to Kin-chao. At this place the promontory is barely a mile wide, and the Chinese are fortifying it. This part of the country abounds in remains attributed to the Koreans, who were masters of all the country as far north as Mukden in the time of the Tang dynasty, by whom, after very hard fighting, they were expelled in the year 645. One of these forts, still in perfect preservation, is about 120 yards square, with square flanking towers at the corners and in the middle of each side. The walls are 25 feet high, composed of stone at the bottom and fine large bricks, similar to those which may be seen in the Great

\* Lit. East of the Great Wall, a term applied by the Chinese to Liau-tung generally.

† In Chinese, T'u ssü,—local or native.—[Ed.]

Wall of China. The gate is very strongly fortified. This fort was probably built as a protection for the port of Pi-tzu-wo against pirates. Moreover, on the top of every conspicuous hill is a watchtower composed of a solid pyramid of masonry, 40 feet square at the base, tapering off gradually to a rounded top about 40 feet from the ground. Around it is a wall about 15 feet high. The natives informed me that these were used as watchtowers and beacons, and that in former times signals could be exchanged by means of them from the end of the promontory as far north as Mukden, some 300 miles. The day before I reached Port Arthur and finished my journey I nearly met with a catastrophe. I had been warned against attempting to travel while it was snowing: a storm came on, but I persisted in pushing on. Before very long the whole country was buried under a sheet of white, and the track, which passed over very rough and broken ground, was completely obliterated, and not a sign of a house or dwelling-place could be seen. I knew that two missionaries had found themselves in such a predicament not far from the very place where I was only two years before, and they had been kept in the snow several days without food, so I began to feel uncomfortable. Fortunately, a cart came up belonging to a farmer in the neighbourhood, and he showed me the road to a cottage, where I was thankful to get shelter.

Port Arthur is situated to the east of the Liao-ti Shan promontory, only about sixty miles from Che-fu as a crow flies. The Chinese have chosen it as the headquarters of their northern fleet, and as the first line of defence for the capital. The harbour is a good one, with a very narrow entrance to the sea, and the Government has spent large sums in fortifying the coast on each side of it. There are thirteen forts, and the artillery officer in command kindly let me see one, which was armed with magnificent Krupp guns. Great docks are also in progress, while torpedoes, submarine mines, and similar industries are also in full swing. It is garrisoned by troops drilled by foreign officers, so that altogether it would be a hard nut for any nation to crack. Here I found a Chinese transport sailing for Che-fu, and in two days more my tour was at an end, and I had left Manchuria behind me.

From this imperfect account it may be easily gathered that before long Manchuria will cease to have any distinctive existence, and will soon constitute as integral and as thoroughly a Chinese portion of the Empire as Canton. She is at present in a transition state. The southern province is, and always has been Chinese to all intents and purposes. Manchu names and traditions may continue for long within the Imperial precincts at Peking, but in their native country they will disappear. If China be wise she will carry out in the north and east the policy she has already begun in Liau-tung of sending her best, instead of her worst and most corrupt mandarins to a country which is of so much im-

portance, both politically and as a field for emigration and mining; she will foster, instead of repressing, colonisation in the Ch'ang-pai Shan mountains, and on the Russian border, as she will find a contented, well-to-do, loyal people a better defence against possible aggression than empty valleys and hills which are calling aloud for some one to come and occupy them. She will develop her mineral wealth, a royalty on which would amply pay for a better and therefore a more expensive administration, for in Manchuria as in China proper, the officials are infamously underpaid, a system which gives direct encouragement to corruption and every kind of abuse.

To any traveller who contemplates visiting Manchuria in the future, I would make a recommendation. He should make up his mind whether he wants sport or whether he wants exploration. If he wants sport, and chooses to devote himself to it, he could not do better than seek the Ch'ang-pai Shan in the early spring, go to Tang Ho-kou, and hunt in the hills around. He will get tiger, stag, bear, and numerous kinds of deer. Or better, perhaps, he might try the hills north of Pa-yen-shu-shu. If he prefers exploration, let him leave his rifles behind and go to the Pai-shan Mountain, explore the sources of the Yalu and T'umên as well as of the Sungari, and follow down the Korean boundary, which map-makers seem a little in doubt about. Then let him find Odoli, and hunt for a great wall, which Père du Halde says once existed between Korea and Manchuria, and for any other antiquities he may have a fancy for, and I am sure he will find it a very pleasant and interesting tour.

After the reading of the above paper,

Sir THOS. WADE expressed a hope that all travellers in China would be careful, if possible, to record the names of the places visited in written Chinese. The paucity of distinct sounds in the language was necessarily the cause of great confusion. As to the country through which Mr. James had travelled to the north of Korea, it was the home of many races of which the history was more or less known for thirty centuries, and who had migrated westward. Korea which was now bounded by the T'umên, in former ages spread right into the province of which Peking was the capital. In the eastern end of that province there were still remains of ancient Korean cities. The authorities of all the three eastern provinces were obliged to present their reports to Court in Manchu as well as in Chinese. The whole Court at Peking used the Manchu language *en famille*, and even Chinese officials when they had passed the highest degrees were commanded to study it, though they did not go very far. He deprecated the drawing of any distinction between Manchuria and the rest of China politically, whether in respect of its people or its officials. There was no reason to suppose that an inferior class of officials was sent there. In former days the provinces of Kirin and Tsitsihar were used, among other purposes, as places of exile for peccant officials, but they were administered by very high personages indeed, by cousins of the Emperor, and by officials possessing in every respect as high a status as any in the empire. It was one of the blood imperial who was governing Kirin in 1858 when General Muravief crossed the Amur and extorted a treaty from him conceding to Russia from the



Sea of Okotsk down to Vladivostock, some 20° of latitude. The then emperor had had on his hands for six years the Taeping rebellion, and had just got into a quarrel with England and France, but notwithstanding that he by no means surrendered the country with indifference: on the contrary, while he did not punish his cousin, he exposed the second in command for two months in a wooden collar on the banks of the Amur. Two years later, when the French and English armies had advanced to Peking, and when General Ignatief was negotiating with regard to the frontiers, the pressure of circumstances surrounding the Imperial Court was such as to leave them no option but to concede whatever Russia chose to take. Still he did not believe that the Chinese now contemplated any attempt to recover the 20° of coast-line. They were spending vast sums upon the purchase of Krupp guns and the manufacture of arms, but there were very good reasons why they should do so. Ever since 1860 foreigners had been hammering away at China to adopt their steamers and railways, and bridges, and arms, and to drill troops; it therefore could not be wondered at that they were taking steps to defend themselves. He rejoiced to hear such an excellent account as Mr. James had given of the climate and country of Manchuria. One of the early writers said of it, "Although it is doubtful in what part of the world the Creator may have placed Paradise, it is unquestionable that Paradise could not have been placed in Manchuria, and this I infer from the aridity of the soil and the frigidity of the climate." The tobacco of Manchuria was extremely esteemed in China, and was a source of considerable revenue at Peking. There was a very heavy *octroi* laid upon it at Peking, and it was a Government monopoly. But Manchuria by no means took the lead among the poppy producing provinces of the empire. He was glad of the opportunity of gainsaying the assertion that Englishmen introduced opium into China. It was introduced there by the Portuguese, near the end of the 16th century, and when its importation became so serious a question between China and England, it was already grown to an enormous extent in China itself. At the time of the war in 1839 the English importation into the country would not have supplied one per cent. of the population, and within seven years of that date the poppy was ascertained to be cultivated in ten of the eighteen provinces; that grown in Kansu being spoken of as rivalling the foreign opium. He congratulated Mr. James on having penetrated the mystery of the Ch'ang Pai Shan, the Long White Mountains. Owing to a confusion between *ch'ang*, perpetual, and *cha'ng*, long, the range had been supposed to be covered with eternal snow, which would have justified the assertion of different travellers that they were so many thousand feet high. The Chinese got rid of the question by sometimes saying they were 10,000 feet, and sometimes 100,000 feet high. Mr. James, however, had discovered that the whiteness was not owing to snow, but to a pumice stone. The lake which had been mentioned had a foremost place in the consideration of the present dynasty. The legend was that years ago three ladies were bathing there, when one was met by a stork, which laid some fruit on her lap, and she became the mother of the Manchu race, which now reigned in China. The Manchus therefore had brought themselves to regard the Ch'ang Pai Shan as sacred ground, and it had been the subject of compositions both in prose and verse of the great emperor Kien-lung, who reigned in the middle of the last century. In a paper preserved in an admirable geography, prepared about 100 years ago, Odoli was specially mentioned by him as being about 500 miles to the east—probably north-east was meant—of a city called Hsing Ching, where were the tombs of all the early emperors of the dynasty, and which was famous in past ages as the capital of the race from which the Manchus were descended. He suspected that it would be found in the neighbourhood of Tung Ching Chêng, the eastern capital of an ancient power. He hoped that Mr. James's interesting journey would encourage

other travellers to make the attempt to decide the position of Odoli, in the existence of which he had the fullest faith.

Mr. JAMES said that Mr. Ross, the accomplished author of 'The Manchus,' was of opinion that the Manchus were unable to locate Odoli at all: on the other hand, M. Boyer, the Roman Catholic coadjutor bishop of Manchuria, thought, with Sir Thomas Wade, that Tung Ching Chêng was probably about the site of it. The description of Tung Ching Chêng did not, however, agree with that given by Père Du Halde, who said it was situated in the midst of a lake, with lofty staircases, and a causeway approaching it. Mr. Ross's researches led him to the conclusion that the cradle of the Manchu race was in the valley south, not east, of the Ch'ang Pai Shan, called Huatoola, at a place known as Lao-chêng, or old town, and afterwards at Hing-King, where there was at the present day only an insignificant *yamên*. Hing-King was situated a few miles to the east of Yung-ling, the tombs of the Emperor's ancestors, the place marked as Yenden or Shing-king on the maps. It was certainly a fact that the Russians began exploring the mouth of the Amur as early as 1847, and in 1851 the towns of Nikolayevsk and Mariinsh were founded on the Lower Amur, followed by two others in 1853. But it was during the Crimean war they found how useful the river was. With regard to the Mandarins, when he was there the Governor-Generalship of Tsitsihar was vacant, the officer holding that post having, so it was said, just been dismissed for corruption; so, though it might be possible, he feared it was hardly likely that it was an exceptional state of things that he met with.

Mr. H. H. HOWARTH drew attention to the enormous amount of information published by the Russians in the 'Peking Mission.' In one volume which had been translated into German, there was a most elaborate discussion with regard to old sites, including Odoli, and the towns from which the Manchus sprang. One race, which had virtually disappeared from history, had a small fragment still remaining,—the famous dynasty of the Khetans. There was one tribe, which supplied a large number of bannermen to the Chinese army, called the Solans. It would be interesting to know if Mr. James had come into contact with them, and had collected a vocabulary of any of their words. He believed there was no doubt that they were descendants from the old race which blended the Mongols and Manchurians proper.

Sir THOS. WADE said the Solans were regarded as the cream of the Manchus. With regard to Tung-ching-chang, the word *ching* indicated the residence of the Emperor, and at one time the Khetan dynasty had five capitals.

The PRESIDENT congratulated the Society on having listened to such an extremely interesting paper. Very little was known about Manchuria, and if any one thought there was any difficulty about finding a field for geographical research in the future, he should now be satisfied that there was plenty of ground still to be explored.

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*The Aboriginal Indian Races of the State of Vera Cruz, Mexico.*

By A. BAKER, British Consul, Vera Cruz.\*

THE origin of the aboriginal tribes of Vera Cruz is involved in doubt; they may have descended from the Toltecs or the Aztecs, or from a mixture of one or both of these peoples with other races. At the present moment there is nothing to distinguish these tribes from each other except their languages, and even this distinction is fast disappearing before the advance of civilisation ever accompanied by the language of the original conquerors—Spanish. Language being thus the only distinction available, it will be as well to consider at once its statistics; and to appreciate the importance of the Indian element in the population one must glance at the whole. The following table gives the numbers of the Spanish and Indian elements of the population of this State, which may be taken at 620,000 souls, exclusive of foreigners.

		Per cent.		
1. Creoles .. .. .	99,200	15·00	} These 63·26 per cent. of the total population speak Spanish as their principal, or only language.	
1a. Indo-Creoles ("Mestizos") ..	262,160	43·26		
1b. Indians .. .. .	31,000	5·00		
	392,360	63·26	} Spoken in all parts of the State; canton of Zongolica speaks it almost exclusively. Spoken in the cantons of Jalapa, Misantla, Papantla, and Tuxpan. Spoken in Tantayuca and Tuxpan. Spoken in Chicontepec. Spoken in Acayuean. Spoken in Chicontepec. Spoken in Cosamalóapam. Spoken in Cosamalóapam. Spoken in Tuxtla.	
Races of Indians speaking principally their own languages, and but very little or no Spanish.	2. Mexican ..	161,000		26·00
	3. Totonaco ..	32,000		5·16
	4. Huasteco ..	16,000		2·58
	5. Otomí ..	8,000		1·29
	6. Popoloco ..	7,400		1·20
	7. Tepehua ..	1,400		·22
	8. Zapoteco ..	1,200		·19
	9. Chinanteco	200		·03
	10. Mayo .. ..	440		·07
		620,000	100·00	

As will be seen from the foregoing table, 15 per cent. of the population are creoles, i. e. descendants of the Spanish conquerors and immigrants, whilst over 43 per cent. are of mixed race, and 5 per cent. are Indians who from living in towns and thus coming in contact with the Spanish language have gradually adopted it to the entire, or partial, exclusion of their tribal tongues. Thus the *Spanish-speaking* population amounts to 63·26 per cent. of the whole; the remaining 36·74 per cent. speaking their own languages, nine in number. If to this 36·74 per cent. one adds the 5 per cent. of Spanish-speaking Indians, we arrive at 41·74 per cent. as the total aboriginal proportion of the population. This

\* Communicated by the Foreign Office.



In the above ten cantons the Spanish-speaking amount to 144,800, whilst the non-Spanish speaking races number 157,260.

The most important language (next to Spanish) is, as will be seen, the so-called "Mexican," spoken by 26 per cent. of the whole population of the State, and the canton of Zongolica has been added to the above list because in that canton Mexican is spoken by 20,000 of its entire population of 21,300, the odd 1300 only being Spanish-speaking. The explanation of this fact is that the canton of Zongolica is mountainous and difficult of access, and has thus escaped almost entirely the invasion of the European, so that the original tribe (Mexican) has been there undisturbed.

In the mountainous districts of Tuxpan, Tantayuca, and Chicontepec (forming a crescent from the coast inwards), and of Tuxtla round the volcano of San André, this tribe (the Mexican) has held its ground and is much superior in numbers to the Spanish-speaking races.

Next in importance to the "Mexican" comes the Totonaca tribe numbering 31,700, and occupying an irregular strip of mountainous territory about 200 kilometres long by 50 broad, and extending over parts of four cantons, viz. Jalapa, Misantla, Papantla, and Tuxpan.

The Huasteco tribe, 15,400 strong, inhabit the adjoining cantons of Tuxpan and Tantayuca. The Otomí tribe, 78,000, has its stronghold in Chicontepec, and the Popoloco, 7400, in Acayucan. The Tepehua is a small tribe of 1400, and is settled in Chicontepec.

The only tribes in the state of Vera Cruz, south of the city of Vera Cruz, are the Mexican and the Popoloco already mentioned, and the Zapateco, 950, and Chinanteco 200, both in Cosamalóapam, and the Mayo, 430, in Tuxtla. And it will be observed that it is chiefly in the lowlands that the native Indian, or at all events his language, is conspicuously absent.

The native Indian is somewhat shorter than the European, and although he is thin he is "wiry," and capable of enduring fatigue and hardship even better than the white man or negro. His skin is fine and soft, his colour ranges from brownish-yellow to nearly white, according to climate (for the State of Vera Cruz presents three distinct climates; tropical near the coast, temperate at elevations of 4000 feet, and frigid above 9000 feet). His forehead is broad, but not very high, and his coarse black hair falls in straight lines over it, giving it the appearance of being even lower than it is. His eyes are small but keen, very black, and being deeply set in their sockets give their owner an air of ferocity rather characteristic of his sad history than indicative of his present character. His nose is large but not ill-shaped, being generally aquiline. His cheek-bones are pronounced and lend some support to the theory of the Indian's Mongolian origin. His limbs, though spare, are muscular, and he carries heavy burdens long distances with less fatigue than a European.

Neither the male nor the female Indian is remarkable for personal beauty, which may account for the limited extent to which the European and Indian races have mixed. The Indian woman is almost as strong physically as her husband, and she generally brings her children into the world without assistance. It is true that a large proportion of the children die in infancy, unable to battle with the hardship of their surroundings, and this mortality has the effect of restraining the increase of the Indian race and of maintaining its physical standard by the action of "the survival of the fittest."

The Indian is decidedly brave and fights well on the side (whichever it is) which has enlisted him, or rather pressed him into its service. But he has no sentiment of patriotism, or rather his patriotism is tribal and has little or nothing in common with that of the ruling white race, to whom he has been, since the conquest, nothing more than a hewer of wood and drawer of water. He is industrious where he sees an opportunity of enjoying the fruits of his labours, but he is inclined to be lazy when he is in the service of hard masters at the starvation rate of wages—2 reales, 10d., per day—which is but too general.

The Indian possesses a large imagination, and exercises it, from what he considers necessity, as extensively as the Russian does for amusement, but he has no more of this vice of slaves than his past history would lead one to expect.

The Indian is honest, and seldom yields to even the greatest temptation to steal. His honesty is natural, while his untruthfulness is evidently only acquired as a weapon against what he considers the tyranny of the ruling race.

As a rule the Indian is sober, though, like other races, he often drowns his troubles in alcohol, generally in the shape of *pulque* (juice of the maguey plant), or *aguardiente* (spirits.)

The Indian is religious, indeed superstitious, and is very much under the influence of the clergy, the only class that has taught him that he is a man; for the conquerors by word and deed denied him the possession of a soul, and their successors have often forgotten the fact that the question was decided by a council in the affirmative. It might be thought that the conversion of the aboriginal races to the religion of their conquerors would have softened the asperities of their relative position, but it has had in this State a contrary effect; for the common religion taught the Indian that he was entitled to the rights of citizenship, whilst his conquerors denied him those rights, and used him as a beast of burden in peace and as "food for cannon" in war. The Indian to this day believes that the "white" civilisation is condemned by the religion, and the priests of the religion, it brought in its train; and to this belief may be traced the Indian's unbounded suspicion of the white man. This suspicion is ever asserting itself. When the Spaniards quitted the country they attempted to carry with them more treasure

than they could transport to the coast, and they had to abandon large caravans of precious metals. These they buried in the ground with the assistance of their Indian carters, men and boys; they then killed the grown-up carters to prevent their stealing the treasure, but they often spared the boys, simply carrying them off long journeys away from the points where the treasure was buried. There are still Indians alive who know, or think they know, of these buried treasures, and they would be entitled to a large share of them if they "denounced" them; but their suspicion of the white man is so great that they will not take him into their confidence on any terms, satisfied that if they told him of the treasure he would keep it all for himself in spite of law and justice! and so the hidden treasure remains unfound.

The Indian is decidedly intelligent, and has, when occasion chanced to present itself, shone in art, poetry, diplomacy, and statesmanship. It is only fifteen years ago that Benito Juarez died President of the Republic; he was an Indian of unmixed race, and he lived at an epoch of Mexican history when intelligence and strength of character were necessary qualities for success in public affairs, either military or civil.

The condition of the Indian since the Independence, and particularly since the "laws of reform," has no doubt been ameliorated in some measure, but in no sense radically. And unfortunately neither Benito Juarez nor any other Indian who has achieved power and influence has found time or opportunity for assisting his race. The general policy has been not to establish the Indian on the soil he is so capable of tilling, but to hand it over to foreign colonists. The experiments of foreign colonisation made in this State have, however, not been very successful, and one of them—of Southern Italians—has been a disastrous and expensive failure. The Indian's connection with the soil is still the humble one of agricultural labourer, with wages sufficient, it is true, to keep body and soul together, but insufficient to provide decent housing or clothing.

The Indian is still pressed into the army, and being poor, cannot often enforce his constitutional rights in the matter, though that such rights exist is proved by the number of appeals to the courts which Indians with well-to-do friends are able to prosecute.

He is almost entirely uneducated. He is taught little by his masters, spiritual or temporal; and what he does learn he generally learns in the barracks, and under such uncongenial circumstances, that he deserts his barracks and barrack-school on the first opportunity, although his home has no material attractions of any sort, being simply a wattled mud hut.

In short, the Indian, in spite of his legal rights of equality, is in fact still the hewer of wood and drawer of water he always has been to the race that brought him civilisation and religion, the latter of which only has he been able to assimilate and share with his conquerors.

What will be the ultimate fate of the Indian in this country is a very grave question, and its answer is at present doubtful. Some think he will entirely disappear before the superior white race—that the little of his blood that flows with white in the same veins will, each generation, become less and less, till all trace of it be lost with abandoned pedigrees, and his existence become a matter of remote history. Others, and these seem the more numerous, have faith in the physical, mental, and moral qualities of the Indian, and believe he will ultimately “colonise” his native land, cultivate its rich and boundless fields and prairies, learn to have “necessities” and to consume manufactures, and in a word become a civilised citizen, enriching commerce and the State by his intelligent agriculture.

Amongst those who have faith in the future of the Indian must be numbered Mr. Rafael de Zayas Enriquez, who has just published an able work on the subject, under the title of ‘The Redemption of a Race.’ Mr. Zayas is an advocate and a journalist (proprietor and editor of the *Ferro-carriil*, a daily newspaper published in Vera Cruz). In politics he is a supporter of the present Government, and he dedicates his work to President Diaz. But the work itself is in no sense political, and as regards the position of the Indian, it metes out praise and blame, and particularly blame, with perfect impartiality to all the administrations, of whatever party, that have existed in Mexico since the Independence.

Mr. Zayas deals with the whole Indian population of the Republic (7,000,000 in number), and therefore covers a much larger area than does this report, but his conclusions are as applicable to the State of Vera Cruz as to the other States of the Republic, and as Mr. Zayas’s views are shared by a considerable number of patriotic public men, it may be well to quote them on the subject of the future of the Indian and what should be done to assure it.

Mr. Zayas is of opinion that the present laws are quite adequate to the protection of the Indian, and that all that is required is to take means for their impartial application to Indian and white man alike. To attain this end he would establish, under the auspices of the Government, in each State, “societies for the redemption of the Indian” (just as in Europe one establishes societies for the protection of animals).

These societies would encourage the education of the Indian, protect him from all imposition on the part of his master, arbitrate between him and his master in case of doubtful disputes, protect him from being pressed illegally into the military service, supplying the necessary funds for carrying his complaint to the tribunals, encourage him to join benefit societies and to deposit his money in savings banks instead of hiding it, encourage him to live on the plains and near roads instead of in the inaccessible forests and mountains.

Whether these means will be adopted, and, if adopted, will prove



adequate to the "redemption of the Indian" is a question that time alone can solve. But it does seem highly probable that a sparsely populated country like this and the other States of the Mexican Republic will, sooner or later, direct its serious attention to its Indian races and their capacity for cultivating its rich soil, not as serfs, but as farmers or even peasant proprietors. And if once the Indian succeed in regaining a stake in his country, then indeed there will be no doubt of his redemption. But will he?

VERA CRUZ, July 22nd, 1887.

### *Indian Surveys, 1885-6.*

THE record of work of the Indian Surveys for the year 1885-6, under the direction of Lieut.-Colonel H. R. Thuillier, R.E., officiating surveyor-general, is noticeable for the completion of the work of the Afghan Boundary Commission. Although there was much delay in the settlement of the actual boundary, this delay was turned to good account by Colonel Holdich and Captains Gore and Talbot, who by making the most of every opportunity that presented itself, and being efficiently aided by some of their brother-officers, not to mention the valuable assistance given by members of the native staff who penetrated into regions where it was dangerous for the Europeans to venture, succeeded in making a reconnaissance survey of a very large portion of Afghanistan, amounting to an area of upwards of 120,000 square miles. The whole of this work is based on a network of triangulation mainly executed by Captain Talbot, extending from Mashhad in the west, on the position of which (determined by Captain Gore) the longitudes depend, to beyond Cabul on the east and to Farah on the south, a connection giving the work a value far beyond that generally appertaining to geographical surveys. Special maps of Herat, Bala, Murghab, Maruchak, and other strongholds have been prepared, while the boundary demarcation itself is represented by a map in five sheets of the combined Russian and English topography, showing a strip of eight miles adjoining the boundary, on the scale of half an inch to the mile; one copy of the English topography on the quarter-inch scale showing the boundary in relation to the roads, rivers, and passes over to the mountains to the south, in three sheets, and special maps of the country between Daulatabad and the Oxus, and of the Khamiab district, regarding which negotiations have since been concluded in St. Petersburg. At the suggestion of the Secretary of State for India, Colonel Holdich has prepared an interesting report on the geographical work of the boundary, and as this has been designedly written for publication, it is to be hoped that its appearance may not be long delayed.

Colonel Holdich will also hereafter prepare a general report, which will include the great body of the computations, and form, with previous reports on Afghanistan, a complete synoptical volume of the survey of India series. The duty of undertaking the preparation of the entire series of maps and of constructing one general map of Afghanistan, has been entrusted to Captain Gore, R.E., who is now engaged on the work in India. In connection with the Boundary Survey, it may be mentioned that interesting reports have been written by individual officers of very imperfectly known tracts, such as one by Captain the Hon. M. G. Talbot, of Daulatyar, Haibak, and the Balka survey (a notice of which appeared in our 'Proceedings'), a report by Sub-surveyor Hira Sing on the Firuzkuhi country, and

by Sub-surveyor Imam Sharif on the Taimani country and the districts south of Herat. In the second of these reports light is shed on the formation of an important mountain range of Northern Afghanistan, the Band-i-Turkestan, which is described as a separate mountain system from the Paropamisus, the connecting link between the two on the east being an insignificant watershed formed by an irregular ridge of soft clay and sand. Its configuration is that of a series of approximately horizontal plateaux, occasionally divided laterally by sheltered valleys, and singularly accessible along the main watershed. The source of the Hari Rud, according to Captain Talbot's researches, proved to be at an altitude of some 12,000 feet above sea-level, about latitude  $34^{\circ} 30'$  and longitude  $67^{\circ} 0'$ , and flows for some 70 or 80 miles, under the name of the Ab-i-Sar-i-jangal, to Daulatyar, almost due west, and in a different direction from that hitherto shown on our maps. In Imam Sharif's journey through the Taimani country one interesting identification was the Chalopdalan or Chahil Abdal peak, a solitary mountain, 12,000 feet in height, said to be the "Takht" of Zohak-i-Maran, the snake-bearing governor of these provinces in the days of Ghur, and it was from here that he built the massive walls and towers of the old forts which surround Taiwara, and border the way to Ghur. In addition to the above work, the survey of a considerable portion of Eastern Khorassan has been executed, and has recently been continued by Captain Gore, who, returning to India through Persia, has surveyed the route from Herat via Birjand through the Lut desert to Kirman and Dandar Abbass.

The military occupation of Upper Burma in 1886 afforded scope for geography, and Captain Hobday, with a moderate establishment of surveyors, has been most actively engaged on various important and diligent pieces of survey work, chief among which may be mentioned a general map of Upper Burma, from  $19^{\circ}$  to  $26^{\circ}$  N. latitude, and from the meridian of  $94^{\circ}$  to  $98^{\circ}$  E. longitude, and a survey of the city of Mandalay and environs, covering an area of about 50 square miles. In Upper Burma principal triangulation will soon become necessary for the accurate adjustment of the military and topographical surveys which are being carried on, but in the present state of the country so extensive a project would be premature.

One small party during the year ended March 1886 was engaged in secondary triangulation from Coconada to Masulipatam on the east coast. Tidal observations were carried on at seventeen stations, four of which were new, viz. Bhavnagar, Cochin, Coconada, and Chittagong; while at three, Diamond Harbour, Amherst, and Moulmein, the observations have been discontinued, in consequence of the usual period of five years' registration having been completed.

The out-turn of topography executed during the year amounts to 19,162 square miles, exclusive of forest surveys, the bulk of this being on the 2-inch scale. Three of the parties, viz. those in the Andaman Islands, Cutch, and Mysore, completed their tasks, and the first of these was deputed to the Nicobars to undertake a survey of those islands. Six parties were employed on cadastral surveys, and in addition to these riverain, forest, and traverse surveys were also in operation.

Colonel Woodthorpe, R.E., whose deputation to join the Gilgit Mission has been already referred to in the pages of these 'Proceedings,' has thoroughly sustained his reputation as a most able and intrepid explorer, and has brought back a mass of valuable information and surveys, covering in all about 10,000 square miles of the important and little-known districts of Yasin, Chitral, Hunza-Nagyr, and Wakhan. The reports and maps, as well as those belonging to the explorations in Tibet of M—H. and R—N., referred to in the President's Annual Address (see 'Proceedings' for June last, p. 342), are under preparation.

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## GEOGRAPHICAL NOTES.

**Discovery of Two New Rivers in New Guinea.**—In the course of a short exploratory visit of six weeks' duration, in March and April last, to the delta region known as Aird river, our Associate, Mr. Theodore Bevan, made the important discovery of two large rivers, flowing from the interior highlands at a distance apart of about 60 miles, into that part of the Gulf of Papua. Furnished by the liberality of the enterprising merchants, Messrs. Burns, Philp, & Co., with a well-equipped steamer, the *Victory*, Mr. Bevan and party left Thursday Island on the 15th of March, and proceeding up the Aird, found a large navigable stream entering the head of the delta, up which they steamed for about 100 miles, besides penetrating some distance up two of its tributaries. This river he has named the Douglas. The second river, named by Mr. Bevan the Jubilee, was entered from Bald Head, and navigated for about the same distance as the Douglas. His time having nearly expired, he was obliged to turn back, when apparently on the threshold of most valuable discoveries; the river at that point being still 300 yards wide, and the country hilly and picturesque, with range after range visible towards the interior, capped by a series of lofty mountain peaks in the blue distance. The trip is stated to be only a preliminary one, and we hope that Mr. Bevan's successful dash will be rewarded by his being supplied with the means of following up his discovery.

**Antarctic Exploration.**—The Councils of the Royal Society of Victoria and the Victorian Branch of the Royal Geographical Society of Australasia have jointly addressed, through Capt. Crawford Pasco, R.N., the President of the Joint Committee of the two societies, a letter to Sir Erasmus Ommanney, Secretary to the Antarctic Committee of the British Association, expressing a hope that the expediency of a national expedition for the further exploration of the Antarctic Regions will be urged upon the Home Government. The Australian Societies themselves are contemplating, if funds can be raised, to encourage by means of money grants for definite results, a preliminary exploration by private vessels, partly with scientific, partly with commercial objects. They state that the cost of a purely scientific expedition is more than any colony would defray single-handed. The joint committee had taken considerable pains to ascertain whether any unrecorded exploratory work by whalers and sealers has been done south of 60° since the memorable voyage of Ross, and have found that these seamen, one and all, have avoided these high latitudes; the rough seas prevailing between 40° and 55° S., notwithstanding the abundance of fish, being fatal to successful whaling, and that they dare not cruise in the calmer seas south of 55° on account of the ice.

**Survey Work in Burma.**—From Burma we learn that Captain Hobday returned to Mandalay early in May from his trip to Thibaw,

in the Shan States, with the force that accompanied the Tsawbwa of that place back to his capital, after having been away just two months. He says that he and sub-surveyor Faida Ali managed to do a good deal of work notwithstanding the hazy state of the atmosphere. The party will remain during the wet season at Mandalay, but as the rains are light, field work will be continued when opportunities occur till the end of July, after which the country is too unhealthy to move about in. In the middle of November regular field work will recommence. Colonel Woodthorpe has managed to effect a junction between his triangulation which he carried down the Kyendwin from Manipur, and that of Captain Hobday, round Mandalay.

**Survey of Travancore and neighbouring States.**—The Government of India have sanctioned a topographical survey of the Native States of Travancore, Cochin, and Pudukottai, which will be undertaken by No. 19 (Madras) party on the completion of its operations in the Madura district. Some parts of the existing maps of the mountainous tracts of Travancore and Cochin are absolutely blank, and the topography of the hills is quite unreliable, the survey having been executed nearly seventy years ago.

**The Russian Expedition to the New Siberian Islands.**—A paper read by Dr. A. Bunge before the Imperial Geographical Society of Russia gives some details of the work accomplished by this important expedition, to the progress of which we have from time to time referred.\* Baron von Toll, the colleague of Dr. Bunge, started in April 1886, from Aidshergaidach for the island of Liakov, with the object of studying its geological character. He was joined shortly afterwards by Dr. Bunge, who brought the rest of the stores and provisions. It was then decided to divide the party, Dr. Bunge undertaking an exploration of the island of Liakov, which was reported to be especially rich in bone fossils, while von Toll proceeded to the island of Kotelny. Before executing this project the former traveller attempted a topographical survey of a part of the east coast of Kotelny, but with small success, owing to the unfavourable weather and the lack of fuel, which collects as driftwood only in certain localities. He consequently returned to the southern extremity of the island, where he killed the only polar bear which was seen in the course of the expedition, and then crossed over to the island of Liakov on the 25th May. Meanwhile, von Toll had visited the islands of Fadeief and New Siberia. On the latter he made a special exploration of the mountain known to travellers of the beginning of the present century as the "wood-mountain," which was found to be a beautiful tertiary profile with carbonised tree-trunks and a rich collection of leaf impressions and fruits, corresponding exactly with the tertiary flora of Greenland and Spitzbergen, as described by

\* See 'Proceedings R.G.S.,' 1887, pp. 119 *et ante*.

Oswald Heer. On returning to Kotelny he commenced at once his exploration of the island, making a complete circle of it in forty days. From the northern point of the island he obtained a view of the still untrodden land of Ssannikov; he estimated the distance at about 100 miles. As regards geology, the northern half of Kotelny consists of Devonian strata, while in the south Trias formations exist. The flora shows some thirty species of flowering plants. The summer was very unfavourable; the temperature only once rose to 50° Fahr., while snow showers fell nearly every day. The whole coast was blocked by ice, and in the majority of valleys the snow remained throughout the summer. At the end of October, von Toll, who had spent the cold period of September and October in a comparatively comfortable winter hut, rejoined his companion at Liakov. Dr. Bunge was considerably hampered in his exploration of this island by the want of reindeer for the purposes of transport; by some mistake the majority of these animals were sent to Kotelny, and owing to the advanced season could not get back. He was able, however, to do some good work. With the exception of some granite peaks the prevailing formations of the island are quaternary; the ice blocks are covered with loamy deposits, in which are found fossil bones. There are conditions here which appear to be exactly similar to those at Eschscholz Bay in Behring Straits. Besides the fossil remains of the mammoth, rhinoceros, and musk ox, Dr. Bunge discovered remains of two species of oxen, deer, horses, and of some smaller animals, from the study of which interesting results may be expected. The flora is richer than that of Kotelny. The traveller collected about seventy phanerogams. In small pools, notwithstanding the frozen ground, numerous worms and fresh-water crustacea were found, as the water reached a temperature of nearly 61° Fahr. The summer temperature was practically the same as that of Kotelny, although there were more days free from snow showers. Both islands are much poorer in birds than might have been supposed considering their situation; the insect world is also poorly represented. There are but few fish on the island of Liakov, but some fine salmon were found on Kotelny.

**Cinchona Cultivation in the Island of Réunion.**—Mr. C. L. St. John, British Consul at Réunion, in his Annual Report (No. 207) on the trade of the island speaks of the plantations of cinchona, which have excited for some years considerable attention in Réunion. Although they have not yet assumed any extensive development, the results are very satisfactory. The plantations are made at an altitude of about 4000 feet, where no high trees exist, but merely brushwood. Parallel alleys from five to six feet wide are formed in spots sheltered, if possible, from the violent winds so common in Réunion. These alleys are separated by ranges of brushwood 10 feet wide, which serve to protect the young cinchona plants from the wind. The latter are planted in prepared soil 15 feet apart. The plants thus grow without

difficulty, care being taken to keep them free from the roots of the brush-wood. At the end of seven or eight years they reach a diameter of  $3\frac{1}{2}$  inches, and are ready to be worked. About the month of October, when the sap resumes its upward movement, the plants are cut down at about two inches from the ground. The bark is then taken off and laid in the sun to dry. From the stump a large number of young shoots soon spring, which have a rapid growth, so that at the end of seven or eight years a new crop is ready. In this way the cultivation of the cinchona, when once started, can be kept up at little expense.

**The Discovery of the Congo.**—The Visconde de Sanches de Baena claims to have shed a clear light upon the disputed chronologies of Diogo Caõ's (Cam) voyages to the west coast of Africa. A careful examination of unpublished documents has led him to the conclusion that Caõ started on his first voyage in 1482, and remained away nineteen months. It was during this voyage that he set up the *pedra padraõ* at the mouth of the Congo, fragments of which have recently been discovered by Senhor França and Baron Schwerin, or rather rediscovered, as Sir R. Burton described these same fragments in 'A Trip to Gorilla Land and the Congo.' After his return Diogo Caõ was granted a coat of arms, the patent of which is dated Santarem, April 14th, 1484. He set out on a second voyage in 1485, in the course of which he erected similar stone pillars on Cape Agostinho and Cape Cross. If this chronology is correct, the legend on Behaim's globe, which informs us that the pillar at Cape Cross was erected on January 18th, 1485, can scarcely be correct. Peschel\* assumes that Diogo Caõ only performed one voyage, from which he returned, after an absence of nineteen months, in 1486. Major † says that the Congo was discovered in 1484, and that the pillars further to the south were set up during a second voyage in 1485.‡

**Blue Mountain Peak, Jamaica.**—According to a careful series of observations, taken with excellent instruments, by Mr. Maxwell Hall, in November last, the height of the Blue Mountain Peak, Jamaica (north-western summit), is 7423 feet above sea-level. The mean temperature of the air on the peak has been shown by the same accurate observer, after applying the due correction to a long series of readings taken during 1885-6, to be, max.  $71^{\circ} \cdot 1$ , min.  $46^{\circ} \cdot 3$ . As a result of observations on temperature and elevation made at successive altitudes from the sea-level to the summit, Mr. Hall concludes that 14,000 feet would be the lower limit of perpetual snow for Jamaica, the pressure at that height being 18 inches, corresponding to a mean temperature of  $32^{\circ}$ .

**The Bahamas.**—In a recent official report, Mr. H. A. Blake, Governor of the Bahamas, gives an interesting general description of this extensive

\* 'Geschichte des Zeitalters der Entdeckungen,' p. 69.

† 'Prince Henry the Navigator.'

‡ 'Boletim' Lisbon Geographical Society, 1886, pp. 55-6.

group of low islands, founded partly on the scientific investigations of Mr. J. Gardiner (B.Sc. London). He says the numerous islands and islets forming the group lie mostly on the eastward or windward edges of the Bahama banks, and vary in size from Andros (100 miles long by 20 to 40 miles wide) to mere rocks. The banks cover an area of about 43,000 square miles, of which only about 4400 are above water. They rise very abruptly from ocean depths, varying from 500 fathoms on the western to 2000 fathoms on the eastern side, and are indented by two submarine gorges from 800 to 1000 fathoms in depth. The islands are formed of coral-sand and shells, consolidated into rock by the action of rain-water dissolving lime from the weathered upper layers, and binding the lower with infiltrated carbonate of lime. There are three distinct kinds of soil on the islands—white, black, and red. The white is composed of calcareous sand, with a certain proportion of organic matter, and is suitable, when fertilisers are used, for the growth of potatoes and other vegetables. The black soil is mainly vegetable mould, and very fertile; it occurs everywhere in the islands, in some places (called “Banana holes,”) to a considerable depth. The red earth is the most important and fertile of all, and closely resembles that of the Bermudas in its composition, containing a large proportion of oxide of iron. It occurs in larger or smaller patches in all the islands, and in Eleuthera and Cat Island covers thousands of acres. A layer of it has been found under a superincumbent stratum of the solid rock. The origin of the red earth is not known, but it appears certain that it has not been derived from the surrounding submarine banks, for no similar soil has been found there or by soundings in the neighbouring deep-sea bed. In four of the islands there are large tracts of pine forest; the indigenous timber on other islands has long since been destroyed. Some of the islands of the group, viz. Watling’s, Rum Cay, Conception, Samana, the Crooked Island Group, Mayaguana, and Great and Little Inagua, are separated from the bank, and spring directly from a depth of over 2000 fathoms, thus representing the flat tops of precipitous submarine mountains 12,000 feet high.

**Breaks in the Andean Watershed of Southern Chili.**—The discovery by Don Guillermo Cox on his journey to the source of the Limay, a quarter of a century ago, that the main chain of the Andes did not in that part of Chili form the watershed between the rivers flowing respectively to the Atlantic and Pacific Oceans, has been corroborated by an expedition sent out by the Chilian Government to those latitudes; this expedition having proved that certain rivers flowing into the Pacific Ocean rise to the east of the Andes, in a plain at the comparatively low altitude of 1650 feet above the sea-level. These rivers spring from small lakes, and cut their way through the Cordilleras in deep gorges. Thus while the Limay, a tributary of the Rio Negro flowing into the Atlantic, rises on the west of the main ridge, numerous Pacific streams rise on the east. Another important stream, the Palena, which rises to the east of

the Andes and desembogues in the Gulf of Corcovado, opposite the southern end of the Island of Chiloe, has been recently explored by Captain Serrano, who ascended it in a boat as far as long.  $72^{\circ}$ . The Palena proves to be navigable for some distance from its mouth, and in its lower course is half a mile broad. These discoveries will affect the political boundary between Chili and the Argentine Republic, which had been fixed by treaty as lying along the watershed.

**The Aguaray-Guázu.\***—According to Azara, the main branch of the Rio Pilcomayo enters the Paraguay in lat.  $24^{\circ} 24'$  S. It was to verify this statement that Captain Federico W. Fernandez and Mr. Carlos Thompson, having chartered a small river steamer, the *Sucre*, started from Asuncion on the 12th June, 1886. A few days afterwards they discovered a broad opening into a lagoon, locally known as Laguna Ñaro, and a considerable river of brackish water disemboguing into it, which appeared to correspond to Azara's description. Not having a sufficient supply of fuel, they were only able to trace this river for a distance of 27 leagues upwards, and then returned to Asuncion. Captain Fernandez, having in the meantime secured the support of the 'Instituto Geográfico,' was able to return soon afterwards to the scene of his labours. On October 1st, 1886, he once more left Asuncion in the *Sucre*, having a barge in tow. He reached the bar of the river ( $24^{\circ} 26'$  S.,  $57^{\circ} 13'$  W. by obs.) on the same day. Two islands, Carolina and Placedo, lie off the mouth of the river. The depth of the northern and principal arm was found to exceed 50 feet. Having expended a week in an examination of the mouth of the river, the *Sucre* began its ascent on October 9th. The depth varied from 11 to 16 feet. After two leagues the expedition arrived at a bifurcation, and took the channel opening to the right, which, after an ascent of 25 leagues, proved to be only a tributary, formed by two streams, the one rising in a small pool, the other tumbling over three cataracts 10 feet in height. This Arroyo Huergo is of considerable depth, its brackish waters are discoloured by oxide of iron, and its banks rise to a height of 4 to 10 feet. Twenty days were expended in its exploration, in the course of which the river fell eight feet. On again reaching its mouth the *Sucre* grounded. By digging a channel through the sand her occupants succeeded in again floating her, but the engines had sustained some injury, and it was found necessary to send her to Asuncion to be repaired. Thus valuable time was lost, in the course of which the river fell 10 feet. On November 23rd the *Sucre* returned, and already on the following day she started up the river, which was at that time about 15 feet below the highest flood-marks, although its depth still exceeded 13 feet, and its volume rolled along at the rate of 1940 metres an hour. On the third day the furthest point of the first

\* 'Boletin del Instituto Geográfico Argentino,' 1887, pp. 151-71.



ascent was reached. On the fourth day smoke was seen rising from an encampment of civilised Indians (tribe, Anima-acá). On November 29th it rained during ten hours, and the river rose 7 feet, much fresh water being poured into it by its numerous tributaries. The depth continued almost uniformly at 12 to 13 feet, and the *Sucre* was able to make a good record up to December 24th. On that day a "raft" obstructed all progress, and a passage had to be cleared at much labour, and on the following day, the depth not being over 6 feet, numerous "snags" had to be avoided. At length, on December 26th, when 130 leagues from the mouth, the *Sucre* grounded near the mouth of the Rio Argerich, a brackish tributary coming from the north-west, and not far from the Laguna Juarez Celman, in lat.  $23^{\circ} 46' S.$ , long.  $58^{\circ} 49' W.$  Captain Fernandez, anxious to solve the problem of the supposed connection of the river he was exploring with the Pilcomayo, started on February 10th with three men and a boat. After three days of difficult navigation, and after having accomplished six leagues, the boat too had to be abandoned, and having attached to a timbó-tree a tin plate bearing an appropriate inscription, the journey was continued during four days more on foot. The explorers only carried with them a supply of biscuits and Paraguayan tea. During the last day of this difficult journey the river trended to the south; it grew wider and deeper, and its banks attained a height of 20 feet. The water was perfectly drinkable. When 18 leagues from the steamer the explorers turned back. They reached the *Sucre* by forced marches in three days and a half. On February 19th it rained heavily and the river began to rise, but it was nevertheless thought imprudent to delay the return any longer. The *Sucre* and the barge were consequently abandoned, and the retreat down the river was effected in two boats, which started on February 20th and reached the Paraguay seventeen days afterwards. During the whole of this expedition not a single human being was met with. The problem whether the Aguaray-Guázu is a branch of the Pilcomayo has not been solved, but Captain Fernandez inclines to think that the statement respecting it made by Azara will ultimately be confirmed. The water of the river is brackish, except in its upper reaches, owing to the deposits of saltpetre which it drains. The lagoons, however, into which the river discharges some of its surplus waters when in flood, are fresh, and being imbedded amid luxuriant vegetation, present charming pictures, worthy the "brush of a Rembrandt." The country adjoining the river presents an undulating surface. Geologically it consists of beds of chalk and clay, thickly covered with vegetable mould. Pure kaolin of a reddish hue is found in some of the ravines, and is used by the Indians for making their pottery. The shells discovered belonged to species still existing on the sea-coast. Dense bands of forest, some three miles in depth, fringe the river on either side, and beyond these extends an open country, covered with coarse grass, and dotted over

with graceful palms. The forests contain much valuable timber, including the quebracho (*Aspidosperma Quebracho*), both white and coloured; the guayacán, which here attains a large size, the lapacho, the jacarandá, the palobobo, and many others. Five species of palms were observed, viz. the carandui (*Palma coperniciana*), the pindó (*Cocos australis*), the carandá (which yields a useful fibre), and a small palm with a big trunk, bearing a golden-coloured fruit of pleasant taste. Most of the trees bear fruit, and during the ascent of the river the trees were so thickly covered with blossoms that they resembled walls hung with tapestry. The animal world is represented by jaguars, tapirs, deer, foxes, armadillos, the carpinchó (*Hydrochaerus Capybara*), and a variety of apes. Birds are in great number, and the river yields an abundance of fish. An expedition could thus for months subsist upon the produce of the chase.

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### Obituary.

**Rev. T. J. Comber.**—It is with deep regret that we announce the death of this ardent missionary and successful African explorer. Mr. Comber was born in London in 1852. As a youth he resolved to devote himself to missionary work in Africa, and after a short training at Regent's Park College, his services were accepted in 1875 by the committee of the Baptist Missionary Society. Towards the end of that year he reached the mission station of Victoria, Cameroons, which for nearly three years formed the centre of his activity. During that period he ascended the Cameroons Peak (in April 1877) and explored the country to the north of the peak, proving that it stood out an isolated mass and had no connection with a mountain-range supposed at that time to extend far into the interior of Africa.\* When Stanley's discoveries on the Congo directed the attention of his committee to that quarter of Africa, he and Mr. Grenfell, in June 1878, proceeded on a preliminary trip to San Salvador, with a view to the selection of missionary sites. On that occasion the two pioneers pushed to the north-east, as far as Tungwa, the capital of Makuta, which Lieutenant Grandy had failed to reach.† At the close of 1878 Mr. Comber came to England for reinforcements, but returned early in the following year accompanied by his wife (who died shortly after his arrival in Africa), and by Messrs. Bentley, Hartland, and Crudgington. The journeys undertaken by these missionaries in the vicinity of San Salvador proved of considerable benefit to our geographical knowledge, and resulted in a map, based upon astronomical observations, and forming a great improvement upon that published some time before by Lieutenant Grandy. Repeated attempts to travel by a direct road from San Salvador to Stanley Pool failed, on account of the opposition of the native ivory traders, who feared that their monopoly would be lost if the country were opened to European enterprise.‡ He was fired at and wounded in his attempt to traverse their district. Mr. Comber consequently proceeded to the Pool by the ordinary route along the Congo river, and soon after his arrival, in 1883, he laid it down on a rough map.§ In July 1884 he accompanied

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\* 'Proceedings R.G.S.' 1879, p. 225, with a map.

† *Ibid.*, p. 234.

‡ *Ibid.*, 1881, p. 20, with a map.

§ *Ibid.*, 1884, p. 71.

Mr. Grenfell in a trip in the *Peace* up the Congo to Bangala, and up the Kasai to the mouth of the Kuango,\* and then paid another short visit to England. On his return to Africa he took up his quarters at Lutete. He died at sea at the close of June, on board the German steamer *Lulu Böhlen*, and his body was landed at Mayumba for burial. In Mr. Comber the Baptist Missionary Society has lost one of its most earnest workers, and geography an observer of very considerable ability; while numerous friends among all classes, without difference of religion, deplore a most genial and kind-hearted companion. Mr. Grenfell, who has only recently returned to England for much-needed rest, left Liverpool on the 24th August to fill up the gap created in the staff of the Mission.

**Giacomo Bove**, whose recent death by suicide has been announced in the papers, was born at Maranzano, in the Province of Acqui, Italy, in April 1852. He entered the navy, and when still quite young accompanied Signor Giordone on a mission to Borneo and Japan. In 1878-9 he accompanied Baron Nordenskiöld in his remarkable voyage round Northern Asia, in the *Vega*, and on his return to Italy he agitated for the despatch of an expedition into the Antarctic regions. The subscriptions proving inadequate for that purpose, Lieutenant Bove in 1881 accepted the command of an expedition, organised at his solicitation by the Argentine Government, for the scientific exploration of Southern Patagonia and Tierra del Fuego. The scientific members of this expedition were Professor Lovisato (geologist), Dr. Venciguerra (zoologist), Dr. Spegazzi, and Lieutenant Roncagli. Their Reports have been published in Spanish and in Italian.† In 1885, the Italian Government charged him jointly with Captain Frabello with a mission to the Congo, which he ascended as high up as the Stanley Falls. Lieutenant Bove, to judge from his official report, does not appear to have been impressed very favourably with the commercial capabilities of this "high-road" in Central Africa.

#### PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Berlin**, July 2nd, 1887: Professor SACHAU in the chair.—Some brief communications were read announcing that Lieutenant Oudenfeldt, of Lancerote, had completed an exploration of the Atlantic coast of the Sahara from Santa Cruz de Mar Pequena to Cape Juby, and had executed a topographical survey of the region.—News from the Congo was laid before the Society as to the progress of the Stanley Expedition, which had encountered great difficulties on the march to Stanley Pool. The famishing people plundered the villages and carried off all the eatables. A considerable number of sick and others perishing from hunger, who had been indiscreetly left behind, were lying along the track of the expedition. The famine at Stanley Pool was due not so much to the want of rain as to the careless way in which the natives had cultivated their manioc fields, provision for a sufficient second growth not having been made. The expedition left Leopoldville on the 1st of May in the following order—first the *Stanley*, with the hull of the *Florida*, a steamer chartered in Banana, belonging to the Sandford Exploring Expedition, and of the same pattern as the *Stanley*, only a little smaller, then the *Henry Reed*, with the hull of the *En avant* and Stanley's own boat in tow, and last of all the *Peace*, with a large lighter and a smaller boat belonging to the mission. It had thus been possible for Stanley to take all his forces with him. The greater part of the goods had, however, to be left behind. A permanent camp was to be

\* 'Proceedings R.G.S.,' 1885, p. 353.

† Ibid., 1883, p. 112.

established, on the Aruwimi, where the arrival of the loads would be awaited. Meanwhile Stanley, with a part of the expedition, would push forward at once along the Aruwimi. Major Bartlett was in command of the rear guard.—Dr. Schinz, who from October 1884 to December 1886 travelled over the south-west of Africa, gave a sketch of the general features of the country traversed. In the first instance he made an attempt to explore the region lying due east of Angra Pequena and to penetrate into the Kalahari desert, but his plans failed owing to the perfidy and hostility of the Hottentots. He therefore returned to Arudans, where he severed his connection with the Luderitz Expedition, to which he had up to this time belonged. He then undertook a journey at his own expense to the north. After being plundered in Great Namaqua-Land by well-armed Hottentots, he succeeded in reaching Damara-Land by way of Rehoboth, and thence proceeded to Fort Humbe, on the Cunene river. The insecurity of the country caused him to abandon his plan of travelling farther to the north; indeed a few days later hostilities broke out between the Portuguese garrison and the settlers, in the course of which two French missionaries were murdered. From the Cunene River Dr. Schinz took a south-easterly direction across the "salt pans" of Etosha to the Boer settlement of Grootfontein, which contains the greater part of those Boers who formerly settled at Huila in Humpata, in the Portuguese province of Mossamedes. The latter settlement is now completely abandoned, the Boers having dispersed in all directions. The majority of those who travelled to the east and north have succumbed to fever or to the hostility of the natives. From Upingtonia Dr. Schinz marched to Lake Ngami, which appeared to be slowly drying up. He eventually returned to Walfish Bay after undergoing many privations.—Professor Ascherson made some observations upon the desert of the Egyptian Isthmus east of the Suez Canal. The Egyptian frontier here does not run, as represented on the best maps, from El Arish south-east in a straight line to the head of the Gulf of Akabah, but starts from Rafah, a point on the sea-coast between Gaza and El Arish. From Rafah a belt of Egyptian territory along the coast, some miles in breadth, extends as far as the Wadi el Arish, which has been hitherto supposed, but incorrectly, to form the political boundary between Syria and Egypt. The Turkish territory goes considerably beyond this "brook of Egypt" of the Bible, and stretches in the shape of a wedge up to the meridian of the oasis of Katieh, thus forming the divide between the abodes of two Arab stocks, the Egyptian Ssauarkah and the Turkish Tarabin. As regards geology, it is to be noted that the coast region between the Suez Canal and El Arish consists of a broad zone of dunes, in the valleys of which are found extensive "salt pans." These are the result of the evaporation of pools of water formed by the winter rains, and are surrounded by their own peculiar vegetation, viz. tamariak, artiplex, &c. The rocky formation begins with the steep slope (2300 to 3300 feet) of the plateau of the Sinai peninsula, which at El Arish is about a day's march from the coast, and which beyond the Bir el Abd bounds the southern horizon of the traveller approaching it along the caravan route. In the west this range goes by the name of Djebel Meghārah, and in the east Djebel Haltal. The district is by no means destitute of vegetation. From an elevation the country appears green almost everywhere, not only the lowest parts of the valleys, but the slopes of the dunes, especially those lying to the north. The plants visible from a distance are principally of woody growth; particularly a variety of *Artemisium* with a sweet aroma, and also species of *Calligonum* and *Retanum*; the last mentioned, however, is found exclusively in the eastern part of the district. Speaking generally, this region is surprisingly rich in botanical species. Economically the country may be said to gravitate towards Syria rather than towards Egypt. The centre of population in the sparsely peopled western district is the oasis of Katieh. The groves of date

palms belong to four Arab tribes, which during the greater portion of the year wander in nomad fashion over Syria, returning to the oasis only for the date harvest. Agriculture is but very little practised. In the valley of the Wadi el Arish, however, wheat and barley are cultivated with success in winter, and maize (which is here called "durrah") from April to June. Water melons cost in the height of summer only sixpence per camel load. The construction of the canal has to a large extent diminished the trade along the caravan route, nearly all goods being now carried by sea from Jaffa. The representation of the caravan route on Jacotin's map is nearly accurate, but in the case of Lake Serbonis, the tongue of land which is shown as dividing the lake in the middle at El Gels, has no existence, as Greville Chester showed in 1880. The south coast of the lake, which is now again dry, is almost completely unknown. The position of El Arish was determined last year by M. Floyer, chief inspector of Egyptian telegraphs, as  $31^{\circ}10'20''$  lat. and  $33^{\circ}48'30''$  long. (east of Greenwich). The telegraph lines laid a few years ago, and the country in their vicinity along the caravan route from El Kantarah to Rafah, as well as part of the line to Constantinople, have been topographically surveyed by Albino Paoletti, whose map will shortly be published.

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

### EUROPE.

**Baddeley, M. J. B.**—Thorough Guide Series. Scotland (Part I.). Edinburgh, Glasgow, and the Highlands as far north as Aberdeen, Inverness, Gairloch, and Stornoway, with a full description of the various Approaches and Chief Places of Interest in the Lowlands. Thirty-seven maps and plans by J. Bartholomew, F.R.G.S. 5th edition. London, Dulau & Co., 1887: 12mo., pp. xxxiv. and 297. Price 7s. [Presented by Messrs. Dulau & Co.]

**Botella, Federico de.**—España. Geografía Morfológica y Etiológica. Observaciones acerca de la Constitución Orográfica de la Península y Leyes de Dirección de sus Sierras, Cordilleras, Costas y Rios principales. Madrid, Imprenta de Fortanet, 1886: large 8vo., pp. viii. and 129, maps.

[France.]—Ministère de l'Intérieur. Dénombrement de la population. 1886. Paris, Imp. Nationale, 1887: 8vo., pp. 870. [Presented by the French Minister of the Interior.]

### ASIA.

**Amat, Pietro.**—Delle Relazioni Antiche e Moderne fra l'Italia e l'India. Memoria premiata dalla Reale Accademia dei Lincei. Roma, Stabilimento Tipografico dell' *Opinione*, 1886: 8vo., pp. x. and 158, map. [Presented by the Author.]

**Atkinson, Edwin S.**—The Himálayan District of the North-western Provinces of India. Vol. iii. (Forming vol. xii. of the Gazetteer, N.-W.P.) Allahabad, 1886: imp. 8vo., pp. (iii.), iv., and 721. [Presented by the Secretary of State for India in Council.]

The present volume concludes the historical, geographical, and statistical account of the Himalayan districts of the North-west Provinces, in accordance with the official instructions given in the preface to the second volume of the

*Gazetteer.* These instructions have been most faithfully carried out, and the result is a mine of information on the districts treated of the highest value. The present volume gives the topographical, statistical, and other local information for each fiscal subdivision and important tract, town, or place in the Kumaon, Garwhál, Tarai, Dehra Dun, and Jaunsár-Báwar districts. There are five large maps and three photographs.

**Azémar, H.**—*Dictionnaire Stieng; Recueil de 2500 mots.* Saigon, Imprimerie Coloniale, 1887: 8vo., pp. vii. and 134.

Père Azémar prefixes to his valuable vocabulary of the Stieng people, who inhabit Cambodia, an exceedingly interesting account of the people themselves, of the country, its fauna and flora, the history of the people, and their manners and customs.

**Barthélemy-St. Hilaire, J.**—*L'Inde Anglaise, son état actuel—son avenir, précédée d'une Introduction sur l'Angleterre et la Russie.* Paris, Perrin et Cie., 1887: 8vo., pp. 484. Price 6s. 6d.

This work is valuable as giving the views of an intelligent and observant Frenchman on the situation in India.

**China.** No. 2 (1887). *Despatch from Her Majesty's Minister at Peking, forwarding a Report by Mr. H. E. Fulford, Student Interpreter in the China Consular Service, of a Journey in Manchuria.* Presented to both Houses of Parliament by command of Her Majesty. June 1887. London, Harrison & Sons: folio, pp. 18, map. Price 5½d.

This journey has already been described in the 'Proceedings.' See Nos. for December 1886, pp. 779-80, and April 1887, pp. 235-9.

**[Hedges, William.]**—*The Diary of William Hedges, Esq. (afterwards Sir William Hedges), during his Agency in Bengal; as well as on his Voyage out and Return overland (1681-1687).* Transcribed for the press, with Introductory Notes, &c., by R. Barlow, Esq., and illustrated by copious Extracts from Unpublished Records, &c., by Colonel Henry Yule, R.E., C.B., LL.D. Vol. I. *The Diary, with Index.* [Hakluyt Society Publication, No. LXXIV.] London, printed for the Hakluyt Society, 1887: 8vo., pp. xii. and 265. [Presented by the Hakluyt Society.]

**Naumann, [Dr. E.]**—*Die Japanische Inselwelt. Eine geographisch-geologische Skizze.* [Separat-Abdruck aus den Mittheilungen der Kais. Königl. Geographischen Gesellschaft in Wien, Jahrg. 1887.] Wien, E. Hölzel, 1887: 8vo., pp. 21, 2 maps. [Presented by the Author.]

**Satow, E. M. [C.M.G.]**—*Essay towards a Bibliography of Siam.* Singapore, Government Printing Office, 1886: 8vo., pp. 103. [Presented by the Author.]

Mr. Satow has rendered excellent service by compiling this bibliography, which must have been the result of much research. It is divided into four parts:—1. Separate works relating to Siam; 2. Periodicals and Proceedings of Learned Societies; 3. Language; 4. Maps.

#### AFRICA.

**Baraban, Léopold.**—*À travers la Tunisie. Études sur les Oasis, les Dunes, les Forêts, la Flore et la Géologie.* Paris, Rothschild, 1887: 8vo., pp. viii. and 227. Price 12s.

M. Baraban is Inspector of Forests, and was entrusted by the French Minister of Agriculture with a mission to Tunis. The result is a work on Tunis of considerable scientific value. M. Baraban sailed from Tunis to Gabes, and made a very careful examination of the Great Chott that lies westward

from the Gulf of Gabes. Proceeding across the Hammema to Gafsa, he traversed that hilly region eastwards to Malarés on the coast, and thence went on to Sfax and Cheba. Striking inland to Kairwan, he spent some time at the holy city, and then went northwards to Tunis. Subsequently he made an excursion into the country of the Kroumirs, on the Algerian border. The physical geography, the geology, and the flora of the region visited by M. Baraban he discusses very fully. The invasion of the country by sand in the Gabes region and the causes of the disintegration of the rocks here receive special attention, as well as the means of preventing such disasters. M. Baraban also discusses Roudaire's project of a great interior sea, but does not seem at all favourable to it, mainly from the economical standpoint; he thinks good railways would be much more useful. The book has many interesting illustrations, and a fairly good map.

**Theal, George McCall.**—History of the Boers in South Africa. London, Sonnenschein & Co., 1887: 8vo., pp. xxiv. and 392. Price 15s. [Presented by the Publisher.]

No one is better qualified than Mr. Theal to write a history of the Boers in South Africa, a history which covers so wide an area and has to deal so largely with certain geographical developments of much interest. His 'Compendium of South African History' is the leading authority on the subject. Presumably he has had ample opportunities of visiting all parts of the South African territories, and has seen much of the Boers at various stages. He has, moreover, had access to special sources of information which came in his way officially, and the result is this volume, which may be taken as now the standard authority on a subject of great interest. The copious bibliographies are of special value.

**Wakefield, [Rev.] M.**—Vocabulary of the Káviróndo Language. London, Society for Promoting Christian Knowledge, 1887: 12mo., pp. 7. [Presented by R. N. Cust, Esq.]

**Wolf, Ludwig.**—Volksstämme Central Afrika's. [Berlin, 1886]: 8vo.

This is a copy of a paper read before the Berlin Anthropological Society, on the 18th December, 1886.

#### AMERICA.

**[America.]**—Narrative and Critical History of America. Edited by Justin Winsor. Vol. v. London, Sampson Low & Co., 1887: imp. 8vo., pp. vii. and 649.

The present volume deals with the English and French in North America, 1689-1763. Chapter i. is devoted to Canada and Louisiana, by Mr. A. McFarland Davis. There are the usual critical essay and editorial notes, with a paper on the cartography of Louisiana and the Mississippi Basin under the French domination, by the editor. In chapter ii. New England, 1689-1763, is dealt with by Mr. Winsor. Chapter iii. deals with the Middle Colonies, by Mr. Berthold Fernow, who adds a critical essay on manuscript sources, the cartography being treated by him jointly with the editor. Mr. Winsor also undertakes Maryland and Virginia in chapter iv., while Prof. W. J. Rivers treats of the Carolinas in chapter v., Mr. Winsor furnishing the critical note and essay on the later histories of Carolina. The English colonisation of Georgia is dealt with in chapter vi. by Dr. Ch. C. Jones, and the wars of the seaboard; Acadia and Cape Breton by Mr. Charles C. Smith; Mr. Winsor adding a dissertation of fifty pages on authorities on the French and Indian wars of New England and Canada, and other ten pages on maps and records of Acadia. The last chapter is by the editor, and treats of the struggle for the great valleys of North America. There is the usual wealth of illustrations and maps.

**[America, United States.]**—[Tenth Census of the United States, 1880.] Vol. xii. Report on the Mortality and Vital Statistics of the United States as returned at the Tenth Census (June 1, 1880), by John S. Billings, Surgeon

U.S. Army. Part II. Washington, Government Printing Office, 1886: 4to. pp. clviii. and 803, maps. [Plates and Diagrams accompanying the above, in separate case.]

Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution to July 1885. Part I. Washington, Government Printing Office, 1886: 8vo., pp. xviii. and 996, illustrations. [Presented by the Smithsonian Institution.]

This Report opens with the Proceedings of the Board of Regents of the Smithsonian Institution for the session of January 1885; the Report of the Executive Committee for the first six months of 1885; and the Annual Report of the Secretary. The General Appendix, occupying more than one-half of the volume, contains:—I. Record of Scientific Progress, 1884, divided as follows—Introduction, by Spencer F. Baird; Astronomy, by William C. Winlock; List of Astronomical Observatories, by George H. Boshmer; Vulcanology and Seismology, by Charles G. Rockwood; Volcanic eruptions and earthquakes in Iceland within historic times; Geography, by J. King Goodrich; Physics, by George F. Barker; Chemistry, by H. Carrington Bolton; Mineralogy, by Edward S. Dana; Bibliography of Invertebrate Palaeontology, by J. B. Marcou; Zoology, by Theodore Gill; and Anthropology, by Otis T. Mason.—II. Miscellaneous papers, including papers relating to Anthropology; Observations on Stone-chipping, by George E. Sellers; Copper implements from Bayfield, Wis., by Charles Whittlesey; Ancient Remains in Ohio, by J. P. MacLean; A primitive store-house of the Creek Indians, by Charles C. Jones, jr.; Shell heaps and mounds in Florida, by James Shepard; Ancient earthworks in China, by Mark Williams; Plan for American Ethnological Investigation, by the late Henry R. Schoolcraft; Index to the Literature of Uranium, by H. Carrington Bolton; and Price-list of the Publications of the Smithsonian Institution.

**Heilprin, Angelo.**—Explorations on the West Coast of Florida and in the Okeechobee Wilderness. A Narrative of Researches undertaken under the auspices of the Wagner Free Institute of Philadelphia. Imp. 8vo., pp. vi. and 134. [Presented by the Wagner Free Institute.]

Professor Heilprin informs us that the State of Florida remains to the present day, as far as its geographical, zoological, and geological features are concerned, very nearly the least-known portion of the United States. The explorations described in the volume are therefore a really original contribution to science. The book is largely geological, but there is also necessarily a good deal of geography in it. The whole of Florida, Professor Heilprin finds, belongs exclusively to the tertiary and post-tertiary periods of geological time, and consequently, as a defined geographical area, represents the youngest portion of the United States. There is no particle of evidence, he assures us, to sustain the coral theory of the growth of the peninsula; on the contrary, all the facts point conclusively against such theory, and indicate that the progressive growth of the peninsula, at least as far as Lake Okeechobee, has been brought about by successive accessions of organic and inorganic material in the normal method of sedimentation and upheaval. The Florida coral tract is evidently limited to a border region of the south and south-west. Professor Heilprin concludes by stating that man's great antiquity in the peninsula is established beyond a doubt, and not improbably the fossilised remains found in Sarasota Bay, now wholly converted into limonite, represent the most ancient belongings of man that have ever been discovered.

#### AUSTRALASIA.

[Queensland.] 1886. Queensland. Report on the Argentine (Star) Silver Mines, Kennedy District. By Robert L. Jack, Government Geologist. [Brisbane, James C. Beal, Government Printer]: folio, pp. 9, map and section. Price 1s. [Presented by the Author.]



## GENERAL.

Catalogue of Printed Books in the Library of the Foreign Office. 31st December, 1885. London, Harrison & Sons, 1886; imp. 8vo., pp. xiv. and 1220. [Presented by Sir Julian Pauncefote, G.C.M.G.]

[**Colonial and Indian Exhibition, 1886.**]—Report of the Royal Commission for the Colonial and Indian Exhibition, London, 1886, to the Right Hon. Henry Matthews, M.P., &c., one of Her Majesty's Principal Secretaries of State. London, W. Clowes & Sons, 1887: 8vo., pp. lxxiii. and 373, plan and plate.

**Edgley, J. C.**—The Origin and Features of Mountain Systems. With remarks on the ancient Glaciers of Wales. [London], J. C. Edgley, [1887]: 8vo., pp. 8, plate. [Presented by the Author.]

**Oliphant, Laurence.**—Episodes in a Life of Adventure; or, Moss from a Rolling Stone. Edinburgh, Blackwood, 1887: 8vo., pp. vi. and 420. Price 10s. 6d. [Presented by the Publisher.]

Mr. Oliphant has rolled pretty well all over the world, and whether or not his gatherings are of a mossy character, they are welcome in this shape. He has seen many men and many great cities, and tells us about them in his ever attractive style. Even from the purely geographical point of view his volume is useful; it shows the actual condition of things in the places visited by Mr. Oliphant during the last forty-five years or so. There is, for example, a chapter on the overland route forty-six years ago; another on politics and Indian affairs in Canada; a chapter on Crimean and Circassian experiences; and another on adventures in Central America. Other chapters deal with experiences in Japan, in India, in Italy, in Cracow and Warsaw, Volhynia, Moldavia, and Schleswig-Holstein.

[**Pyrard, [of Laval] François.**]—The Voyage of François Pyrard of Laval to the East Indies, the Maldives, the Moluccas and Brazil. Translated into English from the third French edition of 1619, and edited, with notes, by Albert Gray, formerly of the Ceylon Civil Service, assisted by H. C. P. Bell, of the Ceylon Civil Service. In two volumes. Vol. I. [Hakluyt Society Publication, No. LXXVI.] London, printed for the Hakluyt Society, 1887: 8vo., pp. lviii. and 452, map, plan, and illustrations. [Presented by the Hakluyt Society.]

[**Ward, Thomas Humphry.**]—The Reign of Queen Victoria: a Survey of Fifty Years of Progress. Edited by Thomas Humphry Ward, M.A. In two volumes. London, Smith, Elder & Co., 1887: 8vo., pp. (vol. i.) 594, (vol. ii.) 620, maps, &c. Price 32s.

In these volumes we have a record of the progress of the British Empire during the last fifty years. Vol. i. contains articles on the following subjects:—Legislation of the Reign, and Foreign Policy, by the Editor; Constitutional Development, by Sir William R. Anson, Bart.; The Army, by General Viscount Wolseley, G.C.B.; Note on the Ordnance Survey, by Colonel Sir C. W. Wilson, K.C.B., Director-General of the Survey; The Navy, by Lord Brassey; The Administration of the Law, by Lord Justice Bowen; Finance, by Leonard H. Courtney, M.P.; Religion and the Churches, by Rev. Edwin Hatch, D.D.; Colonial Policy and Progress, by the Editor; India, by Sir Henry Sumner Maine, K.C.S.I.; and Ireland, by Sir Rowland Blennerhassett, Bart.—Vol. ii. contains articles on The Growth and Distribution of Wealth, by Robert Giffen; Industrial Association, by Right Hon. A. J. Mundella, M.P., and G. Howell, M.P.; Locomotion and Transport, by the Editor; Agriculture, by Sir James Caird, K.C.B.; The Cotton Trade and Industry, by John Slagg, M.P.; The Iron Trade and its Allied Industries, by Sir Lowthian Bell, Bart.; Schools, by Matthew Arnold; The Universities, by C. A. Fyffe; Science, by Prof. Huxley, F.R.S.; Medicine and Surgery, by

Robert Brudenell Carter, F.R.C.S.; Literature, by Richard Garnett, LL.D.; Art, by the Editor; The Drama, by William Archer; and Music, by Walter Parratt. "The maps show the percentage of increase and decrease in the population of the different counties of England, Wales, Scotland, and Ireland, and of the different districts of London, between 1831 and 1881, the year of the latest Census return."

## NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

## EUROPE.

**Deutschen Reiches.**—Karte des —, herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1887. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets: 42, Sagard; 616, Schletstadt. Price 1s. 6d. each. (*Dulau.*)

**Europe.**—Les Monuments de la Géographie, des Bibliothèques de Belgique. Carte de l'Europe, 1480-1485. 4 cartes en 8 feuilles. Texte explicatif par Ch. Ruelens. Bruxelles, Institut National de Géographie. Price 17s.

This is a fac-simile of the copy of Ptolemy's maps in the Royal Library of Brussels, and forms one of a series of maps in course of publication by the Institut National de Géographie de Bruxelles. The letterpress which accompanies the map is extremely interesting; in it Mr. C. Ruelens gives the history of all the existing copies of this map, and the conclusions he arrives at after comparing the Brussels copy with them. The fac-simile copy is a chromolithograph, and the manner in which it has been produced reflects credit on all concerned.

**France.**—Carte géologique détaillée de la —, au 80,000 or 1·1 geographical miles to an inch. Feuille 248, Toulon et tour de Camarat. Paris. (*Dulau.*)

— Carte de —, dressé par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, 1887. Sheets: II.—15, Ile d'Ouessant; VI.—14, Saint Brieuc; XII.—15, Alençon; XIII.—18, Chateau-du-Loir; XIII.—20, Sainte Maure. Price 7d. each sheet. (*Dulau.*)

**Harz.**—Neueste Karte vom —, von C. Diercke und Ed. Gaebler. Scale 1:200,000 or 2·7 geographical miles to an inch. Hannover, C. Meyer. Price 3s. (*Dulau.*)

**London.**—Mason & Payne's Popular Map of —. Scale 580 yards to an inch. With Guide. London, Mason & Payne, 1887. Price 1s.

This is a very clearly drawn map of London, accompanied by seventy-eight pages of letterpress, which forms a compact and useful guide.

**Oesterreichisch-Ungarischen Monarchie.**—Spezialkarte der —. Scale 1:75,000 or 1 geographical mile to an inch. K.k. militär-geografisches Institut, Wien, 1887. Sheets: Zone 12, Col. XXII. Rimaszombat; 14-XXIX. Hozuzemező und Avas-Felsőfalu; 15-XXVII. Nagy-Károly und Ákos; 15-XXIX. Nagy Bánya; 16-XXV. Hajdu-Szoboszló und Esztár; 16-XXVII. Tasnád und Széplak; 17-XXIV. N. Bajom und Szeghalom; 17-XXVII. Szilágy-Somlyó und Élesd; Mező Kovácsháza u. Kurtics; 29-XII. Zara; 31-XV. Sinj und Spalato; 33-XVIII. Zalom und Stolac; 33-XIX. Gacko und Orakovica. Price 1s. 4d. each sheet. (*Dulau.*)

**Prag.**—Plan von — und Umgebung, von A. Hurtig. Scale 1:10,000 or 7·3 inches to a geographical mile. Price 1s. 6d. (*Dulau.*)

**Sachsen.**—Schulwandkarte vom Königreich —, von K. Bamberg. Scale 1:175,000 or 2·3 geographical miles to an inch. 8 sheets, Berlin, Chun Price 9s. (*Dulau.*)

**Salzburger-Alpen.**—Karte der —, und der Salzkammerguts von Ludwig Ravenstein. Bearbeitet unter Mitwirkung der Deutschen und Oesterreichischen Alpenvereins. Scale 1:250,000 or 3·4 geographical miles to an inch. Frankfurt-am-Main, Ravenstein. Price 5s. (*Dulau.*)

**Ungarn.**—Orts- und Strassen-Karte der Königreich —, nebst Kroatien und Slavonien, von A. Steinhauser. Scale 1:1,296,000 or 17·7 geographical miles to an inch. Wien, Artaria & Co. Price 4s. (*Dulau.*)

### ORDNANCE SURVEY MAPS.

Publications issued during the month of July 1887.

#### 1-inch—General Maps:—

ENGLAND AND WALES: New Series. Nos. 109 (outline), 225 (outline), 273 (hills), 1s. each.  
SCOTLAND: 19 (hills), 130 (outline), 1s. 9d. each.  
IRELAND: 133, 142 (hills), 1s. each.

#### 6-inch—County Maps:—

ENGLAND AND WALES: **Bedfordshire:** 30 N.E., S.W.; 1s. each. **Brecknockshire:** 22 S.E., 33 N.E., 34 N.W.; 1s. each. **Cambridgeshire:** (2 S.E. and 5 N.E. on one sheet), 30 N.E., S.W., 33 N.W., 38 N.E., S.E.; 1s. each. **Cardiganshire:** 2 N.W., N.E., S.E., 3 N.W., N.E., S.E., 6 S.E., 11 N.W.; 1s. each. **Carmarthenshire:** 40 S.E.; 1s. **Cornwall:** 36 N.W.; 1s. **Derbyshire:** 47 S.W., [48 S.W., S.E.]; 1s. each. **Devonshire:** 12 N.E. (12A S.E. and 12 S.W. on one sheet); 1s. each. **Dorsetshire:** 6 S.E., 17 N.W., 24 N.W., 33 N.E., S.W.; 1s. each. **Gloucestershire:** 72 S.W., 77 S.W.; 1s. each. **Huntingdonshire:** 23 N.W., 26 N.E., S.E.; 1s. each. **Leicestershire:** 2 S.E., 7 N.E., 8 N.W.; 1s. each. **Lincolnshire:** 13 S.E., 38 N.W., 46 N.W., S.W., 112 S.E., 121 N.E., 122 N.W., 142 N.E., 143 N.E., S.W., S.E., 147 N.W., 148 N.W., N.E., S.W., S.E., 149 S.W., 154 N.W.; 1s. each. **Merionethshire:** 22 S.W., 47 N.E., S.W., S.E., 49 N.W.; 1s. each. **Montgomeryshire:** 25 N.E., S.W., S.E., 32 N.W., N.E., S.E.; 1s. each. **Norfolk:** 52 S.W., 64 N.E., 74 S.E., 75 S.E., 86 N.W.; 1s. each. **Nottinghamshire:** 44 S.E.; 1s. **Oxfordshire:** 5; 2s. 6d. **Shropshire:** 47 N.E., S.W., S.E., 52 N.W., N.E., S.E.; 1s. each. **Staffordshire:** 4 N.E., 8 S.E., 25 S.E., 26 S.W. **Suffolk:** 11 S.E., 48 S.E., 50 S.E., 67 S.E., 68 S.E., 80 N.E., 82 S.W.; 1s. each. **Warwickshire:** 16 N.W., S.W.; 1s. each. **Wiltshire:** 75; 2s.

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ENGLAND AND WALES: **Brecknockshire:** XXXVII. 12, 16, 3s. each. **Cambridgeshire:** XXXV. 1, 5, 6, 3s. each; XXXV. 12, XL. 6, 4s. each; LIII. 10, 13, 14, 16, LVII. 3, 3s. each. **Cardiganshire:** VIII. 9, XII. 5, 3s. each. **Carmarthenshire:** XXVI. 5, 3s.; XXVI. 7, 4s.; XXVI. 8, 10, 11, 3s. each; XXVI. 12, 5s.; XXVI. 13, 14, 3s. each; XXVI. 15, 4s.; XXXIV. 6, 3s. **Devonshire:** XIX. 11, 12, 3s. each; XIX. 14, 4s.; XIX. 15, 16, 3s. each; XXX. 1, 2, 5, 6, 14, XCIX. 14, CXIII. 11, 16, CXIV. 8, CXVIII. 7, 15, CXIX. 2, 3s. each; CXXV. 4, 7, 11, 4s. each. **Dorsetshire:** I. 10, 4s.; III. 14, VI. 5, 6, 7, 3s. each; VI. 8, 4s.; VII. 2, 5, 3s. each; VII. 6, 4s. **Gloucestershire:** XXVI. 10, 4s. Area Book: Cheltenham, 1s. **Herefordshire:** XII. 11, 4s.; XIV. 16, XVIII. 14, XXI. 12, XXIV. 11, 15, 16, XXV. 1, 7, 12, 3s. each; XXVI. 1, 4s.; XXVI. 2, 3, 4, 8, 3s. each; XXVI. 11, 4s.; XXVI. 16, XXVIII. 8, 11, XXXII. 2, XXXII. 5, 3s. each; XXXII. 6, 4s.; XXXII. 8, XXXIII. 1, 4, 7, 3s. each; XXXIV. 1, 4s.; XXXIV. 15, XXXV. 3, 12, 13, 14, 16, 3s. each. **Huntingdonshire:** XX. 6 and 7 (on one), XX. 10 and 11 (on one), 3s. each; XX. 15, 4s.; XXIV. 4, 3s. **Lincolnshire:** VI. 11, 4s.; XII. 12, 13, 14, 15, 16, XX. 3, 4, 5, 3s. each; XX. 6, 4s.; XX. 7, 8, XXXVII. 2, 4, 9, 13, 16, 3s. each; XLV. 11, 4s.; XLV. 16, LXIII. 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, LXXI. 1, 3, 3s. each; LXXI. 6, 4s.; LXXI. 8, 3s.; LXXI. 9, 4s.; LXXI. 11, 3s.; LXXI. 12, 4s.; LXXI. 13, 14, 15, 16, CL. 4, 3s. each. **Montgomeryshire:** XVI. 8, XXVI. 10, 14, 15, XXXIII. 9, 3s. each. **Norfolk:** II. 11, 12, 13, 3s. each; II. 15, 4s.; II. 16, V. 4, 3s. each; V. 8, 4s.; IX. 1, 2, XXXII. 4, LVI. 8, LXIX. 2, 3s. each; LXXXVIII. 3 and 4 (on one), 20s. 6d.; CIV. 13, 4s. **Northamptonshire:** III. 12, 4s. Area Books: Abington, Dallington, Duston, Kingsthorpe, Moulton Park, Priory St. Andrew (Northampton), St. Giles (Northampton), St. Peter (Northampton), St. Sepulchre, Weston Favel; 1s. each. **Rutland:** X. 4, 3s. **Somersetshire:** IX. 12, 3s.; LXVI. 10, LXXXIII. 3, LXXV. 16, LXXXII. 1, 2, 3s. each; LXXXII. 5, 5s.; LXXXII. 8, 12, 16, LXXXIV. 2, 3, 5, 6, 7, 3s. each; LXXXIV. 8, 4s.; LXXXV. 2, 5, 3s.; LXXXV. 6, 4s.; LXXXIX. 3, 4, 3s. each; LXXXIX. 6, 4s. **Suffolk:** II. 3, 20s. 6d.; XV. 13, XXX. 12, 4s. each; LXX. 8, 3s.; LXXXIX. 3, 5s. Area Books: Chattisham, Dalham, Glemsford, Great Wenham, Long Melford; 1s. each. **Warwickshire:** XXIII. 2, 6, XXXI. 9, 10, 14, 15, 16, XXXI. 16, XXXIV. 9, 13, 14, XXXVII. 1, 2, 3s. each; XXXVII. 8, 4s.; XXXVII. 11, 3s.; XXXVII. 13, 14, XLIV. 4, L. 12, 4s. each; LIII. 7, 3s. Area Book: Ipsley, 1s. **Wiltshire:** XXVIII. 11, XXXI. 1, 3s.; XXXVIII. 1, 13, 4s.; LII. 1, 10, LIII. 14, LVII. 2, 3, 4, 8, 12, 3s. each. **Worcestershire:** XXIV. 10, 15, 3s. each; XLIV. 12, 4s.; LI. 7, 3s.

#### Town Plans—10-feet scale:—

ENGLAND AND WALES: Leicester, XXXI. 10, 13, 14, 15, 16, 17, 18, 20, 25, 2s. each. Wisbech, VII. 3, 4, 8, 9, 10, 15, 18, 24, 25.

(*Stanford, Agent.*)

## ASIA.

**Transkaspischen Gebiete und von Nord-Chorassan.**—Karte der —. Hauptsächlich nach General J. Stebnitzki's Karte von Transkaspien (1885), mit Nachträgen und den Routen der Forschungs-Expeditionen unter Dr. G. Radde, Dr. Walter und J. M. Korschin, 1881 bis 1886. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Tafel 12. Gotha: Justus Perthes. (*Dulau.*)

## AFRICA.

**Afrika.**—Neue Karte von, nebst Madagaskar, Arabien, Persien, Afghanistan, Belutschistan, Syrien und Klein Asien, mit Anschluss an Europa. Scale 1:7,500,000 or 102·7 geographical miles to an inch. Stuttgart, J. Maier. Price 8s. (*Dulau.*)

**Algérie.**—Carte topographique de l' — au 50,000<sup>e</sup> or 1·4 inches to a geographical mile. Sheets: 4, Herbillon; 9, Azeffoun; 14, Philippeville; 19, La Calle; 33, Penthievre; 43, Palestro: 64, Tablat; 65, Ben Haroun; 87, Oued-el-Malah; 88, Aïne Bessem; 128, Mostaganem; 182, Saint-Denis du Sig. Paris, Ministère de la Guerre. (*Dulau.*)

**Manica.**—Carta do Districto de — e dos territorios circumvizinhos, 1887. Scale 1:2,000,000 or 27 geographical miles to an inch. Comissão de Cartographia. Coordenada por A. A. d'Oliveira. (*Dulau.*)

**Santo Antão.**—Carta da Ilha de (Cabo Verde), 1887. Scale 1:100,000 or 1·3 geographical miles to an inch. Comissão de Cartographia. Coordenada por Ernesto de Vasconcellos.

## AMERICA.

**Argentina.**—Mapa general de la Republica —, y parte de las naciones circunvecinas, formado en visita de observaciones astronomicas, cartas, exploraciones de autores de crédito y obras publicadas hasta principio de este año de 1887. Bajo la direccion del D. D. Marino Felipe Paz Soldan, dibujado por los ingenieros geografos Carlos Beyer, Federico Block. Scale 1:300,000 or 41·6 geographical miles to an inch. Paris. (*Dulau.*)

**Nord Amerika.**—Officielle Eisenbahnkarte der Vereinigten Staaten von —, Canada und Mexico. Herausgegeben von Rand, McNally & Co. Leipzig, G. Weigel. Price 3s. (*Dulau.*)

**North America.**—General Map of —, constructed from the best authorities, and embodying the results of all explorations to the present time. By W. and A. K. Johnston, Edinburgh and London, 1887. Scale 1:7,160,000 or 98 geographical miles to an inch. Price, mounted on cloth on mahogany rollers, varnished, 1*l.* 1s.; on spiral spring roller, with mahogany case, 8*l.* 8s.

This is a very good general map of North and Central America on which all the railways appear to have been carefully laid down, and although the scale on which it is drawn is small, it is sufficiently large for the purpose of general reference. The physical features are clearly shown, and care has been taken not to overcrowd it with names.

## AUSTRALIA.

**Queensland.**—Geographical Map of —, by Robert L. Jack, Government Geologist. Issued under the authority of the Department of Public Works and Mines, 1886. Scale 1:200,000 or 27 geographical miles to an inch.

## CHARTS.

**United States Charts.**—No. 1031. Potrero and Braxiito Bays, West Coast of Costa Rica. Price 1s. 6d.—No. 1044. Soledad Bay and Santo Tomas Anchorage, West Coast of Lower California. Price 1s. 1d. Published at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

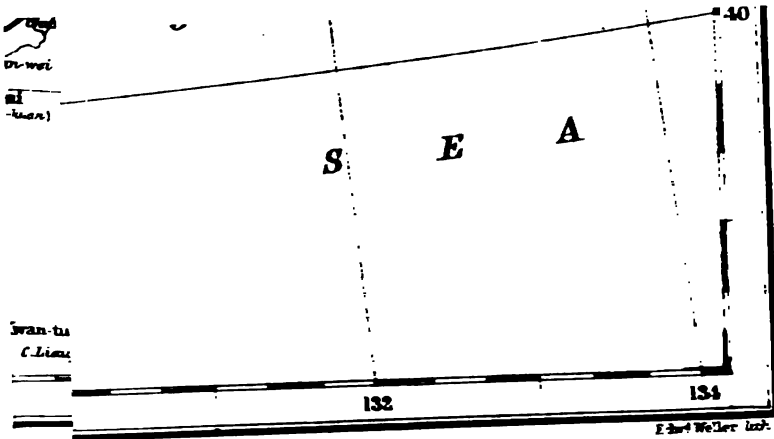
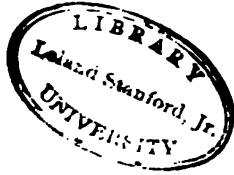
## ATLASES.

**Andree, Richard.**—Supplement zur ersten Auflage von Richard Andrees Handatlas enthaltend die 33 Seiten neuer Karten der zweiten Auflage von 1887. Apart für die Besitzer der ersten Auflage. Herausgegeben von der Geographischen Anstalt von Velhagen und Klasing in Leipzig. In 3 Lieferungen jede zu 2 Mark (2s.). 3. Lief. Schlusslieferung. Bielefeld und Leipzig, Verlag von Velhagen & Klasing, 1887. (*Dulau.*)

This is the last issue of the supplement to Andree's Handatlas, and contains eight maps. No. 2 is a map of Upper Italy which calls for no special mention; the hill-work is, however, rather flat in appearance, and hardly conveys a correct idea of the physical features of the country. No. 19 is an extremely good map of Eastern China and the Corea, the latest information having been used in its construction. No. 20, Afghanistan and Baluchistan, in which the north-west boundary of Afghanistan, which was the subject of protracted discussion, has been correctly laid down, and it has in other respects been brought up to date. No. 21 is a chart of the South-Sea Islands. No. 22, New Guinea and the Bismarck Archipelago, exhibits the results of exploration in New Guinea up to the end of 1886, the Kaiserin Augusta River in Kaiser Wilhelms Land, and other recent discoveries being shown. On this sheet two inset maps, on enlarged scales, one of Astrolabe Bay, and another of parts of New Britain and New Ireland, in the vicinity of St. George's Channel, are given, together with a map of South-west Germany, drawn on the scale of the principal map. No. 31 is a map of German East Africa in which the extent of German possessions is erroneously indicated, and we cannot do better than refer the reader to an exhaustive note on this subject, contained in the R.G.S. 'Proceedings' for August of the present year (pp. 490-6). The territory of the Sultan of Zanzibar is, however, correctly laid down and shows at a glance how meagre are his present possessions in comparison with the vast extent of country over which he claimed authority but a few years ago. No. 34, Cape Colony, Natal, &c., is a well-drawn map in which political boundaries and physical features are clearly indicated. No. 35 is a map of South and Central Africa, on which an inset map of the kingdom of Saxony, drawn on the same scale, is given.

**Argentina.**—Atlas General de la Republica —, construido segun los datos mas recientes bajo la direccion de Carlos Beyer, Ingeniero Geógrafo de la Casa Editora. Grabado y Revisado por los S.S. W. and A. K. Johnston, propiedad exclusiva del Editor. Buenos Aires, Angel Estrada, 1887.

This atlas contains twenty-two maps, the three first being those of the world in hemispheres, a general map of South America, and a general map of the Argentine Republic. As each of the thirteen provinces is given on a single sheet the scales on which they are drawn, of necessity, vary in proportion to the areas represented, and the same remark applies to those of the Governments of Misiones, Formosa y del Chaco, Pampa y del Rio-Negro, Neuquen, Chubut y de Santa Cruz, and Tierra del Fuego. The maps which this atlas contains are the work of Messrs. W. and A. K. Johnston; they are very clearly drawn, and have been compiled from the most recent sources, all railroads being shown up to date, and every road of importance laid down. As a whole the atlas is a very creditable production, and is a most important addition to the cartography of South America.





PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
AND MONTHLY RECORD OF GEOGRAPHY.

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*Discovery of two new rivers in British New Guinea.*

By THEODORE F. BEVAN, F.R.G.S.

Map, p. 658.

THE accompanying map of less than six weeks' exploratory work in British New Guinea will, I trust, be found fairly full and self-explanatory. A private firm (Messrs. Burns, Philp, & Co.) lent their steamer *Victory* (of 90 tons register, 25 horse-power, 100 feet length and 9 feet draught) for the expedition, which was planned, organised, and (so far as related to the specialists) partly found by the leader. To the courtesy of the New South Wales Government we are indebted for the carefully prepared map\* which accompanies this short and hurriedly written preliminary account.

The *Victory* left Thursday Island, Torres Straits, on the 17th March last, and entered the Aird river at Cape Blackwood two days later. At Attack Point a hostile body of sixty nude Papuans contested our entrance to the great river. These savages, after some hesitation, bore down upon us, alternately splashing the water into the air and beating time with their paddles against the sides of their canoes, also shooting volleys of arrows at us both before and after coming within range. This attack was decided in our favour, without any bloodshed, by a judicious use of the steam-whistle and a few shots fired wide and high. These harmless measures caused the natives to take as one man to the water, prior to re-embarking and paddling off crestfallen home. They were painted, decorated with feather head-dresses in addition to other ornaments, and wore white groin shells to partly conceal their nudity. They were above the middle height, of great muscular development, and of a dark bronze colour.

From Attack Point deep water (as shown by the figures representing reductions to low-water soundings) was carried in an easterly direction into a broad opening leading to Aird Hills on the one hand, and out into Deception Bay on the other. This estuary was, I believe, unnoticed by Captain Blackwood in 1845, who turned back from the Aird river, when

\* This map is on a very large scale; the map we give is a reduction of it.—[Ed.]  
No. X.—Oct. 1887.]



distant about eight estimated miles south-westerly from Aird Hills, avowedly "owing to the strong body of enemies in his rear." These latter hills were placed by us in longitude  $144^{\circ} 11'$ , or ten miles west of their location by Blackwood.

From the coast to this point the country was of alluvial formation, intersected in all directions by a labyrinth of waterways. Aird Hills proved to be an isolated range of volcanic tuff resting upon basalt boulders at the water-level. To the north of Aird Hills a second small body of natives was encountered. They came down in their canoes, keeping close in to the river banks until about 400 yards distant, when they landed in the thick scrub, and returned with piles of green branches as a token of peace. By signs, words, and the exercise of patience they were coaxed first to the boat sent out to meet them, and finally alongside the steamer. Amongst them were a few women and children. Males and females possessed but little covering, and in some cases were quite naked. Of the middle height and a light bronze complexion, they reminded me of the Koitapuans of the south-east coast.

A river leading northward was followed up from this point for a distance of 10 miles, when the water shoaled, and a return had to be made to the southward of Aird Hills. Thence a channel was found into a broad stream coming down from a north-westerly direction, up which we proceeded, through swampy alluvial country, as far as Barnett Junction, where the river bifurcated and the tide ceased. This proved to be the head of the delta. From Barnett Junction the river wound round low hills for a distance of four miles, when, at a somewhat abrupt bend, two native houses on the summits of volcanic cones came into view. It was soon evident that the strange apparition of the steamer gliding into these fastnesses was visible from the shore, as the mellow sound of the conch-shell was heard warning the inhabitants of the scattered village of danger. Slowly the steamer approached, and when abreast of the village, and opposite a creek, some canoes full of natives were seen paddling off in abject terror. A mile above this village the river widened, and two important tributaries, coming in from the north-west and north-east, formed Bowden Junction in S. lat.  $7^{\circ} 11'$ , E. long.  $144^{\circ}$ .

Seeing that the steamer had stopped, the natives of Tumū (as the hill-village was called) approached in their canoes, but very warily. As they neared the steamer it was perceived that so pronounced were their friendly feelings that they had dressed their own persons with green boughs as well as their canoes. Then ensued a series of dumb motions on our part to express our good intentions, together with the use of words likely to be recognised by the natives. The next step was to bend a slip of turkey-red cloth, a piece of sharpened hoop-iron, and one or two trifles on to a wooden batten, and let it drift with the current down-stream. One native, bolder than the rest, paddled after this parcel and, after cautious inspection, appropriated it, and donned the



MR. DEVAN MAKING FRIENDS WITH THE TUMUANS. (From a Photograph.)

red cloth as a covering for his frizzly hair. By such means confidence was promoted, and taking with me two men, I drifted slowly down in the boat towards the natives, and after overcoming their natural shyness, obtained bone-tipped arrows in barter, and taught the Tumūans to shake hands.

This tribe had certainly never seen and possibly had never heard of white men before, Blackwood, the only previous explorer in these parts, not having penetrated within 30 miles of this place.

From Bowden Junction the Burns river, or north-west tributary, was ascended until a fall in the river-bed of two feet impeded further navigation. It was found on landing that the banks were 8 or 10 feet above the river-level, that the country was studded with fine timber and not too dense an undergrowth. Tracks of wild hogs were seen, and calls of king birds of Paradise and *Paradisea raggiana*, hornbills, parrots, pigeons, and other birds were heard. Up this river the Tumū natives again visited us and had to be attended to. When the shades of evening fell they glided off home, beating time with their paddles against the sides of their canoes, splashing the water high into the air, chanting a loud song, occasionally looking round and crying out "Narmo! Narmo!" to show that their intentions were friendly.

Up the north-east tributary, or Philp river, however, deep water was carried as far as Victory Junction, the river winding round hills of from 300 to 2000 feet in height, of cretaceous limestone formation, in places sloping precipitously and thickly wooded to the water's edge. A short distance above Victory Junction was found a mineral spring, similar in some respects to the sulphuretted hydrogen waters of Harrogate. Above this point, however, rocky bars or barriers, over which the water ran as through a sluice-gate, closed the river to navigation by the steamer. Thirteen miles were added to our knowledge of this part of the country by means of a boat-party, which reached Fastre Island after three days' hard rowing and warping the boat up the river banks, in some cases foot by foot at a time. Thence a track was cut for four miles along the lower spurs of a lofty range, and through dense tropical jungle.

At the alluvial island camping-place (marked, on map, "Boat-party, 1st April, 1887") pebbles of water-worn metamorphic slate, diorite, also magnetic iron sand yielding from every dish washed a few colours (less than a pin's-head in size) of scaly gold, were obtained. The formation on either bank of the river opposite to this island, as also at the highest point reached by means of the track cut, was of dense basalt. Specimens of these were forwarded to Mr. Wilkinson, Government Geologist of New South Wales, who reports as follows:—"The pebbles of slate and quartz found on the island in the Philp river are indicative of formations which sometimes contain auriferous reefs, as well as copper and other metalliferous lodes. These pebbles, though originally derived from

DISCOVERY OF TWO NEW RIVERS IN BRITISH NEW GUINEA.



palæozoic rocks, may have been washed out of conglomerate beds such as occur in the cretaceous formation on the Strickland river; but from the occurrence of gold in the black sand which is found with them, it is more probable that both they and the gold have been brought down by the river from the primary formation forming the mountains, which may not be more than 20 or 30 miles distant. We may therefore anticipate mineral discoveries being made in these mountains, though not necessarily richer than are found in similar formations forming the ranges in the mining districts of Australia."

In April the wet season is not fairly over. The normal strength of the current on these ridges, combined with the freshets caused by the almost nightly rains, rendered further progress by means of the boat impracticable. The same cause also rendered any hope of getting to the primary rocks in the three weeks which remained of our allotted time, over ranges drenched by the monsoon and swarming with ravenous leeches, quite out of the question. The estimated position of Fastre Island was  $6^{\circ} 39'$  S. lat.,  $144^{\circ} 11'$  E. long., being 80 miles direct from Cape Blackwood, or about 100 miles by the river course. At this point we were within 25 miles of the German boundary.

At 3.30 p.m., on April 3rd, a start was made with the whaleboat on the down-course and return journey. All were found to be well on board the *Victory*.

On the following day the steamer proceeded to return, and in the afternoon anchorage was come to opposite the friendly Tumū village, the inhabitants of which lustily shouted "Narmo," in token of the good feeling that existed between us. An exchange of visits was made; I went ashore in the dingy, and after my return the natives came on board the steamer. A vocabulary of a hundred words was, after some difficulty, obtained from the natives. Men, women, and children examined every niche and cranny open to their inspection on the vessel, and displayed amazement at what they saw. Afterwards another visit was paid to the shore, the boat being taken up a creek skirting the nearest volcanic cone on which rested the chief's house. The gardens of the villagers were soon reached, where sugar-cane, bananas, and tobacco were growing luxuriantly. Off the river bank, opposite to the village, were one or two interesting limestone caves thickly crusted with stalactites and stalagmites.

Next day, April 5th, the natives again came on board and examined everything, one being horrified at seeing salt-beef in a cask, and another terror-struck at seeing his own ugly reflection in a mirror. Several of them now began to exhibit thievish propensities. Finally, the natives when we landed on shore once more began repeating the word "Ootoo," and waving their arms downstream. They had apparently sufficiently satisfied their curiosity, and would be glad to say good-bye to the white men and their vessel. One very old and wrinkled man rubbed his nose

and pinched the tip of it, then pinched and rubbed the pit of his stomach. Another signified by signs the act of cutting off the head and arms, using the words "oorar," and "baddinar."

The mountain ranges to the north they called "Warharagee"; their own hill, houses, and the country to the west, "Tumū"; the country to the east, "Imugū"; and the land to the south, "Kubūee." A peculiarity of the Tumūans was the way in which the men wore their hair, shaving it off from above the forehead, but leaving a tuft on the crown tied with a topknot from behind, while a few matted locks hung down. No known Papuan dialect would have been of use at Tumū.

When leaving the Douglas river, a broad opening unnoticed by Blackwood, leading from Aird Hills out to sea through Deception Bay, was taken, but we first made a stay at the previously unknown village of Mōkō.

While the Tumūans were of average height and size, these coast people were of great stature and muscular development, besides being of a darker bronze colour. Like the other natives of this new district, the Mōkōans were shy and at first difficult of approach. Even when intercourse was had with them they remained suspicious and on the alert, while the slightest hasty action or even discordant sound was sufficient to scare them away.

Deep water was carried out of Deception Bay on 9th April, 1887, into the Gulf of Papua, as will be seen from the soundings on the map, and a visit was then paid to several villages on the coast as far, and including, Motu Motu, where despatches were left for Her Majesty's Special Commissioner for British New Guinea, Hon. John Douglas; so that should any mishap have befallen the expedition on the latter half of its exploratory work, the discovery of the Douglas and Philp rivers would not be lost to the world.

As will be seen by reference to Admiralty chart (Gulf of Papua, sheet 4), five river openings between Orokolō and Bald Head had been reported by natives to lead into one large river, to discover which was our next object. The mouth of each opening, however, proved to be blocked by a sand-bar, washed by heavy surf. The broad estuary bounded by Bald Head on the east and sheltered by a non-shifting sand-bank (seen by Blackwood in 1845) proved to be accessible to navigation, and the *Victory* anchored inside of Bald Head on the night of 14th April, 1887, and broke again on new ground. In a little neighbouring bight a village was discovered, partly hidden and sheltered by a grove of coconut trees. Canoes with natives paddled off, and though shy at first, they afterwards came near. The tribe was called Kīwa Pori. Over two hundred men appeared in thirty canoes. One of their signs was to hide their lowered heads in their hands and then to draw their hands down over cheeks, mouth, chin, neck, breast and abdomen. At dusk they peacefully dispersed; and next morning forty-nine canoes with more

than three hundred natives were counted. The men were of unusually fine stature, equalling those at Motu Motu. They were dark bronze in colour, and almost, some of them entirely, nude. Though with well-nourished and muscular frames, yet their retreating foreheads and heavy eyebrows gave them a sinister expression.

Ten miles from Bald Head in a northerly direction the land was found to traverse the horizon, and broad sheets of water coming in from west and east formed a junction. Taking the westerly opening and passing round the point, after proceeding for a distance of four miles a second (named Beveridge) junction was reached. At this point the river was nearly half a mile wide, and an extensive mud flat was found. Some very fair agricultural land was now passed, with light chocolate-coloured soil, and covered with scrub that could be cleared with ease, and would form a suitable field for the cultivation of rice, sugar-cane, and tobacco. Fresh-water springs were noticed flowing over the banks. Numerous very small deserted huts built on the ground and unsupported by the usual piles, were passed, and a number of crocodiles and flying foxes were seen. The country afterwards steamed through was alluvial swampy land, in which nipa and sago palms flourished amidst a thick scrub. The river subsequently narrowed to 60 yards, and at low tide the water was quite fresh. It was found necessary to anchor here, and some of the party getting into the whale-boat, rowed up the river, which continued to get narrower until it broke up into several deep-water creeks of only a few yards in width, and further navigation was closed. The highest point reached up this (the Stanhope) river was  $7^{\circ} 14'$  S. lat. and  $144^{\circ} 28'$  E. long., being 34 miles due north from Arai river on the coast, or 40 miles by river courses to Bald Head. Returning to Beveridge Junction the Penrose river was followed up for six miles, when it too shoaled, and a return had to be made to Macleay junction. Thence an easterly branch was explored in the whale-boat and found to lead into a larger river which sent off a subdivision down to the coast. This latter was presumably the Mawau river previously charted.

A few miles further, after passing a small grove of coco-nut trees indicating the proximity of natives, a canoe was almost run into at a sudden bend. The occupants, consisting of a few men, women, and children, set up a shrill cry and paddled off hastily. A few minutes later some twenty savages sprang up from behind bushes on the opposite bank, bows and arrows in hand, while simultaneously several canoes came down from ahead. Rowing back past the shore natives we then stopped, and waited for those on the water to approach, with whom after a natural delay some barter was done, and the foundations were laid for amicable intercourse. On the day following, the steamer was taken up to their village, which lined the river bank under groves of coco-nut and bread-fruit trees, and near gardens of banana and sugar-cane. The houses of this village, or Evorra (as we found it was called),

were supported on piles some six feet from the ground, and were of the hog-backed shape, open in front, with projecting peaks, and the usual verandah. From this tribe (in the Namai district) a vocabulary of one hundred words was obtained after some difficulty. The word for sun, *iperr*, being given with a whisper, finger pointing upwards, but averted gaze. These Evorra natives, though only some 12 or 15 miles distant in a direct line from the coast, were not of so fine a physique as either the Kiwa Porians or Mokoans, probably owing to their river being less abundant in fish than the ocean. They also seemed to be of a somewhat lighter complexion, and to speak a different dialect. Carved and painted bark waist-belts tightly pinched the abdomens of the males, who also wore white groin shells and pearl-shell breastplates of crescent shape, while the younger men adorned their persons with the brilliant leaves of variegated crotons. Among novelties obtained at this village were flat masks of semi-oval shape, varying in length from one to eight feet. These were constructed of fibre of a sterculiaceous plant with a raised rim down the middle from top to bottom, and at one end a projection shaped like a nose with two eye-apertures alongside. The whole was decorated with an irregular semi-serpentine pattern in black and white, and the rims were edged with cane frilling. Human and cabalistic representations carved on small flat slabs of bark and palm frond were also new to my previous experience of Papuan ethnology. Specimens of both descriptions of these curios were hung up in front of the houses apparently as emblems.

Two miles from Evorra village a second junction was reached, where a river over two hundred yards broad, with a steady current of fresh water, came down and bifurcated, throwing off the side branch which we had steamed up, in addition to a river flowing southerly. Five miles above Llewellyn Junction a few natives were spoken, but from that on to the highest point reached no signs of human life presented themselves, save at different places (as marked on the map) groups of small and seemingly deserted huts, sometimes surrounded by gardens. These little domiciles consisted of one or two stakes and a roof thatched over with palm fronds, and were probably the temporary shelter of coast tribes paying occasional visits up the river to obtain sago and other like produce which abounded in the swampy country on the Stanhope, also in the deltaic portion of the larger rivers. In one deserted hut, exceeding the others in size, was found fixed up in front a "taboo" consisting of a painted mask resting on a large circular wisp of sago-palm fibre and rattan, with pendent streamers of the same fibrous material; while half-way down the floor of the hut were bones of fishes and small deer suspended from streamers.

Up to Bennett Junction the river pursued a remarkably tortuous course, and at that point widened to nearly half a mile. Five miles further, at Woodhouse Junction, the head of the delta of the large river



previously reported by the natives was reached. At an easterly bend about one mile north of Mount Samuel, where the stream expanded to nearly three-quarters of a mile for a short distance before entering the ridges, a magnificent view was obtained of hill and mountain scenery rising tier above tier in the clear morning air, over a foreground of reeds and Pandanus scrub. Above this bend the river narrowed to 400 yards, flowing between banks covered with bread-fruit trees. Further north the channel ran through gorges of volcanic rocks clothed with verdant foliage to the water's edge. Here the whirling eddies denoted the presence of sunken rocks underlying the swift current in the bed of the stream. Higher up again a rapid was shot with some difficulty, owing to the velocity of the water. Its discoloration was due in this case, as on the Philp river, to the amount of detritus in suspension brought down from the great mountains. Half a mile above this rapid it was deemed unsafe to proceed further in a vessel drawing nine feet of water. Estimated position, S. lat.  $7^{\circ} 18'$ , E. long.  $144^{\circ} 59\frac{1}{2}'$ .

Two miles were added, however, by means of the boat, and thence an uninterrupted view for a like stretch was obtained; but soundings became more and more irregular. There seemed some possibility, however, that beyond this tier of near ranges a valley stretched to the foot of mountains of great altitude over the German boundary. As the six weeks of our allotted time were nearly up, and representations were made to me of the risk of continuing, also that our coal would not suffice for further steaming, it became necessary to return seawards by means of the channels ascended, and consequently known. To have taken any of the untried channels in the delta would have been unsafe in view of the current astern, which might have carried the steamer high and dry on to any hidden shoal. The Gulf of Papua was again entered from Bald Head on 28th April, 1887.

It will appear from the map that as the result of thirty-four days' actual exploration two principal new rivers—namely, the Douglas (with its tributary the Philp) and the Queen's Jubilee—were discovered, and each was followed up for a distance of nearly 100 miles by river courses from the coast. The Aird river, discovered by Blackwood in 1845, proves to be only one of numerous subdivisions in the delta of the main stream. From Barnett Junction, the head of the delta of the Douglas river, 45 miles from the coast, Aird Hills are the solitary exception to the vast expanse of level alluvial land, clothed with jungle, which forms the delta. From Barnett Junction to the highest point reached, the country was scrubby, and of cretaceous limestone formation, giving place to a belt of basalt rocks, while the pebbles of metamorphic slate, diorite, also the magnetic iron sand containing auriferous indications found on the alluvial island in the Philp river, point to the primary rocks as forming the watershed of this river at a distance of probably not exceeding 20 to 30 miles, if so much, from the highest points reached. By the Stanhope

and Penrose rivers the expedition passed through low country similar to that in the deltaic portions of the larger rivers, and formed of fertile alluvium washed down from the main range. Igneous rocks again were found north of Woodhouse Junction, on the Queen's Jubilee river. Both rivers disembogue themselves into the Gulf of Papua over an area respectively of probably 40 miles. Above the head of the deltas of the two larger rivers the scenery was found to be picturesque in the extreme. Hills of from a few hundred feet to ranges of one, two, and even three thousand feet, clothed with verdure, came down almost to the water's edge. There were, amongst other trees, cedars, oaks, eucalypti, myristica, fig-trees, acacias, pines, palms, and tree-ferns. Bamboos, ferns, and a varied flora adorned the river bank. Butterflies of gaudy hue and some birds of the brightest plumage fluttered in and out amongst the trees and shrubs. The water was placid, and in the deepest recesses of the gorge-like ranges, was sombre and cold.

On steaming slowly upwards the finely wooded ranges became higher, the river bends more abrupt, and the current swifter. On both rivers the country thus described was of a good useful class, quite uninhabited as far as could be perceived. It also possesses three great advantages—plenty of timber, deep water alongside, and a navigable channel for a deep-draughted vessel for a distance of nearly 100 miles from the coast. Vast areas of unclaimed and uninhabited land on all these new rivers offer the facilities required for the successful cultivation of rice, sugar-cane, and tobacco; or for the production of what are known in India as valuable crops in contradistinction to "dry crops." For the prosecution of these industries coolie labour would have to be imported. In their lower portion there was a tidal rise and fall of 12 to 14 feet; and the rule seemed to apply that the land was making on the convex side while the deepest channel and strongest current were found close in to the concave bank. Thus by studying the tides, and when the tide ceased, following the deepest channels, in addition to taking continuous soundings, no serious difficulties were met with. Though the steamer was several times aground, for hours at a time, as a rule in soft mud, either a freshet in the river, or the tidal rise near the coast (backing up the fresh water for one or two feet for great distances inland) came to our aid, and the vessel floated off without ever sustaining damage. One important feature in connection with the higher waters of the larger rivers was that owing to the almost daily scouring caused by the frequent nightly rains, mosquitoes and malaria were absent, and beyond the fact that one man had a relapse for a few hours of illness caught months previously in Western Australia, fever and ague were unknown.

The days were almost invariably bright, and the sky clear till noon when masses of cumuli appeared on the horizon. While among the ranges on both rivers the thunder at nights was frequently almost deafening and the forked lightning most vivid, both being usually the

precursors of torrential rain. The mean temperature at midday was  $86^{\circ}$  in the shade, falling as low as  $72^{\circ}$  at daybreak. During March and April there was occasionally a slight breeze off the land at night-time. The mornings in March frequently set in with a breeze from the north-west, veering round to south-west as the day advanced. At the end of April the south-east monsoon began to fume and bluster off the Queensland coast, causing a heavy swell to wash the opposite Papuan shores. By reference to the map it will be seen that the Gulf of Papua presents a lee shore to the whole force of the south-east monsoon. Making the entrances of these new rivers will therefore not be unattended by dangers to navigation, from May to September inclusive, until this part of the coast has been systematically surveyed by the Admiralty.

The map is based upon a careful compass survey, supported by a few astronomical observations taken as opportunity offered. It should, however, be regarded as a preliminary reconnaissance or flying survey, since it was compiled in thirty-four days, that being the aggregate period spent by the expedition in these new rivers. For the same reason, as also the circumstance of imperfect instruments, the altitude of the mountains and the great slope of the river-beds could not be obtained with any pretensions to absolute accuracy on this occasion. These and kindred observations, together with a register of rainfall, must make a leading feature of the next (and it is to be hoped more extended) expedition.

Hills and ranges varying from a few hundred to considerably over 2000 feet, clothed with verdure, came down almost to the water's edge on the Philp and Jubilee rivers, as previously mentioned, while the serrated forest-clad tops of mountains estimated to be over 6000 feet in altitude, were distant not more than 12 or 15 miles from the highest points reached. Behind these latter again rose blue mountain-peaks, rivalling in elevation Mounts Yule and Owen Stanley.

Fastre Island, on the Philp river, would appear to be not more than 25 miles distant from the German boundary, which comes even nearer to the highest point reached by us on the Jubilee river. It seems therefore probable that the natural boundary or water-parting between the river systems of the two territories may be found to exist a few miles to the north of the present line. In any case there is probably an impenetrable wall of mountains between the two possessions, with no likelihood of any large river on the German side having its source in close proximity to the head-waters of the Philp or Jubilee rivers, so that a compromise or adjustment should if necessary be readily effected between the two powers. This boundary question will, however, be one of the most important problems for any future expedition to definitely determine.

The new regions explored proved but thinly peopled. All the natives met with, except the hostile Papuans at Attack Point, were

readily amenable to humane influence. The two largest tribes, and these were found on the coast, as might have been expected, namely, those of Moko in Deception Bay, and the Kiwa Pori at Bald Head, numbered probably considerably less than one thousand souls, all told; while the small tribe behind Aird Hills and the Tumūans combined were only some two or three hundred strong. Not more than a dozen Pimurūans or Vaimuruans were seen, while the Evorra natives possessed some fifteen houses only, and a population which might be very liberally estimated at two hundred. No natives at all were seen on the Philp river, nor north of 25 miles by river courses from the coast up the Jubilee river. It would therefore appear that the higher waters of these rivers, and even for some considerable distances before they enter the gorges and near the main ranges, are uninhabited. Long rambles into the bush for collecting purposes whenever opportunity offered seemed also to confirm this view.

The natives of the few villages referred to gave indications of Dravidian origin, as well as of both Moluccan and Melanesian characteristics, to judge from dialects, appearances, and customs. From the new tribe behind Aird Hills a long screen of latticework, such as is used in Siam to this day for stretching across the mouths of creeks to ensnare fish, was obtained. It is put by the New Guinea natives to the same use, namely, that of forming a weir; also the war shields of the Kiwa Pori natives resembled, not indistinctly, those until lately in use in New Caledonia. All these new tribes wore nose pencils, and distended the lobes of their ears, also smoked sun-dried tobacco (corresponding to the Manilla leaf) by means of bamboo tubes. The Tumūans especially might be described as almost of an intellectual cast.

The canoes of all these tribes were of a more or less similar type, namely, dug-outs with either a bank of mud or a small boy squatting in the prow and opposing his back as an obstacle to the incoming water. All were without outriggers. Some, however, were of unusual dimensions; one Kiwa Pori canoe holding twenty-nine men, who all stood up to paddle. Not a few were grotesquely carved and painted outside to represent either inverted turtle-shells or crocodile scales. We were not a little amused at the action of one Moko native, who, singly in his fragile canoe, baled the water out by a motion of his left foot; keeping his balance, and paddling vigorously against the choppy sea meanwhile.

In the nomenclature adopted on the map every member of the expedition is represented. The three principal rivers are named respectively to commemorate the leading event in the year of their discovery, namely, the anniversary of the fiftieth year of Her Majesty's reign; also the names of the Hon. John Douglas (Special Commissioner for British New Guinea); and Mr. Robert Philp (to whose intelligent liberality these discoveries are greatly due).

This six weeks' expedition, though primarily planned mainly for

geographical discovery, was by no means barren in collateral results. Fifty photographs, including many of new tribes and scenery, were obtained, and interesting additions to our knowledge of the flora, fauna, and anthropology of New Guinea have been contributed by means of the collections made.

*The Raïan Mæris; or storage reservoir of Middle Egypt.*

By COPE WHITEHOUSE, M.A.\*

Map, p. 658.

It is now generally known, as the result of my researches previously communicated to the scientific world,† that the Raïan basin is a depression to the south and west of the Fayoum, between lat. 28° 40' and lat. 29° 30'. Its northern extremity is nearly on a line with Beni-Suef, 73 miles south of Cairo. It is connected on the south-east with a narrow valley known as the Wadi Muélah. I have heretofore described how I was led to believe that some such depression must exist, and how, at first alone, and subsequently accompanied by engineers employed by me, or put at my disposal by the Egyptian Government, these observations were verified. It was my opinion that about the eighteenth century before our era, foreign engineers had conceived a gigantic scheme for the draining of the Fayoum, and the redemption of the Delta. They had constructed a dyke at el-Lahun, with a regulator by which the supply of Nile water was reduced to the amount required for the perennial irrigation of a province, which the Jews in the time of St. Jerome identified with Goshen, and in the twelfth century asserted to be Pithom. The dyke still serves its original purpose. They had also availed themselves of a series of drainage channels under the west bank of the Nile valley. By deepening the natural watercourses, diverting the flood waters of the Nile, and protecting the stream at intervals by dykes, they succeeded in making a canal which for over three thousand years—from the Exodus to the present time—has continuously supplied the Fayoum with water. It is 270 miles in length, and with its immense discharge, is far beyond any similar work in the world. Known as the Bahr Jûsuf, or Canal of Joseph, it deserves the name, whether it be due to the Hebrew engineer who is said to have designed it, or to the meaning of the word which, in popular parlance, implied that the reproach of barrenness had been taken away by this offspring from the Nile, and a new province added to Egypt.

In order to extend cultivation throughout the entire delta it is necessary to increase the summer supply of water in the river itself. It had been suggested by French engineers that a dam might be built

\* Read at the Manchester Meeting of the British Association, September 2nd, 1887.

† Vide 'Proceedings,' 1884, p. 601; 1885, p. 756; 1886, p. 445.

across the Upper Nile near Silsileh, and a lake formed which would give a considerable additional supply. It did not seem to occur to any one that if the whole delta was in former times under cultivation, this was in itself a conclusive proof that a storage reservoir had once existed. The explicit statements of Herodotus, Strabo, Diodorus, Mutianus, Pliny, and Claudius Ptolemy showed that the Nile had been regulated by utilising a depression in the desert corresponding in shape and situation to the Raïan basin. It had been converted into an artificial lake which controlled the flow of the Nile, averted its excessive rise, and made provision against the annual recurrence of drought. In Lower Egypt there are three seasons. From April 1st to the end of July the discharge of the Nile is about 14,000 cubic feet per second, or an average of about fifty million cubic metres per diem. A very high Nile discharges 387,000 cubic feet per second, or an average of over a thousand million cubic metres per diem. Only about one-half of the delta, or about 2,625,000 acres, is under cultivation. About 820,000 acres more are ready for cultivation and about 1,570,000 acres could be reclaimed if a uniform supply of water could be assured. In the province of Gharbieh alone the area of land capable of being reclaimed is reported by Mr. William Willcocks to be over 600,000 acres. Ten shillings an acre is the tax paid by inferior land in Egypt. The revenue from better land exceeds thirty shillings. In a despatch, dated June 14th, Sir H. Drummond Wolff says:—"The cultivable land of Egypt amounts to about 6,300,000 acres. The railways, telegraphs, and the port of Alexandria are owned by the bondholders. Thus, from a country consisting of 6,300,000 acres of cultivable land, and with a population of about 6,800,000 including foreigners, an annual sum is extracted and exported of 5,170,050*l*." The total revenue is about 10,000,000*l*.

It may therefore be assumed that a further revenue of 3,000,000*l*. could be raised if 2,390,000 acres were brought under irrigation.

On my return to Egypt in December 1886, the Egyptian Government requested me to carry out further surveys, and detailed engineers to work under my direction. Mr. Stadler ran a line of levels from Mazurah, on the Bahr Jusuf, for a distance of 26 kilometres to the west. This line was continued to the north-west into the Wadi Raïan. It was checked by a line to the south-east and east, back to the valley of the Nile. It is shown on the accompanying map. Another line of levels was run between the Gharaq and the Raïan depressions, which showed that at the level of high Nile (ca. 30 metres) these basins are connected by a narrow defile. A survey was also made of the desert from Birtebat to Sedment el-Gebel, and a line of levels run across a narrow part of the limestone hills separating the Gharaq basin from the valley of the Nile. Another, and fifth, independent line of levels was carried from the west end of the Birket el-Qerun, whose surface level had been

previously established at — 40 metres, or 70 metres (about 225 feet) below high Nile. Major Surtees (of the Coldstream Guards) was detailed by the War Office, at the request of Sir C. Scott-Moncrieff, to accompany this expedition. He drafted a map with contours, which are embodied on the map which accompanies this paper.

In view of these facts, Lieut.-Colonel Western, R.E., Director-General of Works, was charged with the examination of the whole project. His elaborate and most valuable report was prepared under the pressure of work attendant upon the repairs of the Barrage. In it he shows that the Raïan basin might be utilised with immense benefit to Lower Egypt. His report, which is dated May 12th, is as follows:—

The Wadi Raïan having been proved to be of a reasonably large area, with a bed level well below that of the Nile, and so situated as to lead to fair hopes of the possibility of its being filled with Nile water at a cost commensurate with results, the project was ordered to be considered.

The inspectors of irrigation of Lower Egypt were asked the areas of waste land they could in the future profitably irrigate, the increased volumes necessary for such extended irrigation, and the levels at which the Nile must be maintained at the barrage to insure existing areas.

The answers received were as follows:—

Area cultivated .. .. .	2,500,000 feddans
Area cultivable [i. e. ready for cultivation, without water]..	800,000 "
Area reclaimable [i. e. marsh or other land requiring treatment] .. .. .	1,500,000 "
Total area .. .. .	4,800,000 "

NOTE.—A feddan = 1·05 acre.

And as the *minimum* service supply of 40 millions of cubic metres per day in the Nile is considered as barely sufficient for the irrigation of the 2,500,000 feddans of cultivated land, the volume necessary for the reclaimable lands would amount to some 25 millions, or a volume far in excess of that likely to be available.

In order to fill any reservoir the opportunity of the high level of the river in flood time must be availed of.

The inspectors report that for fair crops in the flood season the river should stand at the barrage at the following level:—

September 1 .. .. .	16·3	December 1 .. .. .	14·0
October 1 .. .. .	16·3	January 1 .. .. .	13·5
November 1 .. .. .	15·0	February 1 .. .. .	13·5

While from the records of the past 11 years it is found that the gauges to be expected range:—

	Maximum.	Average.	Minimum.
September 1 .. .. .	16·6	16·1	15·2
October 1 .. .. .	17·7	16·6	15·1
November 1 .. .. .	17·5	15·9	14·3
December 1 .. .. .	15·1	14·1	13·5
January 1 .. .. .	14·2	13·3	11·9
February 1 .. .. .	13·6	12·7	11·2
May 1 .. .. .	..	11·1	..

THE RAJAN MCRIS; OR STORAGE RESERVOIR OF MIDDLE EGYPT. 611

And as average years can only (even in an optimist view) be calculated for we find that the river level is only just sufficient for current requirements. (N.B.—It is very probable that the inspectors took fair average years as giving the levels necessary, but it is recorded by Linant Pasha that famines in Egypt very rarely occur from lack of water, but almost invariably from an excess.) However, to proceed on the figures given by the inspectors.

It has been assumed hitherto that when the river naturally fell to a gauge of 13, the barrage gates might be lowered and the water maintained at this level. On February 1st then, the gauge would be made to read 13 instead of the 12·7 recorded as the average, and from this date forward to the rising of the river in July.

As these gauges, however, do not really show the result required, the volumes in the river for every tenth day, from September 1st to February 1st, have been worked out, and against these figures placed the volumes required at the barrage on the same dates.

The results run as follows in millions of cubic metres per day :—

	Number of years in which supply is available.	Maximum available in any one year.	Minimum available in any one year.	Available for the number of years.
September 1 .. .. .	5	102	18	50
"  10 .. .. .	6	113	33	71
"  21 .. .. .	7	204	33	124
October 1 .. .. .	7	293	49	164
"  10 .. .. .	7	367	18	175
"  21 .. .. .	10	468	15	209
November 1 .. .. .	8	431	74	189
"  10 .. .. .	10	410	13	131
"  21 .. .. .	10	276	14	92
December 1 .. .. .	8	159	14	58
"  10 .. .. .	11	196	23	98
"  21 .. .. .	11	253	90	159

And this abstracted again gives average volume—

For 11 years, 129 millions per day for 20 days on December 11 to 31.
"  10 " 138 " " 50 " November 10 "
"  8 " 134 " " 70 " October 21 "
"  7 " 140 " " 100 " September 21 "
"  6 " 134 " " 110 " " 10 "
"  5 " 127 " " 120 " " 1 "

The site for the head of the canal of supply to the Wadi Rajan reservoir would be probably at or near Feshn, and the river levels at this site corresponding to the average gauges on the dates worked to

September 1 .. .. .	29·1	January 1 .. .. .	25·6
October 1 .. .. .	29·8	February 1 .. .. .	24·9
November 1 .. .. .	28·8	May 1 .. .. .	19·0
December 1 .. .. .	26·6		

at Wasta.

It will thus be seen, that to ensure the filling of the reservoir every year, the time available runs only from December 10th to 31st, or with a river gauge at 26·5 to 25·6, but that if a filling every second year or so were sufficient, the time would be from September 1st to December 31st, or with gauges varying from 29·1 to 25·6.

The Wadi Rajan, according to latest plans, may be taken as having surfaces and contents as follows :—At 20 metres above the Mediterranean, surface 846,000,000 metres, contents 24,540 million metres; at 25 metres, surface 924,000,000 metres, contents 28,965 million metres; at 30 metres, surface 1,001,000,000 metres, con-



tents 33,777 million metres. The distance along the line of the probable canal from Feshn or Bibeh to the Wadi, may be taken at 55 kilometres, and allowing a slope of 1-25,000th there will be a loss of level of about 2 metres—and the lake can never be filled to a higher level than 2·0 Nile level—and as there will be approximately a similar loss of level in conveying the water back to the Nile at about Wasta, the difference of level of the Nile at the time of filling and at the time of emptying must be not less than 2 by 2·0, plus the depth of water in the reservoir to be utilised. The area of the lake at 25 metres above the Mediterranean being 924 millions, we may assume the area at 24 metres to be 911 millions, at 23 metres 896 millions, at 22 metres 880 millions, and again, assuming 10 millions as required per day for 100 days, the depth necessary will be 1·1 metre, or from 24 metres to 22 metres. The project is therefore feasible as regards levels and volumes for the average volumes available every year.

Allowance must be made for evaporation and absorption, and this may fairly be taken at 1·2 metre in depth for the year, or at 25·2 metres to 24 metres above the Mediterranean, 1103 millions. Total volume then to be passed in, 1103 millions for absorption and evaporation, and 1000 millions for irrigation—total, 2103 millions, or 105 millions for 20 days, a smaller volume than that found available during the period December 10th to 31st, and if there is water sufficient in these 20 days, a simple inspection of the table of volumes available will show that there is more than ample water at any other period or for any less number of years than the 11 worked to.

It may be noted here that it has been assumed that the barrage regulating gates must not be touched during flood; but if the barrage is put into working order there is no reason why the river should not be regulated the whole year and any desired level at the barrage maintained, and in this case the Wadi Raïan might be filled always during the months of August, September, and October at a high level and at a reduced cost, due to the smaller section of canals necessary.

The question of cost can at present only be worked out most roughly, and perhaps it would be as well to let this stand over until some decision has been arrived at on the facts collected and embodied in this note.

There are various ways in which the Raïan reservoir might receive an additional supply of water, so as to obviate the danger of even a single short year, and to reduce the loss of head in the canal of supply and outflow. The basins of Middle Egypt are now emptied into the Nile. They might be allowed to flow westward into the new lake. The calculated loss of two metres might thus be materially reduced. A thousand millions of cubic metres might be passed through the Bahr Jusuf from Asiüt, and this would supplement the supply received direct from the Nile at Feshn.

In short, there is no doubt that inasmuch as high Nile discharges into the Mediterranean an enormous quantity of water, it is merely a matter of detail to determine how it can be most advantageously diverted into the basin which nature has placed at the side of the river, and at what height it must be stored so as to yield a sufficient and regular supply in the Delta.

The observations of Colonel Ardagh, C.B., R.E., will be sufficient to show how far all objections, such as evaporation, leakage, deposit, infiltration, impregnation, and loss of head have been sufficiently considered.

It is estimated that less than 1,000,000*l.* would suffice for the works. They would consist of a canal across the Nile valley near Feshn, the improvement of the Bahr Jusuf, an embankment and basins in the Nile valley, a cut or tunnel of less than three miles between the Nile valley and the Gharaq basin, an embankment of twenty miles to guide the water into the Raïan Basin, with incidental expenses for gates, bridges, &c. It is, however, obvious that if the revenue would amount at the end of a few years to three millions sterling, while the cost of maintenance is inconsiderable, the question of the exact outlay is a minor consideration.

The following papers relating to the same subject were also read in the Geographical Section at Manchester:—

**The Feasibility of the Raïan project.** By Colonel ARDAGH, C.B., R.E.—Having maintained a constant interest in the investigations of Mr. Cope Whitehouse during the five years I have passed in Egypt, and having actually accompanied him into the Raïan basin, I conceive that it will be satisfactory to the British Association to receive the evidence of an impartial observer upon this question. Mr. Cope Whitehouse merits the thanks alike of antiquarians, as of modern engineers, for his researches relative to Lake Mœris. I do not intend to say a word as to the identity of the Raïan or Muelah basins with Lake Mœris, but only wish to call attention to the fact that Mr. Cope Whitehouse has discovered a basin or depression which is undeniably capable of being turned into a storage reservoir, fulfilling all the purposes of the ancient Lake Mœris, at a comparatively moderate cost; and that the financial result to Egypt of the construction of such a storage reservoir capable of supplementing the insufficient quantity of water furnished by the Nile during the period of low Nile, and of thus enabling larger tracts of land to be kept in cultivation, would represent a very large profit on the capital invested, and a permanent increase in the produce of the country.

There are no engineering difficulties in the way. The only obstacle is the financial one. It is an enterprise which ought to be carried out by the State, and should not be conceded to private individuals. There is, however, so much to be done in connection with the improvement of irrigation in Egypt, that the time and energy of Sir C. Scott-Moncrieff and his staff are already fully employed, and the funds are inadequate for this and many other excellent projects. For my own part, I feel convinced that sooner or later a storage reservoir must be made; and the people of Egypt should be most grateful to Mr. Cope Whitehouse for his efforts to arouse public interest in a scheme of such value to their prosperity.

**The Desert from Dahshur to Aïn Raïan.** By Captain CONYERS SURTEES, Coldstream Guards, late Major in the Egyptian Army.—Having been detailed, at the request of Sir Colin Scott-Moncrieff, K.C.M.G., C.B., R.E., by the Sirdar of the Egyptian army, to accompany Mr. Cope Whitehouse and examine the desert between the Fayoum and Dahshour and to make a topographical survey of the unexplored desert to the north-west and south-west of the west end of the Birket el-Cherq, and the Wadi Raïan, I followed the routes shown upon the map drafted by the Survey Office, and embodied in a map prepared by Mr. Cope Whitehouse, in the Department of Public Works.

Apart from the contour lines of the Raïan basin, the country is almost entirely settled.

1. There is no continuation of the Fayoum basin, at or near the west end of the Nile, towards the west.

2. The Fayoum and Raïan basins are separated—to the south-west of the Qasr Querun—for a breadth of several miles by a plateau of limestone.

3. The Raïan basin is bounded on the west by steep cliffs.

**The Bahr Yusuf, roughly describing its present state and uses.**—By Captain R. H. BROWN, R.E., Inspector of Irrigation, 4th Circle, Egypt.—The Bahr Yusuf appears originally to have been a drainage channel from Derût to Koshesha, formed naturally during the subsidence of the annual overflow of the Nile, by the flood water finding its way from south to north along the lowest lying parts of the flooded country, which parts run along the edge of the desert at a greater or less distance from it, as the channel winds in its course. It is probable that with the object of giving a more early and plentiful supply to the basins along the course of this channel, or perhaps with the special view of improving the water supply to the Fayûm, an artificial channel was cut to connect this drainage channel with the Nile. The first artificial cut appears to have taken off from the Nile about a mile above Derût, chosen probably because the Nile and the natural drainage channel approached nearest to each other at Derût. Subsequently this connection was suppressed on the construction of a larger channel with its take-off from the Nile just below Manfalût, a town about 25 miles above Derût. This channel also joined the natural drainage channel a little north of Derût. The upper part of it still exists as a disused channel, and is known as the old Bahr Yusuf, or the Manfalûtîyah. This channel also has been superseded by the present Ibrahimîyah Canal, which has its head at Asyût, 38 miles above Derût. The portion of the Manfalûtîyah (old Bahr Yusuf) from Beni Qora to Derût was taken up and enlarged to form part of the present Ibrahimîyah Canal. The Bahr Yusuf has thus now a connection with the Nile sufficiently far up to ensure a supply of water to the Fayûm all the year round. The upper portion of the Ibrahimîyah requires to be kept clear by annual dredging operations, which, previous to 1884, cost not less than 40,000*l.* annually, but now cost about 20,000*l.*, with a prospect of a still further reduction without loss of discharge. The former superseded heads were probably cleared annually by hand labour (unpaid), during which time, at any rate, there must have been a break in the water supply of the Fayûm.

According to present nomenclature, the Bahr Yusuf takes off from the Ibrahimîyah Canal at Derût, its head consisting of a regulator of five openings of 3·0 metres width each, and a lock of 8·5 metres width, which latter is thrown wide open in flood time, as the water-way of the regulator is insufficient without the lock to pass as much as is required for the filling of the basins. At high flood there is 8 metres depth of water on the floor of this head.

The canal-heads, basin-feeders, and escapes, fed at Derût by the Ibrahimîyah Canal, are the following:—

Name.	Use.	Openings.	Remarks.
Dayâwi .. ..	Basin feeder .. ..	2 of 3·0 m. width	For flood time only.
Bahr Yusuf ..	Inundation of basins and irrigation of Fayûm .. .. .	5 of 3·0 m. "	} Flows through year.
		Lock of 8·0 m. "	
Derûtîyah ..	Irrigation and assists inundation .. ..	3 of 3·0 m. "	" "
Ibrahimîyah .. (continuation)	" "	7 of 3·0 m. "	" "
		Lock of 8·5 m. "	
Saheliyah ..	" "	2 of 3·0 m. "	" "
Escape .. ..	(For surplus arriving at Derût .. .. .)	5 of 3·0 m. "	} (For use from about 15th July to 15th March.
		Lock of 8·5 m. "	

The Bahr Yusuf, from a point a little to the north of Derüt to el-Lahün, at its entrance to the Fayüm, winds about to such an extent as to make it appear unlikely that it was ever an artificially made channel, though it is of course admitted that flowing water will make a straight channel sinuous with sufficient time allowed. The cross section and supply of the Bahr Yusuf are not given here for want of references. If, however, my memory can be trusted, the discharges are about as follows:\*

Minimum in June .. .. .	1 million cubic metres per 24 hours.
Maximum of channel in August and September	27 " " "
Maximum of valley of Bahr Yusuf, west of right longitudinal bank, during emptying of basins	72 " " "
in October .. .. .	

The maximum discharge of the Ibrahimiyah Canal at Asyüt is 65 million cubic metres per twenty-four hours. The first regulating work on it is at Derüt, 38 miles from its mouth, so that the flood enters freely at Asyüt, and has to be disposed of, sometimes with much difficulty, on its arrival at Derüt.

During the low Nile season the minimum discharge of the Canal Ibrahimiyah above Derüt may be taken at 4 millions of cubic metres per twenty-four hours. Of this the Ibrahimiyah (below Derüt), Saheliyah, and Derütiah together take 3 millions, leaving 1 million for the Bahr Yusuf to carry to the Fayüm. As the Nile rises, the head of the Bahr Yusuf is gradually opened further, until at last, on or about the 15th August, the lock is opened, and the channel allowed to run as full as possible without doing injury. A longitudinal embankment runs along the east bank of the Bahr Yusuf, forming the west bank of the main basin chain. The lands on the west of the Bahr Yusuf are, as a rule, simply flooded by the final overflow, assisted by a few cross banks to hold up the water to some extent, but these banks are merely the rudiments of degraded basins, or the embryos of basins in an undeveloped state.

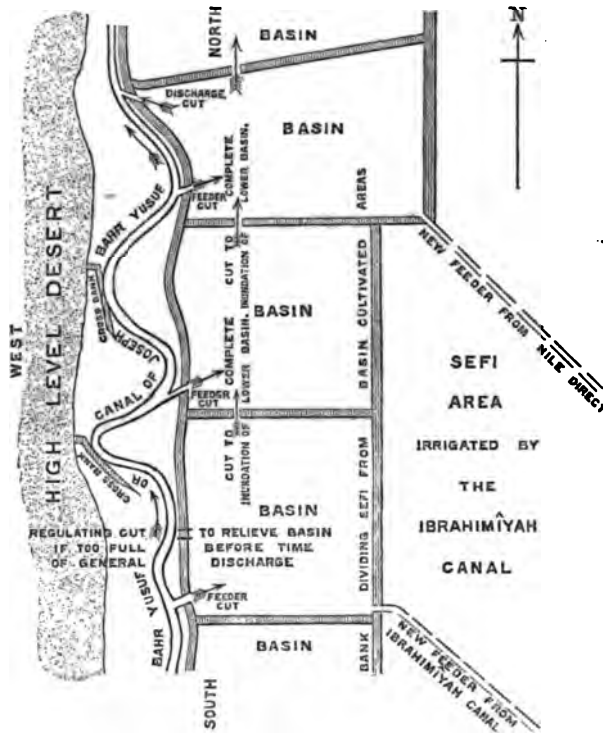
The basins on the east of the Bahr Yusuf are fed through openings in the south-west corners of the basins, and the inundation of each basin is finally completed by passing on the water from the basin next to it on the south. The discharge (at the end of October) is effected by cuts in the cross banks dividing basins, or in the longitudinal bank along the Bahr Yusuf at the north-west corners of the basins.

As the water thus supplied to the basins loses much of its suspended matter before it reaches the more northerly basins, new feeders, either from the Nile direct or from the Ibrahimiyah, crossing the Sefi area,† have been or are being made, or are as yet in the state of proposed projects. As these are carried on to completion less water will be required from the Bahr Yusuf, and therefore its discharge during flood time can be utilised to a greater extent for other objects which may be decided to be desirable. The cuts to feed and discharge basins will, as funds allow, be replaced by regulators. Much has already been accomplished in the study of what is required and in the collection of useful information to guide to practical and economical projects for the proper control of the basin inundation. These works also, when completed, will enable a less body of water to do the same work as is done under present arrangements. The Bahr Yusuf enters the Fayüm at el-Lahün, where there are means of regulation, and escapes its surplus water from above Lahün into the

\* These figures should not be made use of without being checked by records available in Egypt.

† Sefi area is the area under all-year-round irrigation, as distinguished from the basins, which are inundated once a year and grow one crop only.

Koshesha Basin, which has an area of about 40,000 acres, and contains when full above 200 million cubic metres. This basin, when full, is relieved by making a cut in a bank which has to be annually constructed, and which should be replaced by a large masonry escape, to give proper control over the water. During the emptying of the basins, the Bahr Yusuf is the escape channel for the water of all the basins in the Asyüt and Minieh Provinces from Asyüt northwards: by it the water is carried into the Koshesha Basin, from which it is finally discharged back into the Nile. Next to the irrigation of the Fayûm this is its most important function, and probably its original use. Running as it does through the lowest lying land, and considered with reference to the provinces of Asyüt, Minieh, and Beni-Suef, through



SKETCH MAP EXPLANATORY OF THE SYSTEM OF WORKING THE BASINS.

which it passes, it is better situated for a drainage channel than for a canal of irrigation. It is only the peculiarity of the levels of the Fayûm that has rendered the Bahr Yusuf a suitable channel for carrying the water supply of that province, but even for that purpose it cannot be said to work economically, by reason of the increased evaporation that must take place in consequence of its sinuous course, unsuitable section, and low velocity. A straight line from Derût to el-Lahûn is, roughly, 150 miles; the length of the Bahr Yusuf channel between the same places is, actually, 270 miles.

The discharge which, at different seasons, is returned into the Nile by the escape at Derût, could be passed down the Bahr Yusuf, if required, provided that canal were not already running full: that is, the discharge of the Bahr Yusuf could be increased beyond that which it carries under present circumstances, from 15th July

to 15th August, and from 1st November to about the 15th March, the increase in the early part of this latter period being considerable, and decreasing to nothing on the 15th March. If I remember rightly, the escape at Derüt is discharging about 20 millions in November, which would therefore be the amount by which it would be possible to increase the Bahr Yusuf at the commencement of the named period, were there means of utilising the water, and also arrangements for draining the basins without the necessity for lowering the water-level in the Bahr Yusuf.

I regret that I have no papers with me giving for the different months of the year the water-levels which can be maintained at Derüt without affecting the discharge of the Ibrahimiyah above Derüt, as these levels, no doubt, would be of interest in the consideration of the subject, in connection with which Mr. Cope Whitehouse has asked me to write this note.

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*The Caucasus.*

MR. DOUGLAS FRESHFIELD writes:—I have just returned from my second journey in the Caucasus. It was undertaken at the invitation of M. de Déchy of Budapesth, an Honorary Corresponding Fellow of the Royal Geographical Society, who had visited the Caucasus in the three previous years, and on his first journey had ascended Elbruz and Adai Choch. He was good enough to provide tents, various provisions, instruments, &c., for the joint expedition, besides being able by his knowledge of Russian to dispense with an interpreter. I had also with me my old companion and guide François Dévouassoud of Chamonix, with his brother and nephew.

Starting from Naltshik, on the northern side of the chain, on July 22nd, we crossed from Urusbieh by a seldom-used glacier pass of over 12,500 feet, the Adyr-su, to Mestia in Suanetia. From Betsho in that valley, I and two of the guides ascended a spur of Ushba (about 12,500 feet) and closely examined the mighty twin towers of that glorious mountain, which rose still some 4000 feet above us in huge cliffs hissing with avalanches. On August 6th, I, with the three guides, climbed the great snow pyramid conspicuous from the whole of Suanetia, and known to the natives and Russians as Tetnuld. The *ascent* cost us thirteen hours' walking from a bivouac of 9000 feet. Though the cold was not severe, and no one else suffered, one of the guides, owing to an ill-fitting boot, was severely frostbitten. The views, particularly at sunrise and from the top, were clear and glorious. The position of Tetnuld, the only one of the great peaks standing out on a short southern spur from the Caucasian watershed, is particularly favourable.

As we rose, the vast white curves of Elbruz lifted themselves higher and higher above the rock-peaks of the main chain. So, seen from a distance, the dome of Bruneleschi dominates the Campanili of Florence, or St. Paul's the City spires. At our feet lay the lowlands of Mingrelia and the hollow of the Black Sea, and along the southern horizon

stretched the mountains of Armenia and Asia Minor, still streaked with snow. A single observation gave the height as 16,700 feet. The peak to the north, climbed last year by Mr. Dent and Mr. Donkin, the President and Secretary of the Alpine Club, and estimated by them at 16,550, appeared to me at the time from 100 to 150 feet lower than Tetnuld. Four higher summits were close at hand, Schkara and Djanga, on the watershed (their heights I provisionally conjecture at 17,200 and 16,900 feet), and the Koshtantau 17,096 and Dychtau 16,925 feet of the Russian maps, on a northern spur.

On the following day, I caught up M. de Déchy, and crossed with him a long disused pass (13,600 feet) over the Zanner glacier to the valley of the Urban. The amount of snow and ice on these passes exceeds that on any pass over the watershed of the Alps. We were in both passages of the chain from sunrise to sunset on the glaciers. The Aletsch Glacier alone can compare with these vast icefields, but the peaks which rise above it are but snow-hummocks by the side of the cliffs and pinnacles of the central group of the Caucasus.

From Bezingi M. de Déchy and I visited together the glaciers north of Dychtau; and I with F. Dévouassoud and his nephew ascended a peak north of the Mishirgi glacier and over 15,200 feet in height, whence we had a noble, and from a topographer's point of view most instructive panorama of the northern flank of the chain.

From Naltshik, on August 14th, M. de Déchy returned to Odessa, while I went round to Tiflis and Kutais, in order to send home the disabled guide, and to procure an interpreter, which I was fortunate in doing at the latter place. I then returned in cloudless weather to Suanetia by the well-known Latpari Pass, closely examined the southern glaciers of the great central group, and crossed through the forests and giant flowers of the Zenes Skali to Gebi, ascending thence the panoramic peak of Schoda, 11,128 feet. This part of the country I had seen only in bad weather in 1868. The glacier and forest scenery is in many parts superb. It would be difficult to imagine a more sublime and fantastic landscape than that of Ushkul, the highest community in Suanetia, when behind its fifty towers and two black castles the frozen ridge of Schkara rises 10,000 feet overhead against an unclouded sky. From the valley of the Scena, or western source of the Zenes Skali, the five crests of the same great mountain recall one of the noblest views in the Alps, Monte Rosa from Val Anzasca, and they are seen over virgin forests and fields of flowers which are high enough to conceal a laden horse.

The amount of snow lying everywhere this year on the glaciers and rock-peaks was altogether abnormal. The oldest inhabitant professed never to have seen the like, and more trustworthy informants, such as Dr. von Radde and Mr. Peacock, H.B.M.'s Vice-Consul at Batoum, assured me that the winter had lasted two months longer than usual.

This extraordinary snowfall, the unlucky accident to my guide, and the want of an equally enthusiastic climbing companion, interfered to some extent with my mountaineering projects. I believe all the great peaks to be in ordinary seasons accessible, though some of them will probably prove very difficult, and require all the faculties of experienced mountaineers for their conquest.

M. de Déchy, during the three weeks we were together in the mountains, added to his already large collection some eighty plates of the scenery and people, and some measurements of heights. I have amassed a quantity of rough sketches and topographical notes, which will enable me to sketch with approximate accuracy the dimensions and relations of the glaciers and the principal peaks of the great central group of the Caucasus, which contains at least six summits higher than Kazbek, and second only to Elbruz. Of four of these the Russian Staff have as yet, unfortunately, published no measurements. The Koshtantau of my own writings, and of Mr. Grove, proves to be the Sokhara of the Russian map, and is probably the second peak in the whole chain. My "Unknown Peak," Mr. Dent's Guluku, is the Koshtantau of the Russian Staff. The glaciers of the central group on both sides of the chain are generally beginning to advance after a period of retreat, resembling in this those of the Western Alps.

Further details I must reserve for a future occasion. But I wish to lose no time in correcting a paragraph which has appeared in the press during my absence to the effect that owing to a robbery committed on our camp in Suanetia, and the loss or breakage of our baggage and scientific instruments, my companion and I were obliged to abandon an intended visit to Daghestan.

It is perfectly true that, under cover of a dark and wet night, a thief from the village of Adish pilfered a revolver, some *Steigisen*, half a sheep, and a little portmanteau containing M. de Déchy's change of clothes. The loss of his mountain wardrobe was, of course, an inconvenience to my companion. But I was happily able to supply his most urgent needs, at Naltshik we had a reserve of baggage, and Tiflis is a city well provided with shops. The loss did not, in fact, in any way affect our plans, and we were on the point of starting for the Eastern Caucasus when M. de Déchy, as he informed me, received news from home which made his return convenient. I went on to the southern side of the Central Caucasus rather than to Basardjui, on the advice of Dr. von Radde, whom I was fortunate enough to find at Tiflis, and who with his usual kindness placed his unrivalled knowledge of the Caucasus unreservedly at my disposal.

The sequel to our "robbery"—which M. de Déchy left the country too soon to learn—must be shortly told. On receiving a report of our loss, the Priestav (magistrate) resident at Betsho in Suanetia, came up the valley with the small force of Cossacks at his disposal and summoned



before him the fifteen heads of families of the offending village. They were ordered to remain as hostages until the goods were returned. As it was the height of the haymaking season this measure was exceedingly well-judged; and in the end it proved effectual. The stolen goods, or the greater part of them, have been recovered.

I have given some details as to this petty and speedily punished theft, because the exaggerated report first circulated is likely to have, and has even already had, a very mischievous effect in spreading completely false impressions as to the difficulty or even danger of travel in the Central Caucasus. It would be a misfortune if intelligent travellers were frightened off from a country which in my opinion is now ripe for the better sort of long vacation tourists and Alpine Clubmen. Two parties of foreign travellers, each with an Alpine guide, were in Suanetia when I left it. I wandered about for five weeks on both sides of the central chain, unarmed and often alone and by night, in perfect security, meeting with nothing but pleasant greetings, and sometimes hearty handshakes from old acquaintances of nineteen years ago. I found little difficulty, with or without government papers, in obtaining provisions, horses, or porters. Delay of course there is, as in all countries where time is no object, and talk takes the place of newspaper-reading as a daily occupation. But once on the road, the natives are, as a rule, good travellers. Adish, the scene of our solitary misadventure, is a remote hamlet, in former days notorious for the wildness of its people, and exactly the spot where a last outbreak of old habits was to be looked for.

Of course, the above remarks apply only to the district I have lately visited, the most interesting to mountaineers. I am not generalising as to the whole Caucasus, which as a political term extends with each Russian annexation, and includes frontier districts which may become insecure from time to time.

I may add that I and the Alpine guides passed twice through the southern valleys in the latter half of August, and in exceptional heat, without suffering from fever or any sort of indisposition, and that there appears to be now little risk in embarking or landing at Batoum, the climate of which has been much improved by the extension of the town and the construction of large docks.

The completion of a railway to Novorossisk, which as a port accessible at all seasons is expected to supersede Taganrog, will open next year a new route to the Caucasus, which can already be reached from England in from a week to ten days viâ Kieff, Charkoff, Rostoff; Odessa and Batoum; or the Orient Express and the southern shores of the Black Sea.

## GEOGRAPHICAL NOTES.

**Ascent of the Owen Stanley Range, New Guinea.**—Mr. C. H. Hartmann informs us, by letter from Port Moresby, that he and Mr. G. Hunter succeeded last July in reaching the summit of the main range of British New Guinea. They appear not to have reached the highest elevations, but by a judicious choice of route, along the valleys of the Kemp Welsh and Musgrave rivers, ascended to the saddle between Mounts Obree and Brown, and crossed to the eastern or inland slopes of the range. They started with twenty-seven friendly natives, but had some difficulty, in commencing the ascent, with the hostile tribe who guard the great mountain Paramagoro, which they believe to be the abode of the spirits of the departed. Their hostility was eventually overcome by peaceable measures, and upwards of 200 of them followed the expedition in the ascent, conciliated by the daily supply of meat of wild pigs which the travellers obtained by means of their rifles, though the chief cause of the success is attributed to the great experience of Mr. Hunter, who had for a long time prepared for the expedition by making friends with the tribes, several of whose languages he speaks fluently. The journey from Rigo, a village near the coast at Kapatapa, and back, occupied only eleven days, and it rained in torrents nearly all the time they were on the mountains. The flora is described as magnificent in the extreme, including palms of many species, tree-ferns, marantas, strelitzias, orchids, and an endless variety of tropical flowering plants; east of the range the country is more open and richly grassed.

**Captain Paiva de Andrada in Manica.**—From a private letter of Captain Paiva de Andrada we learn that this enterprising traveller has recently performed several journeys in the countries to the south of the Zambezi. Captain de Andrada does not aspire to rank as an "explorer"; but he has nevertheless visited many districts of which we know next to nothing, and lays down his routes upon a map drawn on a scale of 1:46,000. He points out that the small sketch in the 'Proceedings' (1886, p. 508) is in many respects superior to the large map by Moraes Pinto published in the 'Journal of the Manchester Geographical Society.' Both have been superseded by the 'Carta do Districto de Manica' by A. A. d'Oliveira of the 'Commissão de Cartographia,' but this recent map, too, already needs rectifications in several respects. When Gungunyana, the successor of Umzila, sent an army to the vicinity of Inhambane, for the purpose of punishing the chiefs who had renounced their allegiance to him, Captain de Andrada was staying at the village of the Portuguese resident on the Musurise (Umswelise) in the vicinity of the chief's kraal. Starting from Chilokane he had successively crossed the swampy maritime zone, the open grass plains of Mashanga, and the woody region of Madanda, where rubber abounded.

His furthest point south was Macoupi's village (lat.  $20^{\circ} 52' S.$ ), near which he visited the grave of Captain Phipson-Wybrants. On approaching the Muengeze the country rises into hills, and the district of Zinhumbo is mountainous. After a visit to the confluence of the Lundi with the Save, Captain de Andrada returned to the coast, touching the Busi in two places, in lat.  $20^{\circ} 14' S.$ , long.  $33^{\circ} 41' E.$ , and in lat.  $19^{\circ} 57' 20'' S.$ , long.  $34^{\circ} 14' E.$  The Busi is navigable up to the mouth of the Lusite. From Sofala Captain de Andrada started for the mouth of the Pungue, and he ascended that river during ten days in three "Berton" boats and a dug-out, until near the Inyamisse hills (in lat.  $19^{\circ}$ , long.  $34^{\circ} 16'$ ), masses of rocks render its further navigation impossible. The banks of the Pungue are described as being exceedingly fertile, and well suited for plantations, and the writer's imagination pictures a flourishing town springing up at its mouth, which shall become the outlet of a well-cultivated country, and of productive mining districts in the interior. From Makaka's village, near the rapids, the writer proceeded to Gouveia, the capital of Manica, where he arrived on April 16th. He started again on April 17th for Rupire (in which are the Emperor William Goldfields), passing through Shitindire, which is not a swamp, as shown on Pinto's map, but a beautiful upland, in which the Inyandue and the Vundusi have their sources. Passing thence through Tana and Tumbara, and crossing the Kavreze near its mouth ( $170^{\circ} 15' S.$ ), Rupire was reached on April 30th. Starting thence on May 2nd the writer reached the Zambezi above the Kebrabassa rapids on May 13th. On May 15th he left Chikova on his return journey, spent the night of the 20th at Tete, travelled thence back to Rupire by a new route, and once more reached his headquarters at Gouveia on June 23rd. It will thus be seen that Captain de Andrada has passed through extensive regions hitherto but very inadequately shown upon our maps.

**Antarctic Exploration.**—An important letter has been addressed to Admiral Sir Erasmus Ommanney by the Agent-General for Victoria, Sir Graham Berry. Sir Graham states that having, in accordance with instructions from his Government, asked Her Majesty's Government if they would contribute the sum of 5000*l.* towards an antarctic expedition, provided the Australian Colonies agreed to contribute a similar sum, he has received a letter from the Colonial Office stating that the subject is "now under the consideration of Her Majesty's Government." The letter is dated Sept. 2nd, but unfortunately did not reach Sir Erasmus until after the meeting of the British Association, before the Antarctic Committee of which Sir Graham suggested the subject might be brought, with a view to bring the influence of the Association to bear on the Government in support of the grant. In the event of a favourable answer being received Sir Graham was instructed to communicate with Sir Allen Young with the view of ascertaining upon what terms would take command of the proposed expedition. It is a pity

proposal could not have been brought before the British Association, but we hope it is not too late for the important subject to be taken up in influential quarters. So favourable an opportunity for the resumption of Antarctic exploration should not be neglected.

**New Route to Timbuktu.**—M. George Angeli, who has recently returned from a journey of exploration in the Western Sahara, has brought forward a scheme of a railway direct from Cape Juby on the West Coast, just opposite to the Canary Islands, through the Sahara to Timbuktu and the Upper Niger. He states that he has received concessions from native chiefs both in the Sahara and Sudan. The matter only interests us from the geographical point of view. There are two ways now of getting to Timbuktu; one from the French colony on the Senegal, the other from Algeria, or Tunisia, or Tripolitana, across the Sahara, and through the territory of the Tuwáreg. M. Angeli maintains that his line is perfectly flat, that there are supplies of water, and a sparse, but not hostile population. No doubt this is the line which will eventually be followed, but the times are not propitious. It was in this neighbourhood that Mr. Donald Mackenzie proposed to let the waters of the Atlantic into a great depression of the Sahara, and thus form a great navigable lake. Timbuktu, so long inaccessible, will probably be got at in this or the next generation.

**The Physical Features of Fernando Po.**—Herr Oscar Baumann, a member of Dr. Lenz' recent expedition to Equatorial Africa, contributes to the current part of Petermann's 'Mitteilungen' an interesting sketch of the physical geography of the island of Fernando Po. The volcanic group of which the island is a member, forms a line running south-west from the Cameroons, and may be regarded as the result of an eruptive fissure, which on the one side extends from the Cameroons to the Isle of Anno Bon, and perhaps further, and on the other appears to find in the Rumbi mountains a continuation into the heart of Africa. The northern half of the island is covered almost entirely by the huge volcanic peak of O-Wassa (Clarence Peak), with its summit situated in the centre. Towards the north and north-east the mountain gently slopes to a precipitous rocky coast. On the west and north-west its steep sides are cut by deeply eroded gorges with rocky walls, which end in a narrow belt of flat country rising abruptly from the coast. On its eastern side the upper slopes of the mountain are precipitous and wooded, extending down to a long stretch of grass plateau about 1300 feet above the sea-level, which in its turn presents an abrupt slope to the coast. The south-west face shows a gradual descent to the plateau of Batei, which, together with the Rumbi mountains (about 1000 feet high) forms a part of the volcanic system of the southern coast. The island is a volcanic island in consequence of

the different authorities he takes its height to be 9350 feet. The altitude shown on the Admiralty charts is 10,030 feet. He determined, by his own observations, about fifty altitudes in different parts of the island. The volcano may be regarded as extinct, the fire and clouds of smoke seen at times on the summit being easily explained by the annual burning of the grass. The crater on the top of the mountain is 515 feet in depth, and is enclosed by grey disintegrated walls of basalt. On the thickly wooded and almost impassable slopes there are many subsidiary craters, with which in a certain sense the remarkable crater ruin of the Bay of Santa Isabel may be said to stand in connection. The east and west coasts of the island present a strong contrast. The basaltic rock of the former is being continually crumbled and carried away by the sea, while along the latter the land is gaining on the sea. Here the formation of successive sandbanks in front of the mouths of the more important watercourses has cut off lagoons of brackish water, which are first of all covered by mangroves and shrubs, and then very soon by marshy tropical woods. On the west coast the river mouths are turned to the left, while on the east they appear to be directed to the right.—The physical geography of the southern half of the island is determined by the mountain range of the "Cordillera of Fernando Po," which in two chains connected by a pass runs practically east and west. These chains culminate in several summits which have a volcanic character only on account of their basaltic composition. In the south of the island, and apparently quite independent of the Cordillera, there rises a lofty volcanic mass. On the top of one cone-shaped peak, precipitous on all sides, there extends a flat basin surrounded by a circle of hills. This the author supposes to be the remains of a large crater. It is a noteworthy fact that the aborigines of the island, the Bube, chose this basin as the site of their largest and most important town, Riabba, which is held in great respect as Moka's village. The hill range running parallel to the south-east coast, and on which the villages of Kutari and Olobe Riabba are situated, may perhaps be considered as the remains of a wall of the Riabba crater. The mountains in the south for the most part present an almost perpendicular slope to the sea, at the foot of which there is in some places nothing but a huge barrier of volcanic rocks heaped together, upon which the foaming surf beats furiously. On the east coast, however, there is frequently a stretch of sandy beach between the sea and the mountain front. Like all volcanic islands in the tropics, Fernando Po is well watered. From all the mountain slopes numerous streams of clear ferruginous water precipitate themselves in cascades into the depths below. But the relative scarcity of water on the east coast, as compared with the west, is striking. The principal river of the island is the Uapa or Shark river, which rising in a small lake on the southern slopes of the cordillera, flows south; it is navigable for some

distance for a canoe. The rivers seldom rise at a height of more than 2000 feet. As an example of valley formation in this volcanic district, the author describes the valley of the Amesuwa in the south of the island. The river flows in a narrow gorge and forms a succession of waterfalls and pools, the latter being dammed up by banks of stones. The river is generally dry in its upper course, but it frequently happens after heavy rains that the pools above mentioned are swollen and overflow, forming a strong current. In a cross section the valley in many places shows an elevation in the centre of the river-bed; here the sides of the ravine are hollowed into caves by the underwash of the stream.—An excellent map embodying the results of the writer's three months' exploration of the island is published with the paper.

**The Attak Oasis and Trans-Caspian Deserts.**—An admirable paper on the physical geography of this region appears in Petermann's 'Mitteilungen' (No. 8), by M. A. Konschin, the geologist who accompanied Dr. Radde on his recent expedition. Speaking of the oases of Attak, the writer says, "The mountainous part of Transcaspia is bounded on the west (i. e. towards the Caspian), north, and more particularly on the east, by an interminable sand and salt desert, which is rapidly advancing in the direction of the mountains. The loam of the mountain face being easily disintegrated and washed down by the action of the rain and snow, a zone of alluvial soil, in many places 20 miles broad, has been formed along the foot of the heights. This belt, where sufficiently irrigated by mountain streams, gives rise to the oases of Transcaspia. The recent 'loess,' which covers the plain still further increases the fertility of the soil." A tract of country of this nature extends along the north of the mountain range from Kizil-Arvat to Sarakhs, a distance of over 300 miles, equalling in area the cultivated part of the Khiva oasis. The contrast between the two districts is, however, very striking. While the oasis of Khiva is covered everywhere with luxuriant shady orchards and rows of slender poplars enclosing extensive cotton-fields, the Attak region is for the most part a salt desert-waste, clothed with a sparse vegetation, and cultivated only in such places as Geok tepe, Askabad, Artyk, and Kaaka, which scarcely seem to break the desolate uniformity of the remaining nine-tenths of the country. The chief reason for this is the lack of running water in the latter region. The streams flowing from the mountains into this belt of country number only twenty-six, and the volume of water thus discharged is calculated to be not more than 75 cubic metres per second, or about a tenth part of the quantity required. On the other hand, the Amu Daria pours water into the oasis of Khiva at the rate of 2800 cubic metres per second. The relative scarcity of water in the Transcaspian region may be explained on the following grounds:—(1) the small amount of atmospheric precipitation, (2) the narrow area and thin clothing of vegetation, combined with the unimportant absolute height

and steep slope of the mountains which give rise to the majority of the watercourses. The oases of Tejend and Merv possess a much greater wealth of water than those of Attak, being fed by the Tejend and Murghab rivers, which draw their supply from the snow-clad summits of the Paropamisus and Hindu Kush.—With regard to the Trans-Caspian deserts, M. Korschin gives a mass of valuable information. It is impossible for us to do more than indicate some of the conclusions at which he arrives. He regards the great Kara-Kum desert as originally having formed part of the old Aralo-Caspian basin, the marly loamy bed of the latter having by the action of air-currents been transformed into the sandy desert. He found between Zulfigar and Pul-i-Khatun important traces of the earlier action of the sea in washing away the sedimentary strata of the hills. Regarding the dunes proper as belonging only to the sea-coast, he divides the typical sand-hills of Turkomania into two classes: (1) the bare hills of recent formation and relatively unimportant dimensions, which are distinguished by their sickle-shaped form and extraordinary mobility; (2) those of greater antiquity and larger dimensions, characterised by irregular outline and rendered perfectly stable by plant growth. The takyr and other physical features of the desert are also described in detail. That the western part of the Kara-kum and all the south-east coast of the Caspian was at a comparatively recent period under the waves of the sea is proved by the numerous specimens of the Aralo-Caspian mollusk fauna found in the sand. In the centre of the Kara-kum the takyr and depressions have lost their remains of marine fauna, and the sand-hills have become more stable, proving this part of the desert to be older than the west. The eastern portion, which is of still greater antiquity, is the region of the "ungusses," or desiccated lakes, gulfs, &c. The principal series of these, known as the Charjui-daria, Charjui-ungus, and Kelif-usboi, intersects the Kara-kum steppe from north-west to south-east. M. Korschin proves this to be only an ancient shore-line of the Caspian, and not, as formerly supposed, an old bed of the Amu-Daria. Upon this ancient shore-line of the Caspian he dwells at some length, showing how it corresponds with the contour-line of the sand-banks of the Kara-kum. He then passes on to a description of the Sara-Kamysh basin and compares it with that of the Kara-kum. The former, when filled with water, was in connection with the Aral by means of the Gulf of Abougir and with the Caspian by the Balkan Gulf, and into the united basin the Amu-Daria flowed from the south-east. The final connection between the Aral and the Caspian was by means of the depression of the western Usboi extending along the Ust-Urt and the Great Balkan. After the ruin of the more pronounced basin there still remained a series of coast lakes parallel to the shore-line of the Ust-Urt. Through these lakes the waters of the Aralo-Sara Kamysh basin drained into the Caspian in a slowly moving stream. That the Usboi formed

this final communication between the Aral and Caspian is further proved by the discovery of important traces of the action of marine ice in this line of depression. In conclusion, M. Korschin expresses his opinion that the conversion of the low-lying plain of Turkomania from a sea basin into a sandy desert is due to (1) the influence of the polar winds, (2) the upheaval of the ground. With regard to the former cause, the action of the prevailing north and north-east winds in this region is well known; they may be regarded as great pumping works extracting the moisture from the soil and carrying it away to the west. He takes the following to be evidences of an upheaval:—(1) The high altitude of the most recent pliocene strata in the ravines of the Kioren Dag; (2) the hook shape of the peninsulas of Krasnovodsk, Darshe, and of the island of Cheleken; (3) the narrow and extraordinarily long coast-lakes which line the shore of the Caspian between Khiva Bay and Chikishliar Bay; (4) the numerous narrow lagoon-beds running parallel to the oasis of Akal-tekke and the Kioren and Kopet Dag ranges; (5) the peculiarity of the mouths of the Atrek and Gurgan rivers, with their marshy tracts and continually changing channels; (6) the numerous remains of marine organisms and traces of the action of the sea at elevations considerably higher than the present sea-level.

**The Upper Hawash.**—An Italian traveller, Dr. Traversi, made during the summer of last year an excursion to the Suai Lake and the upper course of the Hawash. He accompanied the expedition despatched by King Menilek of Shoa against the Arussi Galla. Although he only reached the north shore of the lake, he ascertained by his route that there is no discharge from the lake to the Hawash. The river Maki, rising in the Gurage hills, flows westwards into the northern end of the lake, where the Catara, coming from the east, also discharges. According to the natives, the lake has an outlet in the south called the Suxuki, which flows into a second lake named Hogga. From the high ground to the west of the lakes the traveller was able to see a third and more important lake further south, which bears the name of Lake Lamina. The sketches and information obtained by Dr. Traversi have been embodied in a map by Professor Della Vedova, from which it may be seen that Cecchi's representation of all the country to the south of the Upper Hawash needs considerable alteration.



PROCEEDINGS OF THE GEOGRAPHICAL SECTION  
OF THE BRITISH ASSOCIATION.

MANCHESTER MEETING, 1887.

THE Committee of the Geographical Section was constituted as follows:—

PRESIDENT.—Colonel Sir Charles Warren, R.E., G.C.M.G., F.R.S., F.R.G.S.

VICE-PRESIDENTS.—H. W. Bates, F.R.S.; Henry Lee (Chairman of the Manchester Geographical Society); Admiral Sir Erasmus Ommanney, C.B., F.R.S.; General Sir H. E. L. Thuillier, R.A., F.R.S.; General J. T. Walker, R.E., F.R.S.; Colonel Sir Charles W. Wilson, B.E., K.C.B., F.R.S.

SECRETARIES.—Rev. L. C. Casartelli, M.A., PH.D.; J. S. Keltie; H. J. Mackinder, M.A.; E. G. Ravenstein (*Recorder*).

COMMITTEE.—E. van Eetvelde (Chief of the Foreign Department of the Independent Congo State); Dr. Ginsburg; Colonel Holdich, R.E.; J. Arthur Hutton (of Manchester); Prof. Libbey (of Princeton, New Jersey); Hugh R. Mill, D.Sc.; E. Delmar Morgan; Josiah Pierce, jun. (of the United States Geological and Geographical Survey); Sir Rawson W. Rawson, K.C.M.G.; Trelawney W. Saunders; Eli Sowerbutts (Secretary of the Manchester Geographical Society); Rev. S. Alford Steinthal (of Manchester); Rev. Canon Tristram, D.D., F.R.S.; Coutts Trotter; Sir Harry Verney, Bart.; Captain Verney, R.N.; Rev. Thomas Wakefield; Prof. A. W. Ward (Vice-Chancellor of the Victoria University); Cope Whitehouse, M.A.; Colonel Sir Francis de Winton, K.C.M.G.; Dr. Ludwig H. Wolf (Staff-Surgeon, Royal Saxon Army Corps).

DELEGATE.—T. Cushing (Croydon Microscopical and Natural History Society).

The meetings of the Section took place in the Anatomy Room of the School of Arts, a lofty apartment, seating about 300 auditors. The meetings were largely attended, and occasionally the room was crowded to its fullest capacity. The papers on geographical education, and on the Ordnance Survey, and on the Congo, excited perhaps most interest, and led to lively discussions, which had to be curtailed owing to the want of time. Amongst the distinguished foreigners present were M. E. van Eetvelde and Lieutenant Le Marinel, both deputed by the King of the Belgians to represent the Congo State.

Altogether thirty-four papers were read and three Reports of Committees were presented, including fourteen on Africa, four on Asia, two on America, one on Australia, one on the Antarctic regions, five on geographical education, four on cartography, and six of a miscellaneous nature.

On Monday, Sir Francis de Winton delivered a lecture on "Explorations in Central Africa," in the Free Trade Hall, which attracted a very large audience. Earlier on the same day, Professor Libbey, a member of the United States Alaska Exploring Expedition, lectured, in another place, on the Indians and the scenery of South-eastern Alaska.

Thursday, September 1st.

The PRESIDENT opened the Section with the following address:—

My predecessors in former years have used their discretion in the opening address either to generalise on the science of geography or to lay stress upon those particular subjects to which they considered it desirable to call attention. I propose on this occasion to refer to matters which have long been of importance to those who are desirous of the spread of the knowledge of geography, and in which I trust the public generally are acquiring an interest. I refer to the teaching of geography in our schools and the economy and advantage to the State which would result from a more perfect and skilful system of instruction.

The term geography covers a very wide area, and while limiting its use to-day to the more restricted sense generally accorded to it in modern times, I must protest against its being applied only to a dry digest of names of places and record of statistics, rendering it a bugbear in the instruction of youth instead of allowing it to cover all those interesting and engrossing subjects which truly belong to it, and without the knowledge of which the mind of youth cannot be trained and expanded in the direction to which the science tends.

As the geographer Strabo points out, our science embraces astronomy, natural history, and is closely connected with meteorology and geometry, the arts, history, and fable; but since his day so much progress has been made in the arts and sciences that the branches of geography have become specialities to be taught separately, and the old root geography has been almost laid aside and treated with contempt, though it is only by a thorough acquaintance with it, the knowledge of common things, that the branches which depend upon it can be thoroughly comprehended. We may take geography, then, to embrace all that knowledge of common things connected with the surface of the earth, including the seas and the atmosphere, which it is necessary for every human being to be acquainted with in order that progress in other knowledge may be acquired and acquaintance with the world be made which will fit man for life in any capacity, whether as occupying the highest position even to the most humble. Indeed, it is difficult to say in what capacity in life this knowledge is most required. No man can do practical work without it, and to the theorist it is absolutely essential. . . .

It should be a matter of great interest to those who instruct in geography to study its gradual development from the earliest data and to watch the progress it has made. And this is not a matter of very great difficulty, for as geography is the knowledge of common things, and the ancients were more experienced observers than ever we may hope to be, the earliest records we possess are full of geographical accounts. In the books of Moses, three thousand years ago, we obtain our first recorded view of the cosmogony of the ancients, at which time the world is supposed to be a flat disc with water surrounding the land, and this idea pervades later books, and is dwelt upon in the Psalms of David. Homer also held a similar view, and to him is accorded by Strabo the honour of being the founder of geographical science, because he excelled in the sublimity of his poetry and his experience of social life; and a reason why he excelled is carefully related. He could not have accomplished it had he not exerted himself to become not only acquainted with historical facts, but also with the various regions of the inhabited land and sea, some intimately, others in a more general manner. "For otherwise he would not have reached the utmost limits of the earth, traversing it in his imagination." Herodotus, to whom we are indebted for furnishing us with the *earliest known* system of geography, also held the same view concerning the earth; but it is worthy of remark that he speaks in his day (450 B.C.) of there being another view, as to the world being round,

which he considers to be exceedingly ridiculous, and therefore it may be surmised that even at that early period there were minds that had arrived generally at the conclusion which now obtains as to the shape of the world. . . .

When we come, however, to consider the progress of discoveries on the surface of the earth itself, the strides in latter years appear to be enormous, but yet we must not forget that there is an ebb and flow constantly going on. Discoveries are made and lost sight of, and again are brought forward as new. Sometimes, after an account of discoveries has been published, a second account differs most materially from the first, and the public have to wait for further examination. Cases have occurred, as in the early Portuguese discoveries in Central Africa, in which the plans and accounts have been laid on one side and forgotten, and the territories rediscovered and surveyed years afterwards. Again, sketches of new countries have been made, and the surveyor has omitted to show what is conjecture and what is from actual observation, and his plans throughout have been discredited. In some cases these mistakes have retarded discovery, in some they have directly led up to it—as, for example, in the gigantic geographical error in placing on the globes of the fifteenth century the eastern extremity of Asia no less than 150 degrees longitude too far east, which prompted Columbus to endeavour to reach Asia from the west, and thus led to his discovery of America. . . .

What we require, however, is precise and accurate information of the earth's surface, however it may be obtained, and to train the minds of our youth in the powers of observation sufficient to enable them to obtain this information; and if in so doing our countrymen continue to be stimulated to deeds of daring, to enterprise and adventures, to self-denial and hardships, it will assist in preserving the manhood of our country, which is more and more endangered year by year in consequence of our endeavour to keep peace within our borders and to stave off strife with our neighbours.

Probably many of us here to-day of mature age, on looking back at our early acquaintance with geography, will recollect little but a confused list of proper names and statistics, learnt by rote, and only imperfectly carried in the mind, so that only a few portions stand out still visible, and those probably connected with pleasurable and, in some cases, painful accessories; perhaps those particular lessons which we may have assisted some school friend to master still remain as clear as ever; or, again, those learnt under the terror of the rod.

Taking schools and subjects all round, nothing probably has ever been worse taught than geography was only a few years ago, and very little progress towards a good system has even yet been introduced into higher class schools, though in the schools of the people an effort has been made to render the subject more palatable and instructive.

The faults, however, of the system hitherto in use are now fully recognised, and objections are general that the study has been made too painful a grind and that the whole process has been of too severe a character. If this were the only fault to be found in the old method, I for one would be inclined to adhere to it, assured, as I am, that no training of the mind can take place without great denial and sacrifice in learning self-control. But the real question is as to the practical results of the old system. Are they of such a character with all or the majority of minds (of all classes and conditions) that they have become stored with useful knowledge and at the same time trained to take a pleasure in increasing it in the future? If the results are short of this we cannot but pronounce the old system to be a failure, as the knowledge of geography is the knowledge of common things inseparably connected with the life of each one of us, and there is no better medium through which the mind can be trained to be always in a condition for acquiring knowledge without making too great an effort.

Unfortunately for the prospects of introducing a complete and perfect system of teaching geography (suitable to most minds), the reaction that has set in recently is likely to lead to evil results, if not carefully curbed. It seems now to be desired to promote the acquirement of knowledge at the earliest age without effort and without hard work; but this appears to be directed towards alleviating the toils of the instructor as much as the instructed, and we have now, as a result, children taught common things without any effort to strengthen their memories, and then a system of cramming introduced at a later period, when the memory has ceased to be capable of responding to the efforts made, and consequently all the information crammed in is dropped again in a few months. . . .

It seems to me that the remedy recently adopted is worse than the disease it was to eradicate, and that however injurious it was to attempt to store the mind with mere names, yet the memory was trained thereby to retain something definite; and it is still worse to attempt to store the mind with mere ideas without the connection of names, and leave the memory to rust.

There is obviously a middle course which may rid us of the errors of the past without leading us into still greater difficulties. And if we keep the object to be gained always in view we cannot fail to take a direct line. We want first to lead the memory to constant exertion of such a nature that it grows stronger day by day, but is not overstrained or wearied; at the same time it must be stored with useful facts, which may be quite above the capacity of the mind to comprehend at the time, but which will be required all through life: this can readily be done by means of verses or rhymes set to simple airs and committed to memory by song. There are facts of the greatest importance which can be learnt in this manner with very little effort, and which, if not fixed in the mind at a very early age, the want of them may be felt throughout life.

As, for example, the directions in which latitude and longitude are reckoned, in which the sun rises and sets, the relations of the east and west respectively to the north and south, and many other matters which appear to be of a trivial character, but which require to be as rigidly committed to memory by rote as does the multiplication table.

These very small matters are the foundations of everything we require to know, and if we do not have these foundations firmly and securely fixed, we will be the sufferers all our lives. Too much attention cannot be paid to them, as it is the early lessons which remain most clearly fixed in our minds. . . .

Children have a remarkable capacity for making pictures for their mind's eye of everything they think of, which is dulled gradually as books are taken into use; this faculty, if made right use of, may be developed, and will greatly assist the study of geography, and will lead to a "picture memory," which will be most useful in regard to maps, drawing, and spelling. . . . When highly developed, we find it employed by novelists, who can bring their characters up before them and picture them enacting their parts, and also by artists, who sometimes lose the power of discriminating between that which they actually see and that which their picture memories call up.

Although it seems to me absolutely essential to cultivate and develop the memory, this is by no means all that is necessary. At the same time must be taught the proper use of the powers of observation with reference to nature, which in towns is so difficult a matter, placing the bulk of our population at so great a disadvantage. One of the first points neglected by teachers generally is to explain to children what the object or result of the lesson is to be. In most minds it is very difficult to pay real attention unless it is known what is to be the general drift of the conversation, for otherwise the mind will be directed to points quite irrelevant.

Children should be first told in a few words the line the lesson is going to take; this will greatly tend to secure the attention of what are termed dull children, who often, if properly treated, would turn out the cleverest, but who cannot grasp a subject until they see it from all sides, and know it thoroughly, while the "clever children" are satisfied with a view of one side only. . . .

It must be recollected that from the moment geography is taught, children will make maps or pictures in their mind's eye, whether they are actually presented to them or not.

For example, if a house or a garden is mentioned, both the teacher and the child must view it from the outside and from a certain distance, for it is impracticable for most minds to look all round and behind at one time. To have a full view of what is mentioned it is necessary to get outside and beyond it. Children will differ among themselves in their method of viewing what is spoken of, but the teacher can readily ascertain what mental pictures they have formed, and can make use of this faculty in the first use of maps. It is remarkable how readily uneducated natives in uncivilised countries can understand plans from their constant observation of nature. . . .

It is of vital importance that children in our island, who cannot under ordinary circumstances have sufficient opportunities for using, cultivating, and developing their powers of observation to any purpose, should have the use of maps put before them in such a manner that they will not be led into error. . . .

It is very common for children to mistake east for west, north for south, and even to make still more ridiculous errors, which appear on reflection to be quite impossible. Yet these errors remain often unobserved until the youth is eighteen or nineteen years old, when he begins to think the matter out for himself, from finding that he is continually making absurd mistakes, but then it is too late for him to do more than know that he is liable to the error, for on an emergency it will crop up in spite of himself. . . .

It seems very desirable that the first maps presented to a child, viz. those of the school grounds and the parish, should be placed on the floor and properly oriented; this will go far to fix the correct positions of east and west, north and south, and will prevent the idea of the north necessarily being *up* and the south *down*. It is to be observed that if a child looks up to a map it is almost equivalent to looking at the map when lying on the back, in which case the east and west are inverted. The motion of the sun over the map might with advantage be pointed out at various times of the day, and if the position of the rays of the sun on the floor when on the meridian could be shown each day when practicable on the line drawn north and south, it would do much to fix in the mind the fact that the sun is in the meridian at apparent noon each day. A sundial should also be available in every school-yard to which children may have access. . . .

Too much detail should not be crammed into the early lessons; a good firm foundation is required, something to start upon before the great test of faith is made in teaching, viz. that the world is round.

Children should be taught, as far as is practicable, to make this discovery for themselves, and many will arrive at it one way or another, or think they do so, which is equally important. It is far better they should grasp truths themselves than have them drummed into them; it gives them confidence in their own deductions, and leads to further observation of nature. In introducing the world as round, a *blackboard* globe should be used, about three feet in diameter, on which the continents are outlined boldly in red, with some meridians and parallels of latitude in white. It would be well if a portion of this globe could be taken to pieces to show how a horizontal sundial for the particular latitude is constructed, and for other

matters of interest. It is material to show that the earth revolves on a fixed axis from day to day, and in one direction. All the great difficulties in learning geography are at the threshold of the science for those who have not observed nature; the more abstruse subjects are comparatively easy to teach.

The first difficulty common to all is that regarding latitude and longitude, regarding which there are so many elements of error. It is so difficult for the child to recollect what term means length and which breadth, and then to get the restive imagination to grasp the fact that the length is sideways and not up and down, as it apparently should be; for even if the earth is shown to be an oblate spheroid, there is nothing to lead a child to see that there is a greater circumference round the equator than round the poles, and the time has not arrived to perplex the child with the views of the ancients on the subject. . . . The only practicable method is to put the facts of the case into amusing verse, and commit it to the memory by song. At this stage, also, some easy standards of measurement put into verse and to music should be learnt by rote, to enable the child readily to recollect the relative measurements of the earth, sun, and moon, and the radii of their orbits and times of progression. . . .

Once the preliminary difficulties are over, and the power of observation and contemplation is acquired, even in a small degree, the study of geography becomes but a simple matter, for it is the learning of common things, matters of everyday life, which we may, if in the country, acquire to a partial extent of our own experience; but though so simple, it requires continuous application and attention.

In each calling or trade a man may become an experienced geographer to a limited degree. The pilot, for example, is an expert in the geography of the seas he works in, for he not only knows the ports, the coast-lines, and the sunken rocks and sand-banks, but he also knows the tides, the winds, he studies the clouds and the currents, and has an intimate knowledge of the contours of the shallows; moreover, he knows the shipping of various countries, the merchandise they carry, and the produce shipped from each port. In the same manner, by hunting, shooting, fishing, bicycling, birds-nesting, &c., we acquire a knowledge of natural history and topography which aid us most materially in the study of geography, and which in a limited degree is the study of geography. . . .

Even in large towns it is practicable to learn lessons in geography from actual experience and observation, for if the markets and railway produce are examined, it can soon be ascertained from whence the articles come and from what ports, and with careful attention most valuable lessons in political economy can be gained.

The knowledge of geography thus, even in its restricted sense, embraces the life of an Englishman of every class and occupation, and its study is of the greatest importance to every man who has an occupation; it is singular that so little comparatively is thought of cultivating the science, and how small interest the State has hitherto taken in fostering this class of education.

But while the Board and other schools for the people are gradually taking up the work and endeavouring to work out a good system of education, it is mortifying to find how little progress has been made in the higher class schools where such heavy fees are charged; and the question arises whether in these schools the teachers of geography really understand the subject they teach, and would pass an examination before a Government inspector.

are put to the greatest disadvantage with the son of a labourer will hear the price of gold, so also with the son of a mechanic and a philosopher on the subjects with which the peasant learns to exercise his observa-

tion; but the son of wealthy parents is too often carefully kept from hearing all that might teach him geography, and he is seldom obliged to exert himself to use his observation in any essential matters of daily life; this is reserved for the playground, where nothing of real importance is at stake, and must have the most deleterious and detrimental effect on many young minds, and naturally results in so large a proportion becoming useless for any occupation.

It is apparent that, as education throughout the country progresses, the sons of the wealthy classes, if they are to compete successfully with others, must have some better mental training than they obtain at present, otherwise they will in a few years be distanced by the sons of the labourers, artisans, and shopkeepers. What an Englishman asks for is a fair field and no favour, and it seems hard upon a parent who struggles through life to make money to be enabled to give his children the best and most expensive education the country affords, that with it he must risk a training of the mind which is inferior to that in the less expensive schools of the people. As we are behind the Continental States and our colonies in so many of our institutions and land laws, so we are behind them in our training of the mind in our upper-class schools; by neglecting by artificial means to develop the power of observation among boys, who until they are put out in the world are never accustomed to do anything that will tend directly to any practical and useful result, we are putting them to the greatest disadvantage, and handicapping them in the race of life.

We omit to train the memory in early years, to lay a foundation of facts in the mind, and to develop any power of observation; we carefully prevent their doing anything useful, and bring them up in a moral atmosphere in which the idea of anything but amusement is practically excluded, and then in later years we attempt to adjust all our errors by cramming, when the memory is incapable of being crammed, and the mind has ceased to desire to acquire information; the result is that so many young men are deliberately rendered unfit for work in life, and those who have sufficient courage and energy to look their prospects in the face find the enormous disadvantages to which their teaching has subjected them, and lose precious years in unlearning and learning again.

More unfortunately still, the best and choicest of our minds cannot be crammed; and thus drop out at our examinations many minds of the class that for practical purposes would be most useful to the State. I allude more particularly to the minds endowed with cogitative faculties, which tend to originality and research; these minds cannot be successfully trained unless combined with the teaching there is something useful to do. It is often observable that an indolent, inert, and lazy boy suddenly becomes filled with enthusiasm and emulation, both at studies and in the playground, when subjected to a change of training. I venture to assert that every year at our public examinations many men are rejected who are of the most superior class of mind for all practical purposes, who are physically most capable, who are so constituted that they cannot cram, and who, though retarded by want of proper training, are beginning to train their minds for themselves, and who if brought up under a good system in early years would take the highest places in examination. We are thus losing year by year from our front rank the men who would be of the greatest service to the State.

The pleas given for the study of geography by Strabo are worth bringing before the mind of youth, for he points out that while the success resulting from knowledge in the execution of great undertakings is great, the consequences of ignorance are disastrous, and he refers, among other instances, to the shameful retreat of the fleet of Agamemnon when ravaging Mysia, and to bring it more home to our everyday life he says: "Even if we descend to such trivial matters as hunting, the case is

still the same ; for he will be most successful in the chase who is acquainted with the size and nature of the wood, and one familiar with the locality will be the most competent to superintend an encampment, an ambush, or a march."

He further calls attention to " the importance of geography in a political view. For the sea and the earth on which we dwell furnish theatres for action ; limited, for limited action, vast, for grander deeds ; but that which contains them all and is the scene of the greatest undertakings, constitutes what we term the habitable earth ; and they are the greatest generals, who, subduing nations and kingdoms under one sceptre and one political administration, have acquired dominion over land and sea. It is clear, then, that geography is essential to all the transactions of the statesman, informing us as it does of the positions of the continents, seas, and oceans of the habitable earth."

Of all persons who require a knowledge of geography stand first those who are most concerned in the government of our empire, and yet, as has been mentioned, these have for the most part been brought up at schools where the mental training for geography is most defective. Our statesmen, as a rule, have neither theoretical teaching nor practical experience, and it is perhaps not too much to say that, putting on one side those who are merchants and sailors, there are no more ignorant persons with regard to geography than our lawgivers. This ignorance endangers the safety of the country, for the people are continually perceiving, with regard to matters of everyday life and practical experience, that their lawgivers are more ignorant than themselves, and are consequently constantly interfering and giving advice in the details of the administration of the empire.

The progress and development of a free country depends upon the characteristics of the inhabitants, but these again depend in great measure upon the natural resources of the country—the soil, climate, mineral wealth, navigation, mountain ranges, risks and dangers from natural causes, and we must not omit the position of the country both with reference to commerce and war.

It is not usually the country too greatly favoured by nature which develops most rapidly, neither is it necessarily a long term of peace which favours progress ; on the contrary, all experience shows that man requires a certain amount of opposition to bring out his energies and stimulate him to exertion, and though we are constantly talking in our country of the blessings of peace and horrors of war, we must generally acknowledge that our present foremost place among nations is due in a great degree to the keeping up of our innate energies by incessant turmoils and differences of opinion within and little wars and commercial rivalry without. It is not, then, to a reign of peace in which our energies would stagnate and become effete, but to a continuance of political excitement, which keeps the people on the alert, that we should be indebted for progress, and our statesmen should be sufficiently well educated and trained to take advantage of every time of excitement in furthering the welfare of the empire.

We owe the benefit (before railways) in the improvement of our great northern roads for military purposes to the rebellion of 1745, leading to our being able to run coaches between London and Manchester in 1754, and between London and Edinburgh in 1763. Scotland and Ireland are both indebted to war and disorder for the first roads, constructed for purely military purposes.

But while the duty of taking advantage of each fitting opportunity for developing a country lies with the statesman, his prospect of success depends in great measure upon his geographical knowledge. His work may serve but for the purposes of the moment, and never benefit posterity, if he has no knowledge or foresight, no originality of purpose and perception of the fitness of things.

The measures that can be taken may be divided into two classes—domestic and



international. The former designed to benefit the country or empire directly; the latter to shield the land from hostilities from without, and in which the consideration of geographical position has a most all-important bearing. In this latter class a complete knowledge of geography is an absolute necessity, as the question arises so often as to whether the acquisition of geographical positions will weaken or strengthen a kingdom. For example, were Ireland two degrees further to the west, it is probable that all our views as to the method of connecting it for administrative purposes with Great Britain would be greatly modified. Again, the particular points at which our coaling stations may be situated about the world may depend upon a variety of circumstances, changing from one year to another. Thus Gibraltar, from its geographical position, was an absolute necessity to us thirty years ago, but, owing to various changes, it is not now of equal value, either as a coaling station, for protecting our commerce, or as a depôt for our wares, and the question is arising with some geographers whether it might not with advantage be exchanged for Ceuta on the opposite coast.

It is possible that a more full geographical knowledge of Egypt and the Suez Canal might have materially modified our present occupation of Egypt. The canal could not be held without a fresh-water supply, and the possession of Cairo and the Nile is the key to the fresh-water canal supplying Ismailia and Suez. Had it been known that a plentiful supply of water could be obtained close to the marine canal, independent of the Nile water, it is questionable how far any occupation of Egypt would have been necessary.

In such cases it is not sufficient that the Government subordinates should have a knowledge of geography, for even if they are fully conversant with what they ought to know, it would be almost impracticable for them to convey to statesmen knowledge which their untrained minds render them incapable of retaining or making use of.

In settling political boundaries it may appear at first sight that they should coincide with certain geographical features, forming natural boundaries not only in international matters, but also in cases of provincial, county, town, and parish boundaries, and also in accordance with historical associations; but we must do our statesmen the justice to admit that the deviations they adopt may not always be the result of ignorance, but arise from an astute perception that it may be necessary in the future to have a cause for further modification, or even for raising the whole question anew. It is difficult, however, to see how this can with any propriety arise in domestic matters, and, apart from the doubtful political morality involved, it would only occur in international matters on the assumption that our empire is paramount, and can quarrel when it chooses; and, moreover, in such a case could only be justified by being carried out with so perfect a knowledge of geography that in any reopening of the question our country should be in the right; whereas bitter experience has shown us that our statesmen have almost invariably placed us in the wrong.

It is fatal in domestic matters to ignore the physical features within a country, and attempt to obliterate its historical and topographical associations, as the French Revolutionists attempted, by substituting their departments for the old provinces. This has only led to an artificial division, which has not taken root among the people, and French geographers are still calling attention to the absurdity of present divisions. In such cases, we must keep alive to what are the ostensible and what the actual reasons for such changes, and if the so-called simplicity introduced by lawyer statesmen leads to increased law expenses, we may reasonably look with suspicion on such an interference with the economical administration of the affairs of the nation. In our own country geography is intimately connected with all kinds

of divisions of land, which are dealt with by the administration. A simplification of the arbitrary political divisions, and a modification and synchronisation of boundaries might lead directly to simplification of administrative machinery, and saving of expenses in salaries, &c. London itself is a glaring instance of the waste of money and friction of departments, from the extraordinary overlapping of boundaries—political, magisterial, petty-sessional, police, statistical, postal, public works, &c. Probably a great portion of the time and energies of the superior officers in the various departments is occupied in waging war on one another, keeping the peace, or temporising with or watching each other; and this not from their own desire to quarrel, but from the fault of the system which overlaps duties as well as boundaries, and often gives one and the same duties to be performed by distinct departments. Perhaps, in some instances, this friction may call out latent energy, but it at least most successfully prevents departmental superiors from looking into their own departmental affairs, and developing and perfecting the local administration, and keeping up to the times.

With regard to international boundaries, too little attention is usually paid to the changes which are caused by the advance of civilisation. For example, a natural boundary may, in time, become merely conventional owing to development of communications.

At one time the Rhine was a natural boundary, but has now become a channel of communication. Again, the Zambesi is at present a natural boundary, completely separating distinct tribes; the time may come when it also will be a great channel of communication. The usual natural international boundaries are broad or rapid rivers and arms of the sea, mountain ranges, deserts, and swamps; but the highlands and lowlands of a country are also naturally separated, as they usually are inhabited by people of different nationality.

In Europe we find natural boundaries gradually losing their efficiency, as political boundaries. The Rhine, for example, throughout a great portion of its length has ceased altogether to be a political boundary, for though it is still a military line of great strength, each large town on either bank has its suburb on the opposite side, and the population has become so assimilated that the river has ceased to be a practical political line. Consequently the line of the Voëges is deemed by many to have become the natural boundary between France and Germany, on account of its coinciding with the linguistic barrier. But, again, linguistic boundaries are no tests of the limits of nationalities or national feeling. When a foreign language is forced upon an unwilling people, they may for many generations be acutely opposed to the nation whose language they have adopted. On the Lower Danube, however, the physical, linguistic, and political divisions all coincide, and the river has become neutralised and is a natural boundary.

In Central Europe we find the highlands of the Alps forming the natural and political boundary, though the people speak three different languages; but in these cases the people probably will not be found to be of the same race as those speaking the same language in the plains below.

Again, in the Pyrenees we find a natural, political, and linguistic barrier coinciding, assisted by the fact that the mountain people are a different race from those in the plains to the north and south.

In our own country we have a curious instance of language being no proof of the nationality of the people, as the Iberians in Wales speak Celtic, and the Celts in Western Britain speak Anglo-Saxon. Again in South Africa, we have the people of French extraction speaking Dutch and still feeling resentment to the Government on account of having forced a foreign language upon them, although the British have succeeded the Dutch.

Among Asiatic and African territories boundaries are very often ill-defined and uncertain. Frequently it happens that between two powerful states there is a large tract of country which owes a double allegiance, paying tribute to each, and yet in some respects remaining independent, probably consisting of lands which are easily ravaged and are comparatively speaking unprotected by nature.

When we look into the subject of boundaries among pastoral tribes, we find curious anomalies. The land belongs in many instances to the tribe and not to the individual, and cannot be alienated. In the desert of Arabia a tribe in one part will have an interest in the date palms or corn lands of a tribe in another part, and this system is rather fostered than discountenanced, so that when evil befalls an individual in one part he may go and live with his tribal friends elsewhere. It is a knowledge of the intricate connections of these tribes and the topographic divisions of their lands which admits of any control being kept over these warlike people. A mistake arising out of a misunderstanding of this Bedouin system nearly led to a disastrous result in the Egyptian campaign of 1882, owing to an outlying branch of one of the most powerful tribes in Arabia being supposed to be a petty independent tribe of no consequence.

In many instances the cattle posts of tribes during peace time by mutual consent intermingle and overlap, yet are kept separate and distinct, so that no geographical boundary is practicable; in fact, among such people it is the tribe before the territory which is under the control of the chief. Thus it is quite practicable to conceive instances of a tribe living on lands within the area occupied by another tribe and yet governed by its own laws. Many of the difficulties the British have encountered in South Africa have arisen from a complete ignorance of, or wilfully ignoring, the native land laws. Under the tribal system even the chiefs in council have not the power of disposing of any portion of the land they use; it belongs to every individual of the tribe and of the tribal branches and to their children's children. Thus, when a chief gives over his territory it does not follow that he gives over the land for disposal as crown lands, but only the government of the people. It is on this account that the offer of Khama and other chiefs of the Bechuanaland territory was of so great value. They proposed by agreement in council in their respective territories to hand over to Great Britain their territories, keeping for themselves the lands they used, and offering for emigration purposes their vast extents of hunting lands, which are not now of the same value for hunting purposes as they were in former days.

But this proposal has not been accepted, and a parallel of latitude has been proclaimed, without consent of the Bechuana chiefs, as the northern limit of the British Protectorate, cutting Khama's territory into two parts, and cutting a portion of Matabeleland off from Lobongolo's territory, so that the Boers of the Transvaal cannot raid upon the Matabeles without violating the British Protectorate, and *vice versa*, while we have no means of securing its protection. Again, the Matabeles, when making their annual raid upon Lake Ngami, will violate the portion of the State of Khama without the Protectorate, and he, if he wishes to oppose them, must do so from his capital within the Protectorate. This will bring us into conflict with the Matabeles, or else will practically deprive Khama of part of his territory.

It is difficult to conceive any arrangement more likely to lead to complications in the future. The Protectorate, based on geographical principles, should extend as far as the Zambesi, taking in all Khama's certain territory and as much of the neutral territory as might be necessary to provide a natural boundary to east and west.

In East Africa, again, the definition of spheres of action recently is anomalous. A boundary ten miles from the coast for the Zanzibar dominions can of course have

only a tentative character, and the exact definition in the future cannot fail to lead to conflicts. Far worse, however, is the adoption of the river Tana as the northern boundary of the British sphere of influence—a river occupied on both banks by the same agricultural tribes. It is not clear for what reason the commissioners have left this difficulty for the future.

It would not be difficult to give many recent instances in which those charged with diplomatic definitions of international boundaries have failed in their duty owing to a want of geographical knowledge of the localities with which they had to deal.

For example, the boundary treaty of 1783 with the United States was incapable of being carried into effect, as the geographical features did not correspond with the assumption of the commissioners. This led to a dispute lasting thirty years, resulting in the boundary treaty of August 9th, 1843. The ignorance of the geography of the country in this case led to very inconvenient and even disastrous results.

Again with the San Juan controversy. Historical and geographical knowledge and ordinary care for the future development of Canada might have led to such measures having been taken in the first instance as would have prevented cession of valuable positions to the United States in 1846.

In India, again, our want of knowledge of the country to the north of the Afghan boundary has led to a series of unnecessary concessions to Russia. Had the slightest encouragement been given in former years by the Indian Government to enable officers to acquire information as to the territories beyond our Indian Empire, no doubt we should now be in a more secure position.

But, fortunately for the British Empire, foreign politicians have also much to answer for to their respective countries on account of their ignorance of geography.

For many years past Germany has been increasing the population of the United States and our own colonies without assisting to further the influence of the German Empire; whereas had her statesmen been able to look forward, a German colony might have been established. Many Germans as far back as 1866 were desirous of establishing a colony in the Transvaal. But Germany now has to cast about for unoccupied territory, and has chosen a piece of useless territory on the western coast of South Africa, whereas with a little foresight Prince Bismarck might have obtained on easy terms the whole of the French colonies in the Gulf of Guinea and north of the Congo, which France had actually abandoned as worthless. Germany would thus probably have held the position of France with reference to the reversion of the Congo State.

By the treaty of Frankfort it was intended that all German-speaking villages were to be ceded to Germany, but the boundary as originally laid down, for want of geographical knowledge on the part of German employées, left several German villages near Metz in possession of France, and it was necessary subsequently to rectify the error.

As a section of the British Association we are interested in the development of geographical knowledge in the world generally, but more particularly in our own Empire, and it is only by unceasingly calling attention to our shortcomings with regard to the science which causes us to meet here to-day that we may hope for that progress to be made which will enable us to maintain the proud position we at present hold among nations, owing to our practical skill and energy. Hitherto we have possessed so many other advantages that we have been able to dispense with a good system of instruction, but owing to various causes other nations are gaining upon us in various ways, and we in our turn should use every effort to successfully grapple with a subject which, if properly taught, must affect our welfare as a nation so deeply.

**Explorations on the Upper Kassai and Sankuru.** By Dr. LUDWIG WOLF.—When Stanley had given us, by his marvellous journey through the Dark Continent, the knowledge of the course of the Congo, the thought naturally arose that there might be a connection between this gigantic river and the Kassai and Sankuru, which had already been crossed far to the south by Livingstone and Pogge. The probability of this soon led to the desire to seek such a connection.

Stanley, on his way down the Congo, came near the Equator to the junction of a river called Ikelemba, which was thought to be identical with the Kassai. But going back a second time to the Congo, he saw that this could not possibly be so, as the Ikelemba was but a small river. Then it was suggested that the Kassai, the "most mysterious river," as it was called, probably might fall into a large inland lake, like Lake Chad, which probably existed in the southern basin of the Congo.

Our expedition, under Lieutenant Wissmann, sent out by the royal protector of African exploration, H.M. the King of the Belgians, undertook to solve the Kassai problem. We left Hamburg in November 1883, for Loanda on the west coast of Africa, went from there to Malange, the last Portuguese station on the eastern frontier of Angola, which was under the command of a native captain, as the highest military as well as civil functionary. Our plan was to engage carriers here, buy the required goods for barter, and then try to reach overland the Lulua river, an affluent of the Kassai, in the Baluba country of Mukenge. There we wished to establish our basis of operations, build canoes, and then trust ourselves to the current as a guide down the Lulua and the Kassai, either into the Congo or into a lake. This seemed to be certainly the simplest way to explore the course of the river, and to find somewhere the place where it discharges its waters. At Malange we could only get carriers as far as Mukenge, nobody was to be found who was willing and plucky enough to go farther with us.

The men of Angola are not nearly so useful for exploratory journeys as the Zanzibarites. In the first place they are on an inferior scale of civilisation, are cowardly and always inclined to mutiny as soon as they hope to gain by it any advantage for themselves. In the second place every carrier has to receive his payment in advance, consisting of goods for barter, which he afterwards tries to sell to the natives at the highest possible rate. He simply offers himself as carrier in order to have the opportunity of trading. The difficulty of keeping together our 500 men, belonging to different, many of them even to still independent, tribes of Angola, we found out already at the commencement of our journey. For this reason the expedition was divided into three separate columns, each one marching independently and separately. They all left Malange in July 1884, under Lieutenant von François, Lieutenant Franz Müller, and myself, for Mukenge, where they joined again in November after an overland march of four months, the distance being about 800 miles.

Lieutenant Wissmann was, as I have already mentioned before, the chief of the whole expedition, and I was designed by himself as second, and also as his presumptive successor in case of his absence or illness. This latter case, unfortunately, happened when we had explored the Kassai and reached Leopoldville on the Congo, July 1885. Lieutenant Wissmann and (later on) also Lieutenant Müller, both fell ill, in consequence of the many hardships we had to endure, and had to be carried to the coast, whilst I returned to the interior to explore the Sankuru and its affluents. Our expedition was in a state of great embarrassment at the Congo. We had left Germany for Africa, altogether eight (white men); two of us, Lieutenant Franz Müller and Mr. Meyer, a gunsmith, had already died. Wissmann and Müller had to be taken back to the coast, seriously ill. Carpenter Bergslag with some

men had remained in charge of Luluaburg Station, which we had established in the Baluba Country, whilst the chief of these natives, Kalamba Mukenge, with about 150 of his people, had agreed to accompany us. Only a few of our Angola men had then pluck enough to go also with us. Gunsmith Schneider was the only white man of our expedition who was still with me. Many of our faithful Baluba, who had shown such an unlimited confidence in the white man, unprecedented in the history of African exploration, were ill and weak in consequence of the hardships suffered. A tedious overland march, or the hard work in canoes up river, of some months' length, would surely have proved murderous for these poor people, and yet they had to be taken back to their homes. This was certainly a sacred duty which by all means had to be carried out.

I cannot think of that time without gratefully remembering a man whose name will ever remain connected with our expedition: I mean Colonel Sir Francis de Winton, who, as Administrator-General of the new Congo Free State, has enabled me to take the Baluba back to their homes by the *Stanley*, a new stern-wheel steamer, which first had to be put together at Leopoldville. Colonel de Winton also accompanied me as far as the junction of the Lulua and Luebo, and assisted me in every possible way. If it had not been for his decision to use the *Stanley* for transport of the Baluba natives, many of them would never have seen their homes again. According to the wishes of His Majesty the King, Colonel de Winton handed over to me a steam launch, the *En Avant*, and allowed two agents of the Congo Free State, Mr. Bateman and Captain v. d. Felsen, to enter as my assistants into the service of the Kassai Expedition. I ought to mention that our expedition was independent of the International Association, and being under direct orders of His Majesty the King was called the Kassai Expedition. At the junction of the Luebo and the Lulua, the furthest navigable point south, I decided on establishing a station, for the accomplishing of which Mr. Bateman deserves great credit. After having taken the Baluba back to Mukenge, and seeing the station of Luluaburg, under the care of Mr. Bergslag, in a prosperous flourishing state, I began the exploration of the Sankuru. Mr. Schneider, a gunsmith of our army, took most skilfully the place of an engineer on the *En Avant*, and thus enabled me to make 1200 miles on this small steam-launch in spite of her poor condition.

On the 8th of January, 1885, I embarked at Luebo station. Exactly then a year ago, when I was amongst the Bakuba, a people who so far had never seen a white man in their country before, I received the first startling news with regard to the course of the Sankuru, which gave me the opinion that this river did not discharge its waters into the Congo, as formerly was believed, but into the Kassai. When we afterwards went down the Kassai, looking out for affluents on both sides, we found that the information I had received from the Bakuba, that the mouth of a river on the right bank of the Kassai was that of the Sankuru, was correct. However, we left the question, for want of time, to be definitely settled by a later exploration as soon as the Kassai problem should be solved.

The junction of the Sankuru with the Kassai is full of sandbanks and islands. The total width of both rivers is about 2½ miles; four miles above the junction they are running quite parallel to each other N.N.W., so that one may be inclined to take the right banks of the Sankuru for those of the Kassai, and so consider both rivers to be only one. But soon the Sankuru changes its course almost suddenly, and is now coming from north and north-east, whereas the direction of the Kassai is from south and south-east. Near the junction the right bank forms a steep wall of laterite about 15 yards high. The country behind is an open prairie, with narrow strips of forest. The nearest village was in a northern direction about three miles from the river, inhabited partly by Bashilehle and partly by Bassongo Mino,

with whom friendly relations were soon established. The Sankuru further up showed itself to be a most beautiful river, the width of which sometimes reaches to about three miles. This lake-like appearance of the river explains probably why Livingstone and Cameron heard about the existence of a lake Sankora in the central basin of Africa. The average depth of the river is about three fathoms, and the average velocity of the current three to four miles an hour, a little more than that of the Kassai. Yet the navigation was not easy for the *En Avant*, as she was in too poor a condition. Sometimes it took her one to two hours to gain about 200 yards against a current of only  $3\frac{1}{2}$  miles an hour. I had to sacrifice some of my few guns, which were used to replace the worn-out steam-pipes and fire-bars; besides, the broken plate of the engine had to be plastered every morning with clay.

The banks on either side of the river were now covered with dense forest, now an open prairie, dotted here and there with palms and other trees, making the scenery quite pretty. There are hills on both sides, gently rising from 50 to 200 feet in height, but near the Lubi junction the river has often sharp cuts and steep laterite banks 100 to 200 feet high. The oil-palm (*Elwis guineensis*) is quite abundant. On the right bank of the lower river-section, in the Bassongo Mino country, I saw the fan-palm (*Borassus*). I mention this particularly, as I never found the *Borassus* on the left bank, or south of lat.  $4^{\circ}$  S. on the right Kassai bank. There seems to be here a kind of botanical limit for this species. The banks on both sides, especially on the left, are thickly populated. From the junction up to the  $23^{\text{rd}}$  degree E. long. are settled the Bankutu, belonging to the warlike Bassongo Mino tribe.

The same distance on the left bank is inhabited by the Bakuba, small tribes, who, though independent of one another and each one under their particular chief, highly respect the name of the great Bakuba king Lukengo, whom I had visited a year ago, and for that reason I was amicably received everywhere. Joining the Bassongo Mino and Bakuba are several smaller tribes, as the Bashabbe, Butoto, Bena Lussamba, Kato, Baluba, &c.

All these tribes are more or less troublesome, though finally I succeeded in establishing friendly relations with almost all of them.

The Bassongo Mino, with whom we had rather a hard struggle on the Kassai, as they attacked us treacherously, were also hostile on the Sankuru. Yet the daughter of the powerful chief Gapetsh interfered and influenced her people not to fight. She came, quite fearless, with but a few companions, to pay me a friendly visit and to exchange presents with me.

The tribe of these Bassongo Mino is settled near to the junction, about 20 miles above. I saw in their villages some commercial articles which seemed to have come the long distance from the Congo. The chief, for instance, wore a heavy solid brass ring round his neck, like the Bayanzi do on the Congo. When I asked whence this brass came, they at once pointed towards the north-west and told me of a large river, where white men with fire-arms lived. Undoubtedly they meant by this river the Congo. The Bassongo Mino further up river, under their chief Tongolata, were quite hostile, and were the only people who confessed themselves to be cannibals. When I reached the country the *En Avant* had to be repaired as she had a leak. Cloth, cartridges, everything was wet, and had to be dried on shore.

Soon several canoes full of natives came along. All the men were armed with bows and arrows. They were quite astonished to see a white man, but not at all frightened by this first sight. One of my Baluba attracted their particular attention, being fleshy and very stout. Some remarks were heard that it would be easy to kill us all, as we were only a few, then to chop us up and to take all the beautiful things besides. Their chief Tongolata already fancied I was quite at his

mercy, and did not even hesitate to tell me so. Our guns, in their ignorance, were not considered to be weapons at all.

Something had to be done to check these hostile natives if we would not run the risk to be quickly overpowered by their large number, which was increasing every minute. Following a sudden impulse I drew my revolver and discharged it close to the chief's ear. The result was startling. Tongolata got so frightened, that he, shivering all over his body, took hold of his ears. The tingling in his head made him probably think that they were gone. All the natives looked perfectly aghast and quite horrified. The chief, as soon as he found himself unhurt, pretended to be my best friend, and gave me as a proof of it a present of two chickens.

Up to the Lubi junction there were a great many canoes on the river. Some days I have counted 100 of them, and the largest one, having double the length of the *En Avant*, could carry as many as 80 people. The natives rowed standing up, and at such speed that they easily overtook the *En Avant*. When they had done so, they used to express their joy by wild cries and by drumming with the palms of their hands against the sides of their canoes.

After reaching the junction of the Lubi and the Sankuru the river narrows in some places to 250 yards width. On the 18th of February, 1886, I arrived at Katshitsh, where Pogge and Wissmann on their journey to Nyangwe in 1882 had crossed the river and had learnt from the natives that the Sankuru always maintained a northern direction. They told me the same, not knowing better; anything below the junction of the Lubi is a mystery to them. Instead of Sankuru the river is now often called Lubilash. A Koto chief on the right bank told me about some rapids ahead, and said, "The Sankuru is good, the Lubilash is bad!" which means that the river, as long as it bears the name Sankuru, is navigable, but becomes dangerous for navigation on account of these rapids as soon as its name is changed to the Lubilash. The river narrows to 250 yards, has an average depth of three fathoms, a velocity of current of  $4\frac{1}{2}$  miles, and runs sometimes with sharp cuts between steep banks of laterite 50 yards high. I passed four rapids with the *En Avant*, but she twice struck a rock, fortunately without being damaged. On account of these rapids I went nearly as far as 6° S. lat. overland to the Baluba tribe Batondoï, who live on both sides of the river, and I found the rapids increasing in number; the river being only 30 yards wide, and the velocity of the current  $4\frac{1}{2}$  miles an hour.

Between Katshitsh and the Batondoï I met the powerful chief Zappu Zapp, who, as a slave-hunter, is the curse of the country between the Lubilash and the Lomami. Nearly all his men were armed with percussion guns, which he gets at Nyangwe from the Arabs in exchange for slaves and ivory. The other tribes are still armed with bows and arrows. This was the furthest point to the west, whence the trade all goes to Zanzibar. Several of Zappu Zapp's men, also his sons, spoke the Suahili language. Zappu Zapp wanted guns and powder from me. He did not care for anything else. When I refused to accept his slaves and ivory he resolved to take the *En Avant* by force overnight. I fortunately heard of his scheme, soon enough to prevent it. I found the Lubi, an affluent of the Sankuru on the left side, 50 to 60 yards wide, with about two fathoms depth, on account of sharp cuts and turns not good for navigation. The *En Avant* was driven by the strong current at one of the sharp turns against the right bank and badly damaged. Going down the Sankuru I found on the right bank the junction of a river from 100 to 120 yards wide, two to three fathoms deep, falling into the Sankuru by two arms. The banks on either side were covered with dense forest and Pandanus. There was hardly a place for landing, and no village to be seen. All our food was consumed, tea and coffee weeks ago, and nothing but salt left. For some days we suffered badly. At last I got provisions, and also good information from the Bena Tehka, friendly



natives on the left bank of the Lomami, who fell down on their knees when the *En Avant* came in sight. They told me that the river at its junction was called Luetsahu, and by the Bassongo Mino, Lukenge, yet that they themselves, and also the natives further up, used the name Lomami. I got the same information from other natives also, who all distinctly called the river Lomami.

When I found the river taking and keeping steadily a south-easterly direction, I began to think that the river *might* be the Lomami. As the Kassai, the junction of which was thought to be near the Equator, and the Sankuru, which was supposed to discharge itself at about  $1^{\circ} 30'$  N. lat. into the Congo, both unexpectedly took a direction north-west, even west, it is not surprising that the Lomami should do the same. As the central basin of the Congo is a tableland with a gradual slope from the south-east to the north-west, it seems also to be quite natural that the Lomami should take a corresponding course. The Kassai, Sankuru, and Lomami form from the Congo a nearly straight water-way to the east, 780 miles long, which cuts off the north curve of the Congo, and opens up to civilisation and commerce a vast, rich, and hitherto unknown country.

After my return from the Sankuru I happened to meet again quite accidentally at the junction of the Lulua with the Kassai, in April 1886, Lieut. Wissmann, who had recovered and regained his health by his stay at Madeira. Mr. Grenfell, of the Baptist Mission, had brought him from Leopoldville up the Kassai on board the *Peace*. It was a singular meeting! On the very same day I had tied up the disabled *En Avant* here, close to the right bank of the Kassai, as she could not be taken back to the Luebo station against the current. I had the intention to continue my journey in a boat or overland, when suddenly here, in the centre of Africa, the English flag of the *Peace* came in sight. One day sooner or later, and we should not have met each other. Mr. Grenfell was so kind as to take the *En Avant*, with Captain v. d. Felsen and Mr. Schneider on board, under the protection of the *Peace* down the Kassai to Leopoldville. I have still to mention that our expedition is in many ways indebted to Mr. Grenfell and the Baptist Mission. When Mr. Wissmann and Lieut. Müller were taken seriously ill at Leopoldville, and no suitable rooms could be found for them at the station, they were kindly received and taken care of at the Baptist Mission-house. The good work done also in this regard by the Baptist missionaries on the Congo, especially by the late much-lamented Mr. Comber, cannot be highly enough valued and appreciated.

In the spring of last year Wissmann and I explored the Kassai beyond the Lulua junction. We found the river navigable for another 60 miles, and then came to a cataract eight yards high, which I, in honour of my friend Wissmann, have called the "Wissmann Fall."

It is rather a remarkable fact that on passing the 5th parallel of south lat., the river-beds become stony. This is—so far was already known—the case in the Congo and Kuango, and I found the same in the Kassai, Lulua, Lubi, and Sankuru. I conclude, from all the information I have gathered, that this cataract region between  $5^{\circ}$  and  $6^{\circ}$  S. lat. stretches from the west coast as far as the Tanganyika lake. We know that the Lukugu, the outlet of the Tanganyika, also is stony. This cataract region does not seem to be without influence on the climate and on the fertility of the soil.

The highest temperature I ever found in Africa was on the Lomami, where the motion of the air sometimes seemed to fail altogether. The heat was like that of a hothouse, yet I never found it so disagreeable as for instance during the summer in the United States of America. The nights are generally cool and quite fresh. From the Kuango to the Kassai the primeval forest gradually increases, but it is still more or less limited as gallery forest to the many rivers, streams, and brooks.

Yet passing the Kassai and further on the Lulua, I found by a superficial estimate about 40 to 50 per cent. dense forest. On my journey from Mukenge to the Bakuba land, I have often travelled for days through primeval forest. I mention this particularly, because it has been stated that there is no forest of any amount in Central Africa. The Sterculiaceæ and Burseraceæ form here gigantic trees springing out of the dense mass of foliage and bushwood. The indiarubber creeper, *Landolphia*, is very abundant in the bordering forest of all the tributaries of the Kassai, Lulua, and Sankuru, but the value of it is known to but few tribes. Wherever the forest disappears, grassy glades and hills prevail, dotted here and there with groups of oil- or wine-palms (*Elæis* and *Raph. vinifera*). The soil itself in its composition shows a general uniformity, and only the proportion of the single components to one another seems to be a little different; ferruginous clay and sand mixed with humus are most to be seen. The much talked-of laterite is to be found everywhere, yet does not at all cause sterility. As in the upper region of the Nile, the laterite also runs through the most fertile territories of the central basin of the Congo. The value of the soil depends chiefly on its abundant irrigation, which often defies its chemical composition. In regard to the rainfall, the central basin of the Congo, as far as 6° S. lat., differs to its advantage from the coast. There is not a marked dry season. At Luluaburg, for instance, during two years of meteorological observations in 1885 and 1886, we had rain every month. June, July, and August are the months in which the least rain falls, but they have a heavy morning dew. The soils proved to be excellent for plantations of rice, sugar, maize, &c.

The country from the coast to the Kassai is thinly populated, though all the villages I passed through showed a great number of healthy-looking children. This will be understood if we remember that this region has for centuries provided Angola and the foreign market with slaves. Already, at the beginning of this century, the Portuguese slave-dealers have sent their black *employés* as far as Muata Yamvo to buy slaves there. This explains to us also the name "Pombeiros" on old maps of Africa. Pombeiros means simply slaves who have received their freedom, and is not a family name, though we still find it erroneously written so.

Passing the Kassai, we enter the thickly populated territories of Central Africa. The first people we met here were the Baluba. It is only a few years since they became first known to us. Pogge and Wissmann were the first white men who passed (1881-82) their country on the way to Nyangwa. Our expedition then followed (1885), and we have been enabled by these natives to add some knowledge to the hitherto unknown hydro-orographical condition of Central Africa. While the natives generally at first meet the white man with hardly withheld suspicion and even hostility, the Baluba at once showed us a blind childlike confidence. They greeted us as former deceased chiefs and relations of their king, Kalamba Mukenge, by which names they always called us. According to their belief, all distinguished warriors and chiefs will return to them metamorphosed after their death. Whilst our 500 Angola men had not the courage at Mukenge to go with us down the Kassai, or to make any further journeys into the interior, the Baluba were ready to help us, and to go wherever we wanted them.

The Baluba are not the original people of their present country; they are emigrants from the south-east, whilst the Bakuba have come from the north-west. There is a remarkable difference between these two tribes. They differ in appearance, habits, and language. The Baluba are a strongly mixed race, which I could also prove by anthropological measures. The capacity of the skull is extremely variable, being even in the extremes 513 ccm. On the whole, the average capacity is but little, and gave from seven skulls, for instance, but 1257 ccm. Women had only 1085, and men 1386. A remarkable difference!

It would lead me too far to give here further details of our anthropological observations.

The Bakuba have the characteristics of a pure race; they are warlike, real savages, and very superstitious. Enormous numbers of human sacrifices still take place on the death of their chiefs. The Bakuba told me most distinctly that they had come from the north-west, and taken their present country by main force from the Batua, who were subdued or driven away.

On my journey in the Bakuba country, north of Mukenge, marching all day long through a dense forest, I suddenly arrived at a grassy glade, where I unexpectedly found a settlement of Batua, the African dwarfs. These little people, men and women, were as much startled as I was at our meeting. At first they were frightened and would have run away, if they had not been taken quite by surprise. After a while they became friendly, though in spite of all efforts on my side they still remained very timid. I was able to take the measure of their length by a marked spear unobserved by them. They were all well shaped, had uniform dark coffee-brown colour, and not apparently any pithecoïd signs whatever. Prognathism and also steatopygy were not more developed than with other African tribes. The Batua are a mere hunting people and do not cultivate the soil. They dry the flesh of the animals and then exchange it for Indian corn, manioc, pea-nuts, &c., even for weapons and other requirements of life, with the Bakuba and Baluba, on a neutral market-place in the centre of the forest. Everywhere near their mean-looking grass huts were well-covered pits about three to four yards deep, for catching elephants, buffaloes, and wild boars, in case they should leave the forest to seek food on this small grassy glade. I also found the Batua at the court of the Bakuba king Lukengo, where they were employed as providers of game and palm wine for the chief's table.

Neither the Bakuba nor the Batua know the use of fire-arms, yet they are very skilful in the management of their bows, arrows, and spears. Since the Baluba have come into contact with the Kioque and Bangala, trading tribes from the Lunda country and from the Kuango, they are getting provided with guns and powder, for which they barter children, girls, and even their own wives. Mukenge may be called the most important slave market of Central Africa, as yearly thousands of people are sold there into slavery. The natives are so interested in the slave trade that it will take a long time, and a strong civilising influence, before it will cease to exist. Though the Baluba have a very keen feeling of right and wrong, which they so well express by their saying—

"Law is better than force,  
Life is better than wealth,"

yet they do not understand that there is any wrong in selling their wives and children; as these are property they consider themselves entitled to dispose of them at their pleasure. However, they make a difference between domestic slaves and slaves for export. The latter are usually troublesome individuals whom they want to get rid of. Last spring there was in the market at Mukenge an old slave, a rather distinguished looking fellow, who had been a chief in the southern part of Baluba. At the time of his reign he was very warlike, always fighting with the neighbouring tribes. During these continual wars many of his subjects had been killed, so that at last the people began to grumble and decided quietly to sell their own chief into slavery, the best way to get rid of him, and to live for the future in peace. They sold him for ten goats, which were killed, and the meat, as a compensation, distributed amongst the relations of all those who had died in the frequent battles of their chief.

When I mentioned to a Baluba chief how wrong it was to sell their own wives, he quietly listened to my arguments, and then told me, rather in confidence, that they only sold their troublesome wives out of the country, never the good ones.

The slaves are sold either to the Bakuba in exchange for ivory, or to the tribes living more west for guns, powder, and cloth.

There is also at Mukenge quite an important trade in indiarubber, which has been carried on for several years. The indiarubber is taken overland to Malange. Yet to carry one load of about 75 lbs. weight, consisting of 1000 small balls of indiarubber, this long distance costs 500 balls and four yards of cloth besides. To meet these great expenses, the black Bangala or Baluba trader buys slaves in the Baluba country and uses them as carriers. There is no doubt that all the indiarubber trade from Mukenge will go its natural way down the Kassai to the Congo as soon as the Congo railway is made. The Kassai, Sankuru, and Lomami, forming a magnificent waterway, lead into the very heart of Africa through hitherto untouched countries, where an abundance of dead as well as of living ivory proves that it would be at least too premature an occupation to calculate in how long or short a time probably the last elephant tusk may be shipped from Africa. To gain the real profit by this shipping road the access to this navigation from the coast has first to be gained. Without a railway on the Lower Congo, where rapids and cataracts prevent the transport on the river, commerce will hardly gain any profit from the vast stretch of navigation offered by the Congo and its tributaries.

The climate of no country has been so much abused as that of the Congo, and in fact the whole of Central Africa. People who have come home disappointed from the Lower Congo have often considered themselves competent to discuss not only the climate of the small part of Africa they had seen, but also of the interior. Africa, as well as other countries, has its climato-geographical frontiers, and the climate of the interior differs most advantageously from that on the coast. On the whole, the climate is merely tropical, and has certainly its dangers when the necessary precautions are neglected. For this reason I do not think that Central Africa, any more than India, ever will become a country for European emigration as America and Australia are. Yet a European of good constitution is quite able not only to live there, but also to do for several hours a day manual labour, without injuring his health. We ought not to judge the danger of the African climate by the mortality of travellers and explorers. They have to live under quite exceptional circumstances, have to suffer many wants, and to undergo many hardships.

Convenient dwelling-houses, with some comfort, regular work, and a temperate way of living are in Africa, as well as everywhere else, the chief conditions of good general health. As in India and the West Indies the progressive cultivation will also improve the climate. Many of the pioneers, however, will have to pay for this improvement with their lives. The history of the colonies of all parts of the world teaches us that these sacrifices must be made, as an inexorable necessity. As a nucleus of African civilisation, and the result of a most disinterested large-minded philanthropy, the Congo Free State deserves the sympathy of all civilised nations, who are all welcome there, to join in the work of raising Africa to culture, and of reaping its commercial advantages.

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## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* B.G.S.)

## EUROPE.

**Baddeley, M. J. B.**—Thorough Guide Series. Ireland (Part I.) Northern Counties including Dublin and neighbourhood. Seventeen maps and plans by J. Bartholomew, F.R.G.S. London, Dulau & Co., 1887: 12mo., pp. xv. and 165. Price 4s. [Presented by Messrs. Dulau & Co.]

**Baedeker, K.**—London and its Environs. Handbook for Travellers. With 3 maps and 15 plans. Sixth revised edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1887: 12mo., pp. viii., 340, and 45. Price 6s. [Presented by Messrs. Dulau & Co.]

— Southern Germany and Austria, including Hungary and Transylvania. Handbook for Travellers. With 14 maps and 30 plans. Sixth edition, revised and augmented. Leipsic, Karl Baedeker; London, Dulau & Co., 1887: 12mo., pp. xvi. and 441. Price 7s. [Presented by Messrs. Dulau & Co.]

**Jackson, T. G.**—Dalmatia, the Quarnero, and Istria, with Cettigne in Montenegro and the Island of Grado. Oxford, Clarendon Press, 1887: 3 vols. 8vo.; vol. i. pp. xxvi. and 418; vol. ii. pp. vii. and 397; vol. iii. pp. vii. and 453. Price 2l. 2s. [Presented by the Publishers.]

Although the interest of this fine and richly illustrated work is mainly antiquarian and architectural, it abounds with topographical descriptions and details of value to the geographical student. Many of the towns and villages in the interesting regions embraced by the work are described with considerable fulness, and the historical information given will be of service to any one desirous of tracing how far the development of the places referred to has been dependent on geographical conditions. Places like Spalato and Ragusa, the Bocche di Cattaro, Pola, Trieste, and other considerable towns, come in for detailed treatment, while there is much information concerning several of the islands along the coast.

**Lux, A. C.**—Die Balkanhalbinsel (mit Ausschluss von Griechenland). Freiburg i. B., 1887: 8vo., pp. x. and 276. Price 6s. (*Dulau.*)

This is a useful systematic description of the region included under the title. It deals in its first section with the physical geography, in the second with ethnology, and in the third with towns and routes. There are numerous illustrations and a small map.

**[Murray, John.]**—A Handbook for Travellers in Devonshire. Tenth edition, revised. With maps and plans. London, John Murray, 1887: post 8vo., pp. xlii. and 301. Price 7s. 6d.

— Ditto in Portugal. A Complete Guide for Lisbon, Cintra, Mafra, Evora, the British Battle-fields, Santarem, Alcobaca, Batalha, Coimbra, Bussaco, Oporto, Braga, Bragança, the Baths and Mountain Passes, &c. With a short account of Madeira, the Azores, and the Canary Islands. Fourth edition. With plans of Lisbon and Oporto, and a travelling map. London: John Murray, 1887: post 8vo., pp. [67] and 201. Price 12s.

## ASIA.

**Cantley, N.**—Straits Settlements. Report on the Forest Department for the year 1886. Singapore, Government Printing Office, 1887: folio, pp. 85.

[**Central Asia.**]—Délimitation Afghane. Négociations entre la Russie et la Grande Bretagne 1872-85. Édition du Ministère des Affaires Étrangères. St. Petersburg, 1886: 4to., pp. 384. [Presented by M. Venukoff.]

This volume includes a memoir (in Russian) by M. Venukoff. There are four maps illustrating the work.

**China.**—Imperial Maritime Customs. 1. Statistical Series: Nos. 3 and 4. Returns of Trade at the Treaty Ports, and Trade Reports, for the year 1886. Part I. Report on the Trade of China, and Abstract of Statistics. Part II. Reports and Statistics for each Port. With the Reports and Statistics for Corea. Published by order of the Inspector General of Customs. Shanghai, published at the Statistical Department of the Inspectorate General of Customs, 1887: 4to., pp. (Part I.) 27; (Part II.) vi. and 473.

The total net imports into China amounted in 1886 to 87,479,323 Hk. Tls. as compared with 88,200,018 Hk. Tls. in 1885; and the total exports in 1886 amounted to 77,206,568 Hk. Tls. as compared with 65,005,711 Hk. Tls. in 1885. The value of the Haikwan Tael for 1886 was 5s.  $\frac{1}{2}$ d.

The total value of foreign imports into Corea has been in 1886, 2,474,185 dollars, as compared with 1,671,562 dollars in 1885; the total value of exports to foreign countries has been in 1886, 504,225 dollars, as compared with 388,023 dollars in 1885.

**Haig, [Major-Gen.] F. T.**—Report of a Journey to the Red Sea Ports, Somaliland, and Southern and Eastern Arabia. Reprinted from the 'Church Missionary Intelligencer.' 8vo., pp. 40. Price 6d. [Presented by the Church Missionary Society.]

#### AFRICA.

**Bentley, [Rev.] W. Holman.**—Life on the Congo. With an Introduction by the Rev. George Grenfell. London, Religious Tract Society, 1887: 8vo., pp. 124. Price 1s. 6d. [Presented by the Publishers.]

This is a trustworthy and useful little volume, containing in brief space a summary of what we know of the Congo region. It deals with the discovery of the Congo, physical features, vegetation, climate, and people; home life on the Congo; religious ideas of the natives; cannibalism, freemasonry, and charms; missions in Central Africa and on the Congo. There are a considerable number of illustrations and a small map.

**Fallot, Ernest.**—Par delà la Méditerranée.—Kabylie, Aurès, Kroumerie. Paris, Plon [1887]: 8vo., pp. 3 and 307. Price 3s. (*Dulau.*)

**Vignon, Louis.**—La France dans l'Afrique du Nord,—Algérie et Tunisie. Paris, Guillaumin et Cie., 1887: 8vo., pp. v. and 290. Price 5s. 3d. (*Dulau.*)

**Bernard [Docteur].**—L'Algérie Qui S'en Va. Paris, Plon [1887], 8vo., pp. 388. Price 3s. (*Dulau.*)

**Lanessan, J.-L. [De].**—La Tunisie. Paris, Alcan, 1887: 8vo., pp. 268. Price 3s. 9d. (*Dulau.*)

These four volumes are all the result of the increased interest aroused in French possessions in North Africa, since the annexation of Tunis. M. Fallot, Secretary of the Geographical Society of Marseilles, made a run over Algiers in 1884. He has some useful notes on his visit to Kabylia, the Aurès Mountains, and the Kroumir country.

M. Vignon, a former official of the French Colonial Office, has been making a special study of the French colonies. His present volume is a systematic and critical investigation into French colonial enterprise in the north of Africa. He compares the progress of Algeria with that of Australia, not by any means to the advantage of the former. Between 1830 and 1886 Algeria cost France over 4764 million francs, while the Treasury receipts in Algeria

amounted to only 1,161,612,000 francs. Among the questions discussed in detail by M. Vignon are acclimatisation and immigration; the land question; the resources of the country; commerce; public works; credit; administration. Altogether, while he thinks that France has a heavy task before her in the development of the country, he believes she is quite equal to it.

Dr. Bernard's volume is a sketchy but interestingly written account of a visit to this country, without any dates.

M. Lanessan, the author of an able work on the Colonial Expansion of France, gives in his 'La Tunisie' a systematic description of the country in its various aspects. He treats in succession of the soil, climate, and population; indigenous and European agriculture and industry; mines and marble quarries; the commercial situation; taxes and customs; means of communication; public works; and necessary reforms. A small map is appended, showing the area of forests and the limits of agriculture.

#### AMERICA.

**Eves, C. Washington.**—Jamaica at the Royal Jubilee Exhibition, Liverpool, 1887. London, Spottiswoode & Co., 1887: 8vo., pp. 91, map and portraits. [Presented by C. Washington Eves, Esq.]

**Petitot, Emile.**—Les Grands Esquimaux. Paris, Plon, 1887: 8vo., pp. vi. and 307. Price 3s.

This is only a small instalment of the narrative of Abbé Petitot's twenty years' sojourn among the Eskimo and Indians of British North America. It refers to a winter journey in 1865 to the Eskimo at the mouth of the Anderson river, and to his summer journeys in 1868 and 1877 to the people at the mouth of the Mackenzie river, especially around Fort Macpherson. While on both journeys he made valuable observations on the geography of the country through which he passed, and is able to correct and add to existing information, the main value of Abbé Petitot's narrative lies in the extremely interesting details he gives concerning the Eskimo among whom he sojourned, their physique, their manners, their mode of life, and their language. He writes unreservedly concerning his Eskimo friends, so much so that he states in the preface that his volume, "N'est point destiné à la jeunesse." There is a good map (1:2,100,000) to illustrate the Abbé's journeys.

#### AUSTRALIA.

**[Australia.]**—Manual of Physical Geography of Australia. By H. Beresford De la Poer Wall, M.A. Melbourne, 1883: 12mo., pp. viii. and 194. [Presented by the Author.]

Victoria. Geology and Physical Geography, by Reginald A. F. Murray, Geological Surveyor for the Department of Mines. Melbourne, 1887: 8vo., pp. iv. and 179. [Presented by the Mining Department.]

Mr. Wall's book is a welcome summary of the leading facts of the physical geography of Australia, so far as these are known. It seems to be written with knowledge and judgment. It deals with the great features of the continent in successive chapters—relief, plains and tablelands, mountains, oceans, rivers, lakes, &c. There is a chapter on climatology, in which Mr. Wall gives a very fair statement as to rainfall. "It has been a favourite speculation," he tells us, "to endeavour to draw from statistics a theory of periodicity; but nearly all the theories have been given up as contrary to extended experience. If there be such a thing as a drought period at all, it must be one of great length—probably one of between fifty and sixty years." There are separate chapters on the flora, fauna, and geology.

Mr. Murray's book is mainly geological, but there is much in it which the geographer will find useful. It may be accepted as an authoritative and trustworthy treatise on the geology of Victoria.

## OCEANIA.

**Churchward, William B.**—My Consulate in Samoa: a Record of Four Years Sojourn in the Navigators Islands; with Personal Experiences of King Malietoa Laupepa, his Country, and his Men. London, R. Bentley and Son, 1887; 8vo., pp. xii. and 403. Price 15s. [Presented by the Publishers.]

This volume does not in any way pretend to be scientific, being simply a record of actual experiences during a four years' official residence amongst the Samoans. Much useful information is given regarding the Samoan Islands, the author devoting a separate chapter to a description of the whole group. He has also much to tell us about the people themselves—their character, manners and customs, sports, and the results which have followed the introduction of Christianity. Mr. Churchward also narrates many incidents which happened during his consulate, which help to make the book an interesting one. The addition of an index and a map would have added greatly to its value.

## GENERAL.

**A Manual of Scientific Enquiry**; prepared for the use of Officers in Her Majesty's Navy and Travellers in general. Originally edited by Sir John F. W. Herschel, Bart. Fifth edition. Edited by Sir Robert S. Ball, LL.D., F.R.S., Royal Astronomer of Ireland. London, Eyre & Spottiswoode, 1886: sm. 8vo., pp. xii. and 450 charts. Price 2s. 6d. [Presented by the Hydrographer of the Admiralty.]

In this edition many of the articles have been entirely re-written. The following is a list of the contents of the work:—I. Astronomy, by Sir G. B. Airy, K.C.B., F.R.S.; II. Hydrography, by Captain W. J. L. Wharton, R.N., F.R.S., Hydrographer of the Admiralty; III. Tides, by Prof. George H. Darwin, LL.D., F.R.S.; IV. Terrestrial Magnetism, by Prof. George F. Fitzgerald, F.R.S., assisted by Staff-Commander Creak, R.N., F.R.S., and G. M. Whipple, Esq., B.Sc.; V. Meteorology, by Robert H. Scott, Esq., F.R.S.; VI. Geography, by Gen. Sir Henry Lefroy, B.A., F.R.S., F.R.G.S.; VII. Anthropology, by Edward B. Tylor, Esq., D.C.L., F.R.S.; VIII. Statistics, by Prof. C. F. Bastable, M.A.; IX. Medical Statistics, by William Aitken, Esq., M.D., F.R.S.; X. Geology, by Prof. Archibald Geikie, F.R.S.; XI. Mineralogy, by Prof. W. J. Sollas, D.Sc.; XII. Seismology, by Thomas Gray, Esq., B.Sc., F.R.S.E.; XIII. Zoology, by Prof. H. N. Moseley, F.R.S.; XIV. Botany, by Sir J. D. Hooker, K.C.S.L., F.R.S.

**Berlin, Dorothea.**—Erinnerungen an Gustav Nachtigal. Berlin, Paetel, 1887: 8vo., pp. vii. and 232. Price 5s. (*Dulau.*)

This little volume consists mainly of extracts from the late Dr. Nachtigal's private correspondence. Besides containing interesting notes on the incidents of his African journeys, they bring out, as Frau Berlin intended, the leading features of the man's noble character.

**Jolly, William.**—The Realistic Teaching of Geography. London, Blackie & Son: 8vo., pp. vi. and 56. Price 1s. [Presented by the Publisher.]

Mr. Jolly, one of Her Majesty's Inspectors, and himself an old and eminently successful teacher, has here given many hints that ought to be of real service in the teaching of elementary geography. There is nothing particularly new, but Mr. Jolly has arranged his hints methodically and expressed them clearly and vigorously. In making use of the simple arrangements for the realistic teaching of geography which he suggests, the teacher should be on his guard not to convey erroneous ideas to young pupils. In building up features with sand or clay, e.g., take care that the pupil does not get the idea that nature builds after the fashion of the teacher. We should think also that much caution must be observed in using toy houses, horses, carriages, and similar things to illustrate the work of man on the face of the earth. But any method, however perfect, is liable to abuse, if the teacher is not master of his subject and is devoid of common sense.



**Lucas, C. P.**—Introduction to an Historical Geography of the British Colonies. Oxford, Clarendon Press: 1887, 8vo., pp. xii. and 142. Price 4s. 6d. [Presented by the Publishers.]

This is the first volume of what ought to be a useful work. The succeeding volumes, the author tells us, will be more purely geographical than the present, and will deal with the separate divisions of the empire. Mr. Lucas's position in the Colonial Office gives him exceptional opportunities of obtaining certain kinds of information. In the present volume he discusses certain preliminary questions of much interest. In his first chapter he tries to settle what a colony really is. The second chapter deals with motives for colonisation, which he thinks are four—love of adventure, desire of wealth, political and social discontent, and religion. In the following chapter Mr. Lucas deals with the subjects of climate and race; modes of colonising and kinds of colonies; nations which have colonised, ancient and modern; English colonisation; and changes in the English colonies during the 19th century. The volume contains eight page maps.

**Murray, Kenric B.**—Commercial Geography, considered especially in its relation to New Markets and Fields of Production for British Trade. London, Thomas C. Jack, [1887]: 8vo., pp. viii. and 298. Price 2s. 6d.

This is not a text-book of commercial geography, but rather, as its secondary title indicates, a collection of statistics and other data bearing on undeveloped fields for British commerce. Mr. Murray very strangely maintains that commercial geography has nothing to do with old-established States, but only with uncivilised or recently settled countries. This appears a very narrow view to take of the field of commercial geography, which, by the bye, can hardly be termed a "science." All Europe is included and the United States, while considerable space is devoted to our colonies. So far as it goes, the book is a useful collection of facts.

**Naumann, [Dr.] Edmund.**—Die Erscheinungen des Erdmagnetismus in ihrer Abhängigkeit vom Bau der Erdrinde. Stuttgart, Ferdinand Enke, 1887: 8vo., pp. 78. [Presented by the Author.]

**Nursingrow, A. V.**—G. V. Juggarow Observatory, Daba Gardens, Vizagapatam. Results of Meteorological Observations, 1886. With an Introduction containing Astronomical Observations and the Explanation of the Reported Results. Calcutta, Thacker, Spink & Co., 1887: 12mo., pp. 167, plates. [Presented by the Author.]

**Penck, [Dr.] Albrecht.**—Ueber Denudation der Erdoberfläche.—Die alte Rheingletscher auf den Alpenvorlande.—Der Ausbruch des Tarawera und Rotomahana auf Neu-Seeland.—Die Höttinger Breccie.—Bericht über eine gemeinsame Excursion in den Böhmerwald. [Presented by the Author.]

The first of these pamphlets by one of the most eminent of the younger geographers of Germany, is a lecture delivered to the Vienna Society for the Advancement of Scientific Knowledge. It is an instructive and suggestive summary of facts bearing on the very important geographical subject of denudation. The other pamphlets are reprints of papers, mostly short, from various serials, and are mostly of a geological character.

**Reade, T. Mellard.**—The Origin of Mountain Ranges, considered experimentally, structurally, dynamically, and in relation to their geological history. London, Taylor and Francis, 1886: 8vo., pp. xviii. and 359. Price 21s.

Mr. Mellard Reade has done service in keeping alive a discussion on the origin and formation of mountains. Few, we should think, are likely to accept his theory, and for the geographer, the chief value of his work will be the vast amount of information he has collected bearing on these most important features of the earth's surface. What Mr. Reade's theory is, may be stated nearly in his own words. Mountain ranges, according to him, are ridgings up of the earth's crust, which take place only in areas of great sedimentation. The inciting

cause of the various horizontal and vertical strains ending in the birth of a mountain range, is the rise of the isotherms and consequent increase of temperature of the new sedimentaries, and that portion of the old crust that they underlie. The rise of isotherms, the direct result of sedimentation, by a series of reactions detailed in the body of the work, evidently, in Mr. Reade's conception, produces an accumulated temperature much in excess of its normal effect. The rise of temperature, Mr. Reade tells us, exerts a tendency to expand the new sedimentaries in every direction, in proportion to their extent and mass. The tendency to expand horizontally is checked by the mass of the earth's crust bounding the locally heated area. The expanding mass is therefore forced to expend its energies within itself; hence arise those foldings of lengthening strata, repacking of beds, reversed faults, ridging up and elevating movements which occur in varied forms, according to the conditions present in each case.

In other words, Mr. Reade tells us, all the phenomena of mountain-building are the result of local variations in temperature of the earth's crust, caused by the reaction of surface influences on the heated interior. Every rise of temperature, whatever its amount, in the locus of a mountain-chain tends to elevation and permanent ridging up by a lateral displacement of materials. Every fall of temperature produces a proportionate vertical subsidence of the surface over the district affected, but as the materials laterally ridged up in mountain ranges by expansion cannot be drawn back again during contraction, there remains a permanent total of uplift in the range with every rise of temperature, that can only be removed by atmospheric denudation. In this way mountain ranges become permanent features of the earth's surface, notwithstanding the vicissitudes of the larger areal subsidences and elevations that take place, and the subsidences due to faulting. Such is Mr. Reade's theory of mountain-building, criticism of which must be left to the geologists and the physicists.

Soundings taken by the India Rubber, Gutta Percha, and Telegraph Works Company, Limited. 1885-1887. Havana—Key West Expedition, 1885. Second West African Expedition, 1885 and 1886. Havana—Key West Expedition, 1886. Congo Repairs Expedition, 1887. 8vo., pp. 23. [Presented by the India Rubber, Gutta Percha, and Telegraph Works Company, Limited.]

[**Universal Geography.**]—Unser Wissen von der Erde. Allgemeine Erdkunde und Länderkunde, herausgegeben unter fachmännischer Mitwirkung von Alfred Kirchhoff. Erster Band: Allgemeine Erdkunde von Dr. F. Hann, Dr. F. von Hochstetten und Dr. A. Pokorný. Leipzig, Freytag, 1886: imp. 8vo., pp. xxii. and 985. Price 45s.

Länderkunde von Erdteils Europa, herausgegeben unter fachmännischer Mitwirkung von Alfred Kirchhoff. In 2 Teilen. Erster Teil, erste Hälfte: Europa im allgemeinen von Prof. Dr. A. Kirchhoff.—Physikalische Skizze von Mittel-Europa, von Prof. Dr. A. Penck.—Das Deutsche Reich, von Prof. Dr. A. Penck. Leipzig, Freytag, 1887: imp. 8vo., pp. x. and 618. [Presented by the Publisher.]

These are the first two volumes of a great work, well begun. One naturally compares it at first with Reclus' well-known 'Géographie Universelle,' and indeed Prof. Kirchhoff, the editor of the whole, in the preface makes the comparison himself. It is not intended, however, according to the preface, to make this German work so extensive as the French one, but so far as we can judge from the volumes before us, and from the space which will be devoted to Europe, there is not likely to be much difference in extent. The apparent difference between these two publications is that while M. Reclus is entirely responsible for his work, that edited by Professor Kirchhoff will be the production of a number of specialists. At the same time, it should be remembered that in each section of his work M. Reclus has also the aid of men who have special knowledge of the particular regions dealt with. While M. Reclus is above all descriptive, it seems to us from these two volumes that Professor Kirchhoff and his colleagues promise to be markedly scientific, while by no means neglecting description.

They will include both *Länderkunde* and *Erdbeschreibung*. This is especially seen in the second volume, devoted mostly to Germany, and written by Professor Penck of Vienna, who justly enjoys among his colleagues a high reputation as a scientific geographer. He constantly seeks to discover the relations which exist between physical conditions and human development. This will be seen, for instance, in his treatment of some of the old towns of Southern Germany, whose position and growth have many of them been determined by physical conditions; in the case of some, it must be admitted, their eminence was due to other circumstances as well, but the geographical position must first of all be favourable.

The first volume of this series may be regarded as introductory, somewhat analogous to Reclus' 'The Earth' and 'The Ocean.' It is, indeed, an elaborate treatise on physical geography, in which the separate sciences on which that department of geography is based receive detailed treatment. The work, it should be remembered, is not meant for geographical specialists, but rather for the educated public, the teacher, and the student; hence there is some excuse for devoting so much space to geology and biology, a fair knowledge of which, it must be admitted, is essential to the thoroughgoing student of geography.

The first part of the general volume deals with Astronomical and Physical Geography, by Dr. Hann, the well-known Austrian meteorologist. This includes sections on the earth as a planet, terrestrial magnetism, the atmosphere, and the hydrosphere. Thus it will be seen that "physical geography" is used here in a somewhat narrow sense, and really ought to include a considerable portion of what follows. The second part, for example, deals with the solid crust in its composition, its structure and its growth, by the late Dr. F. von Hochstetter. This includes sections on physiography, petrography, and tectonics, temperature of the crust and the interior, dynamical geology or the forces at work to modify the surface, and historical geology or stratigraphy and palæontology. The third part, by Dr. Alois Pokorný, deals with biological geography or the earth as the dwelling-place of organic life. Thus, as we have said, this first volume is rather a series of separate treatises on the sciences related to geography than a connected geographical whole. From a purely geographical point of view the second volume seems to us more satisfactory than the first. After an introduction of eighty pages by Professor Kirchhoff, giving a very clear account of Europe in general, Professor Penck follows with a physical sketch of Central Europe, in which he traces its development during the three great geological periods—Palæozoic, Mesozoic, and Cainozoic; followed by sections on the evolution of its climate, on the glacial period, and on the introduction of man into Europe. Dr. Penck insists, and rightly, that a sharp line must be drawn between Central Europe and Mediterranean Europe, in accordance with the evolution of the two regions. The former owes its present physiognomy to the "transgression" of the ocean, the latter to the ingression of the sea, and their present condition is only one phase in a process of evolution still at work, the end of which cannot be foreseen, since its origin is unknown. These two sections occupy only 110 pages, the rest of the 600 pages being devoted to Germany. Professor Penck's method and principles of treatment may be learnt from the headings of his various chapters. The first chapter deals with the physical geography of the northern face of the Alps and the neighbouring tableland from which it springs. The two succeeding chapters deal with the formation and structure of the German Alpine borderland and its anthropogeography. Three chapters are devoted to the physical geography, the formation, and the anthropogeography of the south-western region of Germany. After the same manner Professor Penck successively treats of the Central German mountain region or hilly tableland, the northern circumvallation of Bohemia, and the North German plain. The volume concludes with a brief view of the empire as a whole. The volumes abound with the most beautiful and appropriate illustrations, diagrams, and maps. The picture, however, at p. 277, is an unfortunate misrepresentation of the island of Staffa.

## NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

## EUROPE.

**Berlin und Potsdam.**—Spezialkarte der Umgegend von —. Scale 1:6,000 or 12·2 inches to a geographical mile. Jul. Straube. Nebst alphabetische Namens-Verzeichniss. Berlin, Straube. Price 2s. (*Dulau.*)

**Europäische Orient.**—Der —. Scale 1:1,200,000 or 16·4 geographical miles to an inch. Nach den neuesten Quellen bearbeitet und herausgegeben vom k. k. militär geographischen Institute in Wien, 1887. 4 sheets. Price 7s. 6d. (*Dulau.*)

This is a very neatly executed map of the Balkan Peninsula and Grecian archipelago. The heights, which are given in metres, are also indicated by different shades of drab, varying with each 500 metres, except in the lower altitudes and places which are at, or below, sea-level. In addition to the explanation of the signs and symbols used in the construction of the map, a table is given containing explanatory notes with reference to the abbreviations of names and their signification in German.

**Le Havre et ses Environs,** par L. Leblanc. Nouveau plan de 1887. Le Havre. Price 1s. (*Dulau.*)

**Mittel und Südbayern, Nordtyrol, Salzburg.**—Reliefkarte von —, nebst den angrenzenden Gebieten. Scale 1:500,000 or 6·8 geographical miles to an inch. Augsburg, Lampart's Alpiner Verlag. Price 5s. (*Dulau.*)

**München.**—Neuesten Plan von —. Scale 1:10,000 or 7·2 inches to a geographical mile, von Jul. Straube. Nebst Verzeichniss der Strassen und Plätze. München, Mey and Widmayer. Price 1s. (*Dulau.*)

**Oesterreich-Ungarn.**—Verkehrskarte von — und den angrenzenden Ländern von Russland und der europäischen Türkei. Scale 1:250,000 or 17·1 geographical miles to an inch. Nach amtliche Quellen bearbeitet. 6 sheets. Berlin, Berliner Lithographischen Institut. Price 5s. (*Dulau.*)

**Sachsen.**—Geologischen Spezialkarte der Königreich —. Scale 1:25,000 or 2·9 inches to a geographical mile. Herausgegeben vom Finanz-Ministerium. Bearbeitet unter der Leitung von Hermann Credner. Sect. 142, mit Erläuterungen enthaltend Plauen-Oelsnitz. Geologische Aufnahme von E. Weise und Th. Liebe. Die Erzgänge von H. Müller. Leipzig, Engelmann. Price 3s. (*Dulau.*)

**Schweiz.**—Reisekarte der —, von H. Keller. Scale 1:400,000 or 5·5 geographical miles to an inch. Zürich, Heinrich Keller's Geograph. Verlag. Price 6s. folded and mounted. (*Dulau.*)

## ORDNANCE SURVEY MAPS.

Publications issued during the month of August 1887.

## 1-inch—General Maps:—

ENGLAND AND WALES: New Series. Nos. 107 (outline), 110 (outline), 1s. each.

## 6-inch—County Maps:—

ENGLAND AND WALES: Bedfordshire: 22 S.E., 27 S.W., 30 N.W.; 1s. each. Cambridge-shire: 5 S.W., 29 S.W.; 1s. each. Devonshire: 13 S.E.; 1s. Dorsetshire: 5 S.E., 24 S.E., 33 S.E.; 1s. each. Gloucestershire: 54 S.W.; 1s. Lincolnshire: 38 S.E., 73 N.W., N.E., 142 S.E., 144 N.W., 146 S.W., 147 N.E.; 1s. each. Merionethshire: 6 S.W.; 1s. Norfolk: 52 N.W.; 1s. Somersetshire: 83 S.E.; 1s. Staffordshire: 31 N.E., 65 S.W., 74 N.W.; 1s. each. Warwickshire: 5 S.W., 21 N.W., S.W.; 1s. each. Wiltshire: 23; 2s. 6d. Worcestershire: 8 N.W.; 1s.

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**AFRICA.**

**Afrika.**—Special-Karte von — im Massstab von 1 : 4,000,000 or 1/55.5 geographical miles to an inch. (10 Blatt.) Entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. Zweite Auflage. III. Lieferung. Inhalt: Sektion West-Sudan (4) nebst Bemerkungen von B. Domann. Sektion Capland (9) nebst Bemerkungen von Dr. R. Lüddecke. Gotha, Justus Perthes, 1887. Price 3s. (*Dulau.*)

In this issue there will be found numerous corrections and additions, of which the most important are the following:—On sheet 4 the boundaries of the French possessions in Senegambia and Foulah have been considerably extended to the south. The boundary of the Portuguese possessions has been changed so that they are laid down as including all the territory between Cape Roxo and the left bank of the Cassini river, while they reach inland to 13° 45' west longitude. The boundary of the Sierra Leone Government is shifted to the Jong river, and British possessions on the Gold Coast are drawn as reaching to the Assini, and including the Sahwi territory. The Niger Co.'s territory extends much farther up the river, and is marked as terminating at Say. On sheet 9 the most noticeable alteration is in the boundary of the German possessions in South Africa, which are now laid down as extending right across the continent to the Zambesi, and have been moved from Cape Frio to the Cunene river, thus including a farther extent of territory about seventy geographical miles wide.

— Geologische Skizze von —. Von Dr. G. Gurich. Scale 1 : 45,000,000 or 10 degrees to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Tafel 13. Justus Perthes, Gotha. (*Dulau.*)

**Fernando Póo.**—Karte der Insel —. Nach eigenen Aufnahmen konstruiert und gezeichnet von Oscar Baumann, Mitglied der Prof. Dr. Lenz'schen Expedition nach Aequatorialafrika 1885–87. Scale 1 : 200,000 or 2.7 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Tafel 14. Justus Perthes, Gotha. (*Dulau.*)

**Madagaskara.**—Sarin-Taniny —. Natonta Fanintelony. F. F. M. A. Antananarivo, 1887. Scale 1 : 1,700,000 or 26.9 geographical miles to an inch. Nalainy Wm. Johnson tany ny nataon'ny Mpizaha-tany maro, sady nampiany no nahitsing. On rollers, varnished.

On comparing this map with one published by the same author ten years ago, some idea may be formed of the progress made in our knowledge of the

geography of Madagascar since that time; this is especially noticeable in all the central districts of the island. The map has been lithographed at the Friends Mission Press, Antananarivo, and is in all respects a most creditable production.

**Zaire.**—Embocadura do ——. Reconhecimento Hydrographico para lançamento do cabo submarino 1886. Scale 1 : 750,000 or 10·3 geographical miles to an inch. Comissões de Cartographia. Lisboa, 1887. (*Dulau.*)

## AMERICA.

**British Columbia.**—Indexed Map of —, with a new and original compilation and Index. Scale 1 : 2,400,000 or 32·8 geographical miles to an inch. Rand, McNally & Co. Chicago. (*Trübner.*)

**United States.**—Indexed County and Township Pocket Map and Shippers' Guide of **Arkansas.** Scale 1 : 1,300,000 or 17·8 geographical miles to an inch.

Ditto, ditto. **Colorado.** Scale 1 : 1,480,000 or 20·2 geographical miles to an inch.

Indexed County and Railroad Pocket Map and Shippers' Guide of **Connecticut.** Scale 1 : 560,000 or 7·6 geographical miles to an inch.

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Indexed County and Railroad Pocket Map and Shippers' Guide of **Georgia.** Scale 1 : 1,365,000 or 18·7 geographical miles to an inch.

Official Map of the **Indian Territory.** Scale 1 : 750,000 or 10·2 geographical miles to an inch.

Indexed County and Railroad Pocket Map and Shippers' Guide of **Kentucky.** Scale 1 : 1,500,000 or 20·4 geographical miles to an inch.

Indexed County and Township Pocket Map and Shippers' Guide of **Louisiana.** Scale 1 : 1,500,000 or 20·4 geographical miles to an inch.

Ditto, ditto. **New Hampshire.** Scale 1 : 590,000 or 8 geographical miles to an inch.

Indexed County, Township and Sectional Pocket Map and Shippers' Guide of **Ohio.** Scale 1 : 635,000 or 8·7 geographical miles to an inch.

Indexed County and Railroad Pocket Map and Shippers' Guide of **South Carolina.** Scale 1 : 2,000,000 or 27 geographical miles to an inch.

Indexed County and Township Pocket Map and Shippers' Guide of **Utah.** Scale 1 : 1,430,000 or 19·6 geographical miles to an inch.

Ditto, ditto. **Wyoming.** Scale 1 : 1,120,000 or 15·3 geographical miles to an inch. Published by Rand, McNally & Co. Chicago. (*Trübner.*)

These all belong to Rand, McNally & Co.'s series of tourists' maps; they each contain a copious index, with reference letters and numbers, by which the position of any place on the map is easily found. Being handy in size and clearly lettered, they are very well suited to the purpose for which they are published.

## ATLASES.

**Berghaus' Physikalischer Atlas** (begründet 1836 von Heinrich Berghaus).—75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Berghaus. Elfte Lieferung, Inhalt: Nr. 33, Isobaren im Januar. 44, Florenreiche. 73, Amerika um 1880. Titel und Vorbemerkungen zum Atlas der Pflanzenverbreitung. Zwölfte Lieferung, Inhalt:

Nr. 2, Tiefländer. 34, Isobaren im Juli. 58, Käfer. Titel und Vorbemerkungen zum Atlas der Meteorologie. Gotha, Justus Perthes, 1887. Price 3s. each part. (*Dulau.*)

Sheet No. 33 contains a Mercator's projection of the World, on which is laid down isobars, and arrows indicating the direction of prevailing winds throughout the world during the month of January; and three smaller inset meteorological maps, one showing the isobars in Europe, on an enlarged scale, in January, another exhibiting those of the North Polar region, also on a larger scale, during the same month, and a third the mean lowest readings of the world, drawn on a greatly reduced scale. Sheet No. 44 contains a set of botanical maps, exhibiting the regions of the different flora of the world; they are drawn on Lambert's projection. On sheet No. 73 is shown the distribution of races in North and South America in 1880. These are most interesting maps, but the number of shades of colour and the numerous symbols which it has been found necessary to employ are somewhat confusing. Sheet No. 2 shows the depressions below sea-level. Sheet No. 34 is a set of meteorological maps for July, in which the scheme of production corresponds to that already described with reference to Map No. 33. Sheet 58 contains six maps, showing the distribution of genera of Coleoptera throughout the world.

**Ireland.**—Pocket Atlas of —. By J. Bartholomew, F.R.G.S. With Index and Geographical Statistical Notes. London, John Walker & Co., 1887. Price 1s.

**Schweiz.**—Topographischer Atlas der Schweiz im Masstab der Original-Aufnahmen nach dem Bundesgesetz vom 18. Dezember 1868, durch das eidgenössische Statsbüreau unter der Direktion von Oberst Siegfried veröffentlicht. XXXI. Lieferung (1:25,000). Nr. 80, Heiden. 169, Triengen. 170, Meisterschwanden. 172, Reinach. 173, Merenschwand. 188, Sempach. 191, Zug. 193, Aegeri. 271, Balgach. 272, Oberriet. 285, Concise. XXX. Lieferung. (1:25,000) Rheinfelden. 171, Muri. 179, Melchnau. 181, Huttwil. 224, Appenzell. 237, Stockberg. 255, Buchs. 267, Mels. 268, Sargans. 270, Ragaz. 346, Farvagny. 385, Schwarzenegg. Bern, Schmid, Francke & Cie. (vormals Buchhandlung Dalp, Bahnhofplatz). Price 12s. 6d. each part. (*Dulau.*)

**Uncrowded Atlas of Political Geography.**—The — being an atlas specially prepared for school use, and which gives in each map only the geographical information scholars should possess, and no more. By T. Ruddiman Johnston, F.R.G.S. Containing twenty-four maps and astronomical diagrams. London, Ruddiman Johnston & Co., Limited. Price 1s.

In this atlas all mountain ranges are represented by black lines, and the maps contain so few names that in some cases they are little more than skeletons. The author does not seem to have grasped the difference there is between an overcrowded map and one which, while containing nothing unnecessary, shall at the same time convey to the mind of the scholar a correct notion of the general physical features of the country, the positions of centres of manufacture, and the chief towns of counties or departments. This cannot be done by indicating a tableland or wide range of hills by a black line, which can only tend to give a child a very erroneous idea of the country.



Edw. Walker, Lith.





PROCEEDINGS  
OF THE  
ROYAL GEOGRAPHICAL SOCIETY  
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*Notes on a Sketch Map of two Routes in the Eastern Desert of Egypt.*

By ERNEST A. FLOYER, F.L.S.

Map, p. 730.

THERE is in the region under description much that differs widely from the Egypt of the ordinary traveller. It is a district of lofty mountains, of valleys wrapped in snow, of keen morning mists, of waterfalls springing from ambushes of tall reeds, of crystal pools mirroring the stately heads of ibex, and of grottoes hid in maidenhair fern. These things seem strange in the land of dull mud flats, the featureless and woodless land, where an evil-smelling temple is substituted for a hill, and the "forests" of dates supply food to a kind-hearted but eminently prosaic population.

The roughly oblong stretch of country of which the top corners are Cairo and Suez, and which stretches down between the Nile and the Red Sea to Assuan and Berenice, which are the bottom corners, presents the same general characteristic throughout. It is a mountainous desert, 150 miles broad, rising slowly from the Nile over sandy wastes and secondary hills for about a hundred miles, where the elevation is 2000 feet. Down the centre runs a main range or backbone of granite and primary rocks. From this the desert slopes more steeply and more evenly to the sea, over shingly plains and sometimes low secondary and tertiary ranges to the coral of the sea-coast. The eastern side of the watershed is, as might be guessed, more often blessed with rain than the western. On the seaward side during the winter months heavy clouds hang round the summits, until with thunder and violent winds they pour in torrents down the barren mountain clefts, and fill the granite dells and basins with an ample supply for the scanty flocks during the summer. The western side remains for the most part a hot, dry, scorched-up, sunny waste. Always the same. One wishes for no twilight after a long day's ride from the Nile banks to the foot of the mountains, but is content with the almost sudden darkness after sunset, which is one of the great points of difference between an English and

an Egyptian day. The rain-clouds which burst on the lofty granite summits are not, however, entirely restricted to the seaward side. The Nile side has its picturesque ravines, its tree-sprinkled nullahs, its waterfalls and granite basins. But the seaward side is steeper and stonier, and the gullies show a deeper erosion, and a wilder commotion among the water-worn boulders, than the sand-choked wadies which wind their ribbon of stunted mimosas down to the Nile.

Wilkinson has described many of its antiquities, while its modern aspect has been treated by Herr Klunzinger, and my friend Professor Schweinfurth has laid out the country in wadies or torrent-beds, one of which he explores whenever he can spare time from his other multifarious pursuits. This system of marching up the various wadies is the only system by which the country can be practically explored. So fantastically rugged and chaotic are the mountains of the main range that you can only follow where water shows you the way. And the traveller will not long forget that water leaps down a precipice which gives him considerable trouble to climb up.

The Bedawin inhabitants are to the north the Ma'āza tribe, who live in goat's-hair tents, and despise the comparatively civilised Ababdi who live south of a line drawn east from Kenneh, and who occasionally build themselves huts of mats.

The prominent features of a Bedawi are courage, endurance, and avarice. Avarice is the quality most deeply engrained, but it is not a reproach to them. It is simply self-preservation. I should say that the Ma'āza have a harder struggle for existence than the Ababdi, and cling to their view of a money transaction with proportionately greater tenacity. The former speak a singularly pure Arabic, and their articulation is beautiful. Some of the Arabic plurals of tribal names are curious. An Abādi is one of the Ababdi tribe; a Hendua is one of the Hadendowa tribe. The Ababdi are perhaps the pleasanter tribe to deal with, but all Bedawin are tough parties in a money transaction. The relations between the tribes and the Government are for the most part tranquil. The local governor of a Nile town requires a Bedawi sheikh to live in his town. This man is nominally responsible for the behaviour of his tribe, while in return all camel contracts are made through him. Define this position as a hostage, agent, political resident—gild the pill how you will—no self-respecting Bedawi will live in a town or associate with its governor. The man sent by the tribe is generally some old man, in whose character there is a flaw.

If one reflects on the conditions of Bedawi existence, it is obvious that the highest conceivable standard of honesty is a first and absolute essential.

A Bedawi is not generally supposed to have much property, but he is distinctly a property-owning creature. His gun and his camel-saddle he keeps with him; but in nine cases out of ten his wife would take care

that he did not have a very expensive gun, until she had got at least a cooking-pot and a flat metal baking-platter.

A Bedawi leaves his women, children, and property for months at a time; when his camels are grazing he takes off their saddles and puts them under a bush; he deposits a bag of beans by the way, for his camel to eat on the return journey. If these things were impossible, he could not carry on his struggle for existence. A thief is only possible where there are locks and bars. There are always weaker vessels who in an unguarded moment "find" a camel rein, and such people gravitate towards the river bank. This class supplies the resident agents, and it may be readily imagined that so long as the governor could draw money to suppress Bedawin raids, so long were the dreadful Bedawin spoken of with bated breath, and their numbers and fierceness ludicrously exaggerated.

Public security is not, however, dependent on the Bedawin since Baker Pasha and his police took up their duties in Upper Egypt.

The young men of both the Ma'aza and Ababdi wear their hair in the fuzzy fashion rendered familiar during the Suakin campaign, but it is always under some special circumstances, and usually a white scanty turban is worn by young and old.

It seems probable that the Eastern desert was the scene of the establishment of the first monasteries in the world. Those of St. Anthony and St. Paul are still visited by travellers. They are about 9 miles apart, and about 17 from the coast in latitude 29°, while in the two routes which I shall more particularly describe are found the remains of others, which, so far as I have been able to investigate, date from the fourth or fifth century of the Christian era.

The part of the country, however, which has the most ancient record is the old trade route between Kosseir, on the Red Sea, and Koptos (modern Kufi), on the Nile.

This road, which two thousand years ago carried almost the whole traffic between the East and West (between Rome and India), has very great natural advantages. Sooner than sail the long voyage up to Suez, Sir David Baird marched across it in July 1801, and only lost 3 men out of, so far as I can read, 5000, of which 700 were English. He dug two wells, but his expedition nearly failed through the rottenness of his waterskins, than which there is no more futile vehicle for water.

Later on, in 1839, the Peninsular and Oriental Steam Navigation Company carried their passengers and mails across from Kenneh to Kosseir. In a diary of an ancestor in India, I find him in 1826 praising the rapidity with which letters had arrived by this new route. The company rebuilt some of the wells, and over the entrance to the Sayala well is a well-cut inscription as follows:—"M. R. BRIGGS. W. I. HANCOCK. THO. WOOD. May 25, 1839." I think these are evidently the names of masons employed. The route from Kosseir to Kenneh, 111 miles long,

divides into two roads, called respectively the Russafa and the Sikka road (Baird's road); but from all I can learn, a description of the Russafa road will serve for both.

It was in February 1886 that, on my return from Suakin, I landed at Kosseir. The population of 2500 were much astonished at the near approach of a large English steamer, a sight which had not been seen since 1864, when an enterprising cable company laid short lengths of cable down the Red Sea, and built a temporary station at Kosseir. Numerous flags were hoisted, and almost the whole population came to the shore to meet me. I installed myself in the large Government house, where the governor was most hospitable, though he was such a small, aged, and inconsequential little man that he really appeared to have been accidentally discovered by my servants while dusting out a room for me to sleep in. From the appearance of the house, I never for a moment supposed it was inhabited, and ordered my people to sweep it out for me, under the impression that it had not been occupied for a hundred years or so. But we were neither of us greatly disconcerted, and after coffee we explored his town together.

Although the water-supply is brought from a distance of ten hours, we found a busy little town, and new houses were in course of construction from the coarse soft coral which forms the coast, while the huge empty granaries were memorials of the time when the Egyptian tribute was paid in grain to the Turkish soldiers in Arabia, and was shipped hence in native boats to Jeddah and Yambo, on the opposite coast. The fort was built by Belliard and Donzeld, and in 1800 played havoc with a detachment of marines from H.M.S. *Fox*, who appear to have landed in ignorance of its existence, and were cut to pieces. It contains a curious relic of the French occupation in a mortar dated "Messidor de l'an 3 de la République Française."

I think the repaired well, with its homely and rather cockney inscription, is characteristic of the plain and practical impress England leaves upon a country. If we were to leave Egypt to-morrow we should leave the *corvée* abolished, a measure which makes no show, but which is of as unmixed a benefit in its results as even the abolition of slavery, the great object which the Khedive of Egypt is slowly but surely attaining.

Kosseir is situated on the northern bank of the broad water-course, or Khor Ambagi. During rain this brings down a heavy flood of sweet water, which, however, all runs into the sea. And on this point Klunzinger has a theory, which I mention that it may receive fuller investigation. He thinks that the ancient ports on the Red Sea were all opposite mouths of similar water-courses, and that the harbours were formed by the sweet water killing the coral, and thus forming a break in the reef, which otherwise ran in a continuous line along the coast.

A mile to the south-west, in the main bed of the river, is a small garden with twelve date-trees in it, but beyond this there is no vegeta-

tion but sea-weed, and how the 200 goats which exist are maintained is a puzzle.

One day sufficed to exhaust the sights of Kosseir, though Klunzinger spent eight happy years among the fishes, sea-weeds, the rocks, and sparse flora of the neighbourhood. Six picked camels were waiting for me, and the next morning I started off, full of the pleasurable excitement of a new route.

We started up the Khor Ambagi, and soon entered into the mountains. This is an excessively barren part of the world, and in seventy miles I only saw two species of plants, neither of which were camel fodder, and all of which were burnt to tinder; for it was four years, the natives said, since any rain had fallen. But the most striking feature is the goodness of the road through the mountains. The idea is constantly suggested that it is artificial, though a closer examination dispels this; and Strabo and other ancient writers mention the road as an ordinary desert track. I can convey the best idea of it by describing something else.

A horseman travelling in middle Egypt in the hot weather, finds the narrow donkey-paths winding between the fields very irksome to his horse. The surface of the fields themselves is baked into deep crevasses, making them dangerous to ride over, so that short cuts cannot be made. The banks which control the inundation wind about so much as to sometimes nearly double the distance from point to point. He is glad therefore when he finds a canal which has just been cleaned out and which runs in the direction he is travelling. He descends into the bed and finds himself in a perfectly level road, perhaps 100 feet wide, the edges accurately cut, while on either side is a miniature mountain-range formed by the banks of the canal, and the loose earth which has recently been dug from the bed.

Petrify this dry canal into granite, substitute a gradual incline for a dead level, make it wind slightly instead of running straight, and you have an exact reproduction on a small scale of the seventy-mile mountainous portion of the Bussafa route. One is tempted to describe it as smooth and well kept. The western forty miles stretches over a fairly hard shingly plain, diversified with low undulating ridges; and with the exception of two rather steep defiles, each of 200 yards, an omnibus—indeed many omnibuses abreast—might trot the whole distance from the Nile to the Red Sea.

There is little to be seen that is not properly transferred to the itinerary. Down in a trough you rarely see far to the right or left. A glimpse now and then shows you nothing but hills, from which, if you try to select one as a landmark, you will be hidden by the next turn in the valley.

One can keep up an even four miles an hour over the smooth road, and the compass and road-book are always busy. In the evening, as

dusk approaches, rocks assume fantastic shapes, and shadows seem to move. Then from the storehouse of your mind, you may people the valley with the varied crowds, which, thousands of times, have filled its rocky windings. It may be an endless chain of silent-footed camels, each carrying his two goat's-hair sacks of wheat straddled upright across his back. These plod past with a resistless and monotonous swing, and you wonder how the ten or twelve wiry little men can possibly look after the five or six hundred camels. But a caravan of wheat requires but little attention. When they halt, the camel kneels, the toggles which fasten the bales are unslipped, and the camel walks away. To load up, the camel is made to kneel between the sacks; one is raised slightly by two men, the toggle is slipped in, and the camel rises with his load, and wanders off after those who have already started. It is with European miscellaneous baggage and over an uneven road which causes the packages to shift, that camel-loading is a tedious operation.

What did a caravan along the Russafa route two thousand years ago look like? The sun, the rocks, the regular valley road are the same. The men are the same. There is no doubt, I think, that the Ababdi, with whom we are riding, are the Blemmyes of Strabo's history. The caravan would be going the other way, the bales being of valuable silks and perfumes would be smaller than the wheat sacks. They would be like the bales which are to-day sent from the silk-loom of Yezd to the sea-coast, long square-sectioned bales, thickly wrapped in many folds of goat's-hair cloth. And instead of six men there would be six hundred, with javelins instead of matchlocks, for each of the bales is worth 40*l*. Sharpe, in his history, says the Egyptians in the time of Hadrian, A.D. 120, sent coarse linen, glass bottles, brazen vessels, brass for money, iron for weapons; while they received ivory, steel, Indian ink, silk, slaves, tortoiseshell, myrrh, and other scents.

At every five or six miles along the valley is the remains of a khan or caravansera. They are much in ruins, but I should think that each would accommodate a hundred camels with their loads and attendants. Thus the road would accommodate a *cafila* of 2000 camels, a stately procession resembling that which leaves Yezd once a year for Bunder Abbass.

Perched on the summits of the hills round each khan are little watch-towers, from which the watchmen announced the approach of a *cafila*, and perhaps, but rarely I should think, a raid by robbers. The surrounding chaos of hills could never have supported a band numerous enough to attack a well-guarded caravan.

In the month of February you face a cool invigorating breeze; you can speak of a bright sun without associations of blistered face and hands; every turn in the valley may disclose something interesting; your camels swing along without urging, and at every mile you rise

into a purer and brisker atmosphere. At forty-one miles you reach the narrow steep defile of Abu Fanána, where the aneroid shows 1900 feet, and whence you slowly descend. You will probably camp for the night at Sid, a fine gorge choked with huge blocks of black and white granite containing a little picturesque nook of sweet water.

From Sid you start down a broad coach-road, and soon enter a fine gorge, called the Mesāgh El Bagar. Here are traces of the Greeks and the Romans, who, there seems little doubt, 2000 years ago worked the quarries which had been abandoned by the Egyptians 3000 years previously. It requires an effort to appreciate the antiquity of things Egyptian. Here the irrepressible tourist has been carving his name and disfiguring the ancient quarries. But the tourists' names are Cambyses, Darius, and Xerxes, and they carved their names 2400 years ago. At Oxford you may see crumbling old carvings which are 150 years old. A sample of the breccia, or pudding-stone, from Hammamat, has been prepared for me by the kindness of my friend, Mr. Brindley, the modern builder of temples.

On leaving Hammamat the road emerges from the mountains, and follows a broad shallow wadi over undulating shingly plains for 28 miles, when you leave it on the left, and halt at a village called El Gaita. This valley is the Wadi Zeidun, which reaches the river near Koptos, and may very likely be the canal to the Nile, on which Strabo says Koptos was situated.

These Ababdi Bedawin are so civilised, that here they have a village of forty brick huts, a few patches of corn and date palms, many brackish wells, and some good ones. El Gaita is a more important place than it seems. It is, in its way, what Burton described Suez as, a jumping-off place from civilisation. It is a good twenty miles away from the edge of the Rif, the general name of the cultivated Nile valley, and has an ample supply of good water. It served as a starting-point for the Kosseir route, and also for the ancient route to Berenice. This last was one of the six great military roads in Egypt, and was well provided with khans and water.

The violent north winds which prevail in the Red Sea made the navigation so difficult and slow for the poor ships of the ancients, that 2200 years ago, Ptolemy Philadelphus established the port of Berenice. This is 200 miles south of the ancient ports at or near Kosseir, and consequently saved that distance and its attendant delays and dangers to the mariners from Southern Arabia and India. I suppose the best camels and the worst ships would choose Berenice, while the best ships and the worst camels would carry the Kosseir traffic. For it is interesting to note that Philadelphus, at the same time that he built Berenice, also rebuilt the old Kosseir port, and Myos Hormos, a third port still higher up the coast, was still kept in repair. In modern days, luxurious steamers, steaming 300 miles a day, compete with Pullman



cars, which go 700 miles a day. In former days it is probable that many a sea-sick traveller, buffeted by contrary winds, joyfully landed at Berenice, and took the twelve days' camel journey sooner than continue in his cramped ship, just as now they disembark at Brindisi instead of Venice.

But there is little of interest left in the Berenice road now, and Captain Colson, who journeyed there in 1878, found little to record but the ruined halting-places and choked wells.

From El Gaita the traveller will probably find the road uninteresting, and he will speed off to the "rif." But, if possible, he should arrange to arrive at the Nile in the evening, and thus enjoy one of the richest visions that ever steeped his senses in delight.

Some people exult in the desert, are inspired by its air, moved to emotion by its rugged mountain solitudes, and stimulated even by the vigour of its absolute sterility. Such men draw pleasure from all things alike—from the bracing tonic of the desert, and from the soft indolence of the Nile valley's wealth of verdure. Others will think of Socrates, as he rubbed his leg, and say, "What is pleasure but release from pain?" And it is true, that though the Englishman is the only man who travels unmoved alike in the hottest and the coldest parts of his planet, still there are many Englishmen whose functions are most perfectly fulfilled in their own island, and who wish neither barren desert nor fertile valley.

Volumes have been written in praise of the Nile valley by those who have reached it in luxurious vessels, which have borne them swiftly from their sylvan homes in the loveliest country in the world. What must be the feelings of him who has spent a month or two on the Red Sea, and then reaches it across the Russafa road?

As you approach from the east you see long cliffs which back the river, and a line of haze marking its course. Still the sandy shingle you are riding over might be at Kosseir for any signs it shows of neighbourhood to the bountiful Nile. At last you rise over the last low ridge—one more step, and you are in a sea of clover of the richest green. What a pleasant homely prospect lies before you! The sun is setting in a crimson haze over a rich plain dotted with houses and with villages; men, women, and children troop along the narrow paths, laughing and talking, driving their cows and sheep before them. A soft, warm moisture steals over your sunburnt cheek, you draw in one deep draught, and the vigorous condition to which the desert air and the swift ride have braced you, all melts away in that first breath, and you are undone. But it is a delicious undoing. The scent of clover, the cheerful talk, the broad good-natured faces, and last, but not least, the friendly groaning of a hundred waterwheels, dotted all over the plain—everything murmurs, "Lay you down and sleep; why this hard riding; why this pestilential energy?" Yonder, made glorious by the setting sun, lies hundred-gated

Thebes, and here we will stop. The prophet, when he looked down upon the beautiful gardens of Damascus, turned him about and departed. What he said was that he could only go to one Paradise, and he preferred to wait for the other. What we feel is, that the Luxor Hotel, even when kept by Mr. Cook, does not require description here.

We have gone south-west to see the sunset over the rich broad plain of Thebes. We wished to strike the Nile valley at right angles, and thus plunge headlong into it, instead of approaching it obliquely and making the disenchantment gradual. But our way from El Gaita lies north-west. Seventeen miles brings us to Bir Ambar, a village on the edge of the "rif" and the desert. Thence ten miles along the edge of the fields bring us to the large and once important town of Kenneh.

From Kenneh we have yet before us the most interesting route, and we enter upon ground which was briefly described by Mr., later on Sir Gardner, Wilkinson in 1830. North-east from here, or, to be more exact, from Koft, now a village near here, runs another trade route, by which the merchandise landed at Myos Hormos arrived in Egypt. By this route Ælius Gallus, the Roman general, returned from his unsuccessful expedition to Arabia 1900 years ago, after Syllaus, King Obadas' crafty minister, had led him a wild-goose chase over the most inhospitable deserts of Arabia. The valley behind Kenneh drains the western slopes of a hundred miles of mountains; and as a curious instance of the power of even infrequent water persevering through long cycles, large pebbles of primary rock may be picked up in its bed which have travelled not less than 50 miles. Along this road came the groaning carts conveying the rich red porphyry from the quarries of what is now Jebel Dukhan, the mountain of smoke. I do not feel sure that the granite was ever brought in large quantities from the granite quarries of Jebel Fatireh; but it was along this road that the unhappy convicts struggled to their dreary labours, or perhaps bounded joyously along after having completed their labours; for in those days it seems that men were condemned to excavate so many feet of granite as now they are condemned to pick so many pounds of oakum.

Starting from Kenneh in a northerly direction, you notice that for a mile the debouchement of the Wadi Kenneh, along which the route lies, bears a rich crop of corn, and several wells of good water are found near the Coptic burying-ground at the head of the cultivated land. Here is the ruin of a house built by Mr. Libby some twenty years ago, when he supervised the supply of provisions to the Marquis de Bassano while the latter was excavating sulphur from Jimseh, on the Red Sea. The woodwork was all torn down and burnt during the great "year of hunger," 1878, when Mr. Baird, of Uri, went up the Nile to distribute the Khedive's bounty to his suffering but patient people.

Thence you follow the wadi up a broad shingly plain skirting the eastern flank of some low secondary hills, and at 12 miles you find that

the water-course sweeps round a low bluff of pudding-stone, where very little water is found 12 feet below the surface. As you approach this Bir Arras, or Arras well, you see quivering and shifting under the burning sun what appears to be some Bedawi goat's-hair tents. They are, however, no tents, but a curious example of how soil is made. For some miles, a number of tamarisks, encouraged by the water held up beneath the soil by the bluff before mentioned, have for many years pushed a struggling existence. The spiniform leaves of successive autumns have fallen round each bush, and bound the sand together. Between the mounds thus formed, the water has washed away the sand, leaving them as rocks on a sandy beach. At a distance they look so exactly like a Bedawi encampment, that one reflects whether, like the sandgrouse, bustard, and many other animals, the Bedawi has not sometimes owed his safety to the difficulty in distinguishing his camp from a clump of tamarisk.

The wadi winds, but you ride straight on to Kasr el Jin, the "fort of the evil spirit," which is perched on a spur of the hill 27 miles north of Kenneh. This is the first Roman station; but there is little left but remains of massive walls and deep stuccoed wells. The walls of all these stations are built for the first four or five feet of large stones, without mortar, and the upper walls of hard mud.

The intending traveller will be saved much trouble by the map published with this paper. Before starting on this journey in May, 1886, I made the most careful inquiries I could, but could get no information that would stand cross-examination. The watering-places were many; but it was four years since the last rain fell, and no one knew whether or not they were dry. All that appeared certain was that there was no water for a hundred miles, while the wind in May was very hot, and always in our faces. My caravan started by itself with many water-tanks, and I was independent with my usual five or six picked fast camels. In the summer the sun's declination north is about equal to the latitude, and there is no atom of shade.

But the difficulties were greatly exaggerated; for, as will be seen, there is at all times an ample water supply within 70 miles of Kenneh. And a Kenneh camel will carry his load 70 miles in even the hottest winds, while a riding-camel can do fair work for five days without water.

With my light cavalry, I visited all the water-holes I could hear of, making a specially long and futile detour to the Bir Nejilah, ten miles to the west of Kasr el Jin, but which I found dry like all the others.

At 36 miles from Kenneh is the second Roman station, called Soghi or Naka'al Teir. It is probable that there was a station between Koft and Kasr el Jin; but I did not see it, and only count those I saw. Naka'al Teir, which is the name of the district, was a large caravansera, much like the Persian caravansera of to-day. A large

quadrangular enclosure, stables, and living rooms all round, and a well or cistern in the centre. From the width of the cistern it would seem that the Romans had to dig very deep before they found water, but all is now choked with sand.

The plain for ten miles north of Naka'al Teir is an absolutely flat expanse of dry, hard mud. And on a hot afternoon it is a very long ten miles, for already at Naka'al Teir the rider sees the hills quivering before him, but at ten miles' distance they look as far or as near as they do at one mile.

From the east comes a wadi which joins the Kenneh Wadi, and is said to come from Fatireh and the quarries of Mons Claudianus; but this required further examination, for two Roman stations in the Medisa valley seem to indicate that as the route taken.

At last, at 46 miles, the rider enters the low granite hills at the Bal el Mukhanij. The hills have a calcined or decayed appearance, like all the low hills which cluster round the main range and lofty peaks of comparatively live granite, which appear to have been recently thrust up through them. The vegetation increases at once, and the now confined bed of the wadi bears the fragrant artemisia, taverniera, and many other shrubs, in addition to the stunted mimosa and zilla thistles which have hitherto marked its course. The interest of the ride is at once increased a hundredfold; the eye is relieved from the monotonous waste, and fixed on the peaks of Om Sidr and Jebel Dukhan, now looking cool in the blue distance.

I may mention here a hint about carrying water in the desert, which has twice proved of value. The traveller should pay great attention to an ample provision of water-skins, insist on the addition of one or two to any number the Bedawin propose to carry, and display great anxiety about their lasting out. But he should secretly carry his own supply in strong bottles wrapped in his blankets in his servants' saddlebags. I always carry four commissariat rum-bottles. Bedawin are absolute children about economising their water, and their water-skin is about the least efficient thing that could be devised for carrying water in. People say it keeps the water cool. But you do not want cool water in the desert—you want water and not an empty skin. I never drink on the march, except when I halt and make hot tea. On this occasion, on the fourth day, the Bedawin had drunk all the water; they did not know when they would find any more, and were ill-tempered, and wanted to ride back and meet the caravan. I gave them a drink, and was amused to hear one, evidently ignorant of my temperance habits, remark to a servant, "We knew he had bottles, but thought they were brandy." The real danger of thirst is not to the man, but to his camel, for if the camel droops, the man in walking soon gets an intolerable thirst; though even under these circumstances a man can go on much longer than would be expected.

Winding along the avenue of hills, at 52 miles, they open out a little, and you arrive at the Deir Atrush, the Convent of the Deaf Man. The well here was 38 feet measured down to the sand, which at that depth choked it. For the sake of argument I said this was not a convent, but merely a station like Naka'al Teir; but the Bedawin seemed to have no idea of confounding the one with the other, though I could see no difference.

Jebel Dukhan seemed quite near now, and a tall peak to the north-east in the Kittar mass was pointed out as that from which the valley Um Yessar, or Mother of the Meringa tree, took its rocky course. A man went forward overnight, and returned in the morning with a skin of water from here. I afterwards, while surveying, visited this place, and found it a grand gloomy gorge, choked with huge boulders, and carrying a torrent of rugged blocks far out into the plain to join the Kenneh Wadi. The water was in the little nook under a mass as large as a cottage, and a man could just squeeze himself under and reach the water with outstretched arm.

Riding on over the hard and gradually rising path at 66 miles, we descended into the broad Kittar valley, which crossed our path at right angles. It was studded thickly with big mimosa-trees, some 20 and 30 feet high, but all hacked and chopped about. It seemed piteous, and I was inclined to be angry at the destruction of the few green trees I had found in my mountains. The Bedawin occupation, and the only occupation I know them to engage in, is making charcoal. They chop half through the finest branches, and bending them down, leave them a month or so to wither. Then they come, collect the boughs, bury them, burn them, and carry the charcoal off to the Rif.

An important question was now to be solved. The camels were very thirsty, and the question was, "Is there water in the Kittar?"

We turned to the right and rode up the valley, which was picturesque and well-wooded as desert valleys go. We rode four miles, and then the valley forked, and we went up the westernmost arm, which every moment became steeper and more choked with rocks, caught against which were piles and swathes of dead brushwood, evidence of former floods.

Soon we dismounted, and led the stumbling camels over the rocks, and at last I overtook two men seated on the ground. It was evident from their faces that their troubles were over; but I could see no well. I asked, with assumed indifference, "Is there water?" and they answered "yes"; but no water could I see. The torrent-bed became sandy, and there were two or three holes scraped by hand, but all were dry. The last man of the party had the wooden bowl, and the moment it arrived, the man set to work scraping out the gravel at the base of a large upright boulder. In a very few moments they reached the much-wanted water, and the next ten minutes were occupied in struggling

with the camels who became dangerously hasty, and threatened every moment to trample on us, or break their legs by scrambling over the smooth rocks. They were watered in their turn from a copper basin of which I knew the measure, and in forty-five minutes each of the camels had drunk more than eighteen gallons. After this they began to drink steadily, and less like hydropults than when they began.

With a comfortable sense of repletion, we marched down to the fork, and sent a man to the crossing to warn the caravan of our whereabouts. This man, I remember, came back next morning, reporting that the caravan had passed, and was indignantly sent on their tracks. Thus by sleeping at his post, he gave the laden beasts 44 miles of unnecessary route.

Early next morning I strolled up the second arm of the ravine. The air was cool, scented with artemisia and the fragrant yessar, and each moment the scenery grew wilder and grander. The torrent cut a tortuous channel down the valley, and the bed was sometimes ten and fifteen feet below the surface. The northern flank was generally a precipitous cliff, while down the southern slope tumbled cascades of boulders, and all around tall rugged peaks stood out in bold relief against the clear blue sky. The numerous green mimosas, the yessar, and other shrubs, which were dotted thickly along the valley, were most grateful to the eye. The yessar, or *Moringa aptera* (as distinct from the *Moringa pterygosperma*), is a tree well known in the West Indies, which has a cluster of white flowers like a laburnum, and a fragrant scent. I hope I have succeeded in introducing it both into Cairo and England; for Mr. Bull of Chelsea showed me two young plants grown from seed I sent him, and several are doing well in my garden in Cairo. Mr. Thiselton Dyer writes from Kew, that it was probably the seed of this tree which produced the oil of Ben, in great use by watchmakers before the introduction of fine mineral oils. Ibex were evidently plentiful, and indeed on waking I had found three peering at me from the opposite cliff. The ibex is a grand animal, and as he always selects his home in the wildest and most inaccessible mountains he can find, ibex-shooting is a sport fit for a king.

I was immensely surprised to find here a pair of donkeys, with a young one, running in a semi-wild condition. They belonged to some Bedawin whom we met later on, about 20 miles to the north, and leapt from rock to rock with the agility of goats. They were obviously quite unattended, and had been here a long while; so it was evident that there was another watering-place ahead of us, for they could not drink from the covered well which had refreshed us. But I little anticipated the discovery we were to make as we climbed over the rocks which now obstructed the gradually narrowing ravine. Rounding a shoulder of the cliff, this is what we saw: The ravine was at an end. Over the cliff, which was about 70 feet high, fell a feathery cascade of softest greenest maidenhair

fern. Over the green moss, and through the clustering sprays, trickled innumerable little streams of water into two crystal pools below, which reflected on their pure surface the branches of a Syrian fig-tree. Above were tall rustling reeds and feathery rushes, and between the pools was a soft strip of green turf. Fresh from nature's hand, our pool was unpolluted by camels, who could not climb there, and only ibex shared our treasure with us; for the donkeys drank at a pool some way off, caused by the overflow.

Here was a delightful end to our hot sunny ride. The friendly cliff hung lovingly over the pools, so that the sun never came there, and with great content I stretched myself on the turf. Books, meat, and tea were always with me, and I spent two such delightful days in that grotto of the nymphs, that I was almost sorry when it was announced that the caravan had got up the valley as far as the camels could climb, and I returned to civilisation.

Here I fixed my camp for a month in the most picturesque spot I had seen since I left Baluchistan. There was a grand sweep southward for my transit telescope, and everything was soon made ready for the wire which should connect me with Colonel Ardagh in the observatory at Cairo. The sun was hot, but the air was pure and not oppressive until just as I was starting on an expedition to the quarries of Mons Claudianus, when ten days of phenomenal heat fell upon us, and for some time the thermometer never went below  $114^{\circ}$ , and was often  $118^{\circ}$  throughout the night. Many cattle died at Kenneh during these ten days, and our soldiers at Assuan suffered very much. This wave of heat was felt very severely in India. While it lasted, from the 6th to the 16th of June, it seemed only possible to explain it by some fiery meteor having passed close to the earth. And it is easy to understand how the world will come to an end; for had it been a little hotter, all the animals and human beings on the exposed side of the globe must have perished. It increased for four days, and some of my people ran off to the sea-coast; but after a week it gradually got a little cooler. It was discouraging preparation for our expedition to Mons Claudianus, which was an unknown distance; but still it was fortunate that we had arrived at the Kittar waterfall before it commenced.

The tents were pitched on a beach between the side of the valley and the torrent-bed. A flat granite rock, on which we used to dine, and which is inscribed with the year, marks the spot for which the longitude is calculated. The silence in the hot noonday was most impressive; the rocks seemed to sing in the noonday heat, though this was perhaps a singing in my ears; and in the evening ibex picked their way down the cliff to the water, and regarded us no more than if we had been petrified. Silence and sleep all around almost suggested that the world was not yet created. It might have been an enchanted valley, the nymphs proper to the maidenhair pool being asleep in one of the weird caverns

which abounded in the mountain side. But in the night all the jinns and efreets of Arab story were around us. Every cliff and crag gave forth ghostly and mysterious noises, which I never could explain. Of one noise, however, which astonished me very much, I did discover the cause. From the apparently unbroken face of a cliff, not a hundred yards from the camp, would arise suddenly the most vigorous quacking, as of hundreds of ducks. This, after much wondering and watching, I discovered to be a colony of hyraxes who lived in a crevice which could not be seen from below. It is no wonder that the Bedawin people the darkness with jinns and ghosts. I should surely have believed in them myself, had I stayed much longer in the Kittar valley.

A description of the Kittar torrent will serve for many similar torrents which rive the mountains, and deposit in their caverns and crevasses the store of water which makes this country habitable. No Bedawi will speak of them until their discovery is inevitable, and Major Rundle, in his daring reconnaissance to Abu Hammad during the Soudan expedition, found large natural reservoirs of delicious water which have remained unknown to hundreds of travellers across the Korosko-Abu Hammad desert, though they have all filled their skins from a brackish supply in the immediate neighbourhood.

Climbing up round the side of the waterfall, you arrive on a broad, smooth, sloping plateau, riven in several directions by giant fissures, of which the Kittar valley is one. Near the top of the waterfall is a building, roofless, but otherwise in good repair, which Wilkinson describes as a church, having copied from it an inscription in Greek, which, though mutilated, translates as follows:—"Flavius Julius, the renowned governor of the Thebaid, built this Catholic church in the time of ———, Bishop of Maximianopolis." Close by is a lovely pool of clear water, full of tall rushes and long grass, a young date-tree, and two or three Syrian figs. It may have been a chapel for a summer retreat for the monks of Deirel Atrush, 20 miles away.

Across the top of the waterfall is a curious natural bridge, formed by a slab of granite, and then for a few hundred yards the floor of the broad ravine is polished smooth during years of attrition by the gravel carried by the torrents. Further up are more clumps of long grass, and water reappears. Further again the polished granite is worn into deep rounded pits full of water, and these form the sources of the waterfall. This water escapes through the cracks, and when I visited the waterfall in December, I was surprised to find that, though there had been no rain, the pool at the base had increased and spread many yards beyond its hot-weather limits, which, I think, is accounted for by the fact that the rocks swell in the heat, and narrow the fissures through which the water passes. The great stone reservoirs thus emit their treasure sparingly in the summer and more bountifully in the winter.

The ravine stretches up to the mountain slope, and the neck, or



divide, from which it takes its descent, is a long three hours' climb up. From this ridge, which is 4560 feet above the sea, can be seen a wide view of the surrounding country. Away to the south-west is a broad expanse of desert with patches of low, black foot-hills, which I described at Bab el Mekānij, and which, from the summit, looked like pine forests. In the distance are the Medamūd hills, on the west bank of the Nile, while to the north-east are the mountains behind Tor on the east coast of the Red Sea. From the divide the surrounding peaks seem to be from 500 to 1000 feet higher. Down the further side runs the Medisa ravine. All these hills are rather steep, and difficult climbing, and there are many places where the foot slipping or overbalancing after a spring might produce very serious consequences. The water makes some fine leaps, and has polished itself some grand basins in the granite, much of which is red on this side. The lips of the basins are encrusted with carbonate of lime, and the Medisa water does not make good tea or coffee.

It is a stiff climb down of four hours from the ridge to the Medisa glen, where is always a plentiful supply of water, both in a natural reservoir with steep sides and full of green watercresses, and from holes scraped in the gravelly bed above. Camels are brought up to the Medisa water, and I think that it is the hardest piece of climbing they ever do. Nor do all make the journey safely. One was standing at the foot with a broken leg, waiting quietly to be eaten by jackals and vultures.

From the Medisa an hour's easy climbing takes you clear of the hills into the pretty Medisa park, where are massive remains of a Roman station, and where I pitched my camp in the winter of 1886.

If, however, you follow the windings of the Medisa ravine, you will pass other large basins, one especially large one overgrown with calamus, or Arab pen-reed, which had only dried up in the summer of 1886.

From the well in the North fork, where we watered on our first arrival, is a steep climb of three hours to the divide, which is 3910 feet, and thence another three hours brings you to the beautiful Kohila watering-place. A dark and gloomy fissure leads into the heart of the mountain, and contains a ribbon of deep water about 6 feet wide. Below the mouth is a red granite basin, and in order to water camels, which can approach from the ravine, the men pour the water down the slope—in fact, put the waterfall into action.

From the Kohila water it is a climb of three hours down the ravine to the "Three Yessar" fork, a clump of three exceptionally fine moringa-trees, which forms a useful landmark on the road from Medisa to Fatira, and five hours hence is the Medisa Park, at the debouchement of the ravine of that name. Eight miles round the flank of the mountain, and across the torrents of boulders which pour down from its side, bring

you to the valley, and thence it is six miles to the camp by the waterfall.

The three watering-places described in the Kittar mountains—also a large well to be described later on—can all withstand many years of drought, and, so far as I can learn, never dry up. At Kittar, the only place where the original source could be examined, former water-marks showed a gradual sinking of the supply, but at Kohila and Medisa no such marks are visible, and I think that they are refilled as they waste from hidden reservoirs.

In the neighbourhood of these water-holes are many rude shelters, constructed by the younger Bedawin, and from which they fire at the ibex coming to water. Besides these are sometimes found small stone huts of the shape of bee-hives, about 4 feet high, and with a small door. I cannot explain what these were for, unless the Bedawin kept young goats in them at night, which those with me thought unlikely.

Where what we may call the high road crosses the Kittar valley is a small Roman station. Starting from here, the valley ascends still for miles up to a bold cliff, which I have called the 70 Bluff. It was visible for many hours before I reached it, and always bore 70° on the prismatic compass. Here is the water-parting 1800 feet above the sea. Following the broad, almost straight, valley on the right, are the live granite peaks of Kittar and Munfia', while immediately on the left are the low foot-hills, and behind them Jebel Dukhan. At six miles is a piece of the ancient Roman road, swept of shingle, and defined on either side by heaps of stones. At eight miles you turn to the north into the foot-hills, and at nine miles you reach the Badia' well. This is a large hole scraped in the valley bed, and supplies the water taken from it so rapidly that a hundred camels can be watered at it. I could not hear that it ever ran dry. Here is a large station and several smaller ones, and a steep path leads over the hill to the valley, where the main Roman town and quarries of porphyry are situated. The ancient porphyry workings have recently been examined by Mr. Brindley, who has obtained a concession for working them from His Highness' government.

From Badia' well the road soon clears the foot-hills, and strikes north over a vast sloping plain covered with coarse shingle. Here for the first time is found the *Salvadora Persica*, a shrub which in Persia indicates water underground. It spreads its twisted branches over the surface of the ground until it has accumulated a heap of sand, when it shoots upwards, and its hard bright-green leaves form a fairly nourishing camel fodder. In Persia it is called *tooj*, or quince, of which fruit the bark has a strong scent. Muslims make toothbrushes of sticks of this shrub, which was so employed by the Prophet.

On the right a few stunted mimosas show the winding track of a wadi which has eaten a path through two ranges of hills to the sea.

At 24 miles from Badia' the path passes through a low limestone ridge full of flint nodules, and impregnated with petroleum. A little farther is a parallel range of primary rocks, and between these ranges, and in the track of the wadi, is one of the most interesting places on the route. It bears now only the generic Arab term "mellaha," or salt-place; and Lepsius, who passed here in 1842, suggests that it may be the Fons Tarnos of Pliny. Here has been once a large flourishing date-grove, probably much cultivation, and a large population; but all is now a scene of miserable desolation. It would appear that the torrent of fresh water, of which traces are seen along the route, was once held up by the granite range through which it now winds down a deep and picturesque ravine. The water probably many hundred years ago cut down to a stratum of rock-salt, and has since then poisoned all the vegetation, and covered all the neighbourhood with a greasy mud and salt efflorescence. Some years ago I described a spot of desolation arising from similar causes in the Lashari desert of Baluchistan, and called Marri, or bitterness. But at Marri the desolation was complete and hopeless. At Mellaha hope revived every spring, and was crushed again every autumn. Each date-tree pushed a few struggling fronds, only to droop as soon as grown under the combined poison of salt-water and burning sun. This had been going on for perhaps 400 years, and each living trunk was surrounded by five or six, and even eight or ten prostrate predecessors, who had given up the struggle and lay untrimmed, each with sixty years of fronds round it, reduced to fibre by the action of the salt, which, while it dissolved the softer, preserved the tougher parts.

Some green tamarisk bushes struggle about among the date-trees, and there are masses of rushes and tall feathery reeds. On the north side is what I call, under correction, the remains of a short canal now full of salt-water and overgrown with tall reeds. I could find no vestiges of habitations, but the efflorescence covered everything, even a stick thrown down for 24 hours rendered any discovery impossible except by excavation. It was by accident that I found that there was a ravine through the hills, for the ordinary road lies through a pass three miles to the northward. One evening, while waiting for dinner, I went for a stroll to the foot of the granite range. Singing loudly as I went, I suddenly became aware of five ibex earnestly regarding me from a low spur, snorting and butting in my direction. The moment I stopped singing they retired, but came forward when I began again.

Quitting the rôle of Orpheus, I was on the ground next morning with my rifle at about an hour before daylight, and in the hunt I traced the ravine which is about two miles long, and a hundred yards broad. It is, for the most part, steep on the south and sloping on the north side. Some few date-trees have been washed down from Mellaha, and a considerable stream of salt-water ripples along, sometimes above

ground and sometimes making a marsh over the whole valley, which is then full of tamarisk and green rushes.

Riding down the slope towards the bay of Jimseh, you cross at right angles an old Roman road leading to Abu Sha'r, which is on or near the site of the ancient port of Myos Hormos. The road is distinctly marked by being cleared of stones which are piled in regular heaps at the side.

The route now skirts the bay of Jimseh, the peninsula of which is of coral and limestone formation, and which is interesting as having yielded some small quantities of sulphur and petroleum, of which latter the Government hope to procure a larger supply.

Herr Oscar Schneider has published a long account of the sulphur workings, and I think shows that the concession was obtained from the Egyptian government as a ground on which to establish litigation and claims for compensation, for the sulphur was produced at a cost three times greater than the sulphur from Sicily, and a claim for 21 million francs was made.

Returning across the neck of the Jimseh peninsula, and striking north along the sea-shore or over undulating and broken shingly ground, 25 miles takes us to Jebel Zeit, the oil mountain, where is the wooden town of the petroleum miners. A paragraph in the *Times* early in August stated that at a depth of 1200 feet very favourable indications had been reached, but the great central reservoir from which the entire neighbourhood had been saturated had not yet been reached.

In order to describe the route down the axis of the mountain range, I will return straight to Medisa, and thence take a fresh departure.

Leaving Medisa Park, the route curves round the huge bluff, and enters the hills up a picturesque valley, flanked on either side by such regular buttressed walls of cliff as to suggest passing up the aisle of some great cathedral. The valley is green with shrubs, and here and there smoked and blackened patches of rock suggest that the giants have been roasting a half-dozen camels for supper, though the charred appearance is explained by the manufacture of charcoal.

At the Three Yessar Trees the valley forks, the left hand leading to the Kohila water. On the right are the purple Abu-Hassan mountains, and rounding the north-eastern angle of these, we ride up the broad Ruashid or Rushaidi valley in which some twenty camels are grazing under the charge of some well-armed Bedawin, who are recognised with triumph by those with me as Ababdi, though far north of their established boundary. I travelled this route both in June and in January. The former journey I will not describe, for though I made a rough survey of the route, and took the necessary observations for altitude and latitude, still it was mere labour from the excessive heat which I have before mentioned.

On the 6th of January, as we left the Three Yessars, a name

suggestive of wayside establishments at home, thunder was growling in the mountains and echoing a thousand roars from cliff to cliff. Rain fell, and soon we were riding in a heavy shower which settled into a steady downpour. The effect on the camel saddles was unpleasant, for they were sewn together with leather thongs which quickly stretched, while the shaggy, purple-dyed sheepskins on which we sat gave up the colour most freely. The thermometer fell to 50° Fahr., and we enjoyed more or less a regular English wet afternoon. The camp had been started off to find its way to Luxor, so towards evening we crept under a huge boulder at the foot of the cliff. I lay awake reading until late, as I was waiting for a Bedawi, who was bringing me a bag of gold from Cairo. Suddenly came a splashing rush of water from overhead, and almost in a moment the falls of Lodore were upon us. Within a foot of where we lay was quickly a leaping frothy torrent, and the *saute qui peut* was amusing; for most of us had undressed to dry our wet clothes, and in the scanty lamplight the water seemed everywhere, and men bounced in all directions, and fell over each other and everything in laughing surprise.

The suddenness with which water comes down is explained as follows, as I once saw:—The water on four broad mountain slopes converged. One ran freely, but three carried so much ibex dung, dead shrubs, and twigs, that they dammed themselves. One held up a considerable head of water, and in bursting, loosened the second, and quickly the third, when they all poured tumultuously down together.

We were wet that night, but in the morning a fresh surprise awaited us. When we woke we were covered with snow. The valley was a network of running streams, but the bushes were covered with white. The great Jebel Shaib took upon himself the appearance of the Matterhorn, and an old grey-beard, a long time comrade, hastened up swelling with pride and chattering with cold to explain to the ignorant Englishman what had happened to his beloved mountains. "You see," he said, "those soft white clouds; when it became cold, those clouds came so low down that they were caught upon the mountains and upon the trees; I have seen Jebel Shaib white before."

In the morning we went through a pass at the head of the valley, and skirted the northern and uppermost edge of a broad sandy plateau. To the left, past Jebel Shaib, leads the road to the *nojel*, or precipice. It was by this road that the harassed and weary Herr Lepsius escaped on to the plains in 1842, after he and his caravan had wandered aimlessly on the mountains for two days.

Precipice is, however, too large a word to describe the defile on the north flank of Shaib, by which descent is made to the plain of Munfia'. I should have ridden down it in June had I not wished to note the behaviour of a new aneroid barometer I had received, and I may mention here that the aneroid, an excellent one by Elliott, did not move at all

during the whole descent of 800 feet, but that during the three hours' ride over the shrubby plain to the well under the Munfia' hills, it recovered its position, and accurately marked the difference in altitude.

The Munfia' valley is a good pasturage for the Ma'aza, who in June had a fine flock of sheep there, and dug a large well and planted some twenty date-palms. Hassan, the sheikh of that settlement, complained bitterly that the jealous men of the Rif would not sell them young date-palms, and he had been obliged to obtain his from the small-producing trees of Kufra. Donkeys, of which he had a few, required water daily, sheep and goats every second day, and camels every third day.

To return to the route after skirting the plain, we enter the Fatira valley and ride down it. About three miles to the east lies the mountain of Um Anab, or mother of grapes. Here is a curious water supply. The path to it leads over the east side of the Wadi Fatira into a deep ravine. From this you climb up a long steep valley, almost shut in at the top by rocks. Here on the ridge are two round holes which in June, and so far as I could learn always, were brimful of sweet water. I arrived there at noon, when many thousands of sand-grouse were circling round, impatient to drink, and quite fearless from thirst. Unlike pigeons, sand-grouse cannot drink on the wing, and this watering-place, where they can walk up to the brink, serves the grouse for many miles, who cannot drink from water enclosed by cliffs.

At twenty-one miles the valley turns to the west, and we strike up a steep and narrow path over the hills to the west, see some stone pillars lying about, and at last halt near the ancient square fort, in which lived the quarrymen who excavated the granite from Mons Claudianus.

Here were very extensive quarries of grey or blue and white granite. A low mound of granite about 8 or 10 acres in extent and 100 feet high has been cut and removed in huge blocks. One pillar which lay ready for removal, but cracked, weighed 256 tons. Perhaps in two or three winters it could have been rolled down the Wadi Fatira and embarked at Kenneh, but I think that, having convict labour at his disposal, the master mason sometimes launched out in a specially large pillar, leaving it to the purchaser to carry away if he could. The method of excavation was the same as was used at Assuan and elsewhere in Egypt, wedges were driven in at close intervals along the desired line of fracture; inclined planes led from the hill to the valley, and along either side stand the pillars or towers of large stones which were used as purchases for covering the blocks. At one place was a stage from which blocks were loaded on carts. The town, which was contained in four high walls, is completely in ruins, but the plastered walls of baths and tanks remain. Close by were the remains of a temple built, as would appear from the remains of an inscription, by the Epaphrōditos, who commenced the construction of the temple at Mons Porphyrites.

A ruined wall, evidently an aqueduct, from two to four feet high,

according to the inequalities of the ground, runs about half a mile down the valley and round a hill, behind which is a deep brick-built well, a ruined enclosure, and a tall tower which I suppose to have been used for raising the water. Close by is a building which may have been part of the Roman establishment, but which I incline to think was a monastery built after the quarries were abandoned, but while the water supply held good.

Um Digāl, or the mother of pillars, was the appropriate name given by the Bedawin to these quarries which show work that might have occupied for two or three hundred years the number of people which could live in the fort. Leaving Um Digāl we crossed a wadi running west into the Wadi Fatīra, and struggling up its southern bank we climbed over into the head of the long Abu Dōk ravine, which runs south-west towards Kenneh. Two miles from the head of the ravine a tributary enters from the north. Near the junction are some deep holes which would retain water for perhaps two or three years. Here were ruined buildings, and one approached by a broad flight of steps seemed to be a temple.

It was in the grey dawn of January 7th that we climbed up the rugged south bank of Abu Dōk, rode through a few broken hills, and emerged on a broad level plain 2400 feet above the sea. The air was raw and cold, the camels' breath floated steamy in the frosty air. Due north Jebel Shaib with his snow mantle stood stern and silent. In the east a cheerless sun struggled with heavy clouds, which reddened slowly, as if willing to preserve as long as possible the unaccustomed appearance. Silent and wrapped-up closely we moved noiselessly out on the plain, and here was a pretty sight. Picking their way down a neighbouring ravine to our left came a little herd of ibex; a little brook ran across their path, and while they dallied with the water they suddenly became aware of us, all of them turning their handsome heads at exactly the same moment. They showed no fear, but great curiosity. Far away to the south lay range behind range, and a tall mass called the Missika Hill was the mark we aimed for. Across the broad plain we passed through more low hills, and dropped into the Wadi Abu Shia'—"the father of wormwood," the strong-scented bushes of which filled the valley. Abu Shia' is, like Abu Dōk and Fatīra, a large artery running south-west, and we followed it down to its junction with a third, which carried away the water from the Missika group of hills. Crossing the triangle of low hills, we entered the narrow winding portal of Missika. The east cliff is dovetailed into the west, and the walls on either side are almost sheer perpendicular. Hence the road ascends slightly for four miles to the divide at 1960 feet above the sea. Two miles south of the divide the road turns sharp round the Jiddāma bluffs, and in order to find the water we follow the valley which collects the drainage from north, east, and south.

Jiddāma is both interesting and weirdly picturesque. The gorge or throat of the mountains is of blood-red stone, cavernous and gloomy. Nor is Bedawin legend wanting to add romance to the interest excited by the rugged scenery.

The throat is narrow and winding, and descends by a steep granite step, up which an active camel might be forced, but which is impassable for any loaded camel. Here water is always found, and the Bedawin have been at great trouble to scrape holes in the sandy bed and build them round with rude but efficient masonry. But the chief interest arises from the fact that here is the boundary, not arrived at until after many bloody encounters between the Ababdi and the Ma'āza.

From Jiddāma the road runs south-east to the south side of the Eridia hills, and at 5 miles from the water is the divide, 2130 feet, and the road is choked by low hills. At 15 miles you strike into the Atalla hills, and find by a dry watering-place an *ushera* or *Calotropis gigantea*, the Persian *dirakht abrishum* or silk-tree, the Hindustani *mudar*, and the Baluchi *zahren karrag* or bitter flower. This tree is rarely seen away from sandy deserts, and seemed a strange visitor in the rugged valley where it stood. Hence is a straight run down the broad smooth Wadi Atolla. At 22 miles from Jiddāma the Wadi Eshhay joins from the north-east, and three miles further we cross the Russafa road between Kenneh and Kosseir. Down the Mesāgh-el-Bagar we rode to Hammāmāt, now upon familiar ground. Next morning we sped away to the west; hardly halted at El Gaita, but pressed on; saw the glorious sunset in the evergreen Nile valley; and dined in the evening with the tourists at the Luxor Hotel.

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#### GEOGRAPHICAL NOTES.

**Rev. G. Grenfell.**—In a recent letter, Mr. Grenfell informs us that he hopes to be in England again early next year and give the Society his promised paper on his Congo explorations. His departure from England in August last was very sudden; he says, "the news of Comber's death had not been received more than four hours when I commenced to pack up in readiness for the voyage." His map of a portion of the river, including the Kwango, will accompany the paper. His colleague, Mr. Bentley, had just returned from an interesting land journey to the south-east of Stanley Pool.

**Oxford University Extension Lectures for 1887-8.**—We learn from Oxford that Geography is to form one of the chief subjects in the courses of instruction given under the extension scheme during the season, October 1887 to April 1888, now commencing. Eleven courses, comprising eighty-eight lectures on this subject, have been arranged, with Mr. H. J. Mackinder as lecturer. It is expected that the courses will be attended



by 2700 students, and they will be delivered at Enfield, Tunbridge Wells, Worksop, Leek, Barnsley, Barnsley District, Ashbourne, Banbury, Bath, Bath College, and Taunton.

**Ascent of Kilimanjaro.**—As will be seen in our Report of the Proceedings of the Geographical Society of Berlin, Dr. A. Meyer, of Leipzig, succeeded in August last in ascending Kilimanjaro to the glacier-walled crater summit of Kibo, and explored the volcanic plateau which lies between Kibo and Kimawenzi. Mr. Johnston, as will be remembered, ascended to over 16,000 feet, and estimated the height of Kibo at 18,800 feet. Dr. Meyer believes the height to be 19,680 feet.

**The Forests of Tunis.**—Mr. T. B. Sandwith, British Consul at Tunis, has recently prepared a special report on the forests of the country, which has been published by the Foreign Office (No. 63). These forests, which cover an appreciable part of the surface of Tunis, were, until the French occupation, subject to no supervision, but in the year 1883 the French, alive to the importance of preserving what remained of them, placed them under the management of a separate department, which has carefully explored their extent and conclusively shown that they are an important element of national wealth. The river Mejerda may be said to divide the forests into two main groups. Those covering the north-west of the country consist of the cork tree and deciduous oak, locally known as the *Zen*. The trees grow in a stratum of sandstone, which reposes on the upper chalk, and completely disappear where the latter stratum comes to the surface. The cork trees are invariably found growing on the southern slopes of this mountainous region, while the oaks flourish on the northern slopes and in the hollows of the valleys. The former cover an area of about 330,000 acres, and the latter 30,000. South of the Mejerda both these trees disappear and give place to the pine and a species of evergreen oak. In this part of the country the forests are scattered over various mountainous regions of no great elevation, all comprised in the northern half of the Regency where alone the rainfall is sufficient to sustain their growth. The principal forest groups are found in the following places:—Zaghuan, Djuggar, and Jebel-el-Erssaas, not far from the city of Tunis; Kessera and the Zlass Mountains, further south; Sidi Yussef, Wady Melégue, Nebeur, and Haydra, in the west. The estimated area covered by these groups is about the same as that covered by the cork trees and zens to the north of the Mejerda. It is to the latter that the attention of the new administration has been mainly directed. They are situated in a very sparsely-populated country, inhabited by the Krumirs, whose huts are formed of branches of trees. Much has been done during recent years in improving the condition of the oak forests. Roads have been cut through them and at stated intervals spacious alleys have been formed as a means for arresting the march of the destructive fires which frequently ravage them. The preservation and extension of these forests is held to be of paramount importance to favour the increase of rainfall in the country. That they were more extensive in the times of the Romans, and that they served to augment the annual rainfall may be inferred from the discovery of numerous aqueducts among hills, which are now absolutely denuded of trees and destitute of springs. Much progress has been made in barking the cork trees. The rough bark, which is of no value, is stripped off the trees to the height of six feet from the ground. Ten years after the trees have been so stripped, the inner bark becomes available for commercial purposes, the trees giving a crop of cork every ten years. A statement prepared by the chief of the department shows an estimated profit which in twenty years will reach the sum of 70,000*l*.

per annum derivable from these cork forests alone. The pine forests south of the Mejerda are practically neglected and are consequently rapidly deteriorating. The natives strip the trees of their bark for tanning and colouring hides, and cut them down for fuel, while goats, the worst enemies of the forests, are allowed to roam everywhere. No attempt has yet been made by the Government to stop this waste, but it is expected that some measures will be taken very shortly. The French railway company owning the line from Tunis to the Algerian frontier has succeeded in planting a large number of the *Eucalyptus resinifera* (red gum tree) and the *Acacia cyanophylla*; some 300,000 trees have been planted along the line. In the whole of Southern Tunis there is but one forest. It is formed of a species of acacia, and is situated about twenty-five miles inland from Sfax, covering an area five miles long and one mile broad. This forest, which was formerly much more extensive, is protected from the northerly winds by high land; the trees grow in clumps in depressions of alluvial soil. Though they only attain a height of ten feet, the trunks furnish planks eight to ten inches wide, of very hard grain and capable of taking a fine polish. A small outline map, showing the distribution of the forests, accompanies the Report.

**The Trade Route to Siberia.**—Not daunted by repeated failures, M. Sibiriakoff again despatched his steamer *Nordenskiöld* this autumn to the river Yenisei, viâ the Kara Sea, and this time with partial success. The vessel left Norway in August, and, after encountering much drift ice and fog, succeeded in reaching the mouth of the river Petchora. Here a cargo of skins—bullock, sheep, goat, seal, and bear—was shipped, as well as corn, tallow, and mammoth horns, which had been brought, by lighters and on the backs of reindeer, all the way from Tomsk to Kuja, about seventy miles up the river. The *Nordenskiöld* then left for Bremen, where she has just arrived, having accomplished the voyage in sixteen days. Another steamer, the *Phoenix*, in charge of the well-known arctic voyager Captain Wiggins, which left Vardö for the Yenisei at the end of August, with a cargo of merchandise shipped at Leith, succeeded in reaching and entering the Yenisei in the middle of October, thus accomplishing the voyage from Europe to Siberia, a feat not achieved by any vessel since 1880. Norwegian hunters returning from the neighbourhood of Nova Zembla report that the condition of the ice was unusually favourable for such an adventure late this autumn.

**The Weather in the Arctic Seas.**—Judging from the reports received from the Arctic seas around Nova Zembla, Spitzbergen, and Iceland and Greenland, it seems that the weather and the ice in these regions have been very remarkable during the past summer and autumn. Thus Dr. Karl Pettersen, of Tromsø, states that in July last the Norwegian hunters found the sea full of ice north of Norway and around Spitzbergen, but open towards Nova Zembla. Later on—in August—violent gales from N.N.W., accompanied by heavy fogs, put a stop to the whale-hunting on the north Norwegian coast—by-the-by a month earlier than usual—certain signs of there being large masses of drift ice not far from the shore in that direction. From reports received from Iceland we learn

that there, too, the weather and the state of the ice were most unusual. For instance, in July last, the ice beset the whole northern shore as far as Cape North, the ice-belt extending some twenty nautical miles seawards. In the early part of August the mail-packet *Thyra* encountered such a quantity of drift ice—in fact, a compact mass of ice as far as the eye could reach—that the vessel was compelled to return. The ice lay very close to the shore on the return journey, thus, off the Reikjavik-fjord, only five or six kilometres from the coast. On August 16th the *Thyra* reached the east coast of Iceland, but here, too, all further progress northwards was arrested by ice. It having blown continuously from the north-east, the southern edge of the ice extended as far down as the Berufjord, and lay everywhere close to the shore. This fjord was then the only accessible harbour on the east coast; but already the next day this, too, began to fill with ice, and the steamer had trouble in getting away. About the same time the mail-packet *Laura* succeeded in reaching the Eskefjord, on the west coast, and thence proceeded northwards; but at Cape North large masses of drift ice were encountered, and the vessel was unable to reach the Seydisfjord on the northern side of Iceland. She lay to for some hours in the ice, which appeared to be one compact mass as far as the eye could reach to the north and north-east, neither was there open water in the direction of the Seydisfjord. Thick fog coming on, the vessel returned southwards. However, on the vessel making a second attempt to penetrate northwards, she succeeded in reaching Cape North on August 17th; but having advanced some twenty nautical miles eastwards large masses of ice were again encountered, and the vessel was forced to return. The wind blew steadily from the north and north-east all the time. Never before, in the memory of the inhabitants, have the Seydisfjord and Eskefjord been beset by ice so late in the season, whilst the circumstance of the ice being heaviest on the east coast is a most unusual one. On her next journey, at the end of August, the *Laura* succeeded in reaching the northern shore of the island; but on September 6th, when steaming eastwards, the ice was again encountered in Thistle Bay. As it lay packed close to the shore, and extended seawards as far as the eye could reach, with a falling barometer and foggy weather, the vessel was put about. It was ascertained on this journey that the Seydisfjord was not free from ice till September 6th, and even later large floes were mentioned between this and the Eskefjord. Between September 7th and 10th, a terrible storm from N.N.W. visited the island with heavy falls of snow, particularly on the east coast. There is an old Icelandic belief, that, if the ice does not disappear from the northern shore by August 29th, it will remain all the winter. The ice having not disappeared this year by that date, there was little hope of its moving since. At the Faroe Islands, too, the weather has been stormy and cold during August and September, northerly and easterly gales prevailing, with fogs. The

latter have been almost continuous along the whole east coast. Reports of the state of the ice along the east coast of Greenland this summer are very scanty, but they seem to indicate that these two enormous masses of drift ice have been forced up under the coast. Therefore, from the reports received from the various parts of the Arctic Seas of the state of the weather and the ice this summer referred to above, we may draw the conclusion that the steady and continuous prevalence of easterly and north-easterly winds has forced the ice from the regions north of Spitzbergen and Nova Zembla down into the seas around northern Norway, Jan Mayen, Iceland, the Faroe Islands, and up along the east coast of Greenland. Thus Francis Joseph Land and the regions north and east of Nova Zembla must have been fairly free from ice this summer, a conclusion borne out by the statement of Norwegian hunters. Moreover, it may be safely assumed that the state of the ice and weather in the Arctic Seas above described, in a great measure accounts for the early setting in of winter which we are experiencing.

**The Pyrenees.**—At the recent meeting of the French Association for the Advancement of Science, M. Schrader read a paper on the Orography of the Pyrenees, to the study of which he has devoted the last ten years. M. Schrader pointed out the great inaccuracies of existing maps of this mountain range; the latest maps, he stated, are sixty years old, and abound with the most erroneous indications. Since then various geographers have attempted to correct these maps, with unsatisfactory results. M. Schrader's observations have been made with an instrument of his own invention, which he calls an orograph. He points out first that the mass of the Pyrenees is to the south of the boundary line, that they slope gradually into Spain, while they descend abruptly into France; that they are vaster and less European in aspect on the Spanish than on the French side. According to the old descriptions the Pyrenean chain is compared in its general aspect to a fern-leaf with its transverse veins, or to the dorsal ridge of a fish. But far from presenting this appearance, they are in reality composed of many lines of elevations (*redressements*) (?), oblique to the imaginary axis of the chain with which they generally form an acute angle. Certain regions, that of Mont Perdu for example, present this conformation with a regularity almost geometrical. Others are less marked, though it is impossible to inspect the network formed on the map by the valleys and the masses without being struck with the extreme precision of the meshes which compose it. This network is, however, broken up by fractures, across which wind the streams which pass from one line of elevations to another, taking advantage of the first breach to escape. These fractures are of a different character on the two slopes. On the French side the crests are blunted. The incessant humidity of the atmosphere has worn them away; mountains, ravines, crests, all are effaced to assume the forms of juxtaposed cones or pyramids. On the side of Spain, on the other hand,

the fractures are much fresher, the angles more precise, the forms rougher. The hot and dry climate of Spain has evaporated the moisture, destroyed the lichens, and preserved to the naked rocks their primitive aspect. The arrangement of the Pyrenees is different on the two slopes. On the French side the slope is rapid; the mountains rise like a wall, and have an aspect of grandeur. On the side of Spain the descent is formed by two stages. Starting from the central crests we find a sort of plateau, a compound mammillated surface, from 12 to 20 miles wide, of a wild and melancholy aspect, contrasting with the beauty of the great crests. At the limit of this region a new chain rises to a height of from 1000 to 1600 feet. This long girdle of sierras, cut by narrow and magnificent gorges, through which the rivers escape, appears to enclose the mass of the Spanish Pyrenees in a circle of gigantic walls. The descent of the sierras on to the plains marks the limit of the Pyrenees towards the south.

**Depths of Swiss Lakes.**—In a lecture on the depths of the lakes of Switzerland given to the Bern Society of Engineers by Herr J. Hörnlimann, and printed as a pamphlet, the author describes the methods, apparatus, and results of recent surveys among certain of these lakes, undertaken by the Swiss Topographic Department. Among the soundings obtained are the following:—Bodensee, greatest depth 838 feet, between Uttwil and Friedrichshafen; Lake of Geneva, upper part, between Revaz, St. Gingolph, and Villeneuve, 842 feet, somewhat less than a mile south of Revaz, the greatest depth being in the centre, between Ouchy and Evian, 1017 feet; Lake Lucerne, greatest depth 700 feet, between Gersau and Rütönen; Lake Zug, greatest depth 650 feet, between Walchwil and Immensee; Lake Sempach, greatest depth 286 feet, between Eich and Nottwil; Lake Baldegg, greatest depth 216 feet, between Rettschwil and Gölpi.

**The Lower Camacuam (South Brazil).**—Dr. H. v. Jhering gives a detailed account in the current part of Petermann's 'Mitteilungen' of a short voyage up the river Camacuam, made by him in the spring of last year in company with Herr Soyaux. This river, which flows through the southern part of the province of Rio Grande do Sul into Lake Patos, was ascended from its delta to the town of S. José. A very full description of the river and each day's journey is given by the traveller, but its general physical features are summarised by him as follows:—In the lower course of the Camacuam from the Passo de Bom Sera to the bar, the river winds in numerous curves, and there is a striking contrast between the two banks; while the right bank is steep and wooded, the left is flat and covered with sand or gravel. It is on the latter side of the river that sandbanks abound, whereas the waterway near the steep bank is invariably deep, and the current strong. The high shore is called "barranca"; the "areial" or sandbank is composed either of sand

and gravel or of large smooth pebbles and stones more than a foot long. These argillaceous pebble stones must have been transported to their present position from a long distance, as no corresponding rock was met with by the traveller in his voyage. In contrast with the lower course, the character of the country above the Passo de Bom Sera is the same on both sides of the river. The banks are wooded, and slope gently to the river. The course of the river is less tortuous, and the current not so strong. There is a large volume of water in the river during the winter months, but in the dry season it falls very considerably. Speaking generally, it may be said that the Camacuam has a very strong current, and that it ranks well among the navigable rivers of the province. The fuel of the Camacuam is much prized, while its forests contain many valuable woods, such as the cedar and angico. As regards the distribution of the "campos," or open tracts of grass country and the forest-covered lands, the traveller is of opinion that this cannot be satisfactorily explained by a consideration of the nature of the soil and difference of climate. The former are invariably on a higher level than the latter, and have not the same subsoil. From his observations he concludes that this distribution can be accounted for if from the data which geology furnishes as to the tertiary formations, the distribution of water and land during the chief epochs of the tertiary period, and also of the diluvial and alluvial epochs is determined, at least in its main features. He supposes that the elevated "campo-barrancas" of the Camacuam belong to the diluvial period, while the contiguous wooded lands are of alluvial origin. Dr. Jhering's map of the river, and especially of the delta, has been very carefully prepared. The most recent map of the latter, that of the government engineer, executed in 1882, is strangely inaccurate, showing the river to have three mouths instead of five, and in other respects it is not to be trusted, so that Dr. Jhering's map is a real addition to the cartography of this region.

**Geographical Education in India.**—We are glad to see that the subject of reform in geographical education is attracting attention in India. In two papers in Nos. 1 and 2 of the 'Punjab Magazine' Mr. M. J. Odgers strongly advocates reform in the teaching of the subject in Indian schools, and the foundation of Chairs of Geography in Indian Universities. Another writer contributes an article to No. 1 on "Geography Teachers."

### Obituary.

**Sir Julius Von Haast, K.C.M.G., Ph.D., F.R.S.**, one of the Society's Gold Medallists, whose death took place suddenly on August 16th, was the son of a merchant at Bonn, Germany, and was born there on May 1st, 1824. After passing through the grammar schools of Bonn and Cologne, he spent some time at Bonn University, at the same time that he learned the business of bookseller. He seems at this time to have shown some taste for geological and mineralogical studies. For some years

Haast seems to have travelled extensively in Europe, visiting Russia, Austria, and Italy. During the eruption of Mount Etna, in 1852, he is said to have ascended the mountain for scientific purposes. When living at Hanover, Von Haast received an appointment from an English company to go out to New Zealand for the purpose of showing its suitability for German emigrants. Von Haast arrived in Auckland, New Zealand, in 1858, and there he met the late Dr. Hochstetter, then one of the staff of the *Novara* expedition. At Hochstetter's request Von Haast accompanied him in his exploration of the North Island, south of Auckland, and a portion of Nelson, writing full reports of all he saw to the leading German periodicals. At the request of the Provincial Government of Nelson Von Haast then started on an expedition to explore the western and southern portion of the province. During this journey, in addition to the discovery of the Grey and Buller coal-fields, and of several gold-bearing districts, he filled in the topography of a large part of Nelson, and added largely to the knowledge of the geology, as well as of the fauna and flora of these alpine portions of New Zealand. A report of the journey was published by the Government, and in the beginning of 1861 Von Haast was appointed Provincial Geologist of Canterbury. During a number of years he devoted from six to eight months annually to the investigation of the physical geography and geology of the province. The result was the publication of the 'Geology of the Provinces of Canterbury and Westland'; and in the meantime Von Haast had sent various papers on the geology and physical geography of Canterbury to the Geological and Royal Geographical Societies. His paper on the mountains and glaciers of Canterbury Province, illustrated by a map in part drawn from his own surveys, was read at an evening meeting of the Society in February 1864, and published in vol. xxxiv. of the *Journal*. A subsequent paper on Altitude Sections of the principal routes between the east and west coasts of Canterbury Province appeared in vol. xxxvii. of the *Journal*. During his explorations as a geologist he commenced the formation of the famous Canterbury Museum, the first museum of the southern hemisphere. The entire collection consists of over 150,000 labelled specimens, thousands of which are of great value and rarity, and many are quite unique. Von Haast took much interest in education in New Zealand, and was one of the founders of Canterbury College, in which he was professor of geology and palæontology. In 1862 he founded the Philosophical Institute of Canterbury, the publications of which are well known in Europe. Von Haast took an active share in various exhibitions in which New Zealand was represented; and of the New Zealand section of the recent Colonial Exhibition he was the organiser, and took infinite trouble to render it a success, both from a scientific and an economical point of view. Von Haast did much to make known the geography of New Zealand, as well as its geology and palæontology; and the services he rendered to the interests of his adopted country will make his name long remembered there. He received many honours. In 1862 he was made Ph.D. the University of Tübingen; in 1867 he was elected a Fellow of the Royal Society, and in 1886 was made D.Sc. of Cambridge; in 1884 he was awarded the Gold Medal of the R.G.S. for his explorations; and of above fifty academic and learned societies in various parts of the world, he was a fellow or honorary or corresponding member. The Emperor of Austria conferred upon him a patent of hereditary nobility; a number of European Sovereigns sent him their orders; and Her Majesty created him a K.C.M.G. for his services in connection with the Colonial Exhibition. At the conclusion of the Exhibition, Sir Julius visited the great museums of the Continent of Europe, Paris, Brussels, Berlin, Dresden, Vienna, Venice, Florence, and others. Von Haast leaves a widow and family, who, we are glad to know, will be well provided for.

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PROCEEDINGS OF THE GEOGRAPHICAL SECTION  
OF THE BRITISH ASSOCIATION.

MANCHESTER MEETING, 1887.

*Thursday, September 1st (continued).*

**The Bangala.** By Capt. COQUILHAT.—This paper will appear in full in the Journal of the Manchester Geographical Society.

**The Congo below Stanley Pool.** By Lieut. LE MARINEL.—This paper will be published in the Journal of the Manchester Geographical Society.

**The Lower Congo: a Sociological Study.** By RICHARD CODDEN PHILLIPS. Will be published in the Journal of the Anthropological Institute.

**Notice sur l'État Indépendant du Congo.** By M. VON EETVELDE (Abstract).—The Congo State lies wholly within the tropics, and covers an area of 1,075,000 square miles. In sketching the physical configuration of the country the author drew attention to its magnificent water-highways, and to the exceeding fertility of certain districts. He stated that Captain Vangèle had been charged with a mission which it was hoped would definitely settle the Mobangi-Welle problem. Meteorological observations had not as yet been carried on for a sufficient time to enable us to form a definite idea of the climate. The climate, however, did not sensibly differ from that of other tropical regions; and had this in its favour, that diphtheria, scarlatina, the yellow fever, the cholera, and typhus fever were unknown. The many deaths which had occurred among the officials were due rather to exceptionally hard work, to the want of comforts, and to lack of experience, than to the badness of the climate. The hygienic conditions would improve with the progress of cultivation. Mr. Stanley estimated the total population of the State at forty-three millions, and looking to the accounts of recent explorers as to the populousness of certain districts in the interior, this appeared no exaggerated estimate. The inhabitants might roughly be divided into river-tribes and into tribes inhabiting the "Ngombe," that is, the uplands and regions away from the rivers. The former were traders and fishermen, the latter agriculturists and hunters, and carried on domestic industry, such as iron-smelting, the making of pottery, weaving, &c. On the lower Congo many of the natives sought employment as carriers. Four types of houses had hitherto been observed, viz. the rectangular hut, with a wooden frame and a thatched roof; the circular huts (on the Aruwimi); the houses of the Bakoi, with mud walls; and the huts which the people along the Ubangi built in trees. Many of the villages were stockaded. Human sacrifices on the death of a chief were still common, but the authorities of the State were successfully striving against this barbarity. Socially there existed three classes, viz. chiefs, freemen, and serfs. The civilising influences brought to bear upon the existing conditions were having a visible effect. Missionary enterprise was expanding, and commerce rapidly developing. The railway which it was proposed to build to Stanley Pool would give access to the wealth of the interior. Courts of justice had been established, and atrocities, such as were referred to in a Report by Mr. Consul D. Hopkins, had become impossible. The suppression of the slave razzias, the abolition of human sacrifices, the introduction of an impartial administration of justice, the cessation of tribal wars, the protection and expansion of commerce, and the establishment of public security, were the objects aimed at by the State.

**A Visit to Diogo Caõ's "Padraõ" at the Mouth of the Congo.** By R. E. DENNETT.—The author described a visit, in April 1887, to the supposed fragments



of Diogo Caõ's "Pillar," near Shark's Point, which had then recently been discovered (or rather rediscovered) by Baron Schwerin and Señor F. J. de França. The latter had been told by the natives of the existence of a fetish made of stone, and as no stones are found for miles around San Antonio, where he resided, he at once concluded that the fetish would prove identical with the "Pillar" set up by the discoverer of the Congo. The natives alleged that the fetish had fallen from heaven, and Señor França's persuasive powers were called into use to induce them to reveal its whereabouts. The author landed on the inner side of Shark's Point to avoid the surf. A short walk through coarse grass led past "King George's Palace," close to which are now the tombstones removed from the submerged English cemetery. He then crossed the point, went past the site of the old cemetery, now covered by the sea, and at a few minutes' distance from the shore ascended to a hillock, where, in a dense bush, the venerated stones were discovered. The bandages of cloth, which until recently covered them, had been removed. The fragments consisted of a square base, 27 inches in height, part of the cylindrical column, 12 inches in diameter and 18 inches in height, and of two ball-shaped stones, all of white marble.\*

**On Acclimatisation.** By Dr. A. OPPLER, of Bremen. (Summary).—"Acclimatisation" means the adaptation of an organised being to new surroundings without injury to the individual, or danger to the existence of the species. Our present views as to the origin of the races of man are based upon the possibility of man being able to become acclimatised in regions climatically different from that which has given him birth. If this is not conceded we are compelled to assume an indefinite number of centres of creation, from which man spread over the earth. The unity of race is generally conceded to certain great human families, such as the Mongols, the Indo-Europeans, the Jews, and the American Indians. The last extend from the glacier-fiords of Tierra del Fuego to the Arctic circle, and from the hot and humid lowlands high up to the dry and cold plateaus of Peru and Bolivia. These Indians must have originated from one primeval pair, whose descendants in course of time adapted themselves to the most varied climatic conditions. The Mongols, too, are found in the most varied climates, from the hot and humid plains of Anam to the arid highlands of Tibet and the frozen soil of the Tundras. Physically the Tatar of Lenkoran yields in no respect to his kinsman in the delta of the Lena. The Indo-European family extends from the moist lowlands of the Ganges to Scandinavia and Iceland, and in its case acclimatisation was effected in the course of no more than 2000 years. The Jews further illustrate the faculty of man to become acclimatised. At the present time there exists probably no people which still occupies the soil which originally gave it birth.

Having regard to the over-population of Europe the question of acclimatisation becomes one of practical importance. At the present rate of increase Europe doubles its population in the course of a hundred years, and as the resources of the various

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\* Mr. Ravenstein (who read the paper in the absence of the author) said that the stones described had been referred to by previous explorers. Dr. Bastian alluded to a Portuguese who had visited them, and who had seen inscriptions upon them, which he was unable to decipher. Sir Richard Burton had visited and described what were clearly the same fragments in 1863. It hardly admitted of a doubt that the Shark's Point of the Admiralty chart was identical with the Punta do Padrão de S. Jorge. A thorough exploration of the old Duchy of Sonyo would lead to interesting discoveries bearing upon the history of the early Portuguese occupiers and the missions, and could easily be effected by one of the gentlemen attached to the factories, such as Mr. Philipps or Mr. Dennett.

countries do not increase at the same rate emigration and colonisation have become a necessity. Up till now European emigration has mainly flowed to countries presenting climatic conditions similar to those of Europe, but the temperate region are gradually filling up, and the question arises whether the tropical regions might not afford new homes to European emigrants. On this point opinions differ widely. Henricus Rantzovius already says, "Est optimus aër, qui unicuique est natus." G. F. Kolb, the eminent statistician, looked upon the theory of a "gradual acclimatisation" as a deception. Prof. Virchow maintains that neither individuals nor families can become acclimatised in malarial tropical regions, the families dying out after three generations. Certain tribes or races are, however, capable of offering greater resistance to the deleterious influences of a tropical climate, as for instance the Jews, and certain Southern Europeans, in whose veins flows Arab blood. Dr. Hirsch and Dr. Fritsch agree in the main with these views, and they are also supported by medical men who have lived within the tropics, such as G. A. Fischer, Dutrieux, and J. Montano. The last says, with reference to the Philippine Islands, that Europeans who have lived there during eight or ten years suffer from anæmia, which compels their temporary return to a temperate climate to recruit their health. Women suffer more severely from the climate than men, and children of Europeans suffer most of all.

Among authorities who maintain that Europeans are capable of becoming acclimatised within the tropics M. A. de Quatrefages holds a foremost place. He maintains that the Aryan race is capable of accommodating itself to every climate, although a victory over nature may be secured only at heavy sacrifices and in the course of generations. Many explorers, including Livingstone, Stanley, Pogge, and Felkin, hold the same view. The arguments advanced in support of either of these views are, however, inconclusive, for there are no trustworthy statistics which would enable us to assert that European families have survived in tropical countries for more than three generations. On the other hand, it cannot be denied that the death-rate among Europeans residing there is exceedingly high. If an attempt should be made to establish European colonies within the tropics, only individuals physically and mentally qualified should be selected, and they should previously to starting for their destination, be furnished with hygienic instructions suited to the tropics. In order to enable this to be done effectively, a comprehensive and systematic study of the hygienic conditions of tropical countries is called for.

The author, having given a rapid sketch of the progress of European colonisation since the time of Charlemagne, stated that of 80 million Europeans and their descendants, who lived at the present time in other continents, no fewer than ten millions had found a home within the tropics (or rather within the isothermal lines of 68° F.). Of these ten millions fully nine millions lived in tropical America.

*Friday, September 2nd.*

**The Raian Mæris.** By COPE WHITEHOUSE, M.A.

**The Desert from Dahshur to Ain Raian.** By Captain CONYERS SURTERS.

**The Bahr Yusuf, its present state and uses.** By Captain R. H. BROWN, R.E.

The above three papers are published in the October No. of the 'Proceedings,' ante, p. 608.

**Trade Prospects with the Sudan.** By Major C. M. WATSON, C.M.G., R.E.

**The Red Sea Trade.** By A. B. WYLDE (of Jeddah).—The author of this paper dealt very exhaustively with the trade of the Red Sea ports. He spoke strongly in favour of the Suakin-Berber route, as compared with that down the Nile to Cairo, which was favoured by Egyptian officials. Tribal ports, such as Mersa

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Haiaib (one of the healthiest places on the Red Sea), Roweyat or Mahamed Ghoul, Aghig, and Trinkitat should be opened to trade, which would do away with the necessity of members of one tribe passing over the territory of another, and with the frequent blood-feuds to which this led. He had spent from May last year until quite recently among tribes avowedly unfriendly to the Egyptian government, but had been treated everywhere with the utmost courtesy and hospitality. They were all anxious that trade should be resumed. When the trade had been got back, and when camels were unable to cope with it, then the time for building a railway from Suakin to Berber would have come. By means of this railway the coal required by steamers navigating the Nile could be carried. The Sudanis ought never again to be handed back to their old Egyptian or Turkish rulers, whom they detested and despised. The question of the Sudan could and ought to be settled at once, and the country would cease to be a source of annoyance, and become another outlet for British trade.

**Between the Nile and the Red Sea.** By E. A. FLOYER, of the Khedivial Civil Service, *ante*, p. 659.

**Account of a recent Visit to the ancient Porphyry Quarries of Egypt.** By W. BRINDLEY, F.R.M.S.—Egyptian porphyry has been sought after from the earliest times, as one of the most precious building stones. Ancient writers differed as to the whereabouts of the quarries from which that stone was obtained, and in modern times they were literally rediscovered by Burton and Wilkinson in 1823, and subsequently visited by Lepsius in 1845. The information published by these visitors proving of no immediately practical value, the author determined to follow in the footsteps of Wilkinson, and, accompanied by his wife, he came to Cairo in February last. Having examined the ancient granite quarries at the first cataract, which supplied deep red, rose, and dark grey stone, which was quarried by metal wedges, and not wood (as is generally supposed), the author started from Kenh with a small caravan and supplies calculated to last three weeks. Passing the remains of several Roman stations, the author, on the fifth day, reached an excellent well in the charming Wadi Kitar, hemmed in on three sides by precipitous mountains. Soon after leaving this valley he crossed the watershed (2400 feet above the Nile), and then travelled along the flank of the immense porphyry mountain of Jebel Dukhan as far as an old Roman station with an old fort. The morning after his arrival the author ascended to the top of a pass (3100 feet), without having found even a fragment of porphyry; but espying, by the aid of a good field-glass, porphyry colouring on the opposite mountain he resolved to go there, and his delight knew no bounds when he found the ground there strewn with pieces of the most sumptuous porphyry, and discovered a pitched way or slide, 16 feet wide, down which the blocks were lowered. Further examination led him to the locality where the Romans had extracted their grandest masses, and he found that these quarries had yielded not only the usual spotted variety but also the brecciated sorts and green-greys. The great quarry was at an altitude of 3650 feet above the sea, and a road led down to it to an ancient town with workshops. A path led hence to the old town in the valley, further up which are the ruins of a Roman temple. The blocks were formerly carried to the Nile, a distance of 96 miles, but they will in future be conveyed by a gentle incline to the Red Sea, which is about 25 miles distant. On his return to Cairo the author secured a concession to rework the quarries, the terms of which have since been ratified.

**Matabeleland and the Country between the Zambesi and the Limpopo.** By Capt. C. E. HAYNES, R.E.—This region has been famous from a very early age for its productive gold-mines. They were being worked when the Portuguese first

arrived in the country, and some of the mines still exist, but the slave trade and the inroad of the Matabele power have reduced all native industries to a very indeterminate quantity. The Matabele are the near kinsmen of the Zulu, and have nearly identical customs. Both wear that unique head-dress, the gum-ring, their badge of manhood. The Matabele were driven out of Zululand about the beginning of the century, and under their chief Umselikazi they became a terror to all the Bechuana tribes living north of the Vaal river. Attacked by the Voortrek Boers, and by the Zulus under Panda, they were forced to retire north of the Limpopo, and finally settled down in the midst of the Makalaka and Mashona tribes. About the same period the Gaza kingdom was established by Manikuzi, one of Chaka's generals, to the east of the Sabi river. This tribe, under the government of Umzila, proved itself a fast ally of the Matabele. The invasion of the Matabele has caused the annihilation or disruption of the tribes with whom they came in conflict. There are only fragments of the aboriginal people now, who still carry on in a furtive manner some of their old industries, such as gold-digging, iron-working, and weaving. The climate of Matabeleland resembles that of the Transvaal, and the high veldt which ranges from the Nata river to the vicinity of the Zambesi near Tete, is well fit for European settlers, and promises to become a prosperous agricultural region, with numerous local markets at hand in the mining districts. Care should be taken to protect the forests there. Their wholesale destruction has already begun. The Gaza country and the low veldt is not so salubrious, and, generally speaking, the Zambesi valley is malarious. Agriculture at present is in a depressed state. There is plenty of arable land on the high veldt, and excellent wheat, as well as all English vegetables, can be grown alongside the banana and orange. The high and middle veldts are more suitable for stock-farming. Facilities for irrigation abound. The tsetse does not exist on the high veldt. The mineral wealth of the country still awaits development. The Tati gold-field is now being worked by an English company, but a nod from the Matabele king may at any time put an end to this. It is a pity that this infant colony should not have been made the basis from which British interests in Matabeleland might be protected. The extension of the railway from Kimberley to the Tati mines would have a most beneficial effect in attracting settlers. Complaints have lately been made that northern Bechuanaland is gradually drying up, and it is not difficult to prove that at one time Lake Ngami was drained through the Botletle, Lake Makarikari, and the Shashi into the Limpopo.

**A Note on Houghton, the African Explorer.** By Major Sir HERBERT PERROTT, Bart. (a great-grandson of Major Houghton).—Major Daniel Houghton, who perished in an attempt to reach Timbuktu from the Gambia, was a descendant of the ancient family of De Houghton, De Houghton or Houghton Tower, Lancashire. He was educated at the Charterhouse, and married Philippa, a sister of the two last Baronets Evelyn, of Wotton, Surrey. He entered the army, and served in the 59th Foot, and subsequently became Consul-General at Morocco. His explorations were undertaken at the instance of the African Association. He left two sons, one Commander Houghton, R.N., who served under Nelson, the other a midshipman, R.N., who was lost with all hands on board the *Magnet* sloop of war. His services were alluded to in a sermon preached on Dec. 12, 1872, by the Rev. John W. Irvine, entitled "Brethren and Companions," and published by H. S. King and Co., 1873.

*Friday, September 2nd.*

**Geographical work in Western Australia, 1870-1887.** By the Hon. JOHN FORREST, C.M.G., Commissioner of Crown Lands, and Surveyor-General of Western Australia.—Western Australia is about one-third of the Australian

continent, and comprises all that portion lying to the westward of the 129th meridian of east longitude. Its area is about one million square miles, and is therefore eight times that of the United Kingdom of Great Britain and Ireland. Previous to the year 1869 scarcely anything was known of that vast area of Western Australia lying to the eastward of the narrow fringe of settlements along the western coast, and not much more than one-fourth of its area was explored—in other words, about 750,000 square miles of territory was represented by a blank space on the map of Australia. The object of the paper was principally to show what has been done in regard to exploration since 1869, and specially to refer to the development in recent years of the extreme northern portion of Western Australia, locally called the Kimberley District, which contains about 134,000 square miles. Mr. Forrest continued as follows :—

Previous to the year 1870 Western Australia had existed for forty years in a very isolated condition, and had very little means of communicating with the eastern colonies, or with other parts of the world. In 1870, however, I travelled from Perth to Adelaide along or near to the south coast, a route that had been travelled by Eyre in the very early days of the colony, and under very great difficulties. Benefiting by his experience, and keeping further inland, I was enabled to perform the journey without very great difficulty, and in about five months after leaving Perth I entered Adelaide with my small party of six persons all told, and with my horses and equipments. One of the chief objects of the expedition was to determine whether a telegraph could be erected, and my report being favourable, the work was undertaken and completed.

The result to Western Australia has been that the isolation in which it had existed so long was entirely removed, and we were at once placed in hourly communication with the eastern colonies of Australia and also with the rest of the world. I also found that the country along the shores of the Great Australian Bight was an elevated plateau, averaging from 250 to 500 feet above the sea, of limestone formation and well grassed, but entirely destitute of surface water. No doubt water will eventually be obtained by sinking, or by storage in dams or tanks, and then this large area of good country will be utilised, and be of great value for pastoral purposes. After this journey from Perth to Adelaide a great deal of attention was drawn to the great unknown interior of Australia which remained a blank on the map, and between the year 1873 and 1876 several expeditions were sent out with the object of crossing from the telegraph line between Adelaide and Port Darwin, which had just been erected, to the settlements on the western coast. Several of these expeditions failed to accomplish what was intended, but Warburton, Giles, and myself were successful. Warburton in 1873 left the telegraph line at Alice Springs, travelled generally along the 21st parallel of latitude, and reached the sea-coast by following down the De Grey river on the north-west coast. For the most part this journey was through an inferior country covered with triodia, and water was also very difficult to find. Warburton was provided with camels, and managed after great difficulty and privation, having to kill his camels for food, to complete the work he had undertaken. In 1874 I travelled from Champion Bay, on the west coast, to the telegraph line, along the 26th parallel of latitude, a distance by the route followed of nearly 2000 miles. I reached the Peake telegraph station about 600 miles to the north of Adelaide. This expedition occupied six months. From Champion Bay for several hundred miles was through a fertile and well-grassed country, but after the watershed of the rivers falling into the western coast was reached, I encountered the same inferior district crossed by Warburton further to the north. I was not provided with camels, and had very great difficulty in making progress, owing principally to the absence of water. The country was slightly

undulating, and was from 1500 to 2000 feet above the sea—it was covered with triodia, grassy valleys of limited extent intervening. Here and there masses of hills stood out above the surrounding country, sometimes rising as much as 1200 feet above it. The prevailing rock in this country was the tertiary desert sandstone, so continually met with in central Australia.

Up to this date (1874) the predictions of geographers and others that the interior of Australia might contain a large inland lake, and that beyond the head-waters of the Murchison, rivers might exist running into the interior and emptying themselves into this lake, had strong grounds for their opinion. It was said, and I think, with much to support it, that as the western rivers took their rise at least 1500 feet above the sea, there would most probably be a watershed, and on the other side, rivers would be found running to the eastward.

These predictions and hopes were for ever dispelled by my expedition of 1874, and the fact was established that the drainage of the interior was absorbed by evaporation, and by the salt marshes which are found here and there. In some cases such as Lake Amadeus and Lake Eyre, these marshes are of enormous extent, and rivers several hundred miles in length empty into them.

The next explorer who crossed from the telegraph line to the western coast was Giles, in 1875–76. He crossed to the west coast generally along the 30th parallel of latitude, and returned to the telegraph line generally along the 24th parallel, being on the first expedition midway between my journeys of 1870 and 1874, and on the return journey between that of Warburton in 1873 and my own of 1874. In these expeditions Giles had the advantage of camels and was able to perform long journeys without water, in one instance travelling over 300 miles in 17 days without finding any. His experiences were similar to those of Warburton and myself, the same desert sandstone, the same triodia, the same occasional grassy valleys, and the same difficulty in procuring water. Thus four distinct lines of exploration were accomplished between 1873 and 1876, and this through country that was before 1873 a blank space on the map of Australia. There does not, in my opinion, remain at the present time any problem of great geographic interest unsolved on the Australian continent.

The next exploration of importance was that of my brother, Alexander Forrest, in 1879, and was within the limits of the rivers falling into the sea, being from the De Grey river on the north-western coast to Port Darwin, and for the most part along the 18th parallel of latitude. This route was outside the desert sandstone tracts traversed by Warburton, Giles, and myself, and was generally through a well-watered and fertile country. The Fitzroy river was ascended and mapped as far as the Leopold Ranges, which are about 2000 feet above the sea. It was found to be an almost permanent stream, running through fertile alluvial grassy plains; one of its tributaries was named the Margaret, and was followed for over 100 miles to its source, and after crossing the watershed, a large river, named the Ord, was discovered, and found to empty into Cambridge Gulf. The result of this expedition has been the opening up of this portion of Australia, its occupation by flocks and herds, and the discovery of a payable gold-field.

The whole distance between Roebuck Bay and Cambridge Gulf has since been carefully triangulated, and a good topographical map has been compiled, while a country which two years ago had scarcely been visited, except by the first explorer and afterwards by a few others, is now intersected with roads and cart-tracks, and it is an easy matter to drive from King Sound to Cambridge Gulf. This hurried settlement has been chiefly caused by the discovery of gold at the head-waters of the Fitzroy and Ord rivers, which has attracted large numbers of people from all parts of Australia and New Zealand.

The geology of this part of Australia is most interesting, and although it has been to some extent examined by the late E. J. Hardman, whose labours have been much appreciated, and whose sudden death we all so much deplore, there is still a vast amount of most important and valuable work to be done. The immense basaltic plateau, named by Hardman the Antrim Plateau, covering an area of quite 3000 square miles, the numerous other outcrops of basalt, the carboniferous limestones and sandstones, the numerous gold-bearing quartz reefs, all these and many others present a most inviting field for the geologist.

In a river-bed in lat.  $17^{\circ} 20'$  S. and long.  $125^{\circ}$  E., not far from one of the numerous limestone ridges, Hardman discovered a fossil bone of the *Diprotodon Australis*, the first specimen of this extinct marsupial that has been discovered in Western Australia; and this discovery now I think conclusively proves that this gigantic animal was common to the whole of Australia.

In 1883, and again in 1886, I visited extreme North-western Australia. On the first occasion I travelled from La Grange Bay to the Fitzroy river, ascended it as far as the St. George Range, and also examined the country as far north as Port Osborne. The country consists of rich alluvial grassy plains, is well watered, is admirably suited for settlement, and is fast being stocked with cattle, horses, and sheep. A township, named Derby, with a Government staff, was also established on the eastern shore of King Sound. In 1886 I had a similar duty to perform in founding a Government station, and selecting a township named Wyndham on the east shore of the west arm of Cambridge Gulf, and both these towns now bid fair to be places of much importance; Derby on King Sound being the outlet of the fertile valley on the Fitzroy river, and Wyndham on Cambridge Gulf the outlet for the fertile valley of the Ord, while both are the ports for the Kimberley gold-fields. The gold-fields are situated about 250 miles from both Derby and Wyndham. Good harbours exist at both places, the one at Cambridge Gulf being one of the best in Australia.

It is very encouraging for the future of this part of Australia, that in such a short time two flourishing towns should arise, that a gold-field should be discovered, and that flocks and herds should be depasturing on its rich grassy plains, which in the long past have remained unknown and unutilised.

Australian exploration of the adventurous kind is now almost a thing of the past. Within less than a century, and for the most part within the space of an ordinary lifetime, another Britain has arisen at the Antipodes.

*Monday, September 5th.*

**The Beginning of the Geography of Britain.** By Prof. BOYD DAWKINS, F.R.S.—Exploration is now progressing so swiftly that in comparatively a few years the whole earth will become familiar to geographers, with the exception of perhaps a limited area round the poles, and we can look forward to a time when there will be little left of the surface to conquer. There is, however, *a geography in time*, as well as *a geography in space*, which has to be mastered. The present surface cannot rightly be studied without knowing how it came to be what it is, and geology stands to geography in the relation of ancient to modern history. In this communication an outline is laid before the Section of the first beginning of the geography of Britain, as an example of the method by which the results of geological research may be used for the building up of *a geography in time*.

The results of the deep-sea expeditions, and more especially of the *Challenger*, prove that the accumulations in the waters of the sea are deposited in a definite order and position. While the depths of the ocean are occupied by large areas of Globigerina ooze and of red clay, the sea-bottom at depths varying from about 750 fathoms

to the shore-line is covered by detritus derived from the land and accumulated in bands more or less broad, and lapping round the present shore-line. We may follow Murray in dividing them into abyssal or deep-sea deposits, and marginal, or those formed in water comparatively shallow. If we now pass on to the examination of the marine strata of the crust of the earth, the first point to be remarked is that the abyssal deposits are conspicuous by their absence, while all the marine stratified rocks belong to one or other of the marginal series; in other words, have been accumulated on the borders of an ancient land at depths not exceeding 1000 fathoms, and most of them at a depth very much less. The second point is, that not only do the marine strata of the earth's crust occur in definite bands, but that they are arranged in a definite sequence, which indicates the position of the *massif* of the land on the shores of which they were accumulated. To turn, for example, to the geological map of Britain. The newest rocks (tertiary) occupy the south-eastern counties, while the secondary and primary rocks form a series of bands running from the north-east to the south-west, the older being to the west, until the series is at last abruptly terminated by the crystalline schists, gneisses, and granitoid rocks of the Archaian formation. If, again, we make a traverse from the Caspian Sea through St. Petersburg and Norway, we traverse similar bands of secondary and primary strata, until we are in like manner brought up by the Archaian rocks. On the other side of the Atlantic a traverse from the Gulf of Mexico to the Canadian lakes reveals to us the existence of similar bands of rock, ranged in the same order, and abruptly ending as before with the Archaian or Laurentian strata. It is clear, therefore, that an ancient continent existed in the north and west, composed of Archaian rocks, and which I have therefore named Archaia,\* on the margin of which the newer rocks were laid down in both the Old and the New Worlds during the primary and secondary periods. How far it encroached southwards into the depths of the Atlantic may be left an open question. The British Isles appeared another world (*alter orbis*) to the Romans, because they were isolated from the continent, a view which is true not only historically, but from the geological point of view. They have been built up of materials accumulated on the ever-changing south-eastern margin of a great continent, which was not Europe but Archaia.

Britain in the Archaian age was covered by a waste of water, broken only by a few volcanic cones, to the west of Snowdon, of St. David's, in the district of the Malverns, Wellington and Church-Stretton in Shropshire, and in Charwood in Leicestershire. In my opinion we must ask in vain the question, "Where was the shore of the Archaian Sea?" So profoundly have the rocks been altered and crumpled since they were deposited. We may, however, infer from the enormous crumpling of the schists that the surface of the earth as a whole has contracted to one-half of its original extent at the close of the Archaian age and before the depositing of any of the Cambrian rocks. By these changes the geographical boundaries have been wholly obliterated.

It is only in the succeeding, or Cambrian age, that we are able to mark down the shore-line of Archaia, by massive shingle beaches some 8000 feet in thickness in the Western Highlands, composed of pebbles torn from the Archaian cliffs. At the beginning of the Cambrian age the continent of Archaia extended, as Hull points out, from the western border of the Highlands in a south-westerly direction, so as to touch the extreme north-west of Ireland and to enclose the area of the Hebrides and an indefinite region to the north-west now covered by the Atlantic. It probably extended to the north-east so as to include Norway. From this shore the sea extends over the whole of the British Isles with the exception of small islands in the neigh-

\* Royal Institution Lectures, 1886.



bourhood of Snowdon and Anglesey, at St. David's, the Malverns and Church-Stretton, Charnwood near Leicester, and Lickey near Birmingham. During the Cambrian period the whole British area sank until it was covered many thousand feet deep with Cambrian sand-bank and mud-bank. The sinking continued during the whole of the Lower Silurian or Ordovician times, the sediments from the land accumulating sufficiently swiftly to prevent any very deep water in the British area. At this time no portion of the continent of Archaia touched the British Isles. Active volcanoes, however, rose above the waters, out of whose ashes and lava-streams the higher mountains of Cumberland and North Wales have been carved. They occurred also at St. David's and along the line of the Severn. The cliffs of Archaia are proved not to have been very far to the west of Scotland, from the large blocks of Archaian rocks in the (Ordovician Lower Silurian) strata of Wigtonshire.

We have now to record a profound geographical change in the British Isles, at the close of the Ordovician times. The Ordovician (Lower Silurian) rocks were lifted up above the waters and denuded before the deposit of the Silurian (Upper) strata. In the Highlands the rocks underwent such enormous strain that they were folded and broken and thrust against the *massif* of Archaia with such force that an enormous slice of country in the neighbourhood of Durness has, according to A. Geikie and Peach, been pushed 10 miles to the west of its original position in such a manner as to bring the older Archaian floor on which they rest immediately above them. To this period also belong the faults which have caused the line of weakness now marked by the Great Glen as well as the parallel ranges of mountains.

The shingle-banks of the Upper Silurian sea in the central valley of Scotland mark the shore-line which extended over the extreme north-western parts of Ireland. According to Hull they also mark the presence of an island in Southern Scotland, in Cumberland, in the district of Snowdonia, in Radnorshire, and at Church-Stretton in Shropshire. The whole of these islands, however, were sinking during the Silurian age, and all, with the exception perhaps of Snowdonia, were covered by the Upper Silurian waters.

While this southern area was sinking the marine plateau of the Highlands, so graphically described by A. Geikie, was being attacked by the subaerial agents of denudation, and the line of faults in the Great Glen, and the area of Caithness, and the eastern part of the Southern Highlands, eroded and cut up into valleys, in the lower parts of which the massive shale beds and sandstone of the old red sandstone lochs was accumulated.

From this Silurian age down to the Middle Tertiary time the Highlands, or some portion of them, have formed part of Archaia—a continent which allowed of a free migration of animals and plants from America by way of Greenland to Europe, or *vice versâ*, throughout the primary and secondary periods, and as far down as the Miocene division of the Tertiary.

**Report of the Committee on the Study of Geography at Oxford and Cambridge.**\*—The Committee met on the 12th January, 1887, and decided "That the Council of the British Association be requested to give their support to the representations and offers made to the Vice-Chancellors of the two Universities by the Council of the Geographical Society in letters dated July 9th and December 9th, 1886." †

**The Teaching of Geography at the Universities.** By H. J. MACKINDER.  
—To give a practical value to the discussion on the teaching of geography as

\* See 'Proceedings,' 1886, p. 740.

† Ibid., p. 529. On December 9th a letter of similar purport was addressed by the President (General R. Strachey) to the Vice-Chancellor of Cambridge.

applicable to the Universities, I propose exposing to the fire of your criticism my programme for the coming academical year. There will be two courses of lectures: course A, on the principles of geography; course B, on the geography of Central Europe. In these lectures no definition of geography will for the present be attempted. But to prevent geography becoming a discussion of things in general, a distinct line of argument will be kept steadily in view. This we may indicate thus:—

The basis, a descriptive analysis of the earth's surface, including in that term the atmosphere, the hydrosphere, the form of the lithosphere, and the material of its surface. From this we shall reason backwards to causes, and forwards to effects. The causes largely geological, the effects mainly on man; in other words, in the former stage we answer the question "why?" for physical, in the latter for political geography.

Course A is intended to be annually repeated, subject of course to improvements. It will deal with the methods and principles of geographical observation, reasoning and exposition, with the great circulations in air and water, with the various types of features, with the broad facts of distribution of animals and plants, and lastly, with the dependence of man on geographical conditions and the distribution of his social attributes. The classification will not be topographical, and the examples will be drawn from all parts of the world.

Course B will vary in subject from year to year, but will always be an analysis of a particular region. I select Central Europe to begin with, because it best fulfils the necessary conditions. Good topographical surveys give us with precision the form of the earth. Geological surveys are available for causal reasoning, and a long history gives us abundant scope for the exhibition of effects.

It is impossible to foretell the nature of the classes, but I trust to see at course B historical students; at course A, those who intend becoming masters in our great public schools, and at both a few who intend being geographical professors, politicians, &c.

As regards examination, I am inclined to doubt the ultimate advantage of the too speedy introduction of examinations. We shall lose, perhaps, in the number of students at first, but on the other hand, we require time to train teachers, time to begin the traditions of a school, and as in this time we are bound to make experiments and mistakes, let us at least make them with our hands untied by a syllabus.

One method of stimulating exertion is, however, not open to the same objection. Let us have a prize, but a prize under special conditions. Provisionally I would suggest the following:—Make a list of say twenty small regions, carefully selected, not too distant from England, regions of historical and physical interest. Let the student select one of these at will; let him read up the literature on the subject, and then write an essay. Award the prize by the essays, and let the winner use the money in visiting the region he has treated theoretically. There let him revise his essay on the spot, or, as he will more probably do, rewrite it. Then let it be published. Thus I hope we might help high training, and at the same time produce a valuable set of monographs. I would add also, as a preliminary qualification, attendance at the reader's lectures.

As regards diagram-maps, I advocate many similar outline maps, each coloured to represent one set of features, hung side by side.

Lastly, as to the relation of physiography to geography. It is impossible to teach rational geography without postulating on elementary but sound knowledge of certain chemical and physical laws and facts, chiefly relating to air and water. This training, it is true, is required for other scientific studies, and even for the intelligent newspaper reader; but it is indispensable to the geographer, and until the

schools send us boys so trained, or until the Universities supply such a course for their students generally, the geographical lecturer will have to deal much with physiography. But physiography is not geography; it lacks the topography, which is the essential element in geography.

In the discussion which followed Mr. Mackinder's paper:—

The Rev. Canon TRISTRAM opposed Mr. Mackinder's view that geography had but little concern with geology, and criticised the comprehensive range of subjects which it appeared was to be taught in the new geography.

Dr. YEATS congratulated Mr. Mackinder on the grasp which he had of his subject.

Professor BOYD DAWKINS thought there would be difficulty in the carrying out of what Mr. Mackinder had described as a workable scheme. It seemed to him to cover almost everything, except the three little maps which he (Professor Dawkins) had ventured to bring before the Secretary as a humble offering from the geological side of the hedge. He did not know whether they called that geography or geology; it was the natural outcome of geology, but if it came to dividing geology from geography he could not accept the hard and fast line which Mr. Mackinder was inclined to draw. If we cut off geology from geography we did exactly the same mischief as by separating ancient from modern history. He therefore felt he ought to utter a few words of protest.

Professor SEELEY argued for the importance of geology in geographical study. He appealed most earnestly that they should not sever the present from the past, that we should not take the existing state of the earth as an ultimate fact in any one phase, and not be content to borrow our knowledge from any department of science and assume we could commence with its elementary data and build on them a magnificent superstructure of our own.

Mr. RAVENSTEIN said that the scheme which had been placed before them by Mr. Mackinder was an ambitious one, no doubt, and one which he would perhaps be unable to carry out in its entirety within the limited time placed at his disposal. He thought that Mr. Mackinder intended to approach his subject in the proper spirit. He was more especially pleased to find that it was intended to devote considerable attention to the study of facts, for it was the possession of facts alone which justified their entering upon those geographical speculations, which appeared to exercise so great a fascination upon certain minds. Geography presented, no doubt, many aspects according to the side from which you approached it, and he trusted the multiplication of chairs of geography in the Universities would render it possible to do justice to all of them. From the Universities an adequate knowledge of geography would spread to the training colleges until the whole body of our teachers were permeated with it.

Mr. COPE WHITEHOUSE suggested that geologists themselves needed teaching in geography. In order to correct what in his mind was an error on the part of the geologists, he had just written to Sir H. Roscoe, offering to defray the expenses of an expert to report upon the caves in the island of Staffa, and upon the differences which exist between the illustrations of those caves in the standard works in use in England, America, and Germany.

Professor WILKINS said Mr. Mackinder evidently meant to teach geography on a scientific basis, but not to teach geology or biology. He anticipated that Mr. Mackinder would have some difficulties in his new work at Oxford, and chiefly because of the varying degrees of knowledge with which the students would come to him. To place the study of geography on a satisfactory basis the University should arrange that students should be up in the subjects which would enable them to follow the teaching of the geographical reader, and which it was no part of his duty to teach. Professor Wilkins mentioned incidentally that in the Manchester

Grammar School geography was taught in a manner as attractive to the boys as it was creditable to the teachers.

Mr. MACKINDER, in reply, claimed that the subjects he had indicated could be looked at from different points of view, and that the point of view of the geographer would bring into prominence a special series of facts bearing in a special way on geography. He had in Manchester last winter delivered a course of geographical lectures, somewhat on the lines he proposed to adopt at the University, and with gratifying results. He claimed, therefore, that the practicability of his scheme had to some extent been proved by actual trial. His hope was at first to work with a small class of men, who would afterwards go through the land teaching the results they had arrived at in common.

**The Ruby Mines of Burma.** By GEO. SKELTON STREETER.—The ruby mine tract, which the author reached in the company of a military column, is a broad valley some twelve miles long, lying in the slope of the Sibwi Dung or Golden Mountain. The valley bears unmistakable signs of volcanic origin, its principal feature being ridges and isolated peaks of gneiss, blackened by the hand of time. The mines are of three distinct kinds: the first is furnished by the metamorphic rock, whose mass is traversed in all directions by huge fissures, filled with a soft, reddish, clayey earth, generally containing rubies. The mines are being worked by extracting the earth between the walls of rock, as far as practicable. The second variety of mine is found on the sides of these rocky hills, where diversified strata of clayey consistency have been upheaved. This earth the natives wash away slowly, by a simple system of hydraulic mining, the water being brought from the mountain-streams by means of bamboo or timber aqueducts. The last system of mining is by sinking pits in the lower or level parts of the valley, and washing the earth extracted by the hand. In these pits the ruby-bearing earth is found in two layers, the lower layer being the richer. The rubies extracted from these pits are inferior in value to those obtained from the hill mines.

The mining region was by no means a barren stretch of land, disfigured by huge pits and shafts. The contrary was the case, for the slopes of the hill were covered with trees, shrubs, and flowers, a great part of the level country was under cultivation, and numerous small villages were to be seen, sheltered by the spurs that run down into the valley. Mogók, the capital of the district, contained some well-built timber houses, three large kyungs or monasteries, covered with beautiful carvings, and several rest-houses. It was surrounded on every side by pagodas, many of which were covered with gold-leaf, erected by the principal men or by fortunate miners. From it, paths or mule tracks led direct to Bhamo, Momeit, and Mainlung, and also apparently to Momein, which the Chinese considered their frontier town. On every fifth day a large market was held. The inhabitants of Mogók were mostly Burmanised Shan, but the villages around were inhabited by quite a variety of tribes. Those extending down to the Irawadi were inhabited by the pure Burmese. Then there were Palungs, who cultivated tea on the mountains between China and Burma; Lisaws in some of the more remote villages, who grew paddy and traded in pigs and firewood; Katheys from Manipur; Meinthas from the borders of Yunnan, and also many pure Chinese, the Panthays or Mahomedan Chinese being the principal traders. Just north of the ruby mine valley, on the top of the Sibwi Dung range, 6000 feet above the level of the sea, a sanitarium for the British troops had been built, and this station, christened Bernadmyo, promised to grow into the Simla of Burma.

Mr. A. R. COLQUHOUN (Commissioner of Bhamo, Upper Burma) said he thought that the oil and amber industry would be of more value than the ruby mines in Burma. He found the Burmese not ill-disposed to our Government

or ourselves, but they looked to us very naturally to understand and tolerate their old customs and prejudices. Those charged with the administration of the country were doing their best to attach the clergy of the country and to gain the sympathies of the people, without which we should not get a satisfactory hold of Burma or be able to govern it properly. The Chinaman, he remarked, is the heart and soul of commerce in that region. Mr. Colquhoun warned the public against attaching too much value to minerals in Burma. The real wealth of that country was not in the mines but in the agriculture, forest, and hillside land, with its great possibilities of improvement. He thought it would be most improper to hand over this large country and intelligent people to be exploited by an English syndicate.

**Siam.** By J. M'CARTHY.—Will be published in a subsequent No. of the 'Proceedings.'

**The Valley of the Rio Doce (Brazil).** By WM. JNO. STEAINS.—The author in 1881 left England for Brazil in the employ of Messrs. Hugh Wilson and Son, contractors for the construction of a railway in the flourishing little province of Alagoas. On the completion of this railway the author, at his own expense, undertook an exploration of the Rio Doce and of its northern tributaries, which, notwithstanding his narrow means, and in the face of considerable physical obstacles, he carried to a successful conclusion. His expedition left Rio de Janeiro on June 7th, 1885, and for eight weary months it had to battle against hardships and privations, such as want of provisions, inhospitable natives, fevers, and ague.

The valley of the Rio Doce is one of the most fertile regions of the empire. Virgin forests cover nearly the whole of it. Gold is found in Cuiaté, a district of Minas Geraes, close to the right bank of the Doce, as also on the head-waters of the Rio Tambaquary, a tributary of the Sussuhy Grande. Most of the basin of the Rio Doce is inhabited by wild Botocudo Indians, who possess an inborn hatred of the white man, who, on his side, looks upon these "Bugres" with feelings of intense horror and dread. Until these wild Indians shall at least have been partially civilised, the valley of the Rio Doce must necessarily remain a sealed Paradise. The few attempts made hitherto in this direction have hopelessly failed, perhaps because of the gross mismanagement on the part of those to whom the task was entrusted.

The author's arduous explorations have resulted in a carefully plotted map of the Rio Doce and of its tributaries, based upon over 4000 magnetic bearings and careful dead reckonings. His map and drawings were exhibited to the meeting and excited considerable interest, as the work of a traveller who at the time of undertaking this exploration was under twenty-two years of age.

**South-eastern Alaska.** By Professor W. LIBBEY, JUN.—For the substance of this paper, see 'Bulletin of the American Geographical Society,' No. 4, 1886.

*Tuesday, September 6th.*

**Final Report of a Committee on Bathypographical Maps.**—Will be published in a subsequent number of the 'Proceedings.'

**On some defects of the Ordnance Maps.** By SPENSER WILKINSON, M.A. (Abstract.)—In cartographical matters England seemed to the author to be a long way behind other countries, and the few good maps in existence were only the exceptions which proved the rule. The Ordnance Survey had done so much excellent work, and its shortcomings were so largely due to the indifference of Parliament, that no one would wish to speak of it in any spirit of fault-finding. His criticism would be made in the hope of increasing its usefulness. The hills on the 1-inch map

were shaded without reference to a definite scale of shade. The fundamental principle was that of vertical illumination, but light was sometimes introduced from a corner of the map to give a stronger relief. By giving a pictorial rather than a mechanical delineation of the ground the English cartographer had been eminently successful in representing the hilly districts, but his failure where the unevenness of the ground was only slight was very conspicuous. In this respect the Prussian general staff had been fairly successful. The contours on the Ordnance Maps were so few and faint as to have no practical value. On the cadastral or 25-inch maps, no attempt at all had been made to represent the features of the ground. The intervals between the contours on both the 6-inch and the 1-inch maps were too far apart, and could be traced only with difficulty. Contours on smaller and equal intervals had been used with much effect in foreign maps of even a smaller scale than that of the Ordnance 1-inch map. The "Surrey Hill Survey" was an English example of the combination of contours with shading, but the contours were too far apart to be of any military use. The Ordnance Survey had not contributed as freely as it might have done towards the improvement of cartography. Government might fairly be called upon to furnish the public with a good physical map of the British Isles on a scale of 5 or 6 miles to the inch.

The shortcomings of British geography, the author maintained, were due to the weakness of British geography, and those of the Ordnance Survey in particular to its connection with the army, the one national institution which had been for at least a generation, and until quite recently in a state of intellectual torpor. In conclusion the author quoted Ruskin ('Stones of Venice,' vol. ii. ch. vi.), for a description of an ideal map. (The paper was illustrated by an exhibition of representative foreign and English maps.)

Sir CHARLES WILSON said the officers of the Ordnance Survey Department were always very glad to receive any practical suggestions for the improvement of the maps of the country, but he failed to see any practical suggestion in the paper. The reader of the paper appeared to be under some misconception with regard to the nature and character of the Ordnance Survey. It differed in some respects from those of foreign countries, which were made for purely military purposes. It was true that our Ordnance Survey in its conception was military in character, but its military character was soon lost, and it was now a cadastral survey. The reader of the paper had complained of the crowded detail on the Ordnance maps, but it was to be borne in mind that England was much more crowded than any foreign country. He was acquainted with most of the gentlemen who superintended the foreign surveys, and he knew that our 1-inch map was looked upon as one of the most beautiful pieces of work that had been published. With regard to contours, he said they were tied down by Parliament; but he would like to say that the contours on the Ordnance Survey were instrumental contours, and all strictly accurate. The Ordnance Survey maps indeed were acknowledged to be the most mathematically accurate maps in Europe. Every part of Great Britain that could possibly be exposed to an enemy, or where camps would be necessary in case of a European war, had been sketched by the Ordnance Survey in the most perfect manner on the 6-inch scale. These maps were not issued to the public, but were kept in manuscript, and could be photographed at any moment if required for use. With regard to the publication of small maps, he said the Government had refrained from publishing maps that were not needed for State purposes in order not to take the bread out of the mouths of the map-makers of the country.

Mr. STOTHERT (Bath) suggested that the altitudes of all heights should be inserted upon the 6-inch maps.

Mr. TRELAWNEY SAUNDERS said that the altitudes inserted upon the Ordnance maps had not been selected with sufficient judgment, and that it was more espe

desirable to give the altitudes of river confluences and water-partings. The public were certainly responsible for many defects in the Ordnance Survey. Economy was incompatible with perfection. Every sheet now was out of date before it was published, the interval between the survey and its publication being so great. He thought that the services of local surveyors might be utilised in keeping the maps up to date. Among the specimens of cartography exhibited by Mr. Wilkinson, he missed Lehmann's map of Saxony. Lehmann was the Rembrandt of cartographers.

Mr. H. R. MILL regretted that the Ordnance maps gave no information as to the depth of lakes.

The PRESIDENT said it seemed to him that the reader of the paper had been comparing the work on the Continent of the present day with work in this country of fifty years ago; and he did not quite understand why no distinction was made between the work of an artist in hill shading and scientific accuracy in showing contours. Those who had to do with this work knew the difficulty of combining accuracy with pictorial effect; and it was by no means settled, as the reader of the paper assumed, which system was best for hill shading. For reconnaissance purposes contours only were used.

**On the Utilisation of the Ordnance Survey.** By Sir C. W. WILSON.—Thirteen years ago, when presiding over the Geographical section, the author drew attention to the many practical purposes which the maps of the Ordnance Survey should subserve, and to the manner in which their manifold uses were ignored by the public. The present year, which would see the completion of the field work, seemed a fitting time to recur to the subject. The author then illustrated the manner in which the Survey might be utilised as a basis for the proper assessment and valuation of land for local taxation; in the sale and transfer of land, for a variety of local purposes, for educational purposes, and in many other respects. In Ireland, the maps were very largely used in all branches of the administration, and had done much to economise labour, but England, after spending millions in the production of the most perfect map in Europe, hesitated to make use of that map in the manner intended by the able statesmen and scientific men upon whose recommendations government authorised the prosecution of the survey at the public expense. The author drew attention to the chaotic condition of the administrative boundaries, and hoped that the proposed boundary commission might find some way of evolving order out of the existing chaos. The unit of the area should be the same for all local purposes, and the larger areas should be multiples or aggregates of that unit. This would probably lead to the division of the country into civil parishes, unions, urban sanitary districts, and counties.

Mr. WILKINSON, rising to reply to Sir Charles Wilson's remarks on his paper, said it was no answer for Sir C. Wilson to say that his suggestions were of no value because the Ordnance map was not a military but a cadastral map. He failed to see how the whole of the work of the Survey could be described as cadastral, and in particular how the 1-inch map, which was the one he had chiefly criticised, could be used for cadastral purposes. It was no doubt true that the contours had been limited by the Parliamentary vote, but they must insist on Parliament granting money to make the maps adequate in all respects. Nor was it an answer to say that they had better maps which were not published. It was one of his complaints against the Ordnance Survey that they kept so much secret.

General Sir H. THUILLIER thought the Ordnance Survey was a magnificent production. The introduction of hill-shading on the six-inch scale was an impossibility.

**On the United States Geographical and Geological Survey.** By JOSIAH PIERCE, jun.—The author exhibited twenty-five topographical maps on

various scales, published by the United States Survey, and typical of all the important physical features of the country. In doing so he drew attention to the methods of field-work ; to the wide use of the plane-table ; and to the representation of relief by contours.

**Note on a Bathy-Orographical Map of Scotland and the surrounding Seas.—By H. R. MILL, D.Sc.**

**A Plea for the Meter.** By E. G. RAVENSTEIN.—There have not been wanting in this country advocates for the meter, and of a decimal system of weights and measures generally. Such a system, based, however, upon the existing yard, was recommended by a Royal Commission as long ago as 1839, when terms like “milyard,” “millet,” and “centner” were recommended at the time for general acceptance. It is obvious, that a decimal system could be introduced without introducing the meter, but I also maintain that at this day the meter is that among the international units of length which has most chances of being generally accepted.

I am not concerned here to defend the meter as a unit of length. If the question of an international unit of length had to be determined at the present time, it is very probable that the meter would not secure a majority of votes, the illusory notion of its being in any sense a “natural” unit, and therefore entitled to some particular degree of respect, having long since been dispelled. Geographers and surveyors would perhaps prefer a unit equal to the military pace of 30 inches, whilst others, and I believe a majority, would be in favour of retaining the foot. Indeed, had a system of decimal weights and measures been built up with the English foot for a unit, even fifty years ago, it is just possible that those countries which had not at that time accepted the meter would have accepted the foot, whose reign might then have been perpetuated for all time.

But regrets avail nothing. The meter is too firmly established as an international measure ever to be displaced. The units of length of the countries of the world fall into the four following groups :—

		Area.	Population.
Countries using the English Foot.	sq. miles		
	United Kingdom .. .. .	121,483	35,242,000
	British Colonies and Dependencies	8,854,327	279,599,000
	United States .. .. .	577,390	50,153,000
	Russian Empire .. .. .	8,457,290	104,002,000
	Hawaii, South African Republics ..	177,622	2,085,000
		18,188,112	471,081,000
Countries using the Meter.	European States .. .	2,530,500	229,781,000
	Colonies and Dependencies of ditto ..	2,692,300	70,421,000
	American States .. .. .	6,954,400	40,083,000
	Egypt .. .. .	494,000	6,806,000
		12,671,200	347,091,000
Countries using the Castilian Foot.	Central America .. .. .	168,305	2,829,000
	Dominican Republic .. .. .	20,596	300,000
	Bolivia and Paraguay .. .. .	564,000	2,776,000
		752,901	5,905,000
Countries using various measures of length.	Denmark and Dependencies .. ..	90,000	2,083,000
	Asia .. .. .	7,223,000	401,000,000
	Africa .. .. .	8,984,000	150,000,000
		16,297,000	553,088,000



GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

This table shows that the Castilian foot, long since discarded by Spain, still carries on a lingering existence in Central and South America, but it is sure to be displaced by the meter, which encircles it on all sides.

The *English Foot*, among the three really international units of length, occupies as yet the largest area, and is at least officially made use of by the greatest population. It is more especially India which gives it this preponderance in area and population. In India, however, the metrical system of weights and measures of capacity has been introduced by an Act passed in 1871, and although this does not necessarily lead to the introduction of the meter, it yet shows that there exists a bias in favour of the metrical system. If we examine into the condition of the countries which have not as yet accepted an international unit of length, we shall find that the chances for the introduction of the English foot are very small indeed.

The meter holds a very different position. Its victorious career, begun at the opening of the century, has not yet come to an end, and its latest conquest was made as recently as January last, when it was accepted as the legal standard throughout the Argentine Confederation.\* Its introduction into Japan is contemplated.

Denmark and Russia are at the present day the only countries of continental Europe, which have not as yet adopted the meter. As a matter of fact the meter is much more widely used than appears from the above statement of areas and population, for the scientific men of all countries have very generally accepted it for carrying on their work and for recording the results of their scientific investigations.

I cannot conceive of the commercial and reading classes of this country having an insuperable objection to the substitution of the meter for the yard or foot. As a matter of fact the trade carried on between Great Britain and countries using the meter embraces nearly one-half of the total trade of the country, for in 1885 the exports and imports were as follows:—

To or from countries using the English foot ..	£292,707,000, 50·1 per cent.
"    "    "    "    meter .. ..	283,011,000, 48·5 "
"    "    the rest of the World .. ..	8,295,000, 1·4 "

Even the most conservative business man must admit that the universal acceptance of the meter, and of the metrical system generally would very much facilitate many of his transactions, whilst the schoolmaster must concede that the time at present expended without any appreciable profit to the mental development of their pupils in acquiring a knowledge of an absurdly complicated system of weights and measures might be devoted to more useful subjects.

But whatever may be said by men of business or by schoolmasters, I must confidently assert, as one who for many years has been engaged upon geographical and statistical work, that the introduction of the meter and of the system intimately connected with it, would prove an immense boon. It would result in an immense saving of time, at present spent upon the conversion of the most heterogeneous foreign measures, it would free our books from mistakes, due to errors of computation, and would render directly comparable the results recorded by different observers.

I do not hesitate to assert, that irrespective of local surveys, the scientific work of interest to geographers generally, which is done in countries using the meter, or

\* Date of the introduction of the meter into the principal countries:—1803, Lombardy; 1819, Netherlands and Belgium; 1836, Greece; 1850, Sardinia; 1856, Ecuador; 1857, Venezuela, Columbia; 1859, Spain; 1860, Portugal, Peru; 1862, Brazil, Uruguay; 1865, Chili; 1868, Germany; 1875, Servia, Norway; 1876, Austria-Hungary, Romania, Egypt; 1879, Sweden; 1882, Turkish Empire; 1884, Mexico; 1887, Argentine Republic.

done in other lands, but recorded in meters, far exceeds all the rest in bulk and intrinsic value. It should not be forgotten that the geographer is not solely concerned about the heights of mountains or the distances between different localities. He is bound to take a more comprehensive view of his duties, and since the workers in other departments of science have so largely adopted the meter, he should follow this praiseworthy example.

Geography, however, is so intimately connected with the common affairs of life, that there is little hope of the meter being generally accepted until it shall have become the legal standard of length. Such a change would no doubt be accompanied by some inconvenience, but what has been possible in Germany and in Greece, should not be impossible in England, where every Board-school child is taught the principles of the metrical system.

Mr. C. A. KESSELMAYER (President of the Anglo-Metric Association) objected to the French meter that it was not a perfect decimal, and he gave some explanations with regard to a "one-aught" of twelve units (in which 10 and 11 have separate signs), which he thinks would better answer the purpose.

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### PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Berlin, October 8th, 1887:** Professor SACHAU in the Chair.—The death of Professor Koner was announced, who for many years acted as librarian and editor of the 'Zeitschrift' of the Society. He succumbed on the 29th September to an attack of inflammation of the lungs. Professor H. Kiepert gave some personal reminiscences of the late Dr. Koner, whose friendship he had enjoyed for a period of fifty years. Wilhelm Koner was born in Berlin in the year 1817, and occupied for many years the post of director of the University Library at Berlin. He published with his friend Guhl from 1860 to 1864 the work entitled 'Leben der Griechen und Römer, nach antiken Bildwerken dargestellt,' which has since been translated into almost every European language. In 1861 he undertook the editorship of the 'Zeitschrift,' for which he during thirty-two years compiled the valuable bibliographical notices of newly-published geographical books and maps.—Dr. Mense, formerly a doctor in the service of the Congo State at Leopoldville, gave an account of his journey up the Kwango in company with the Rev. G. Grenfell. The Kwango at the point of its discharge into the Kassai forms a delta, which was reached by the party on the 16th December in the steamer *Peace*. The direction of the river is here almost directly contrary to that of the Kassai, and forms with the latter an angle of 110°. As in the case of the Wabuma tribe on the lower Kassai, female government prevails in the villages along the lower Kwango. The women wear heavy brass hoops, often weighing from 15 to 20 lbs., round their necks. The river is here from 700 to 800 yards in breadth, and flows through a low grass country. In the afternoon of the second day of the voyage up-stream a tributary with deep black water, and possessing a breadth of a quarter of a mile, was discovered flowing from the south-east; it is perhaps the Saia or Kulilu of Kund's expedition. The natives called it Djuma. Above this point the banks of the river are covered with a forest of lofty trees, full of caoutchouc-lianas and valuable timber in greater abundance than is to be found anywhere on the middle Congo. Whether this forest is only a gallery wood, or whether it extends far inland from the river-banks, the party were unable to determine, owing to its impenetrable character. The river gradually widens up to a breadth of about 1½ mile, and becomes in consequence more shallow. The numerous sandbanks impeded very considerably the progress of the vessel. The inhabitants of this region appear to live chiefly by

fishing; they were timid, and fled at the approach of the steamer. The number of hippopotami was exceptionally large; herds of from sixty to seventy animals were met with. The natives of a village reached on 20th December, who called themselves Wabondo, wore some fairly good cotton-stuffs, purchased from coast traders. A new affluent with black water, and coming from the S.S.W., was discovered on the same day in  $3^{\circ} 45'$  S. lat. This stream, which has a breadth of about 170 yards, is perhaps the Wambo of Lieutenant Kund. From this point the course of the Kwango, hitherto south-west, runs due east and west. The natives appeared here in large bands, and showed a hostile disposition, but the guard of wire-netting afforded protection from their arrows, and the steam-whistle did the rest. The lofty trees of the forest here begin gradually to disappear, giving place to a savannah district on both sides of the river. The country becomes hilly, and is sparsely populated by the Wampfuno, who also dwell in the region south of Stanley Pool. The inhabitants of a village which was passed on 23rd December were acquainted with the village of Kintamo on Stanley Pool, and stated that it could be reached in from five to six days' journey from their village. The Kwango now flows with rapid stream between the precipitous slopes of plateaus from 700 to 1100 feet high, its course being studded with islands and sandbanks. On the evening of the 24th the party reached a point in  $4^{\circ} 26'$  S. lat., where the river begins in numerous curves to take a southerly direction again. In deep gorges, which often confine it into a narrow bed not more than 300 yards wide, the river continues its course in sharp bends to the south. The territory of the Bakundi was next traversed. Neither among these people nor among the Wampfuno was any trace of cannibalism observed, although both these tribes are, according to travellers, guilty of this practice. On the 27th of December, after a very arduous voyage through much-disturbed water and rocky channels, the party arrived at the Kingunji rapids, which are only about three feet high. The boat left behind some time ago by Major von Mechow was no longer there, but was still preserved by the chief of the village Kandinga. The return journey on board the steamer was accomplished without any noteworthy incident, and on the 3rd of January the *Peace* was again in Stanley Pool.—A letter, dated 8th August, from Taveta was read, giving an account of the successful ascent of Kilimanjaro by Dr. Hans Meyer of Leipzig, who, in the course of a tour round the world, has visited East Africa, and by this feat has surpassed all the attempts of his predecessors, Rebmann, V. d. Decken, Thornton, Kersten, New, Thomson, and Johnston. On the first day the traveller started from Mareale's village in Marunguland, and reached the lower boundary of the virgin forest. On the second he marched through the rain-drenched primeval forest, and pitched his camp on the upper limit, upon the site of Johnston's old camp. On the third day he crossed the treeless region of the grass meadows, and arrived at the first snow. The fourth day was occupied with the ascent through the region of lava and ashes and bare of vegetation up to the foot of the Kibo crater. On the fifth day Kibo was ascended as far as the edge of the crater, where an overhanging glacier wall, 150 feet high, prevented the traveller from reaching the crater itself; he was, moreover, quite alone, having been compelled to leave behind, some 1000 feet below, his only black servant Msuri, who had courageously followed him into the ice region, but had become unconscious in consequence of the cold. On the same day the traveller returned to the foot of Kibo, and on the day following photographs were taken of the high plateau between Kibo and Kimawensi, and of the chain of volcanic hills crossing the same; geological and topographical surveys were also made. Dr. Meyer remained several days in the region of the first snow, making botanical collections. Another fortnight was spent by the traveller in Mareale's village for the purpose of collecting. He then purposed to travel through the country of Kahe and Arusha to the Upper Rufu, and to return along the latter river to the coast.

## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

## EUROPE.

**[Adria.]**—*Physikalische Untersuchungen in der Adria.* Ein Beitrag von Julius Wolf und Josef Luksch, Professoren an der K.K. Marine-Akademie. Wien, Carl Gerold's Sohn, 1887: 8vo., pp. 22. Price 8d. [Presented by the Publisher.]

This is a minute physiographical study of the district of Adria, and contains a sheet of maps showing the temperatures, currents, salinity, and depths of the sea. It may be regarded as a good example of minute geographical inquiry, while the results are of value as a contribution to our knowledge of the physics of the Adriatic.

**Baedeker, K.**—*Great Britain: England, Wales, and Scotland, as far as Loch Maree and the Cromarty Firth.* Handbook for Travellers. Leipsic, Karl Baedeker; London, Dulau & Co., 1887; 12mo., pp. lxii. and 530. Price 10s. [Presented by Messrs. Dulau & Co.]

This work appears to have been very carefully done by Mr. J. F. Muirhead, but it omits the whole of Ireland and the northernmost part of Scotland. These omissions, however, we learn from the preface, the editor hopes to supply on a future occasion. Too much space appears to have been given to the south of England, and in subsequent editions we would suggest that the matter bearing on this part be more compressed, and Ireland and the north of Scotland included. The introduction includes an Historical Sketch of Architecture in England, by Prof. E. A. Freeman. There are 14 maps, 24 plans, and a panorama illustrating the volume. The maps do not appear to be quite up to the standard of Baedeker's other guides, and it seems to us that better work is done in England, as may be seen in Baddeley's guides.

**Böhm, [Dr.] August.**—*Eintheilung der Ostalpen.* Geographische Abhandlungen herausgegeben von Prof. Dr. Albrecht Penck. Band I. Heft 3. Wien, Hölzel: imp. 8vo., pp. viii. and 235. [Presented by the Publishers.]

This is the concluding part of the first volume of Professor Penck's 'Geographische Abhandlungen' and like the previous parts forms an important contribution to scientific geography. The author has made a thorough study of his subject both from the geological and physical standpoints. He points out that orography has first of all to do with mountains and then with valleys, and last of all with river courses, which last, as a basis of classification from an orographical point of view, do not always represent a complete whole. In the first section of the work, the author seeks to trace the evolution of the divisions of the Alpine mass from the remotest epoch. In the second section, he treats of the principal aspects of mountain-grouping, and seeks to obtain a new basis on which to ground it. In the third part, he applies his principles to the divisions of the Eastern Alps. A natural division must be regulated by the character of the subject viewed from all sides; so that the physiognomy of the mountains, and their oroplastic and geological structures must all be equally considered, in attempting to form a division. Dr. Böhm's main divisions are: (1) The Gneiss Alps; (2) Slate Alps; (3) North Limestone Alps; (4) South Limestone Alps; (5) The Klagenfurt Basin. Under these main divisions, which it will be seen are essentially geological, are eighteen subdivisions. The whole are clearly plotted on a good map. In the preface to the first volume of the *Abhandlungen*, Dr. Penck speaks hopefully of his undertaking, and promises in the future the following memoirs:—The Pamir Region, by Dr.

Wilhelm Geiger; Distribution of Atmospheric Pressure in Central Europe, by Dr. Hann; The Cordillera of Merida, by Dr. W. Sievers; and on the Origin of Oscillations in Underground Waters, by Dr. Isidor Soyka.

**Coolidge, W. A. B., Duhamel, H., Perrin, F.**—Guide du Haut-Dauphiné. Grenoble, Gratier, 1887: 8vo., pp. lix. and 442. [Presented by the Publisher.]

For the Alpinist this is a model guide-book. There is nothing superfluous. The introduction contains a bibliography and cartography, together with some carefully compiled geological information. The rest of the book is divided into sections, according to the various *massifs* of the Dauphiny Alps, and under each section are methodical tables of the order of itineraries, tables of centres of excursions, and succinct but clear directions as to the best routes to the various points and peaks, the authorities for each route being always stated. The index at the end renders the book easy of consultation, the flexible binding and pockets render it manageable, and the broad margin leaves room for notes. The maps for the volume will be issued later.

**Davidson, T. M.**—Geography of the British Isles from ten different standpoints, with 21 maps. London, Thomas Laurie, 1886: small 4to., pp. 52. Price 2s. 6d. [Presented by the Publisher.]

The "ten different standpoints" of Mr. Davidson's Atlas and textbook are the following: Internal Physical Features, External Physical Features, Mineral Wealth, Industrial Pursuits and Commerce, Populations, Railways, Canals, Steampacket and Naval Stations, Battlefields, Cathedral towns, &c., History and People, Counties and Principal Towns, Watering Places and Mineral Waters. This division is to some extent in the right direction, but is essentially artificial, and without much logical sequence. Why, for example, should the "internal" and the "external" physical features be separated, as if they were totally unconnected? The text, though an improvement on the ordinary textbook, is still too much a mere list of names, though we can conceive that with the maps, in the hands of a good teacher, the book would be useful as a collection of hints. The maps are the best feature, so far as their character is concerned, the principle being to show one thing in one map; but their execution is poor.

**Geikie, Archibald.**—The Scenery of Scotland viewed in connection with its Physical Geology. Second edition. London, Macmillan and Co., 1887: 8vo., pp. xx. and 481. Price 12s. 6d. [Presented by the Publishers.]

It is twenty-two years since the first edition of this work was published, and it at once gave its author a high position as an eloquent writer, as well as an accomplished geologist. The work has been to a large extent rewritten and greatly extended for the present edition, and many new illustrations introduced. It is an excellent example of the application of geology to an interpretation of the existing surface; it is indeed a treatise on the science of scenery so far as Scotland is concerned, and will repay serious study by the student of geography. In the first part of the volume Mr. Geikie treats of land-sculpture in general, and in this department of his science he is unsurpassed. The action in moulding the features of the earth into their present fashion is described clearly and graphically of air, rain, rivers, springs, frost; the sea; glaciers and icebergs. Part ii. deals with the Scottish Highlands, their physical features and geological structure. Successive chapters are devoted to the tableland of the Highlands; the Highland valleys; the Highland hills; the Highland lakes; the ancient ice-sheets and glaciers of the Highlands. Part iii. deals with the Southern Uplands, in which also the work of the ancient glaciers is described. Then comes, in part iv., the Midland valley, in connection with which we have chapters on the Denudation of the Lowlands, the Glaciation of the Lowlands, the latest modifications of Scottish scenery, and a most instructive chapter on the influence of the physical features of Scotland upon the people. This last, Mr. Geikie points out, may be seen (1) in the

distribution and migration of races; (2) in the historical development of a people; (3) in industrial and commercial progress; and (4) in natural temperament and literature. Each of these points he treats with necessary brevity; he shows, for example, how the topographical surroundings have given rise to the marked differences that exist between the Scottish Gael and his kinsman the Celt of Ireland. A very useful detailed itinerary is appended, and the book ought to be studied by any one desirous of greatly increasing the pleasure of a trip to Scotland.

**Gumprecht, Otto.**—*Der Mittlere Isonzo und sein Verhältniss zum Natisone. Ein Beitrag zur Lösung der Frage nach dem Alter des Isonzosystems. Mit einer Tafel Karten.* Leipzig, Gustav Fock, 1886: 8vo., pp. 46. [Presented by the Publisher.]

This is a careful special study of the hydrography of the region watered by the little river Isonzo, which discharges into the Gulf of Trieste. The author shows that the Natisone, which now runs into the Torre, a tributary of the Isonzo, ran direct to the latter through the Staroselo valley, until the end of the Tertiary. He traces minutely the changes which have led to the alteration of its course.

**Hanusz, Etienne.**—*La Lutte de l'Existence des Plantes dans les Puszta (Steppes) Hongroises.* 'Bulletin' of the Hungarian Geographical Society, tome xv. fascicule xii., 1887.

**Hess, Heinrich.**—*Illustrierter Führer durch die Zillerthaler Alpen und die Rieserferner-Gruppe.* Wien, Hartleben, 1887: 8vo., pp. 250. Price 5s. [Presented by the Publisher.]

This seems an excellent guide, quite equal to Baedeker's best. It is well arranged, beautifully printed, and copiously supplied with maps and pictures of the best class. It is one of an extensive series of guides to special regions in Central and South-eastern Europe, for which we have no English equivalents. There are, e. g., guides to such regions as the Danube, to the Carpathians, Carinthia, Styria, Dalmatia, &c.

**Kirchhoff, Alfred.**—*Einleitung in die Länderkunde von Europa. Sonderabdruck aus der 'Länderkunde der fünf Erdteile.'* Prag, F. Tempsky; Leipzig, G. Freytag, 1886: imp. 8vo., pp. 87, maps. [Presented by the Author.]

**Navez, Louis.**—*De l'Influence des Formations Géologiques en Belgique.* 'Bulletin' of the Royal Belgian Geographical Society, No. 4, 1887.

This is a careful study of the influences exerted by the character of the surface of Belgium, mainly upon the people and their industries. M. Navez considers Belgium specially suited for such an investigation, as there is so comparatively small variation in altitude and climate, that the geological influence may easily be singled out. He brings out strikingly the intimate relations which exists between natural resources, industries, and density of population.

**Palgrave, Mary E.**—*Pictorial Geography of the British Isles.* London, S.P.C.K., 1887: oblong 4to., pp. 102. Price 5s. [Presented by the Publisher.]

The chief value of this book is that the pictures are likely to give children, into whose hands they may fall, an interest in geography. The text has been written with considerable care, and though somewhat unsystematic, seems sound, and on the whole in the right direction. Many of the pictures are evidently old and worn, and some of them poor and out of date. The picture of St. Andrews on p. 25 must be very old; that of Greenock on next page is useless. With the many fine photographs available, the picture of the Barmouth Estuary on p. 26 is unpardonable. On the feeble picture of Snowdon, p. 37, the point of view ought to be stated. To call the group of heights on p. 39, the Grampians, is quite misleading. The picture of the "Tay as it passes

Perth," p. 57, must be about half a century old; that of Edinburgh is equally unsatisfactory, and we fear many children will take the jail in the foreground for the castle; while in the picture of a coal-mine on p. 89, they will be puzzled to find the mine.

[**Pola.**—Pola, seine Vergangenheit, Gegenwart und Zukunft. Eine Studie. Mit vier Tafeln, enthaltend Ansichten und Pläne. Wien, Carl Gerold's Sohn, 1886: 8vo., pp. 94. Price 4s. [Presented by the Publisher.]

An able historical and topographical study.

**Tomaschek, Wilhelm.**—Zur Kunde der Hämus-Halbinsel. Wien, Carl Gerold's Sohn, 1882 and 1887: 8vo., pp. 73 and 91. Price 2s. 8d.

These are two brochures by Professor Tomaschek at Graz University, the first of which deals with the topography and archeology of the Hæmus peninsula, and the second with the trade routes of the twelfth century, according to the data supplied by Edrisi.

**Umlauf, [Professor Dr.] Friedrich.**—Die Alpen. Handbuch der gesammten Alpenkunde. Wien, Hartleben, 1887: 8vo., pp. viii. and 488. Price 8s.

Professor Umlauf has in this volume compiled a systematic and readable account of the Alps in their various aspects—their boundaries, divisions, structure, geology, topography; valleys, rivers, lakes; results of erosion and weathering; climate; snow and glaciers; fauna and flora; inhabitants; roads and railways; exploration. There are about 100 fair illustrations, five coloured maps, and fifteen maps in the text.

#### ASIA.

[**Burma.**—Report of the Administration of Lower Burma during 1885-6, and of the Administration of Upper Burma during 1886. Rangoon, Government Printing Office, 1887: folio, pp. ii., 71, cxlv., 27, and xl. [Presented by the India Office.]

The special value of this Report is that it contains a somewhat detailed account of the geography of Upper Burma.

**Central Asia.**—No. 1 (1887). Correspondence respecting the Affairs of Central Asia. Presented to both Houses of Parliament by command of Her Majesty. August, 1887. London, Harrison & Sons, folio, pp. 11, maps. Price 3s. 2d.

**Glaser, Eduard.**—Südarabische Streitfragen vom Forschungsreisenden Eduard Glaser. Prague, 1887: 8vo, pp. 47. [Presented by the Author.]

This is a controversial pamphlet, its object being to meet certain criticisms by Dr. D. H. Müller, mainly on Herr Glaser's linguistic researches in South Arabia.

[**Indian Archipelago.**—Das Leben in der Tropenzone, speciell im Indischen Archipelago. Nach Dr. Van der Burg's 'De geneesher in Nederlandsch-Indië' (1. Band, 2. Auflage), mit Genehmigung des Autors bearbeitet von Dr. L. Diemer, Stabsarzt in Dresden. Hamburg, Friederichsen & Co., 1887: 8vo., pp. [6] and 150. [Presented by the Author.]

Dr. Van der Burg, from whom this work is translated, has been for twenty-five years a physician at Batavia, and has made a special study of the Malay Archipelago with reference to European residence therein, the results of his investigations being to a large extent applicable to tropical climates generally. He here discusses land and climate, dwellings, inhabitants, clothing, baths and

cleanliness, food and drink, change and rest, acclimatisation, rules of life, medicine.

**Newall [Major-General] D. J. F.**—The Highlands of India. Vol. ii. being a Chronicle of Field Sports and Travel in India. London, Harrison & Sons; Newport and Ryde, Isle of Wight, Brannon & Co., 1887: 8vo., pp. xvi. and 464. [Presented by the Author.]

The first volume of this work was noticed in the 'Proceedings' for 1882 at page 576. The present volume consists of a narrative of travel and adventure in India, chiefly in the pursuit of sport. Apart from mere personal incident, however, there is much that is useful concerning the geography of the region embraced. The volume is divided into sections as follows:—Section I. Cashmere. Section II. The Kohistan of the Punjab. Section III. The Kohistan of the Punjab (Part 2). Section IV. Simla, the Keyonthal, and the Basins of the Sutlej and Giri. Sections V. and VI. The Himalayan Watersheds—the Basins of the Jumna and Ganges—Gurhwal and Kumaon. Section VII. Nepal and the Basins of the Karnali, Gunduk, and Cosi. Section VIII. Darjeeling and Sikhim. Section IX. The Khasia Hills. Sections X., XI., XII. The Southern Highlands. Section XIII. and XIV. Maharashtra and Central India. Section XV. Rajasthan. Section XVI. Note on India Alba. Section XVII. Note on Ceylon. Appendix. Ethnological. There are numerous full-page and text illustrations, diagrams, &c.

**Oldham, R. D.**—On Probable Changes in the Geography of the Punjab and its Rivers. An Historico-Geographical Study. Calcutta, Baptist Mission Press: 8vo., pp. 22. [Presented by the Author.]

This paper is reprinted from the Journal of the Asiatic Society of Bengal, its object being to show that there have been great changes in the hydrography of the Punjab and Sind, within the recent period of geology; that there are abundant indications not amounting to proof, that these changes have taken place within the historic period, and that the most important of them, by which a large tract of once fertile country has been converted into desert, appears to have taken place after several centuries of the Christian era had passed.

**[Sumatra.]**—Rapport über eine im Dezember 1883 unternommene wissenschaftliche Reise an den Loba-See (Central Sumatra), von Dr. B. Hagen. Tijdschrift van Indische Taal-, Land- en Volkenkunde, deel xxxi., aflevering 4, 1886.

This paper, with the three large maps which accompany it, forms an important contribution to the geography of the part of Sumatra with which it deals.

#### AFRICA.

**Ascherson, P.**—Die Nördliche Isthmus-Wüste Aegyptens. 'Verhandlungen' Berlin Geographical Society, Band xiv. No. 7, 1887.

**Becker, Jerome.**—La Vie en Afrique, avec Préface de Cte. Goblet D'Alviella. 2nd edition. Brussels, Lebegue & Co., 1887: 2 vols. 8vo.; i. pp. xxii. and 500, ii. pp. 528. [Presented by the Publisher.]

Lieut. Becker has seen much service in Africa in connection with the International Association. He was for a considerable time stationed at Karema on Lake Tanganyika. It is with his journeys to and from Karema and his residence there that these volumes mainly deal. Lieut. Becker made the most copious notes of his observations and experiences, so that his two volumes abound with information, some of it of original value. There are numerous appendices in which the author discusses several problems connected with the



opening up of Africa, and many illustrations, some of which are rather sensational and imaginary. Lieut. Becker criticises some of Mr. Joseph Thomson's statements with reference to Karema station somewhat severely.

**Buchner, Max.**—Kamerun. Skizzen und Betrachtungen. Leipzig, Duncker & Humblot, 1887: 8vo., pp. 13 and 260. Price 5s.

Dr. Buchner's 'Sketches and Reflections' are intended more especially for a German public, but as emanating from a traveller of repute, whose knowledge of Africa is extensive, they are deserving a wider audience. The author deals with his subjects under three heads, viz. (1) Physical features of the colony and inhabitants; (2) European residents and commerce; (3) Suggestions for developing the resources of the colony. Dr. Buchner very properly exposes the fallacy of popular opinion as to the fertility of tropical Africa, but points out, at the same, that the country surrounding the Bay of Biafra is exceptionally favoured. The present resources of the district are small, and commerce still lies in its swaddling clothes, but the potentialities are very considerable. No development on a large scale appears, however, to be possible until the Dualla (who at present act as middlemen) shall have been starved into labour, and the inland tribes shall have gained access to the coast. Dr. Buchner is very outspoken on negro equality, missionaries, gin, and slavery. Tropical hygiene naturally occupies a prominent place in a book written by a medical man.

**Schinz, [Dr.] Hans.**—Durch Süd-west 'Africa. 'Verhandlungen' Berlin Geographical Society, Band xiv. No. 7, 1887.

Dr. Schinz, on whose travels in South Africa there have been recent notes in the 'Proceedings,' here describes the journeys he made in the interior from the German Protectorate; he gives valuable notes of his observations on country and people.

**Schmidt (A.)**—Meine Reise in Usaramo und den Deutschen Schutzgebieten Central-Ostafrikas. Berlin, Engelhardt, 1886: 8vo., pp. 36. Price 1s.

This is an unpretending narrative of the leader of one of the expeditions despatched by the German East African Company. Lieut. A. Schmidt left Bagamoyo on August 29th, 1885, followed the Rufu as far as Muhonyera, made thence an excursion to the Rufiji, and finally proceeded to Sima in Usagara, at that time occupied by the late Dr. Jühlke. On his return journey he was attacked by robbers near Kidete, and seriously wounded. He succeeded, however, in reaching Saadani, having been tended during part of his journey by Samaritans in the shape of British missionaries. Lieut. Schmidt made treaties with twenty-five "Sultans" in Uzaramo and Ukami. His route led partly through territory not previously explored, and a map would therefore have proved very acceptable, for that by Dr. T. Engelhardt to which he refers is quite inadequate.

**Soleillet, Paul.**—Voyage à Ségou 1878-79. Redigé d'après les notes et journaux de voyage de Soleillet par Gabriel Gravier. Paris, Challamel Ainé, 1887: 8vo., pp. xvii. and 515. [Presented by the Publisher.]

The journey described in the volume is somewhat old, and the ground traversed has been made familiar by other French explorers. M. Gravier tells the story of M. Soleillet's journey in too minute detail, as if he had copied every trivial incident recorded in the traveller's diary. Nevertheless the volume contains much solid information, especially concerning Ségou and the Niger, where M. Soleillet spent a considerable time. From Daker he went north to St. Louis, and starting thence followed the Senegal to Medina, when he struck eastward by Bagué and Lambalaké to Ségou. On returning he varied the route by striking north-west from Lambalaké and by Niore and the Kaniaremé country down to the Senegal. M. Soleillet states in an interesting preface that his great object in his travels has been to extend the influence of France, which ought to reach from the Atlantic to the meridian of Tripoli and

from the Mediterranean to the Gulf of Guinea. He suggests various ways by which France might make easy trade-routes to the Niger, and maintains that until merchandise can be conveyed cheaply into the interior, slavery will not be abolished. There is a simple route-map appended to the volume.

**Oppel, [Dr.] A.**—Die religiösen Verhältnisse von Africa. 'Zeitschrift' Berlin Geographical Society, Band xxii. Heft 3 and 4, 1887.

A useful collection of data on religious distribution in Africa. Of the various imported religions it is seen from Dr. Oppel's map that Mahomedanism occupies one-half of the continent. Up till the 11th century it occupied only a fringe of the north coast. Between the 11th and 17th centuries it spread south to about 10° N., and during the 19th century it has extended far southwards, especially in the west. The map shows also the distribution of the various Christian mission stations.

**Weiss, Kurt.**—Meine Reise nach dem Kilima-Ndjarogebiet im Auftrage der Deutsch-Ostafrikanischen Gesellschaft. Berlin, F. Luckhardt, 1886: 8vo, pp. 46, map. Price 1s. 6d.

**Jühlke, Karl.**—Die Erwerbung des Kilima-Nscharo-Gebiets. Köln, Du Mont-Schauburg, 1886: 8vo, pp. 33. Price 1s.

These small books deal with an expedition to Kilimanjaro, which the late Dr. Jühlke and Lieut. Weiss undertook on behalf of the German East African Company for the purpose of making territorial acquisitions. They left Pangani on May 10th, 1885, travelled up the Rufu valley, visited Vuga, Masinde, and Taveta, arrived at Mandara's village in Moshi on June 15th, and returned to the coast with "treaties," signed by ten independent chiefs, in their pockets. Lieut. Weiss says of Chagga that it may boldly be described as the "Paradise of Eastern Africa," and that it promises to reward the labour of German colonists a hundredfold. He supplies a good map on a scale of 1:400,000, with altitudes based upon boiling-point observations. Dr. Jühlke enters more largely into personal and political matters than his companion.

**Zululand.**—Further Correspondence respecting the Affairs of Zululand and Adjacent Territories. (In continuation of [C. — 4980], of February 1887.) Presented to both Houses of Parliament by Command of Her Majesty, 1887. London, Eyre & Spottiswoode, 1887: folio, pp. vii. and 66, maps. Price 2s.

#### AMERICA.

[**Andes.**]—Estudio Orografico en la Cordillera de Mendoza y Neuquen, por el Ingeniero de Minas Sr. German Avè Lallemand. Boletin del Instituto Geográfico Argentino, tomo viii. cuaderno viii., 1887.

**Bell, Charles N.**—The Selkirk Settlement and the Settlers. A concise history of the Red River country from its discovery, including information extracted from original documents lately discovered and notes obtained from Selkirk Settlement Colonists. Winnipeg, Office of 'The Commercial,' 1887: 8vo., pp. 44, illustrations. [Presented by the Author.]

**Brinton, Daniel G.**—A Review of the Data for the study of the Prehistoric Chronology of America. Address by Daniel G. Brinton, M.D., Professor of American Archaeology and Linguistics in the University of Pennsylvania, Vice-President, Section H, before the Section of Anthropology, American Association for the Advancement of Science, at the New York Meeting, August 10th, 1887. From the Proceedings of the American Association for the Advancement of Science, vol. xxxvi. Salem, Mass., Salem Press, 1887: 8vo., pp. 21. [Presented by the Author.]

[**British Columbia.**—Dominion of Canada, Province of British Columbia. Information for Intending Settlers. Published by the Government of Canada. Ottawa, Department of Agriculture, 1886: 8vo., pp. 32, 2 maps.

— Illustrated. [The West Shore: an Illustrated Western Magazine. June 1887.] Portland, Oregon, L. Samuel: 8vo.

**Brown, Marie A.**—The Icelandic Discoverers of America; or, Honour to whom Honour is due. London, Marie A. Brown, 1887: sm. 8vo., pp. vi. and 213, illustrations. Price 7s. 6d. [Presented by the Authoress.]

In this volume the authoress endeavours to prove what nobody denies, that America was first discovered by the Norsemen, as far back as 982-85, and totally denounces the fact of its having been first effectively discovered by Columbus. The following is a list of the contents, which will give an idea of the scope of the work:—Chapter I. The Immediate Necessity of Establishing the Truth. II. The Manifest Duty of the United States in this Question. III. The Evidence that the Icelanders discovered America in the Tenth Century. IV. Roman Catholic Cognisance of the Fact at the Time of the Icelandic Discovery. V. All the Motives for the Concealment and Fraud. VI. Columbus' Visit to Iceland. VII. The Scandinavian North and Spain Contrasted. VIII. The Norse Discoverers and Columbus Contrasted. IX. The Beneficial Results to the Present Age and Posterity of Attributing this Momentous Discovery to the True Persons. X. The Celebration of it in 1985! XI. The Righted Position of the Scandinavian North after this Justice has been accorded to it. Bibliography of the important books confirming the Icelandic Discovery of America, from the years 1076-1883.

**Coudreau, Henri A.**—La France Équinoxiale. Two vols. 8vo. and Atlas, 1886-7. I. Études sur les Guyanes et l'Amazonie, pp. xvi. and 436. II. Voyage à travers les Guyanes et l'Amazonie, pp. xxxvi. and 495. Paris, Challamel Ainé. Price 16s. [Presented by the Publisher.]

M. Coudreau is at least a lively writer, abounding with enthusiasm and animal spirits. He obtained from the French Government a mission to Guiana for the purpose of exploration and of investigation of its economical resources, and these volumes are the result of his labours extending over the years 1881-5. The first volume is to a large extent a treatise on the resources of French Guiana proper and of all that extent of country lying east and south of all the Guianas which France claims from Brazil as her's. One chapter is devoted to a history of the colonisation of Guiana. Chapter ii. treats in great detail of the resources of French Guiana, vegetable and mineral. The College of Cayenne forms the subject of chapter iii., and the territory contested between France and Brazil of chapter iv. Other chapters in this volume deal with Parà; European emigration to the provinces of Guiana; Amazonia; and the abortive republic of Counani, of which M. Coudreau seems to be an enthusiastic partisan. The second volume contains an extremely lively narrative of M. Coudreau's extensive wanderings in Guiana and the Amazonian region. In an introductory chapter he describes an excursion which he made to Counani, and the succeeding three chapters an exploration of the lake region south of Counani and of part of the river Araguay. An excursion up the Amazon, the Rio Negro, and the Branco and into the neighbouring regions, forms the subject of succeeding chapters, in which the author tells us much concerning the forests he traversed and the Indians he met with. One chapter deals with the economical and social condition of the Rio Branco. M. Coudreau's work is certainly full of interest, and affords a fair idea of the character of the interesting regions traversed by him. The atlas of eight large maps is an important addition to the work.

**Giles, Pearce.**—The True Source of the Mississippi. [Buffalo, N.Y., 1887]: 8vo., pp. 53, maps and frontispiece.

In this little pamphlet we have copies of letters, and extracts from various

newspapers in support of Captain Glazier's claim to having discovered the true source of the Mississippi.

**Glazier, [Capt.] Willard.**—Down the Great River; embracing an account of the discovery of the True Source of the Mississippi, together with views, descriptive and pictorial, of the Cities, Towns, Villages and Scenery on the banks of the river, as seen during a canoe voyage of over three thousand miles from its head waters to the Gulf of Mexico. Philadelphia, Hubbard Bros., 1887: sm. 8vo., pp. 445. [Presented by the Author.]

Captain Glazier here presents us with a full account of his expedition in 1881, for the discovery of the true source of the Mississippi river. This he lays claim to having discovered, and maintains that a small lake (Glazier) situated to the south of Lake Itasca is the true source. The greater portion of the volume is devoted to a description of the second part of the journey—the descent of the river in canoes from the newly-discovered source to the sea, a distance of 3184 miles. The volume contains many illustrations, besides two maps, and a portrait of the Author.

**[Guiana.]**—Latest Correspondence on the Question of Limits of Guiana. Caracas, 1887: folio, pp. 66, map.

**[Hudson's Bay Expedition.]**—Report of the Hudson's Bay Expedition of 1886, under the command of Lieut. A. R. Gordon, R.N. 8vo., pp. 133.

This is a report of the third expedition sent by the Canadian Government to investigate the navigability of Hudson's Straits, for purposes of commerce. It contains, as usual, a deal of useful information on the region embraced, divided under the following heads:—Narrative, Ice Observations, Notes by Observers, Resources of the Hudson's Bay Region, Meteorological Observations, Report by Mr. F. F. Payne on the Flora and Fauna of Stupart's Bay, Report by Dr. R. Bell on Economic Minerals, &c., concluding remarks on the Navigation of the Straits. With reference to the latter subject—the navigation of Hudson's Straits—Lieut. Gordon considers that the season during which navigation may, in ordinary years, be regarded as practicable for the purposes of commerce, will, on the average, fall between 1st and 10th July, and the closing of the season would be about the first week in October. The report contains two illustrations, three charts, and one plan.

**Im Thurn, Everard F.**—Visit of the Governor to the Pomeroon District (July 1887). (Reprinted from the 'Argosy.') Demerara, 1887: 4to., pp. 8. [Presented by Everard F. Im Thurn, Esq.]

**[Patagonia.]**—Exploracion al interior de la Patagonia y costas del Pacifico, por el Teniente de fregata Sr. Augustin del Castillo. Boletin del Instituto Geográfico Argentino, tomo viii. cuaderno ix., 1887.

**Sinclair, A. C., and Fyfe, Laurence R.**—The Handbook of Jamaica for 1887-8: comprising Historical, Statistical, and General Information concerning the Island. London, Stanford, 1887: 8vo., pp. xii. and 580, map. [Presented by Sir Henry Norman.]

**Tanner, [Prof.] Henry.**—British Columbia; its Agricultural and Commercial Capabilities, and the Advantages it offers for Emigration purposes. London, George Kenning, 1887: 8vo., pp. 45, illustrations.

**Wilde, [Dr.] Eduardo.**—Senado Argentino. Arrendamiento de las Obras de Salubridad de la Capital. Discurso pronunciado por el Dr. Eduardo Wilde, Ministro del Interior, en sesiones del 6, 7 y 8 de Julio 1887. Buenos Aires, Imp. de La Tribuna Nacional, 1887: 12mo., pp. 290.

## AUSTRALASIA.

[**Australasia.**—Transactions and Proceedings of the Royal Geographical Society of Australasia (Victoria Branch). Vols. iii. and iv., January 1885 to December 1886. Melbourne, 1887.

This volume contains reports of proceedings on the return of Captain Everett's New Guinea Expedition. The most important papers are, "Explorations on the West Coast of Tasmania," by C. P. Sprent, with map; "A Few Days Ashore in W. Kimberley," by J. A. Paxton, who also contributes a paper on the probable river-system of N.W. Australia. The Hon. John Forrest contributes a paper on the Kimberley district, while there are several papers on the subject of Antarctic exploration.

[**Australia.**—Results of Meteorological Observations made in New South Wales during 1885, under the direction of H. C. Russell, F.R.S., Government Astronomer of New South Wales. Sydney, Charles Potter, 1887: 8vo., pp. 167 & 191.

Results of Rain and River Observations made in New South Wales and Part of Queensland during 1886. By H. C. Russell. 8vo., pp. 87.

Notes upon Floods and Lake George. By H. C. Russell. Sydney, 1887: 8vo., pp. 30.

Notes upon the History of Floods in the River Darling. By H. C. Russell. Sydney, 1887: 8vo., pp. 56.

In these various publications brought out under Mr. Russell's superintendence will be found much that will contribute to a knowledge of the hydrography and physical geography of South-east Australia. As Mr. Russell remarks, "The history of floods in our rivers and lakes, if it could be accurately written, would form one of the most important chapters in the history of our climate, and probably throw much light upon the laws which control the changes in seasons that have such prominent effects upon a country like this, almost wholly devoted to pastoral pursuits." Mr. Russell is going the right way about to accumulate the material for such a history so far as New South Wales is concerned. His system of observations for ascertaining the amount of evaporation in Lake George and at other stations, and the quantity of rain which finds its way into the rivers, and the character and peculiarity of floods in these rivers, will all lead to valuable results, not only for science but for the economic development of the colony. Lake George, he tells us, is a lake which varies much in size because it is so shallow, being never more than 25 feet deep in the deepest part; it may be taken as 16 miles long and 5 wide, or, roughly, 80 square miles of surface. It is 2200 feet above the sea, and surrounded by high land. On this lake very careful evaporation experiments are being made. During the years 1874 to 1885 the level of the water in the lake fell 12 feet, or at the rate of 13 inches per annum; and during the same period the average rainfall there was 30·8 inches. Hence the lake lost, per annum, by evaporation during these years 43·8 inches—a result confirmed by actual measures during 1886. Statistics of evaporation observations from other parts of the colony are given, the result being that evaporation depends very much on the state of the soil. If it is wet on the surface the evaporation goes on from it much faster than from water; but as the ground dries the condition is reversed and the earth evaporates less than the water. In the paper on Lake George is a large map of the lake, and in that on the River Darling a large table showing graphically the floods in the river from 1831 to 1886.

**Smith, S. Percy.**—The Eruption of Tarawera: A report to the Surveyor-General. Wellington, N.Z., 1886: 8vo., pp. 84. [Presented by S. Percy Smith, Esq.]

This is a report of great value of a survey of the district affected by the recent volcanic eruption in New Zealand, by Mr. Percy Smith and his assistants. It abounds with information of the most varied kind and of high importance, geographical, geological, and ethnological. There are about as many illustrations

and maps, well executed, as there are pages of letterpress. It deserves the careful study both of the geographer and the geologist. It appears to Mr. Smith that all the evidence we have tends to prove the existence of a reservoir of molten matter within that part of the great fissure which underlies the mountains of Tarawera and Ruawahia. The Tarawera eruption, he thinks, appears to offer an example of the first stage in the formation of a volcanic mountain. It is, in fact, an incomplete effort to form a volcano. As far as can be judged from the present state of affairs, the activity is fast dying out.

**Favenc, Ernest.**—*Western Australia: its Past History; its Present Trade and Resources; its Future Position in the Australian Group.* Sydney, Turner & Henderson, 1887: 4to., pp. 84, map. [Presented by the Author.]

[**New Zealand.**]—*Transactions and Proceedings of the New Zealand Institute, 1886.* Vol. xix. (second of New Series.) Edited and published under the authority of the Board of Governors of the Institute, by James Hector, C.M.G., M.D., F.R.S., Director. Issued May, 1887. Wellington, Lyon & Blair; London, Trübner & Co.: 8vo., pp. xix. and 656, plates and map. [Presented by Dr. James Hector.]

Among the papers of geographical interest may be mentioned the following—‘Description of the Little Barrier, or Hauturu Island, the Birds which inhabit it, and the Locality as a Protection to them,’ by A. Reischek, F.L.S.; ‘Narrative of an Ascent of Ruapehu,’ by James Park, Geological Survey Department; and ‘Economic Antarctic Exploration,’ by C. Traill.

#### OCEANIA.

**Cotteau, E.**—*Les Nouvelles-Hébrides.* 8vo., map, pp. 8. [Presented by the Author.]

This is a copy of a paper read before the French Association for the Advancement of Science at the Nancy meeting, 1886.

#### GENERAL.

**Abercromby, Hon. Ralph.**—*Weather: a Popular Exposition of the Nature of Weather Changes from Day to Day.* London, Kegan Paul & Co., 1887: 8vo., pp. xix. and 463. Price 5s. [Presented by the Publisher.]

Mr. Abercromby is one of the most scientific of our meteorologists, and his researches on the forms of clouds and on aerial currents are recognised as of great original value. The results of his researches are embodied in the new volume of the International Scientific Series. The first part of the work is elementary, and deals with such subjects as synoptic charts, weather prognostics, clouds, and cloud prognostics. In the second or advanced section Mr. Abercromby treats of isobars; barographs, thermograms, and meteographs; wind and calm; heat and cold; squalls, thunderstorms, and non-isobaric rain; pampas whirlwinds and tornadoes; local, diurnal, annual, and secular variations of weather; types and spells of weather; forecasts for solitary observers; forecasting by synoptic charts. Thus it will be seen that while Mr. Abercromby's book is no systematic treatise on meteorology, it contains much that is of great practical value, and which will not be found in the regular treatises. There are about 100 illustrations.

*Annuaire du Club Alpin Français. Treizième Année, 1886.* Paris, Hachette & Cie. 1887: 8vo., pp. vii. and 752, illustrations.

Among the papers of geographical interest are—‘L'Islande à vol d'oiseau (La capitale; les solfatares de Krisuvik; l'Islande alpestre; les geysers; les glaciers; déserts de lave; Akreyri; Thingvellir),’ by Dr. Labonne; ‘Ascensions au Sinaï (Le Serbal; le Djebel Mouça; le Raz Safsafeh),’ by Charles Grad; ‘Étude sur les chaînes et massifs du système des Alpes (suite et fin),’ by E. Levassour; and ‘Relevés hypsométriques résultant d'observations faites au baromètre par des membres du Club Alpin Français, et calculées par le commandant du génie Prudent.’

[The 'Challenger' Voyage].—Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873-76, under the command of Captain George S. Nares, R.N., F.R.S., and the late Captain Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, Knt., F.R.S., &c., and now of John Murray, one of the Naturalists of the Expedition. Zoology—Vols. xx., xxi. (text and plates) and xxii. London, Eyre & Spottiswoode, 1887: 4to., pp. (vol. xx.), viii., lxxviii., 275, 16, and 47; (vol. xxi.) 513; (vol. xxii.) viii., lxxv., and 335; charts and plates. Price (vol. xx.) 40s.; (vol. xxi., text and plates), 70s.; (vol. xxii.) 50s. [Presented by the Lords Commissioners of Her Majesty's Treasury.]

**Corvo, João De Andrade.**—Estudos sobre as Provincias Ultramarinas. Lisbon, 1883-5: 3 vols. 8vo., i. pp. 305; ii. pp. 469; iii. pp. 404. [Presented by the Author.]

This work is welcome as containing a vast amount of information on the history and the social and economical condition of the Portuguese Colonies.

**Cust, Robert Needham [LL.D.]**—Linguistic and Oriental Essays, written from the year 1847 to 1887. Second series. London, Trübner, 1887: 8vo., pp. xiv. and 548. Price 21s. [Presented by the Author.]

This volume contains twenty-one essays, many of them of geographical and ethnological interest. Nine of them refer more or less to India on the linguistic and political side; two to Russia, comprising the serf question, the Oxus province, and the Caspian; three to the empire of Turkey, including Egypt; one to the French empire in North Africa; two to the languages of Africa and Oceania; two to the International Oriental Congress; one to the four great European cities of antiquity; and one to the geography of the ancients. The volume contains six maps.

**Drygalski, [Dr.] Erich von.**—Die Geoiddeformationen der Eiszeit. Berlin, Formetter, 1887: 8vo., pp. 116.

This is a long and elaborate paper discussing the influence of the glacial epoch in modifying the shape of the earth's surface. It appears also as a paper in the 'Zeitschrift' of the Berlin Geographical Society, Band xxii. Heft 3 and 4.

**Eckhardt, H.**—Matthæus Merian. Skizze seines Lebens und ausführliche Beschreibung seiner Topographia Germaniæ, nebst Verzeichniss der darin enthaltenen Kupferstiche. Basel, H. Geag, 1887: 8vo., pp. 222. [Presented by the Publisher.]

This is an exceedingly interesting sketch of a German publisher, cartographer, and engraver of the seventeenth century, whose maps and atlases did much to advance both geography and cartography.

[Educational].—Longman's Shilling Geography, with 45 maps and 9 diagrams. London, Longmans, 1887: 8vo., pp. 160.

This book cannot be commended; it is written on the old bad lines, and abounds in such misstatements and puerilities as these:—"A volcano is a mountain from which smoke, flames, ashes, and lava are thrown"; "A roadstead is a part of the sea near the shore, and shut in by sandbanks." In the attempt to distinguish between a town, a city, a village, and a hamlet, the writer gets into a hopeless mess. A hamlet, we are told, is "a small village where few people live." The first three pages are occupied with fifty numbered definitions after this manner; the rest of the book consists of scarcely anything more than crowds of names.

**Lockyer, J. Norman.**—Outlines of Physiography. The Movements of the Earth. London, Macmillan & Co., 1887: 8vo., pp. xvi. and 130. Price 1s. 6d. [Presented by the Publisher.]

Mr. Lockyer states that what he has set himself to do in this little work and

in others which he intends to follow it, is to bring together those facts and lines of thought which will enable us to take a survey of nature with strict relation to the earth's place in it, especially from the point of view of physical astronomy. The present instalment is what would be generally regarded as mainly astronomical; in successive chapters it deals with the Measurement of Angular Surface, the Measurement of Time, Observing Conditions, the Rotation of the Earth, the Earth's Revolution, Conditions of Revolution, and Results of Rotation and Revolution. The volume is illustrated with numerous diagrams.

**Mohn, H.**—Grundzüge der Meteorologie. Die Lehre von Wind und Wetter nach den neuesten Forschungen gemeinfasslich dargestellt von H. Mohn. Deutsche Original-Ausgabe. Vierte verbesserte Auflage. Berlin, D. Reimer, 1887: 8vo., pp. x. and 364, 23 maps and 36 woodcuts. Price 6s.

**Rosny, Léon de.**—Les Religions de l'Extrême Orient. Leçon d'ouverture faite à l'École pratique des Hautes-Études. Paris, Maisonneuve Frères & Ch. Leclerc, 1886: 8vo., pp. 36.

**Struve, H.**—Landkarten, ihre Herstellung und ihre Fehlergrenzen. Berlin, Springer, 1887: 8vo., pp. viii. and 79. Price 2s. 6d.

A solid scientific treatise on map-construction, and on the limits of error in cartography.

[**The Colonies.**]—The Colonial Book Circular and Bibliographical Record. Compiled and published by E. C. Petherick, at the Colonial Booksellers' Agency, London. No. 1, vol. i. September 1887.

This new journal is likely to be useful to all interested in the Colonies.

The first part contains a select list of recent publications in all departments, which no doubt many colonists will be glad to have. Then follows a classified list of recent Colonial publications and books relating to the Colonies.

**Varaldo, O.**—L'Origine di Cristoforo Colombo. 'Bollettino' Italian Geographical Society, September 1887.

Signor Varaldo examines anew the evidence in reference to the birthplace of Columbus in connection with recent controversies on the subject, and concludes decidedly in favour of Genoa.

**Yeats, John.**—Technical, Industrial, and Trade Education. 4 vols. 8vo. I. The Natural History of the Raw Material of Commerce; pp. xx. and 504. II. The Technical History of Commerce, or the Progress of the Useful Arts; pp. xxviii. and 527. III. The Growth and Vicissitudes of Commerce in all Ages, an Historical Narrative of the Industry and Intercourse of Civilised Nations; pp. xlvi. and 619. IV. Recent and Existing Commerce, with statistical supplement, maps showing trade-areas, and tabulated list of places important in business or trade; pp. xviii. and 516. London, Philip & Son, 1887. Price 24s. [Presented by the Publisher.]

This is a formidable and elaborate work, a mine of information, much of which will be found exceedingly useful by the student of what is known as commercial geography, though much of course does not come within the geographical field. Dr. Yeats has been long known as one of the foremost writers on commercial geography, for which he has done much. There is still, however, room for a systematic treatise on the subject written in the light of recent developments of geography. One of the most valuable features of these volumes is the large number of maps by which they are illustrated, exhibiting in a striking manner the various aspects with which Dr. Yeats deals. We can only briefly point out such of the sections of the work as are of special geographical interest. In the first volume, part i. deals with the geography of the home country, the adjacent continent, our colonial dependencies, and foreign trade centres. In one chapter Dr. Yeats endeavours to show the results of climate and soil on the industry of Great Britain, and in another the effects of geology



on the industrial history of the British race. Other countries in this chapter he treats in somewhat the same fashion. In this volume there is a small map of the world, showing the geographical distribution of the raw material of industry and trade. The only distinctively geographical feature in the second volume is an industrial map of the British Islands, exhibiting the chief localities of manufacturing, commercial, and agricultural industry, with the ratio of population in the different counties, and the towns classified according to their respective populations. The map of England especially seems to us on too small a scale for practical utility. This volume contains a great amount of minute and curious information. Volume iii. contains much of geographical interest. It deals, for example, with the earliest trade routes, and in ample detail with the commerce of the ancients—Phœnicia, Assyria, Babylonia, Carthage, Egypt and Ethiopia, Greece, Rome; mediæval commerce—Byzantium, the Saracens, the Italian Republics, Portugal, Spain, France, England, Netherlands, Northern Europe, Germany; lastly, modern commerce, including all the existing commercial nations and their colonies. Here we have two trade-route maps and a map of Great Britain and her colonies, to scale. The last volume has also a good deal of geography throughout its four parts—I. British industry and trade at the close of the nineteenth century; II. Foreign and colonial relations at the close of the nineteenth century; III. Commercial policy of the second half of the nineteenth century; IV. Natural divisions of trade throughout the world. Appended is a tabulated list, covering over 50 pages, of towns or trade centres important in business, giving in each case the country, the local industry, the local market, nearest port, currency, approximate mileage from London, and natural division of trade. This volume has several maps, showing natural divisions of trade and thoroughfares of various classes. Such is a brief analysis of some of the leading geographical features of this elaborate and comprehensive work, which must have cost its author a vast amount of labour and research.

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The following works have also been added to the Library:—

**Ritter, Carl.**—Geschichte der Erdkunde und der Entdeckungen. Vorlesungen an der Universität zu Berlin gehalten. Herausgegeben von H. A. Daniel. Berlin, G. Reimer, 1861: 8vo., pp. vi. and 265, portrait.

——— Allgemeine Erdkunde. Vorlesungen an der Universität zu Berlin gehalten. Herausgegeben von H. A. Daniel. Berlin, G. Reimer, 1862: 8vo., pp. vi. and 240.

[———] Carl Ritter. Ein Lebensbild nach seinem handschriftlichen Nachlass, dargestellt von D. G. Kramer. Zweite durchgesehene und mit einigen Reisebriefen vermehrte Ausgabe. Erster Theil. Nebst einem Bildniss Ritters. Zweiter Theil. Die Reisebriefe enthaltend. Halle, Verlag der Buchhandlung des Waisenhauses, 1875: 8vo., pp. (I.) vi. and 458; (II.) 320, portrait.

[**Varenius, Bernhard.**]—Bernhardi Varenii Med. D. Descriptio Regni Japoniæ et Siam. Item, De Japoniorum Religione & Siamensium. De Diversis omnium Gentium Religionibus. Quibus, præmissâ Dissertatione de variis Rerum publicarum generibus, adduntur quædam de Priscorum Afrorum fide excerpta ex Leone Africano. Cantabrigiæ, Joan. Hayes, 1673: 12mo., pp. 292.

**Warburg** Fever Tincture and Tonic Medicine. Statement proving, by numerous official documents, its remarkable curative power in Fevers, with Evidence, showing its great superiority to Quinine in All Fevers, not excepting Puerperal (see p. 67), both as regards Efficacy, Economy, and Rapidity of Action, and its value as a Tonic, in Debility and Convalescence. London, Dr. Warburg: 12mo., pp. 74, portrait. [Presented by Sir C. W. Wilson.]

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## NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

## EUROPE.

**Denmark.**—Generalstabens topographiske Kaart over —. Scale 1 : 40,000 or 1.8 inches to a geographical mile. Kalchographeret og graveret ved Generalstabens, Kjöbenhavn, 1886. Sheets: Davbjerg, Hadsund, Hjarbæk. (*Dulau.*)

**France.**—Carte de —, dressé par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1 : 100,000 or 1.3 geographical miles to an inch. Paris, 1887. Sheets: II.—14, Laudunvez; II.—15, Ile d'Ouessant; V.—13, Tréguier; V.—18, Lorient; VI.—14, St. Brieu; XI.—13, Falaise; XVI.—5, Calais; XXII.—20, Loubans; XXII.—32, Carpentras; XXIV.—24, St. Julien; XXIV.—25, Annecy; XXV.—25, Sallanches. Hachette et Cie., Paris. Price 7*d.* each sheet. (*Dulau.*)

**Oesterreichisch-Ungarischen Monarchie.**—Specialkarte der —. Scale 1 : 75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut. Wien, 1887. Sheets: Zone 13, Col. XXV. Tokaj; 13—XXVIII. Nagy Szöllös und Huszt; 15—XXV. Debrecen; 15—XXVIII. Szinerváralja und Kraszna-Bélték; 17—XXV. Berettyó-Ujfalu und Körös-Tarján; 17—XXVI. Grosswardein; 19—XXV. Sarkad und Kis Jenö; 30—XVI. Livno; 31—XIII. Žirije (Zuri); 34—XVII. Neum und Stagno Grande. Price 1*s.* 4*d.* each sheet. (*Dulau.*)

**Waldenburg.**—Special-karte des Kreises —, von G. Olbich. Scale 1 : 75,000 or 1 geographical mile to an inch. Waldenburg, Knorrn. Price 1*s.* 6*d.* (*Dulau.*)

## ORDNANCE SURVEY MAPS.

Publications issued during the month of September 1887.

## 1-inch—General Maps:—

ENGLAND AND WALES: New Series. Sheets 108, 223, 261 and 262 (on one), in outline.

## 6-inch—County Maps:—

ENGLAND AND WALES: **Bedfordshire:** 27 N.W.; 1*s.* **Brecknockshire:** 20 N.W., 23 N.E., S.W., 24 N.W., 27 N.E., 28 N.W., 40 N.E.; 1*s.* each. **Cambridgeshire:** 5 S.E., 10 N.W., 19 N.E., 20 S.W., 28 S.E., 29 N.W., S.E., 34 N.E., S.E.; 1*s.* each. **Cardiganshire:** 1 N.E., S.W., S.E., 2 S.W.; 1*s.* each. **Carmarthenshire:** 9 N.E., 19 N.W.; 1*s.* each. **Devonshire:** 13 S.W., 21 N.W., S.W.; 1*s.* each. **Dorsetshire:** 6 S.W., 24 S.W., 25 N.W., S.W., S.E., 26 N.W., S.W., 33 N.W., 34 N.W.; 1*s.* each. **Gloucestershire:** 58 N.E., 71 S.E.; 1*s.* each. **Herefordshire:** 37 N.W., S.W., 40 N.E., S.W., 41 N.W., 43 N.E., 44 N.W., 46 N.E., S.E.; 1*s.* each. **Huntingdonshire:** 10 N.E., 11 S.W., 16 N.E., 17 N.W., 18 N.E., 19 N.W., S.W., S.E., 21 N.E., 25 N.E.; 1*s.* each. **Lincolnshire:** 28 N.W., N.E., S.W., S.E., 38 N.E., S.W., 47 N.W., 55 S.E., 79 S.W., 87 N.E., 97 N.W., N.E., S.W., S.E., 112 N.E., 113 N.W., 136 N.W., 140 S.W., S.E., 141 N.E., S.W., S.E., 143 N.W., 147 S.E., 149 S.E.; 1*s.* each. **Merionethshire:** 6 S.E., 24 N.W., 29 S.W., 35 S.W., 38 N.W., S.W., 39 N.W., S.W., 47 N.W., 48 N.E.; 1*s.* each. **Montgomeryshire:** 12 S.W.; 1*s.* **Norfolk:** 62 S.E., 74 N.W., N.E.; 1*s.* each. **Pembrokeshire:** 32; 2*s.* 6*d.* **Somersetshire:** 36 S.W., 47 S.E., 48 S.W., 71 N.W., S.W., 79 S.E., 84 S.W.; 1*s.* each. **Staffordshire:** 4 S.W., 20 S.W.; 1*s.* each. **Suffolk:** 12 N.W., 68 S.W., 78 N.E.; 1*s.* each. **Warwickshire:** 10 S.E., 28 N.E.; 1*s.* each. **Wiltshire:** 30, 60; 2*s.* 6*d.* each. 3 N.E.; 1*s.*

## 25-inch—Parish Maps:—

ENGLAND AND WALES: **Brecknockshire:** XXVI. 4, 3*s.* **Cambridgeshire:** VIII. 9, 13, XI. 7, 8, 15, XXIII. 9, XXVII. 2, 4*s.* each; XXXI. 9, XXXV. 4, 3*s.* each; XXXV. 7, 4*s.*; XXXV. 8, 3*s.*; XXXV. 16, 5*s.*; XXXVI. 1, 2, XXXIX. 2, 4, 7, 11, 16, 3*s.* each; XL. 4, 5*s.*; XL. 7, 4*s.*; XL. 11, 16, XLVI. 2, 4, 8, 14, LIII. 3, 7, 3*s.* each; LIII. 15, 4*s.* **Carmarthenshire:** XXVI. 16, 3*s.* **Devonshire:** XIX. 10, 4*s.*; XX. 4, 8, CXIX. 10, 11, 12, 3*s.* each. **Area Book:** Bridestowe, 1*s.* **Dorsetshire:** I. 12, III. 2, 12, VII. 1, 3*s.* each. **Gloucestershire:** XXVI. 13, 3*s.* **Herefordshire:** XII. 14, 4*s.*; XXXI. 8, 16, 3*s.* each; XXXIII. 5, 4*s.*; XXXVI. 13, 3*s.* **Leicestershire:** XXXII. 5. **Lincolnshire:** XII. 2, 3*s.* each; LXXX. 9, 4*s.*; LXXXII. 10, 13, 14, 3*s.* each; LXXXVII. 3, 4*s.*; LXXXVII. 4, 7, 11, 15, 16, 3*s.* each; CLI. 6, 4*s.* **Montgomeryshire:** XXXIII. 10, 3*s.* **Norfolk:** XXXII. 8, 4*s.*; XXXII. 12, 5*s.*; XXXII. 15, XXXIII. 13, XL. 9, LVI. 1, 2, 5, 9, 10, 13, 14, LVII. 1, LXVIII. 4, 7, 15, LXIX. 5, 4*s.* each; LXX. 9, 3*s.*; LXIX. 13, LXXXI. 1, 4*s.* each; LXXXI. 2, 3*s.*; LXXXI. 5, 4*s.*; LXXXI. 6, 3*s.*; LXXXI. 14, 4*s.* **Northamptonshire:** II. 6, 4*s.*; VIII. 4, XXV. 9, 13, XXVIII. 2, 3*s.* each; LXXXII. 4, 11, LXXXVI. 2, LXXXIII. 3, LXXXV. 1, 3*s.* each. **Staffordshire:** XXX. 16, 5*s.* **Area Book:** Dudley Castle Hill, 1*s.* **Warwickshire:** XXXIII. 1, 4*s.*; XXXIII. 9, XXXI. 3, 4, 8, 3*s.* each; XXXI. 12, 5*s.*; XXXI. 13, XXXII. 1, 4, 3*s.* each; XXXII. 8, 4*s.*; XXXII. 14, 3*s.*; XXXIV. 2, 4*s.*; XLV. 12, 15, 3*s.* each. **Wiltshire:** XXVIII. 15, XXXII. 5, 4*s.* each; LI. 3, 15, LVII. 6, LXIII. 2, 3, 3*s.* each. **Worcestershire:** **Area Books:** Hallow, Wardon, 1*s.* each.

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**Town Plans**—10-foot scale:—

ENGLAND AND WALES: Bridgewater, L. 10, 13, 14, 15, 18; 2s. each. Leicester, XXXI. 10, 9, 10, 21, 23, 24; XXXI. 14, 1, 2, 3, 5, 6, 10; 2s. each. March, XVI. 1, 8, 9, 13, 19, 23; 2s. each. Sherborne, V. 16, 10; VI. 13, 1, 2, 3, 6, 7, 8, 11, 12, 13, 16, 17; 2s. each. Warwick, XXXIII. 10, 19, 23; XXXIII. 13, 14; XXXIII. 14, 2, 6, 11. Wisbech, VII. 3, 14.

(Stanford, Agent.)

## AFRICA.

**Algérie et de la Tunisie.**—Carte murale de l' —, dressée par J. Gaultier, géographe; dessinée par A. Cuénot. Scale 1:800,000 or 10·9 geographical miles to an inch. Paris, Maison Logerot—J. Gaultier. Price 12s. 6d. in 2 sheets, 18s. 6d. mounted on roller and varnished. (*Dulau.*)

**Congo Français.**—Carte du —, dressée en 1887 par ordre de Mr. le S. Secrétaire d'Etat au Ministère de la Marine et des Colonies, par M. Ch. Rouvier, Capitaine de Frégate, d'après les travaux des explorateurs français et étrangers. Equatorial scale 1:1,840,000, or 25·2 geographical miles to an inch. Price 2s. (*Dulau.*)

This map has been compiled from the latest available materials, and is very neatly drawn. The boundaries laid down are those which have been definitely settled by the commission of delimitation. All heights are given in metres; the positions which have been fixed by Captain Rouvier are indicated, and the positions of military posts, factories, and custom-houses are shown by symbols.

## AMERICA.

**Brazil.**—Originalkarte der südlichen Kolonien von Rio Grande do Sul und der Verkehrsverbindungen mit ihren Absatzorten. Nach neuen Aufnahmen von Dr. H. von Ihering, L. Wertheimer u.a. sowie mit Benutzung des vorhandenen Materials entworfen und gezeichnet von Paul Langhaus. Scale 1:500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 15.—Originalskizze der Deutschen Kolonie S. Lourenço und der Benachbarten Kolonien. Nach Aufnahmen von Dr. H. von Ihering, L. Wertheimer u. Anderen entworfen u. gezeichnet von P. Langhaus. Petermann's 'Geographische Mitteilungen,' Jahrgang 1887, Taf. 16. Justus Perthes, Gotha. (*Dulau.*)

**Florida.**—Williams and Bushnell's New Map of —, compiled from the surveys of the U.S. General Land Office, the U.S. Coast Surveys, Private Surveys, and other original sources. By Arthur T. Williams and John W. Bushnell. Jacksonville, Fla., 1886. Scale 1:250,000 or 3·4 geographical miles to an inch. On rollers.

This map being drawn on so large a scale, shows distinctly the features of the country, and the system of symbolic shading adopted enables any person to see at once the nature of the land, such as swamp and overflowed land, prairie and savanna land, scrub land, high and dry hammock land, or open pine land, all of which are indicated. All railways, whether in operation or projected, are laid down, and a note is given explaining the system of land survey carried out in the State, the survey sections being also shown on the map.

**Ontario.**—Indexed County Map and Shippers' Guide of —. Scale 1:1,110,000 or 15·2 geographical miles to an inch. Rand, McNally & Co., Chicago. (*Trübner.*)

**United States.**—Indexed County and Township Pocket Map and Shippers' Guide of Maryland and Delaware. Scale 1:725,000 or 9·9 geographical miles to an inch.—Indexed County and Township Pocket Map and Shippers' Guide of

**Michigan.** Scale 1:1,300,000 or 17·8 geographical miles to an inch.—Indexed Railroad and County Map of **New York.** Scale 1:1,120,000 or 15·3 geographical miles to an inch. Rand, M'Nally & Co., Chicago. (*Trübner.*)

## PACIFIC OCEAN ISLANDS.

**Sandwich Islands.**—Map of the Hawaiian Islands, compiled from the latest Government Surveys by S. E. Bishop, for J. M. Oat, Jun. & Co. Honolulu, 1886. Scale 1:1,200,000 or 16·4 geographical miles to an inch. Schmidt Label and Lith. Co., San Francisco, Cal. U.S.A.—Maui, Hawaiian Islands, Hawaiian Government Survey, W. D. Alexander, Surveyor-General. Scale 1:60,000 or 1·2 inches to a geographical mile. 1885. 2 sheets. Julius Bien & Co., Photo. lith.—Map of the Island of Hawaii, Hawaiian Islands. W. D. Alexander, Surveyor-General. Scale 1:240,000 or 3·2 geographical miles to an inch. 1886. Preliminary edition.

The first of these is a general map of the Hawaiian Islands on the scale of 16·4 geographical miles to an inch, coloured to show the boundaries of districts. The next is a map showing the results of the survey of Maui, on the scale of 1·2 inches to the geographical mile. It has been produced by photo-lithography, the heights are given in feet, and the topographical features are clearly indicated by a combined system of hatching and contour lines. The third is a map of the island of Hawaii, on which the same system of indicating physical features is followed as in that of Maui. An interesting feature in this map is the manner in which it shows the lava streams which have at different periods issued from various positions on the slopes of Mauna Loa, the dates of each being given where known. This set of maps being the result of actual survey constitute a valuable addition to the Society's Map-room collection.

## CHARTS.

**Admiralty.**—Charts and Plans published by the Hydrographic Office, Admiralty, in May, June, July, and August 1887.

No.	Inches.	
171		Index chart of Admiralty sailing directions. 3 <i>d.</i>
1407	m = 0·5	Scotland, east coast:—St. Abb's head to Aberdeen. 2 <i>s.</i> 6 <i>d.</i>
2333		Lapland, sheet 1:—Plan added, port Vladimer.
2250	m = 0·35	Baltic, Sweden:—Gotland plans, Farö sund, Slite Hamn, Rhone Hamn. 2 <i>s.</i> 6 <i>d.</i>
2378	m = 1·5	Black sea:—Búg river. 2 <i>s.</i> 6 <i>d.</i>
1240		South Polar chart. 2 <i>s.</i>
907	m = 0·8	Canada, lake Huron:—Georgian bay to Clapperton island (plans, Little Current, Killarney harbour). 2 <i>s.</i> 6 <i>d.</i>
1036	m = various	Madagascar:—Bosi, Murondava, Vatomandri, Mahanuru. 1 <i>s.</i> 6 <i>d.</i>
1263	d = 0·9	China sea. 2 <i>s.</i> 6 <i>d.</i>
2683	m = 0·2	Pacific Ocean. 5 <i>s.</i>
174	{ m = 0·33 } { m = 1·5 }	South-west Pacific, New Hebrides islands:—Banks' group. 2 <i>s.</i>
1022	m = various	Islands and anchorages in the South Pacific ocean:—Bounty island, Antipodes islands, Canton island, Canton island anchorage, Hull island, Phoenix islands, Birnies island, Danger island, Nassau island. 1 <i>s.</i> 6 <i>d.</i>

No.		Inches.	
1182	m =	4·0	England, west coast:—Cardiff and Penarth approaches to. 2s. 6d.
2151	m =	5·0	England, east coast:—Broadness to Muckin including Gravesend and Lower Hope 2s. 6d.
2251	m =	0·35	Baltic, Sweden:—Kalmar sound and Öland 2s. 6d.
2228			Tristan da Cunha group:—Plan added, Gough island.
2187	m =	1·75	Gulf of St. Lawrence:—Miramichi bay. 2s.
910	m =	2·0	Canada, Lake Huron:—Clapperton channel.
1323			Independencia bay to Begueta bay:—Plan added, Salinas and Chiriqui.
1067	m =	1·4	Africa, west coast:—Loango and Black Point 1s. 6d.
228	m =	4·0	Arabia, north-east coast:—Suadi islands. 6s.
832	m =	0·5	Bay of Bengal:—Chedúba strait and Ramree 2s.
833			Rangoon river:—Plan added, China Baker river.
864	m =	various	Coral sea:—Islets and reefs in the Coral sea. reefs; Coringa islets; Flinders and adjacent 1s.
134			Harbours and anchorages in New Hebrides:—Plan added, Dives bay.
1071	m =	6·0	New Hebrides:—North coast of Aneityum island, Patrick, Ijipthav and Anau-un-re anchorages.
170	m =	3·0	New Hebrides:—Approaches to Pallikulo bay.

(J. D. Potter, Agent.)

## CHARTS CANCELLED.

No.		Cancelled by
1407	Eyemouth to the Tay .. .. .	} New chart, St Abb's Head to Aberdeen .. .. .
1408	Firth of Tay to Aberdeen .. .. .	
2250	Gottland .. .. .	New chart, Gottland .. .. .
2378	Búg river .. .. .	New plan, Búg river .. .. .
1240	South Polar chart .. .. .	New chart, South Polar chart .. .. .
2839	Ashrafi islands and reefs.	
2683	Pacific ocean .. .. .	New chart, Pacific ocean .. .. .
1182	Cardiff and Penarth roads .. .. .	} New chart, Cardiff and Penarth roads, approaches to .. .. .
2151	River Thames, sheet 4, Gravesend reach .. .. .	
		light .. .. .
2251	Kalmar sound and Öland island	} New chart, Kalmar sound and Öland island .. .. .
2187	Miramichi bay .. .. .	
604	Loango bay, Black Point bay on this sheet .. .. .	} New plan, Loango and Black Point bays .. .. .
832	Chedúba strait and Ramree road and harbour .. .. .	
987	Plan on this sheet, Allier bay.	} New chart, Chedúba strait and Ramree harbour .. .. .

## CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2664. France, west coast:—D'Arcachon point to Coubre point. 2648. France, west coast:—Coubre point to Les Tables d'Olonne. 2700. France, north coast:—Port St. Malo. 943. Philippine islands:—Molucca passage to Manila. 2729. Ireland, north coast:—Sligo and Ballysadare bays. 2057. Ireland, west coast:—Westport bay. 2297. Baltic, Bothnia gulf:—Hango head to South Quarken. 2234. Black Sea:—Sea of Azov. 235. Arctic Sea:—Davis strait and Baffin bay. 1747. Gulf of St. Lawrence:—Northumberland strait, western part. 2754. North America, east coast:—Long island sound, eastern part. 659. West Indies:—Florida strait. 2446. Africa, west coast:—Niger or Kwarra river. 923. Red Sea:—Harbours and Anchorages in Red Sea. 41. India, west coast:—Kundari to Boria Pagoda. 828. Bay of Bengal:—Cape Comorin to Cocanada. 136. Bay of Bengal:—Hûgli river, Calcutta to Saugor point. 823. Bay of Bengal:—Coronge island to White point. 218. Bay of Bengal:—Mergui harbour. 1723. Australia, west coast:—Houtman rocks, and adjacent coast. 2124. New Guinea, south coast:—Bramble haven to Rossel island. 982. Pacific ocean, Caroline islands:—Truk or Hogolu islands.

(*J. D. Potter, Agent.*)

**French Charts.**—No. 4143. Mer Méditerranée. Côte Sud de Corse. Port de Bonifacio. 1886.—4166. Mer Méditerranée. Côte Est de Corse. Bastia. 1887.—4174. Mer des Indes. Côte Est de Madagascar de la Baie d'Antongil à Matitanana. 1887.—4175. Mer de Chine. Golfe du Tonkin. Entrées de Kuaï-Chin-Mun et Tsieng-Mun et Canaux intérieurs entre Ké-Bao et Tien-Yen. 1887.—4147. Chine. Côte Nord de Formosc. Baie de Ke-Lung. 1886.—4152. Mer de Chine. Golfe du Tonkin. Canaux intérieurs aux environs de Ko-Kai-Moun et Dam-hâ. 1886.—4155. Mer de Chine. Golfe du Tonkin. Passes au Sud de l'Archipel des Faï-Tsi-Long. 1886.—4163. Côte Est de Chine. Iles Pescadores (Mouillages Intérieurs). 1886.—4164. Mer de Chine. Golfe du Tonkin. Grande Baie de Faï-Tsi-Long. 1886.—4156. Côte Est de Chine. Ile Matsu. 1886.—4171. Mer de Chine. Golfe du Tonkin. Canaux Intérieurs près de Tsieng-Mui-Taï. 1887.—4176. Mer de Chine. Golfe du Tonkin. Port de Kam-Fa. 1887.—4160. Mer Rouge. Mouillage de l'île de Tirahn. 1886.—4103. Tunisie. Golfe de Gabès. Baie de la Srira El-Khedime ou des Sur-Kenis. 1885.—4086. Tunisie. Côte Est. Mahedia (Ancienne Africa). 1885.—4150. Mer des Indes. Mouillages à la Côte Ouest de Madagascar. Morondava. Bosy. Iles Barren et Atterrages de Maintirano. 1886.—4157. Madagascar. Côte N.O. Baie de Mahajamba. Mouillage de Nosy Manja. 1886.—4149. Mer des Indes. Mouillages à la Côte Est de Madagascar. Vatmandry. Mahanoro. 1886.—4161. Mer des Indes. Mouillages aux Comores. Ile de Moheli. Grande Comore. Côte S.E. Croquis du Mouillage de Shendini. Ile de Moheli. Mouillage de Fomboni. Grande Comore. Côte N.O. Croquis du Mouillage de Mitsamuhuli. Anjouan. Havre de Pomony. Anjouan. Mouillage de Mutsammudu. 1886.—4141. Mer des Antilles. Haïti. Golfe de Port au Prince et Ile de la Gonave. 1886.—4153. Amérique Méridionale. Chili. Baie d'Iquique. 1886.—4170. Océan Pacifique. Archipel de la Société. Ile Huahine. Mouillages et Passes de Fare (Owhare). 1887. Service Hydrographique de la Marine, Paris.

**Guyana.**—Kaart van de Kust van —, van de Essequebo-rivier tot Cayenne. Scale 1 : 750,000 or 10·3 geographical miles to an inch. Samengesteld uit ver-

schillende bronnen. Uitgegeven door het Ministerie van Marine, Afdeeling Hydrographie. 's Hage, Gebr van Cleef. Price 3s. (*Dulau.*)

**Java.**—Kaart van het Eiland —, en omliggende eilanden en vaarwaters, uit de jongste berigten en opnamen tezamen gesteld door Jacob Swart. Amsterdam, Seyffardt's Boekhandel. Scale 1:500,000 or 6·8 geographical miles to an inch. Price 1*l.* 5s. 5 sheets. (*Dulau.*)

**United States Charts.**—No. 1014. Caldera Bay. Island of Santo Domingo, West Indies. 1s. 3*d.*—1017. West Coast of Central America. Judas Point to Burica Point. 2s. 4*d.*—1045. Colnett Bay, West Coast of Lower California. 1s. 1*d.*—1048. Coatzacoalcos River, Gulf of Mexico. 1s. 1*d.*—Pilot Charts of the North Atlantic Ocean, September and October 1887. Published at the Hydrographic Office, Navy Department, Washington, D.C.

#### ATLASES.

**Argentine Republic.**—Atlas de la República Argentina, construido y publicado, por resolucion del 'Instituto Geografico Argentino' bajo los auspicios del Exmo. Gobierno Nacional y redactado por el Dr. Arturo Seelstrang, miembro del Instituto. Buenos Aires: Litografia y Encuadernacion de Guillermo Kraft. 1887. Part II.

This is the second issue of the atlas, and it consists of three maps of portions of the province of Buenos Ayres, two maps of the province of Santa-Fé, and one of the provinces of Tucuman and Santiago del Estero; the two former are drawn on the scale of 13·6, and the latter 20·4 geographical miles to an inch. Some of the sheets contain a good deal of new work; all means of communication are laid down; they are clearly drawn, and are very creditable specimens of cartography.

**Berghaus' Physikalischer Atlas** (begründet 1836 von Heinrich Berghaus).—75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierv Verbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Berghaus. Dreizehnte Lieferung. Inhalt: Nr. 13, Nord-Amerika. Nr. 19, Seetiefen. Nr. 59, Schmetterlinge. Titel und Vorbemerkungen zum Atlas der Tierv Verbreitung. Gotha, Justus Perthes. 1887. Price 3s. each part. (*Dulau.*)

The thirteenth part of this atlas, which is being issued with commendable punctuality, contains three sheets of maps. Sheet No. 13 is a geological map of North America, on which twelve inset maps of different districts are given, drawn on greatly enlarged scales. Sheet No. 16 is a map of the world on Mercator's projection, showing ocean depths, coasts, harbours, and the density of the sea; in addition to this, many interesting circumstances connected with hydrography are given, such as the limit of coral formation, the portions of coasts indented by fiords, and portions of the earth's surface below the sea-level. Mr. Buchanan's maps exhibiting the density of the ocean are given on a reduced scale, as well as eight plans of characteristic harbours. Sheet No. 59 contains six maps, three of which are given to illustrate the distribution of macrolepidoptera throughout the world, and the remaining three have reference to the distribution of land and freshwater mollusca. As usual, with previous parts of this atlas, several pages of explanatory letter-press are given.

With this part the following portions of the atlas are now complete:—  
Meteorology, distribution of plants, and animals.

**India.**—Statistical Atlas of ———, prepared for the Colonial and Indian Exhibition, 1886. Calcutta, printed by the Superintendent of Government Printing, India, 1886. London, Edward Stanford. Price 12s. 6d.

This atlas contains eight maps and three diagrams, illustrative of the physical geography, meteorology, agriculture, irrigation, trade, and emigration of the Indian Empire; these are accompanied by 37 pages of explanatory letter-press, and statistics. The maps have been prepared and printed in the office of the Surveyor-General of India, and the chapters have been written by gentlemen specially qualified to undertake the task. Under these circumstances it is hardly necessary to say that the work, as far as it goes, is thoroughly satisfactory; and those persons who are desirous of obtaining a more intimate acquaintance with facts and figures concerning India are referred to the 19th number of the series of statements annually issued by the India Office, exhibiting the 'Moral and Material Progress and Condition of India,' published at the close of 1885, under the editorship of Mr. James Sutherland Cotton; except, however, in the cases of persons who may be making an exhaustive study of some special subject, the present work will be found to contain all the information that is required for general reference, the maps and diagrams being well suited to the purpose for which they were produced, and the letter-press clear and definite.

**Saint-Martin, M. Vivien de.**—Atlas Universel de Géographie Moderne, Ancienne et du Moyen Age, construit d'après les sources originales et les documents les plus récents, cartes, voyages, mémoires, travaux géodésiques, etc., avec un Texte Analytique, par M. Vivien de Saint-Martin et Fr. Schrader. Environ 110 cartes, gravées sur cuivre sous la direction de MM. E. Colin et Delaune. 7e Livraison. Contenant: Italie méridionale; Empire Russes (Asie septentrionale); Océanie (carte générale). Paris, Hachette et Cie. Price 5s. (*Dulau.*)

This is the seventh issue of the atlas. It contains three maps, all of which are beautiful specimens of cartography. That of Southern Italy (scale 1:1,500,000) has been reduced from the 1:100,000 map of the Italian General Staff, except in some districts where maps of the scale of 1:50,000 and 1:25,000 have been consulted. An inset map of the environs of Naples is given on the scale of 1:500,000. The next map is one of the Russian Empire, scale 1:15,000,000 is reduced from Schwartz's map of Siberia on the scale of 1:1,680,000, the 1:4,200,000 map of Russia in Asia, the first and second parts of Richthofen's atlas of China, and the map of the Corea, published in 'Petermann's Mittheilungen,' map 10, 1883, and other reliable sources. The third map is one of Oceania, on Mercator's projection. It is just twelve months since we received the last issue of this atlas, and it was then announced that a number of the maps were then in the engraver's hands. This fact does not appear, however, to have expedited its publication, and at the present rate at which the numbers are issued (*viz.* three in each year) it will still take rather more than twenty-nine years to complete.

**Stanford, Edward.**—London Atlas of Universal Geography, exhibiting the physical and political divisions of the various countries of the world. Folio edition; ninety maps, with a Geographical Index. London, Edward Stanford, 1887. Price, half-morocco extra, 12l.; full morocco, 15l.

This atlas is in a great measure composed of the maps of the late John Arrowsmith, and published by him in 1840 in his 'London Atlas of Universal Geography,' which title Mr. Stanford has given to the atlas under consideration. The plates of the maps referred to have received numerous corrections to bring them up to date. This must have entailed a work of considerable magnitude, and one which could scarcely be expected to be carried out without some oversights. The work of correcting old maps is always unsatisfactory, being a much more difficult task than the construction of entirely new ones. It is possible that





PROCEEDINGS  
OF THE  
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*A Journey round Chinese Turkistan and along the Northern Frontier  
of Tibet.* By A. D. CAREY.

(Read at the Evening Meeting, November 28th, 1887.)

Map, p. 790.

In the latter part of May 1885 I left Simla, intending to spend two years' leave of absence in carrying out a long-cherished scheme of travelling on the frontiers of Northern Tibet. Through the kindness of the Government of India I was furnished with a passport from the Chinese Government authorising me to visit Turkistan, China Proper, and Tibet, and I had also provided myself with a stock of presents suitable for the different classes of people I should have to deal with, without which the utility of the passport would have been much diminished.

I had selected the troaty road to Ladakh through the Kulu and Lahoul valleys in preference to the Kashmir route, and started by the Great Hindustan and Tibet road—the somewhat high-sounding title given to an excellent bridle-path from Simla to the Sutlej. After passing Narkanda, a favourite resort of holiday-makers from Simla during the spring and autumn, crossing the Sutlej below Kotgarh, and traversing the entire length of the Kulu valley, I was delayed for some days at the Rotang Pass, separating Kulu from Lahoul. The baggage was carried over by coolies, but in consequence of the depth and softness of the snow the unladen mules could not cross until the 20th of June. At Kailang, the residence of the venerable Tibetan scholar and missionary, Dr. Heyde, I was joined by Mr. Ney Elias, British Commissioner in Ladakh, also bound for Turkistan, and, travelling in his company, crossed the Baralacha Pass at the head of the Lahoul valley with some difficulty on the 7th of July. At Leh I found Mr. Dalgleish, whose services I had secured as Turki interpreter and assistant for the trip, awaiting my arrival, he having come down a few days previously from Yarkand, where for some years past he has made his home.

My plan was to reach Turkistan by the route through the uninhabited tract of Tibet lying between Rudokh and Polu, which is now

rarely, if ever, used. Acting on the advice of Mr. Elias, who freely gave me the benefit of his great experience, and with the assistance of Rai Bahadur Radha Kishen, Wazir of Ladakh, I struck a bargain for baggage-ponies with the Tartars of the frontier villages on the Pangong Lake, and left Tanksé on the 12th of August with a caravan of thirty-one men and forty-nine ponies. To save the ponies as long as possible, yaks were engaged to carry the baggage as far as the frontier between Ladakh and Rudokh, at the head of the Changchenmo valley. An easy road now led to the Mangtza Lake, a fine sheet of salt water about nine miles in length, and to another small lake close by, from which salt is collected by people from Rudokh and Ladakh. The severity of the struggle for existence in these barren regions is well illustrated by the fact that natives of Baltistan bring dried apricots from Scardo to Tanksé, and return with salt from the Mangtza Lake along the bed of the Shyok river, over as rough and bad a pathway as can be found anywhere, the burden on each man's back being more than 120 lb.—a striking example of very hard work for the smallest possible recompense.

At the Mangtza Lake we struck the road between Rudokh and Polu, which was surveyed by Kishen Singh, one of the Pandits attached to Sir D. Forsyth's mission to Turkistan; and as the guide we had with us turned out to be entirely ignorant of the route, we were obliged to find the way for ourselves with the aid of the Pandit's map and notes. Thanks to the admirable care and accuracy with which his work had been done, we found no very serious difficulty in doing this, and reached Polu without the loss of a single baggage-animal on the 12th of September, exactly a month after leaving Tanksé.

At various times, and notably in the Geographical Report by Colonel Trotter printed at chapter vii. of the Report of Sir D. Forsyth's mission, hopes have been expressed that this road, if rendered available for traffic, would form a valuable trade route, as it runs direct to India without passing through any part of the territory of the Maharaja of Kashmir. Judging from the portion of it which I saw, I do not think such an expectation can be realised. From the frontier of Ladakh to the Sulphur Horse Pass at the head of the Polu ravine the road is certainly an easy one, inasmuch as it is fairly level and free from obstructions or very bad places. But the great height of over 16,000 feet at which it runs, and the resulting oppression of breathing during so many days continuously, make it extremely trying to both men and animals. The grass at such an elevation is always coarse and scanty, and probably August, September, and October are the only months during which it would be safe for a trader's caravan to attempt the journey. Snow fell almost daily during my march, though it quickly melted; and the Tartars subsequently informed me that on their way back in September and October snow fell on eighteen successive days, and they lost several of their ponies in consequence. Another drawback to the route is that it

enters Turkistan at a point too distant from the markets of Yarkand and Kashgar. The ravine from the Sulphur Horse Pass to Polu is so difficult as to be impracticable for laden baggage-animals. I succeeded in getting through it only through the splendid qualities of the Tartar ponymen, who carried the loads on their shoulders over the worst parts of the road. With any other class of men it would have been almost hopeless. The water in the bed of the torrent, which has to be crossed many times, was fortunately low, or the ravine would have been impassable. I am, however, not sure that another and easier road to the foot of the pass does not exist, though from the cautious reserve of the Polu villagers I was unable to obtain any definite information in reply to my inquiries on the subject. But in any case I am convinced that the route is a useless one for trade purposes. The chief point in its favour is that it avoids Kashmir territory, a consideration now of no importance since, owing to improvement in our political relations with Kashmir, traffic passing through that State by the Srinagar and Murree road is as free from interruption as on the treaty road via Lahoul.

The existence of the Polu road from India was entirely unknown to the Chinese authorities at Kiria, and the news of our arrival appears to have caused some consternation. We were informed that the garrison was called out at midnight, and 200 men were sent half-way to Polu, while the commanding officer, with a smaller body of men and several Mahomedan officials, came to Polu on the evening of the 10th, having marched more than 50 miles during the day. The next morning they paid me a visit, saw the passport, and were very cordial and profuse in offers of assistance. The Chinamen spent a day in exploring the road by which we had come down, and before returning to Kiria instructed the villagers that all our wants were to be supplied.

Leaving Polu, we followed the Kiria river, which has cut itself a channel 200 or 300 feet deep in the soft earth. The banks are so precipitous that we had some difficulty in finding a place from which the water was accessible for our camp.

Kiria, the chief place of the district of the same name, is a small unwall'd town, with a fairly good bazaar. The principal industry of the district is agriculture. As elsewhere in Turkistan, farming operations are entirely dependent on irrigation from the streams which are fed by the melting of the snow on the mountains, and the Mirab, or officer, whose duty it is to regulate the supply of water to the cultivators, is a functionary of considerable importance. Within the area of irrigation the country is dotted over with poplar, mulberry, and other trees, and is extremely fertile. Good crops of wheat, Indian-corn, cotton, &c., &c., are obtained, while fruit—especially grapes, melons, and peaches—and various kinds of vegetables are plentiful and good. Outside the zone of irrigation all is waste and barren.

The respect and civility shown to us, as Englishmen, by all classes

of the people were very marked. I was often rather embarrassed, when strolling about the country, by the attentions in the shape of presents of fruit and sweetmeats, invitations to stop and partake of tea, and so forth, offered me by the inmates of the farmhouses near which I passed, while the flow of visitors to the garden in which we were encamped was constant. Crowds of sick persons begging for medicine also besieged us.

Kiria is connected with Khoten by a good bridged road with well-grown roadside trees, affording a grateful shade wherever the soil admits of it. Substantial marks have also been erected at intervals of a "fotai," or about  $2\frac{1}{4}$  miles. The road passes through a good deal of very barren country.

Khoten is a busy manufacturing town. The people are good workmen, and more enterprising than Turks elsewhere, as they make long journeys into the hills in search of gold. The principal manufactures are carpets, silk, felt, and brass and copper vessels. The area of arable land is too small to supply the wants of the population, and corn and rice are consequently imported—the former from Kargalik, and the latter from Aksu and Kuchar. The Mahomedan city, about  $2\frac{1}{2}$  miles in circumference, is very poorly built. The new or Chinese town, about half a mile distant from the old town, contains the public offices, the barracks, and a wide street of shops, neatly and regularly built. The population is stated to be about 30,000 souls. Ruins of the wall of an ancient and much larger city which included the sites of the present towns are distinctly traceable at many points. I left Khoten on the 16th of October by the Aksu road, which follows the left bank of the Yurangkash river. Two miles from the city cultivation ceased, and, with the exception of a small piece of land at Yangi Arik, 10 miles from Khoten, and another somewhat larger at Tawakal on the opposite or right bank of the river, about 40 miles from the city, no cultivation was met with until Shah Yar was reached. There is plenty of land, to all appearance suitable for the plough, but the water-supply is considered insufficient to irrigate a larger area than is already tilled. The road now follows the river up to its junction with the Karakash at a camping-ground called Koshlash, about 68 miles from the city. The Karakash must next be forded, after which the route is along the left bank of the united stream, now styled the Khoten river. On either bank is a thick belt of jungle, furnishing an ample supply of wood and grass to travellers and shepherds, and giving shelter to large numbers of pheasants and hares. Beyond the strip of jungle, which is of varying depth, is a desert. About 90 miles from Khoten we passed two adjacent and parallel ranges of hills, which rise abruptly from the plain to a height of 500 feet or more, and are known by the name of Mazar Tagh from the tomb of a saint on the summit. These hills run in a north-westerly direction until they cross the high road between Yarkand and Aksu, at a point a few miles north of Maralbashi, where we afterwards recognised them.

The peculiar feature in these hills is that, though touching one another and running side by side, the range to the north is white in colour, while the southern one is a strongly-marked red.

From this point the river had dried up, and water was very scarce. It was only to be found in pools few and far between which had formed in the bed of the river beneath the banks. This inconvenience was, however, compensated by the advantage of no longer having to follow all the sinuosities of the bank, and finding an excellent and direct road down the river-bed. Tracks, both of the tiger and of the Maral stag, were now very numerous; but the jungle is so dense and the wood of the bushes forming it so brittle, that anything like stalking was impossible. Beating might be more successful, though it would be very uncertain, owing to the thickness and extent of the jungle, and is, moreover, impracticable, because beaters are not procurable, there being no inhabitants. The only chance seemed to be by night watching, but, though I sat up through several nights by pools of water in likely-looking places, I was never fortunate enough to get a shot.

The party of Russian explorers under General Prejevalsky left Khoten for Aksu, a few days before my arrival at the former place. I had hoped to overtake them and make the acquaintance of that distinguished traveller, but on reaching the Tarim I was informed that he had gone on to Aksu four or five days previously.

Crossing the Tarim at the ferry, we followed its course as closely as the nature of the country permitted. At first the jungle was exceedingly dense and thorny, and as there was very little trace of a path, it was sometimes no easy matter to make way through it. About 20 miles from the ferry we left the bush and entered a large plain covered with high grass, and extending for many miles, until at Tippak we left the river, and after crossing 13 miles of desert, reached the outskirts of Shah Yar. Six miles farther is the small town of Shah Yar, in the midst of rice-fields, containing about 2000 inhabitants, and the residence of a Chinese official styled Dalai, subordinate to the Amban of Kuchar.

As the camelmen who had brought our baggage from Khoten were unwilling to enter into a further engagement, and wished to return, we now made efforts to procure fresh carriage. The Dalai declined to give us any assistance, and, after making many frivolous excuses, ended by stating frankly, no doubt with perfect truth, that it was more than his place was worth to allow us to proceed any farther in the direction we had been travelling. I therefore went on to Kuchar and preferred my request to the superior Chinese officials. They were very civil and obliging, but at the same time showed a strong reluctance to sanction any more travelling off the main road. Eventually I carried my point on giving them a written assurance that no responsibility should attach to them in case of any mishap, and contenting myself with a caravan of donkeys—the only animals they declared that could travel in that part

of the country. The donkeys supplied were certainly very fine specimens of their kind, but it was not long before we found that they were peculiarly unsuited for the sort of ground we had to traverse.

At the last moment the Amban asked me to allow him to show me some hawking in the country I was going through, and I unsuspectingly consented. On returning to Shah Yar we received a most cordial welcome from the Mahommedan Begs of the district, whose acquaintance we had made during our former visit, and lost no time in again turning our steps towards the river. We had now been joined by fifteen mounted men, with among them nine hawks and two black eagles called Kara Kush or Birkut. The sport was interesting, but during the second day we discovered that they were conducting us by a circuitous route towards the high road I had been endeavouring to avoid, and that the hawkers were policemen in disguise with an inspector at their head, and a clerk whose duty it was to make a daily report of our movements to the Amban of Kuchar—in a word, that we were practically in the custody of the police. This undesirable escort was promptly dismissed. To my agreeable surprise, they made no difficulty about returning, and evidently looked on the game as up as soon as their scheme to put us on the main road had been detected by the aid of the compass. We therefore parted on good terms, and I intrusted them with a friendly message to the Amban, thanking him for the sport I had enjoyed. We were now once more free, and, altering our course, soon reached the bank of the northern branch of the Tarim. The route lay through a swampy tract covered with high reeds and rushes, and entirely submerged when the Tarim is in high flood. We found it very difficult ground for a caravan of laden donkeys. On the higher ground clear of the marsh, the soil is a fine saline dust in which the foot sinks deeply, and it is therefore very disagreeable and fatiguing to walk on. The general character of the country from Shah Yar to Kultokmit Kul, the point at which the two branches of the Tarim reunite, is a dense reedy swamp with occasional sheets of water in the area reached by the floodwaters, bordered by a desolate saline desert.

The Ugen river is not an independent stream, but a branch of the Tarim which reunites itself with the main channel at Kultokmit Kul. The Inchiki, or threadlike river, as it is appropriately called, is very narrow and deep, and flows between high banks. It is called the Shah Yar river farther west.

Up to the middle of November the weather had been very pleasant in camp, but the cold was now rapidly strengthening; and I therefore moved up to Karashahr, intending to go into winter quarters for a few weeks. Karashahr is a poor and dirty town inhabited by Tunganis and Chinese, with numerous encampments of Kalmaks in the vicinity. The Kalmaks expose their dead to be eaten by the ownerless dogs which swarm in the town; and I was told that it was no uncommon thing for

living persons lying drunk on the ground to be killed and eaten by the dogs. There is no improbability in the statement, as the Kalmaks are much addicted to drinking. I found Karashahr so unpleasant a place of residence that, as soon as I had satisfied the requirements of politeness by exchanging visits with the local officials, I retraced my steps to Kurla, a much larger and cleaner town, peopled by Turks who are preferable as neighbours to the forward and inquisitive Chinese and Tunganis. We were immediately accommodated in a large and comfortable house, and utilised the halt in purchasing and equipping a small caravan of ponies, and making preparations for the contemplated journey to the south. I became owner of 15 excellent baggage-ponies, equipped with bridles, clothing, and other necessary gear, for a little more than Rs. 1000. I also arranged for 43 donkey-loads of Indian corn to be delivered at Fort Kara Koshin in the Lob Nor district as a precautionary measure, in the event of supplies being difficult to obtain there. During our stay Dalglish dispensed medicines of which I had brought a large stock, and as he was very successful in a few cases, sick people from the country soon thronged to the house in very inconvenient numbers.

I left Kurla on the 8th of February, and after exploring the course of the river, which flows past it, as far as Kōenchi, struck down to Lob. Among the Turks of the districts I had hitherto visited, and also among the Chinese officials, the most extraordinary ignorance prevailed regarding the Lob people. We had been repeatedly assured that they were much addicted to robbery, and that our horses would certainly be stolen, that they were infidels who spoke an unknown language, and generally a very bad character was given them. All this proved to be the reverse of the truth, as they are all Mussulmans, speaking Turki, and I never so much as heard of the occurrence of a highway robbery. So far as I could see, the inhabitants of the Lob district are no worse than their neighbours, but they are poorer, and this no doubt is their real crime. On the other hand, the people of Lob are equally suspicious of all strangers, and do all in their power to discourage their entrance into the district. At any rumour of an outbreak of small-pox, a disease they much dread, in Kurla or its neighbourhood, the road is at once closed to all. It was now closed on account of a virulent form of sorethroat which had caused much mortality at Kurla; but a special exception was made in our favour, partly no doubt from the reputation which Dalglish had acquired as a doctor. A short time previously I had found it necessary to abandon an intention of paying a flying visit to Kuldja by direct route from Karashahr, because the road had been closed by the Kalmaks as a precaution against the introduction of small-pox.

The Lob frontier station is Kultokmit Kul. In general character the country was similar to that we had seen so much of on the banks of the



Tarim higher up—swampy ground covered with reeds and high coarse grass, but we now had a good and easy road, as everything was frozen hard. In warm weather a circuitous road over the sand hills which fringe the swamp would have to be taken.

Nasir Hakim Beg, the principal officer of the district, accompanied us from Kultokmit Kul to his residence at Kirchin, where we were hospitably entertained. He assembled 40 or 50 horsemen during my stay to beat for tigers which had lately killed several of the villagers' cattle. We saw one which had lain up on the ice in the high reeds near a cow it had killed, and on hearing the noise made by the horse's feet, ascended a low mound of sand at a distance of about one-third of a mile from us to see what was coming. It was forthwith hotly pursued over the ice by the whole troop, but ineffectually, as it was not seen again. From Kirchin a road runs across the desert to Turfan, the district to which Lob is administratively attached, the Hakim Beg being subordinate to the Amban of Turfan.

The nearer we approached the Great Lake, the stronger grew the evidence of the miserable poverty of the district. Chaklik is the only place where we saw cultivation, and the only manufacture appears to be a kind of coarse cloth or sacking made from the fibre, resembling flax of a plant called "chigh." Apart from their sheep, the people depend mainly for subsistence upon fish, and on the ducks and wild fowls which visit the lake in enormous numbers at the time of the annual migrations. In return for the few imported goods they require, they barter sheep, the sacking above referred to, and the skins of otters, foxes, and wild swans. During the summer months, large parties of them move off into the mountains to obtain better pasture for their sheep and cattle, while avoiding the mosquitoes and other insects which abound near the lake, and also to shoot yak and wild asses for the sake of their hides.

Besides the natives of Lob, a small settlement of Khoten people, forming a distinct quarter of the village, is established at Chaklik. They remain under the jurisdiction of the Amban of Kiria, and are not under the Amban of Turfan. They are said to be refugees from Charchand, a place to which bad characters from the Khoten district used formerly to be banished. They are much smarter and more energetic than the Lob people proper, and make long journeys into the mountains in search of gold. It need hardly be said that there is a standing feud between them and the other inhabitants of the village.

I now experienced the advantage of possessing a small caravan of my own and a supply of grain. Had I been dependent on local supplies, I should have been obliged to pay very exorbitant rates for everything required, and in all probability, should have failed altogether to make the arrangements necessary for a long march. But when the people saw my baggage-ponies and the large stock of grain I had brought from Kurla, and purchased from the Hakim Beg at Kirchin, they moderated

their demands, and I was able to obtain additional stores and hired baggage-animals at rates not more than three times as high as those ruling at Kurla.

Chaklik is now a mere village, but, from the ruins of an old town wall still distinctly traceable, it would appear to have been a more important place at some former time. The old high road from Khoten to China probably passed by it, although there is now no intercourse between Lob and Sachu, the road being entirely disused. A Chinese official from the Governor-General at Urumtsi, who visited Chaklik during my stay there, was very anxious to go over the road and report on it, but could get nobody to point it out to him, no doubt because there was little probability of any payment for the guide being forthcoming. The Mandarin afterwards came to my tent to ask for information, and was shown the direction in which Sachu lay, and told the distance. Had I wished to go to Sachu, I should have found no difficulty in procuring a competent guide on payment.

A direct road runs from Chaklik to Kuchar, via Jigda Bashlam.

The weather during December, January, and February, though very cold, had been calm, clear, and fine; in March the cold was less severe, but high winds with frequent dust-storms prevailed and continued throughout April. Frosts ceased in the second week of April.

My preparations being complete, I struck camp on the 29th of that month, and started for a pass over the Altun Tagh mountains by which I should be able to reach the road from Abdal, used by the Kalmaqs of Karashahr when travelling into Tibet. Our march was at first over the strip of barren land between the lake and the mountains, but after crossing the backbone of the range at the Tash Dawan, or stony pass, the country much improved and good patches of grazing were met with. This was followed by another barren tract at points in which, near the Ugen Shor plain, footprints of wild camels were conspicuous; and we then found ourselves at Bagh Tokai, where a halt was made in a large patch of excellent pasture-land for the benefit of the baggage-animals. The guide Abdulla and donkeymen engaged at Chaklik here became troublesome, and demanded that we should turn back, or at least go no farther in a southern direction. Though it was very inconvenient to part with them so soon, I feared that discontent might spread to my own servants and the donkeymen engaged at Kurla if I pressed them to go farther. They were therefore dismissed in disgrace. As soon as they saw that I had no intention of turning back they became very humble and begged to be kept on, but I thought it better not to consent to this, as the same thing would almost certainly have happened again a few days later. I therefore insisted on their forthwith moving off from the neighbourhood of my camp, retaining only one man who had been engaged as a guide from the Khoteni section of the village and had not joined the malcontents. This involved our making very short marches for some

days, and sending back some of the animals for a portion of the stores, as with our reduced transport all could not be carried at once.

We crossed the Chiman Tagh range of mountains by the Amban Achkan Pass. The view to the south from the top of the pass showed us a wide plain with a good deal of water about it, and another formidable range of snowy mountains beyond in the distance. A big lake called the Chong Kum Kul stretched away to the west farther than we could see, and a large river flowed down the plain from east to west, emptying itself into the lake. On descending we found that the plain was a huge morass which could not possibly be crossed by our baggage-animals, and we therefore had to follow the right bank of the river for some forty miles to the east before a place for crossing could be found. The Kalmaks, who usually leave Abdal in May and return from Lhasa in February or March, are able to cross this plain when homeward-bound in the winter, but are obliged in summer to make a circuit to avoid the morass.

The weather now became very cold, with frequent snowstorms, while the grass was so scanty and poor as to cause us much anxiety. After a few days, during which the evident doubt and uncertainty of our remaining guide were somewhat disquieting, we attempted the passage of the Kuen Lun range. Our guide had often assured us that the pass was an easy one, that he was well acquainted with it, and that on reaching the top we should see another wide plain before us intersected by the Kizil Su or Ma Chu river. However, he now was, or appeared to be, completely at fault, and after some hours of marching conducted us to the brink of a mighty precipice. Then with dramatic action he threw his sheepskin cap on the ground, struck himself twice on the forehead, sat down and wept aloud. We begged him to compose himself and try again, but it was unavailing; he could only repeat that he had quite lost the way, and did not know where the pass was.

As soon as the tents had been pitched, I started to ascend a high peak near us from which a good view over the country could be obtained, but the prospect on reaching the summit after a stiff climb was most disheartening. There was no indication of any broad plain or any opening likely to lead to a pass, but a panorama of very lofty snow-clad mountains at least 50 or 60 miles deep was alone visible, and presented to all appearance a quite insurmountable barrier to our further progress southwards. After carefully considering the position, I decided to turn to the east and keep along the foot of the range until an opening was found. This also we found to be impossible, as the valley was absolutely sterile, being not only bare of vegetation, but without argals to serve as fuel. At the end of three days, and after being compelled to burn the ridge-pole of one of our tents, we struck through the mountains to the north in search of grass to save the lives of the animals, and happily found a less barren valley which brought us to a place called Bokalik, at which the people, who later in the year came from Khoten

and Charchan to dig for gold, maintain a sort of standing camp, leaving their baggage-animals to graze here while they push on to the gold-fields said to lie at a distance of about 50 miles to the south. No one had yet arrived. We now sent the Khoten guide back to his home at Chaklik, as he could be of no further use, and was another mouth to be filled from our diminishing stores.

The Bokalik valley is a continuation of the swampy valley we had entered after crossing the Amban Achkan Pass, though separated somewhere by a ridge, as the water was now flowing east instead of west. Our failure to find the pass to the south, if one exists, was a great misfortune, as the baggage-animals suffered severely from the total absence of forage, and the men too had been seriously alarmed by the uncertainty of the road, and the uninviting aspect of the country. Their confidence was now thoroughly shaken, and a quiet but constant and strict watch on them had in future to be kept to prevent any imprudence on their part.

A good deal of snow, hail, and rain fell while we were in this valley.

About 17 miles below Bokalik we crossed a river flowing down from the Kuen Lun range, with a bed about  $\frac{3}{4}$  mile wide. The water was of a deep brick-red colour, and fell into the river in the centre of the valley which was now a very considerable stream. About 50 miles from Bokalik this river turned off to the north through an opening in the Chimán Tagh range, leaving us again in some perplexity as to the direction in which our march ought to be continued. I had made up my mind to work as straight as possible across country to the Naichi valley, where we hoped to find an encampment of nomads and good pasturage for the animals now reduced to little more than skin and bone. But we had no guide, and were directing our course entirely by compass and sextant, as the map for all this region shows a blank space. Before going further we determined to halt and explore a little both to north and south, Dalgleish following the river while I endeavoured to find a way through the mountains to the south. Dalgleish found traces of Mongol camps, and a well-marked path which at one point was entirely blocked by a fall of the mountain, making passage impossible without crossing and recrossing the stream—at this time of year quite unfordable. On the other hand I found no insuperable obstacle to our crossing the mountains to the south. In point of fact we were no great distance from Hajjar, the residence of the Chief of the Thaichinar Mongols. But in the map which accompanies Pandit A—K's explorations, this place is shown about 65 miles to the north-east of its real position, and apparently farther from us than Naichi. We therefore pushed on in the direction of the latter place, the road rapidly rising and bringing us into a very barren region. Snow fell on several days and lay on the ground. Eventually we crossed a pass which, though it presented no difficulty, was very trying to our exhausted animals, and entered a wide

valley containing numerous lakes and much swampy ground. Hail or snow fell almost every day, and oppression of breathing was severely felt by nearly all of us.

It was now of importance to ascertain our exact position, for although we knew that we were somewhere about the latitude of Naichi, we had no means of fixing our longitude, and with every confidence in Dalgleish's care and skill as a navigator, it was impossible not to feel that we might be much further from Naichi than his dead reckoning showed us to be. For 80 days we had not seen a single human being outside the caravan, and my men were naturally gloomy and dispirited. I find no fault with them for this, as there was good ground for their distrust, and they had had much discomfort and hard work; while all our luxuries having long since been exhausted, flour, tea, and such meat as I could get by shooting was the sole ration. All through this march the wild animals were miserably lean and poor. They too had suffered from the scarcity of grazing. But our most serious anxiety was on account of the state of the baggage-animals, now only able to make very short marches with great difficulty. When, therefore, on the 20th July we suddenly came on unmistakable marks of human feet on the soft earth—even the most impassive members of our little company were somewhat excited, while the impulsive Turks threw themselves on the ground, kissed the footprints, and sobbed with delight. There were no more downcast looks now, and soon all in the highest spirits were busily engaged in pitching the tents on a spot where the camp-fires of the party before us were still warm. Our neighbours were pilgrims, several hundreds in numbers, from the provinces to the east of Kokonor, who were marching in three detachments to Lhassa. All carried arms of some kind, and were in great dread of a band of robbers believed to be lurking in the vicinity. We were now able to verify our position, and found that we were between the Kuen Lun and Khokosili ranges, and just south of the Angirtakshia Pass. Our position was indeed very nearly what we had supposed it to be, though but for the fortunate accident of the pilgrim caravan, only one or two of which go down this road annually, having crossed the plain a day before us, we should undoubtedly have pushed further on down the valley, and so missed the Naichi valley and the road to the south.

We now turned our steps northward to Naichi, not without much reluctance and misgiving on my part, as the best season of the year for travelling was commencing, but it was an absolute necessity to obtain fresh stores, and to rest and feed up both animals and men. The Angirtakshia Pass presented no difficulty whatever, but the Naichi Pass six miles further on was steep and trying to our exhausted baggage-animals. When covered with ice and snow it must be very difficult indeed. The number of wild animals in the neighbourhood of these passes was surprising; antelopes were incredibly numerous, and we

also saw herds of yak and kiang (wild asses). A few miles of easy descent brought us on the 25th July to Amthun, a camping-ground in the Naichi valley with good grazing, plenty of firewood and water from the Naichi Gol close at hand. There were no inhabitants, owing apparently to fear of robbers, and two days later I left Dagleish in charge of the camp, and started for Golmo in search of stores with one Tartar and two Turkish servants. One of the latter, a Kalmak who had embraced the Mahommedan faith, spoke the Mongolian language. The road down the valley is difficult in summer from the depth of water in the river and the badness of the fords. I therefore made my way across the mountains by the Sosani Pass, which is steep and stony, and would be quite impracticable when covered with snow. On emerging from the Kuen Lun Range, a barren sandy desert lay before us, but following the course of a stream called Tora Gol, and keeping to the foot of the mountains, we reached a very desolate-looking piece of jungle. The ground here was saline and treacherous in many places. A narrow footpath leads through it which cannot be quitted except under penalty of sinking deep in a fetid quagmire from which animals can only be extricated with great difficulty. Beyond this the pasture grounds of the Thaichinar nomads appeared in view thickly dotted over with felt tents, and we pitched our tiny camp in the midst of them. After some delay, owing to the male population at that time of day (late in the afternoon) being mostly in a state of intoxication, I commenced negotiations for the purchase of stores. Sheep and butter were readily supplied, but barley and satu (meal made by grinding parched barley) could only be obtained in very small quantities and with much difficulty. There are no traders among these Mongols, each family gets from Khorlu once a year a supply of barley sufficient for its own requirements, and does not care to sell any part of it. Moreover, stocks were low as the harvest time was approaching. The people seemed quite unaccustomed to money transactions, and bargains were only made with a good deal of trouble. Had I brought with me a stock of goods for barter, such as tea and cloth, matters would have been much simplified. A party of Lamas gathering contributions for the great monastery at Kumbum were encamped here on my arrival. They had already collected several hundreds of horses and camels, a few horned cattle, and some thousands of sheep and goats.

Finding there was no chance of obtaining barley, I determined, on the advice of the Mongols, to move on to Bhaga Tsaidam, taking the road up the valley as far as Thugthé, and then striking across the salt-waste to the north. The heat on the salt-plain was great, and the ground being soft, and often covered with two or three inches of saturated brine, was most trying to the ponies, one of which died, and the others were much exhausted. Beyond, a rough path through the hills soon brought us to the lake of Bhaga Tsaidam, about six miles

long, which is strongly impregnated with salt. Here we found abundant signs of a recent large encampment of nomads, but in consequence, as we subsequently learned, of the occurrence of a case of small-pox, they had dispersed themselves over the country. This was inconvenient for reckoning with certainty on being able to procure food at Bhaga Tsaidam; I had brought with me only a very small supply, which was already exhausted. I now sent the two Turks back to Golmo, and started with the faithful Tartar, Dogpa, for Hoiduthara. The road was rough and the horses had both cast shoes, we were therefore obliged to walk and go very slowly.

I cannot refrain from here recording an act of great and unsolicited kindness shown us at this time by a young Lama who was travelling in company of a Chinaman towards Khorlu. Observing our exhausted condition, he hastened on to Hoiduthara, borrowed a pony, and immediately rode 10 miles back to meet us with food. With joyful shouts he first thrust into my hands a bag, made of the paunch of a sheep, full of water, then another small bag containing satu, and a third containing chura. We had then been almost without food for four days, and as may be supposed, never enjoyed a meal more. Considering that we were strangers and quite ignorant of the Mongolian language, and that our ragged and travel-stained appearance was not calculated to excite hopes of much being forthcoming in the way of reward, I was greatly touched by this kindness shown to us at a moment of sore need.

There was a good strip of country under barley at Hoiduthara, but only servants were in charge, as the farmers had gone off into the mountains with their flocks and herds to avoid the heat. The Mongols are a pastoral people, and look on agriculture as an inferior occupation which may be left entirely to servants. I have never seen more careless farming. No attempt at weeding is ever made, and in many fields the crop of weeds is larger than that of barley. The only field work needed at the time of my visit was the management of the irrigation, and this was attended to by labourers on horseback, who used a long stick to make openings in the channels, and so saved themselves the trouble of frequently dismounting. Mongolians seem quite incapable of walking; a woman will get on a pony to go 200 yards from her tent to milk her goats, and I noticed that men who were far too drunk to walk, or even to stand, seemed quite safe as soon as they had been lifted on to their horses.

The cultivators are prohibited from selling their grain by the Besi or Chief of Khorlu, who takes his revenue in kind, and claims the right to sell as much as he sees fit from his own stores before any one else can sell at all. All purchasers have therefore to present themselves before him in the first instance. He had just started to pay a visit to the Wang or head of the Mongols of this part of the country at Dulankit, not far from the Kokonor Lake. I therefore engaged horses and set off

at once in pursuit. Fortunately his camp for the day was in the hills at Choko, only 35 miles distant. I was, in the first instance, conducted to a large felt tent, which did duty as an antechamber, with a fire in the middle, on which stood a pan containing three or four gallons of boiling tea, while sacks of satu and chura and a wooden bowl of butter stood near the door. All comers helped themselves freely to these delicacies. Several sheep's tails were twisted into the lattice-work of the tent, from which visitors who preferred it to butter cut off pieces of fat from time to time, and ate them apparently uncooked. Afterwards the Besi and his wife, both in full dress, received me in their big tent, he wearing his official hat and robes and button as a noble of the Chinese Empire. The centre of the tent was occupied by two young women engaged in kneading a large piece of dough. After an amusing interview, the Besi gave me an order for barley, though not for the full quantity I required, but refused baggage-animals to carry it to Naichi on the ground that at this hot time of the year they would die on the road. He also objected to cross the Thaichinar valley to Naichi, because it was beyond his jurisdiction. It was impossible to induce him to yield on this point. There was indeed a good deal of force in his objections, as the Mongols never do take laden animals in the summer time across the salt-plain, where no fresh water can be got for long distances.

At Hoiduthara there was a Gompa or monastery of about 150 Buddhist priests and acolytes, located as is usual among the Mongols in a large felt tent. A Lama, who paid me a visit, informed me that the Gompa was going to change camp, and that many of the priests would probably be willing to sell their stock of mixed satu and chura (butter-milk boiled down to a powder) collected, a handful at a time, by begging from tent to tent. I at once authorised him to announce that I would buy all they brought me, and next day I was busily engaged in purchasing the offerings of the faithful, which were brought down by the priests in small quantities ranging from five pounds to half a pound. In the afternoon the monastery tent was struck, and the stream of monks came to an end.

I now started with Dogpa for Tenkalik, in the hope of being able to make further purchases, easily finding my way by the light of Pandit A.—K.'s description of the route. At Chakangnamaga, a grazing ground at the southern extremity of the Thosu-Nur Lake, I again met the Lamas returning to Kumbum, whom I had previously seen at Golmo. They seemed much pleased at the meeting, insisted on unloading my two ponies, pitching my tent for me, and regaling me with richly-battered tea.

At Tenkalik I succeeded in purchasing some barley, and returned to Harmugan Namaga, near Golmo, where I rejoined Dalgleish and the camp after an absence of thirty-seven days. The road up the valley lay through thick jungle, with many bushes of a shrub called "harmo"



bearing berries, resembling red and black currants, but with little sweetness or taste. Horse-flies swarm at this time to such an extent that the Mongols have to drive off their ponies and cattle from some of the best pastures. A superior official had now arrived at Harmugan Naman from Hajjar, and it was soon apparent that we must not expect any assistance towards further exploration to the south. This was shown by the people declaring themselves unable either to grind some of the barley for us or to lend us the hand-mills required. I, therefore, did not waste time by asking for a guide, but started at once with Dalglish and two servants—a Tartar and a Turk—and supplies for about a month, to see as much of the road to the south as possible. The other servants and spare baggage were left in charge of the Mongol official.

Snow had already commenced to fall on the hills, and we soon found that the ponies, though improved in condition, were still quite unfit for a long and hard march. By the time I had reached the Chu-Ma river, at the foot of the Khokosili mountains, I was driven to the conclusion that all thought of going further must be abandoned. My leave would expire in the following May, and if, as I had every reason to anticipate, my onward progress was stopped by the first official of the Lhassa Government I met, I should find myself unable to return before the spring, as the ponies would not be fit for the march back without a rest, and in the meantime the passes to the north would be closed. If this had happened I could not possibly have reached India until many months after the end of my leave. There was, therefore, no option but to turn back at once, to my very great regret.

From the impossibility of obtaining trustworthy information or a competent guide before leaving Chaklik, I had unavoidably lost much time. Had I to make the journey over again, I should start from Charchand, instead of Chaklik, whence Bagh Tokai is reached by a good road in twelve days, then cross the Amban Achkan Pass, and follow the valley south of the Chiman Tagh Range past Bokalik to Bulantai. From that point I should make as straight as possible for the Naichi valley, where a stay of some duration would be necessary to rest the baggage-animals. During the halt sheep, butter, and such other supplies as were procurable from Golmo might be sent for. Then the journey to the south might be resumed with a caravan in good marching order.

About 80 miles from Harmugan Namaga we reached Hajjar, the residence of the Jhasa or chief of the Thaichinar Mongols. The road lay through a miserable country, mostly desert and in parts covered with a saline efflorescence. I had now seen pretty nearly the whole of Thaichinar, and found it almost as poor as the Lob district. As a pasture-ground the Naichi valley is far superior to any other part of the tract of country under the Jhasa's jurisdiction, but it has the disadvantage of being too frequently visited by bands of robbers. A march of

about 90 miles from Hajjar over an uneven, barren, and desolate country, with occasional beds of salt, brought us to Makhai, the pasture-ground of a small settlement of nomads, and after travelling about 50 miles farther over similar country, and crossing a low range of hills by a pass called Kotuli-la, we reached the Obo or shrine in the Saithang plain where there is a large nomad camp. At the end of another 100 miles, we arrived at Sachu with a Chinese population.

The Mongols are a timid people and very poor. But I found them friendly and hospitable, and received from them many acts of kindness. They are extremely suspicious and troublesome to deal with in any matter of business, such as the purchase of stores. Being constantly cheated by the Chinese, they cannot believe that any one can mean to deal fairly by them, and an immediate assent to their terms or any liberal offer seemed to have the effect of doubling their suspicions, and causing them to raise some fresh obstacle. The town of Sachu is situated in a small but fertile oasis. It is on the right bank of the Danga Gol river, which is crossed by a wooden bridge about 70 yards in length. Each side of the town measures under half a mile. It is surrounded by a mud wall, in fairly good repair, with several gates surmounted by guard-houses of the usual Chinese junk pattern. The interior of the town is uninteresting, the houses are poor, and in many cases dilapidated, and there are no large buildings. Sundried bricks, mud, and timber are the only building materials. The town contains a bazaar with several good shops, but the trade is confined to a retail traffic for supply of the wants of the residents and of the Mongol nomads south of the mountains. Farmhouses are scattered along the banks of the river both above and below the town, and the land appears to be very carefully tilled. The river is the only source of water-supply, and outside the strip of irrigated land the country is a sandy desert. On the left bank of the Danga Gol, and about a mile above the present town, is the site of the old city of Sachu, the limits of which can easily be traced by the ruined walls still standing. The ground inside the wall has been ploughed up and cultivated.

We are informed that the direct road to Hami lay through a desert in which water was scarce, and were advised to turn east and join the great trunk road between China and Turkistan at Ghainshé or Uainshé, on which rest-houses have been erected where supplies are procurable. Ghainshé is about 60 miles from Sachu. It is a wretched place, very small, and in ruins for the most part. Mud forts, now dismantled and ruinous, were numerous between Sachu and Ghainshé.

A few hundred yards from the mud wall of Ghainshé we entered the desert and marched through it on a fairly good road for about 175 miles to a small village called El-Timar. Wood and grass were only procurable at the rest-houses and at famine prices. Thirty miles more over a plain covered with coarse grass brought us to the town of Hami.

Here we found ourselves once more among Europeans, as we were warmly and hospitably greeted by Mr. Spingaerd, a Belgian, who held the post of customs officer under the Chinese Government at Sachu, and had travelled over great part of China in the service of Baron Richthofen, and by two young Russian merchants, who seemed to have been having a bad time of it with the local officials, as one of them had been spending the last five months in jail on an apparently frivolous charge.

Hami comprises a Chinese town inside a small but neatly-built mud fort. Adjoining it is a large suburb containing the bazaars and numerous serais and dwelling-houses of Chinese and Tunganis. We put up in a Tunganis's house in this suburb. About a quarter of a mile to the south-west is the old town, peopled exclusively by Turks under their own Wang or hereditary governor. The Wang left for Peking on the day of our arrival at Hami, as he is required to present himself there on New Year's Day every ninth year. With the exception of the Wang's house, the old town is miserably built. Several officers of the late Amir Yakub Beg are in exile here. They of course remembered Sir D. Forsyth's mission, and on hearing that we were English were very attentive. I abstained from visiting the principal man among them, Muhammad Khan, formerly Hakin Beg of Kashgar, only because I feared by so doing I might increase the suspicions of the Chinese, and perhaps hinder their liberation, for which petitions from the principal Mussulman inhabitants of Turkistan had been forwarded to the governor-general at Urumtsi.

There is but little cultivated land in the immediate vicinity of Hami, and I was informed that the bulk of the land, both arable and pasture, belonging to the residents, is at a distance of several miles within the mountains to the north. The town is well supplied with excellent coal, and also with pine-wood used both as timber and for fuel. The extensive cantonments and official buildings to the west of the town built only a few years back were dismantled on the transfer to Urumtsi of the seat of government. It appears to be customary with the Chinese to destroy any buildings that are no longer required for the purpose for which they were provided, in order that the last occupant may make a little money by selling the materials. They are never transferred for use by any other department of the government. This procedure is irritating to the Turks, who have to furnish the timber and much of the labour employed in constructing the buildings. From Hami our road lay through grass land for about 45 miles to the village of Jigda, then over 145 miles of desert to Pichan, where is a small fort and a guard of 100 Chinese soldiers. This was the frontier outpost of Kashgaria under the Amir. The country now improved, and we passed through cultivated and grass land for the remaining 55 miles to Turfan, where we put up in a trader's serai in the centre of the Mahommedan town.

On nearing Turfan we passed through the ruins of an ancient town, in which a large tomb with a minaret 200 feet high is conspicuous.

The Mahomedan town is about  $1\frac{1}{2}$  miles to the west of the Chinese town, and the distance across it from the eastern to the western gate is about a mile.

Both the city of Turfan and the country in the neighbourhood are irrigated by karezes or underground canals from springs at the foot of the hills. This is the case all the way from Pichan, there being no irrigation from streams.

The Tungani and Chinese element predominates in the population.

I was able to cash Government of India currency notes at Turfan. The discount charged was heavy, but that Indian paper money should be negotiable at all in so remote a place shows how widespread is the confidence of Asiatics in the good faith of the Government of India. Twenty-eight miles from Turfan is the little town of Toktasun, where we were hospitably entertained by the chief Beg. From this point we made an excursion to Urumtsi, about 95 miles distant, passing about half-way the small town of Dawan Chin with a Tungani population. The siege and capture of the fort of Dawan Chin and politic release of the prisoners taken, with the exception of such as were Andijanians, with a small present of money to each, were incidents in the advance of the Chinese troops to reoccupy the country nine years ago.

Urumtsi, the headquarters of the Chinese Government of Turkistan, is situated in a broad valley within the Tian Shan range, watered by a large stream which flows from the southern side of the mountains. It consists of a cluster of nine or ten separate small walled towns. The population is mixed, comprising Manchus, Chinese, Tunganis, and Turks, and there is a large bazaar stocked with Chinese and Russian wares. From November to March the climate is very severe, but the city is well supplied with coal and charcoal of excellent quality. My visit took place in the middle of December.

Liu Joshwé, the Governor-General of Turkistan, and the only man in the province permitted to use a palanquin, was very attentive to me during the seven days of my stay in Urumtsi. He made many enquiries about India, and seemed especially curious regarding the exact nature of the relations between the British Government and Afghanistan, and of the events at Panjdeh in 1885. He seems to be popular with all classes of the people throughout the province, and enjoys the prestige of having regained Turkistan for the Chinese in 1878, and governed it ever since.

Returning to Toktasun, we pushed on without delay to Karashahr, distant about 145 miles, over a generally barren country, much of the road running through low hills. There is a good deal of traffic upon this road, and long strings of camels carrying frozen fish from the Baghrash Lake for sale in Urumtsi were especially noticeable. We passed Karashahr without halting, and put up at our old quarters in Kurla, where a very cordial reception awaited us.

Beyond Kurla the road still ran through a generally barren country, though somewhat less forlorn and desolate than that further to the east. At several of the halting-places we found small patches of cultivation and a tiny bazaar. Eighty-five miles from Kurla the large walled village of Yengi Hissar was reached, and 21 miles further the small town of Bugar, locally famous for its manufacture of rugs. Kuchar, a town of about 15,000 inhabitants, with extensive suburbs, lies about 70 miles further west. A solitary Indian Mussulman has settled down here and acquired some land. He had been unable to communicate with his friends in Ludhiana for several years. I undertook to convey a letter from him to them—a promise which was duly fulfilled.

We had intended to halt at Kuchar for a day or two, but the throng of people which collected immediately on our arrival, drawn by Dalgleish's reputation as a physician, was so embarrassing that we were obliged to make our escape by slipping away the next morning before daylight. A number of persons suffering from various ailments nevertheless pursued us on horseback to the next stage. The only place of any importance between Kuchar and Aksu is the small town of Bai, famous for the excellence of its dairy produce.

Very large burial-grounds are passed through when drawing near to Aksu from the east. The city is invisible until closely approached, as it lies just beneath a very high bank. The Chinese city is about  $6\frac{1}{2}$  miles from the old Mahomedan town, in which we were provided with most comfortable lodgings. Indian currency notes were here easily disposed of at a discount of about 6 per cent. The road from Aksu to Yarkand via the small town and fort of Maralbashi runs for the most part through jungle and desert. Along the road for a considerable distance the Chinese have constructed a large embankment, to prevent the country being submerged when the river is in flood.

Since leaving Kurla we had avoided the huge comfortless Chinese rest-houses, and put up in private houses whenever it was possible to do so. Our reception was always friendly and hospitable on the part of the Dolan shepherds in the country round Maralbashi, no less than of the Turks of the towns and larger villages.

I had now completed the circuit of Chinese Turkistan, and, Kashgar excepted, had visited almost every important place in it.

The chief characteristic of the country is its extreme poverty. It may indeed be described as a huge desert fringed by a few small patches of cultivation. The only really good strip of country of considerable size is the western portion, comprising Kargalik, Yarkand, and Kashgar. To the north a succession of very small oases extends along the foot of the Tian Shan Mountains, the stretches of intervening desert becoming larger as the traveller goes further to the east. The eastern extremity of the province is desert pure and simple, and so is the southern extremity as far west as Kiria, with the exception of the small oases of

Charchand and Chaklik. The central portion is chiefly desert, except that pasture of a coarse and inferior description is found in the neighbourhood of the Tarim river and of parts of the Lob Nor lake system. There are probably many districts in India in charge of a single collector and magistrate, which are richer and better worth having than the whole of this huge province, extending over not much less than 20 degrees of longitude and 6 degrees of latitude.

Sanguine expectations have from time to time been entertained of the development of a large trade with Turkistan, but judging from the poverty of the country, the sparseness of the population, and the absence of any manufacturing industries except on the most petty scale, it appears to me impossible that such anticipations can ever be realised. The volume of trade, either with India or Russia, must, I am disposed to think, always remain insignificant.

Any discussion of our political relations with Turkistan would be out of place here. I may, however, without impropriety say that so far as my personal experience goes, the most friendly feeling appears to exist towards England on the part both of the subject Mahomedan population and of the officials of the Chinese Government. At present the Chinese seem to be adopting a conciliatory policy towards the Mussulmans, due perhaps to a consciousness that their position in Turkistan is not altogether secure. Occasional instances of ill-treatment of individuals occur, but, on the whole, so far as my observation extended, their rule is not a harsh one. The tortures and detestable cruelties practised on criminals and accused persons, as described by travellers in China Proper, are almost unknown in Turkistan, except that the punishment of the cage is sometimes resorted to and severe beatings are often inflicted. Complete religious toleration is maintained. Crime is repressed, and life and property are in ordinary times as safe in Turkistan as in British India. The prestige of the Chinese stands very high, and they are looked up to much as Englishmen used to be in India some years ago. Among the people generally, more confidence seems to be felt in the Chinese than in the Mussulman officials.

The most glaring evil in the administration is the prevalence of official corruption, which is intensified by the uncertain tenure of office and the frequent transfers of the superior functionaries, but as a whole, I do not think the Chinese *régime* in Turkistan compares unfavourably with other Asiatic governments, such, e. g. as those of many Native States in India. In spite of their absurd self-conceit and other peculiarities, the Chinese appeared to me to be by no means altogether wanting in the better characteristics of a ruling class, and to be quite the superiors of the Turks in decision, moderation, intelligence, and the other qualities which fit men for positions of authority.

The Chinese have no military strength in Turkistan that could for a moment resist the advance of European troops. To an unprofessional

eye there seemed to be good raw material among the soldiery, but the men are undisciplined and poorly armed, while the officers are utterly inefficient and often addicted to opium.

China is an unaggressive and not unfriendly neighbour, and our good wishes may therefore go with her efforts to maintain and consolidate her authority.

I left Yarkand on the 7th March, 1887, and travelled by Kargalik and Kugiar to Leh, crossing the Yengi Dawan or New Pass on the 27th March and the Karakoram Pass on the 5th April. The cold was severe, and much snow lay on the ground to the south of the Karakoram in Chai Josh Jilga and as far as Yepchand. I returned by the Kashmir route through Srinagar to Rawalpindi, and reached Simla on the 27th May last, having exceeded my leave of absence by one day.

I am indebted to the kindness of Colonel Haig, R.E., Deputy Surveyor-General of India, in charge of the Trigonometrical Surveys, for the map on the scale of eight miles to an inch which accompanies this paper. It has been constructed from a route-sketch, with explanatory notes kept up at my request by Mr. Dalgleish. Colonel Haig informs me that the latitudes deduced from Mr. Dalgleish's observations made with a pocket sextant are very accordant, and that the sketch and notes form a valuable record of the country traversed. I have placed the original sketch and notes at the disposal of the Royal Geographical Society, which is thus in a position to judge of the care and accuracy with which this tedious task has been performed, and all I need say on the subject is that whatever credit is due for the maintenance of the record belongs entirely and solely to Mr. Dalgleish.

Apart from this, the accomplishment of the trip without any serious hitch is mainly due to the assistance I received from this staunch comrade. His knowledge of the Turki and Persian languages and skill in the management of a caravan and in dealing with Asiatics were invaluable. That the journey was completed without the loss of a single baggage pony, and that the caravan existed for close upon four months without any renewal of supplies, I attribute to his constant vigilance and good arrangements.

The stores with which we left Chaklik on the 29th April, 1886, consisted of—7250 lb. of corn, 750 lb. of dried lucerne grass, 1320 lb. of wheat flour, 675 lb. of rice, 170 lb. of satu, 106 lb. of biscuits, 60 lb. of ghee, a large bag of tea; and nothing more was obtained until the caravan reached Harmugan Namaga on the 1st September following, with the exception of some butter, brick tea, and sheep, which I sent to Naichi from Golmo, and which reached Dalgleish on the 16th of August.

\* \* \* The discussion on the foregoing paper will appear in the January No. of the 'Proceedings.'

*Silva Porto's Journey from Bihe (Bie) to the Bakuba Country.\**

Map, p. 790.

ANTONIO FRANCISCO FERREIRA DA SILVA PORTO occupies a foremost place amongst those enterprising Portuguese traders, who, long before the days of Livingstone, travelled at the head of their caravans into the unexplored regions of Africa. He is almost the only one whose diaries (in part) have been published, so as to enable us to utilise them for the improvement of African geography. In 1852-3 Senhor Silva Porto paid one of his frequent visits to the Barotse country on the Liambai, and despatched thence his servant Chacahanga to the east coast. Mr. M'Queen, who published an abstract of this journey in the Journal of the Royal Geographical Society (vol. xxx. 1860, pp. 136-154), assumed that Silva Porto himself had crossed the continent "a contra costa," an error which down to the present day has been perpetuated in books and maps.† Dr. Livingstone, who met Silva Porto at Linyanti in 1853, and subsequently in the Barotse country, contemptuously refers to him as a slave-dealer,‡ a term of reproach which we feel sure he never deserved. The American missionaries and Mr. Arnott give quite a different account of the man, and the former more especially acknowledge their indebtedness to him.§

The diary, of which we now propose to present an abstract, relates a journey from Bie (Bihe) to the country of the Bakuba beyond the Lulua, recently explored by Dr. Pogge, Lieut. Wissmann, and Dr. L. Wolf. Silva Porto's route led for the most part through regions not hitherto delineated upon our maps. He crossed, however, in several instances the routes of other explorers, and this enabled us to lay down his route in a fairly satisfactory manner. All those statements in the diary capable of being transferred to a map have found a place upon the sketch which accompanies this article. Silva Porto gives the direction and duration of each day's march, and we thus learn that he spent 309½ hours of actual travel upon the journey from Belmonte to the Lulua. As the distance between these places as measured on our sketch amounts to 616 geographical miles, he travelled at the rate of two miles an hour. This rate, however, appears not to have been uniform, as the following tabular statement shows:—

	Hours' march.	Distance. Geographical miles.	Rate per hour. Geographical miles.
Belmonte to the Kuanza (Tuvumuka) ..	34½	64	1·9
Kuanza to Kuango source .. .. .	61	115	1·7
Kuango to Sha Mokanda's .. .. .	45	120	2·7
Sha Mokanda's to Kisenge's .. .. .	20	43	2·1
Kisenge's to Muenta Mosefo .. .. .	58	114	2·0
M. Mosefo's to Kimbundo's.. .. .	29	50	1·7
Kimbundo's to the Kasai .. .. .	19	31	1·6
Kasai to Masasuri river .. .. .	28	55	2·0
Masasuri to Lulua.. .. .	15	24	1·6
Total .. .. .	309½	616	2·0

\* From the 'Boletim' of the Lisbon Geographical Society, 1886-7.

† Porto's original diary, and that of his servant, will be found in the 'Annaes do Conselho Ultramarino,' i., 1854-8, pp. 273 *et seq.*

‡ 'Missionary Travels,' p. 218.

§ 'Missionary Herald,' Boston, 1885, p. 26.



The distances are taken from the accompanying sketch map. The excessive rate between the Kuango source (laid down according to Lieut. Ivens) and Sha Mokanda's (visited by Pogge), appears to point to an error in the positions of these places.

We now turn to the "Diary." Silva Porto left Benguela on November 1st, 1879, and on the 26th of the same month reached his residence Belmonte, in Bihe. On the road he met several caravans carrying wax, ivory, and provisions to the coast. By the end of February 1880, his preparations for a trading trip into the interior had been completed, and on March 1st he started his caravan along the direct road, whilst he himself first paid a visit to Kilemo, the chief of Bihe, at Kobongo. At Boavista, the residence of Lucas José Coimbra, he rejoined his people, and travelling through a fertile clay country, occasionally rising into hills and wooded, he arrived at Tuvumuka, a Kiboko village on the Kuanza, on March 14th. On the following day he and his party were ferried over. The country, as far as Kindumba, the village of Kamboto, a Kiboko chief, is described as being level and fertile, but thence, as far as the Kuango and beyond, it is hilly and densely wooded. The soil throughout is clay.

The Kiboko or Kashoko, who extend from near the Kuanza far to the north-eastward, have adopted many of the habits of the Balunda. Their villages are built in the same style, with a lofty "jango" or public hall in the centre. Sheep, goats, pigs, and pigeons are bred. The word of salutation is "tambuko" in the south, and "bondy" (evidently a corruption of "bom dia") in the north. The hair is worn in innumerable tresses from 8 to 16 inches long. No human beings are sacrificed on the death of a chief. The followers of the deceased chief either return to their relatives or build themselves a new village. The new chief also builds a new village, and if he enjoys the respect of his sub-chiefs, they each present him with a man or a woman to people it. The sites of abandoned villages soon become covered with a dense growth of bush.

From Kanyika's \* village it is one hour's march to Kawewe's (Cauhéu's) village at the source of the Kuango.† A short march of three hours in a north-easterly direction brings the traveller thence to the Kasabi (Kasai), the road plunging almost immediately down a steep descent. The Kasai, at this spot, has clay banks and a sandy bed, and is only 40 yards wide. It is said to rise in Kitangua's country. Still continuing through a fine hilly region, with dense woods yielding rosin, rubber, copal, and timber along the rivers, Silva Porto passed through the villages of Matiamvo and of his son Muata Gunda, and reached the Upper Chiumbue (Chihombo), here about forty yards wide, and flowing along the bottom of a ravine at least 200 feet in depth. After leaving the villages of the Kiboko chiefs Sha Nũmba and Sba Mazembe, a level country quite void of villages was entered upon. The soil was clay and sand. The river banks were densely wooded. The camps here were visited by Balunda and Kiboko, who offered arms, slaves, rubber, wax, domestic animals, and provisions, in exchange for powder and European manufactures.

Passing through the Balunda villages of Muata Ehunda and Sha Mokanda, the caravan, on April 23rd, arrived at the residence of the powerful Kiboko chief Kisenge e ha Tempo, a relative of the Ndumba Tempo visited by Capello and Ivens, and a tributary of the Muatyanvua. He was a man of about twenty-four, tall and slender, and of pleasant countenance. He wore his hair in tresses, to which were

\* Canhecie is evidently a misprint for Canhica.

† Lieut. Ivens (vol. i. p. 196) mentions a Cauêu rivulet rising in Kanika as the source of the Kasai. The Cauêu of his map corresponds to Silva Porto's Monyango.

attached brass ornaments made by native artists, whilst plumes of the red tail-feathers of the grey parrot surmounted the top of his head. Kisenge wore clothes of the finest "fazenda" and was seated upon a chair placed within a screen made of calico and coloured pocket-handkerchiefs. Having his elders upon one side, and his Mukuamada or household on the other, he presented quite an imposing appearance.

Between Kibundo (Kimbundo?) and the Muata Molundo, no villages were met with. On the Sombo the author observed a tree growing to a height of 100 feet, and yielding an aromatic rosin (*mambafo*), as also seeds from which the natives obtain oil, which they use medicinally.

From Muata Shiamba's, on the Chiumbue, to the Luashima, the right bank of which was followed by the author during thirteen marches, as far as its confluence with the Kasai, is a march of six hours.

The Muata Mosefo Matiamvo, already known to us through Schütt, received his visitor seated upon a chair, and supporting himself upon two men who knelt on either side. He wore the *lukano* or bracelet bestowed by the Muat' yanvua for faithful service. This emblem of power is made of brass and copper wire interwoven with the sinews of a human being sacrificed on some specially solemn occasion. It is covered with the skin of a *kisema* (an antelope?), and attached to it are various charms. If the holder of this emblem loses the favour of his feudal lord, a messenger, bearing a similar bracelet, but of smaller size, and a *mukuale* (two-edged knife), is despatched to him, and the disgraced chief quietly submits to decapitation, his brothers and wives generally electing the same fate.

Kimbundo,\* the chief of the Maio or Amamaio, on ceremonial occasions, wears a pink-coloured Mabella loin-cloth reaching down to the knees, and covered with shells, an upper garment of green cloth, a necklace trimmed with shells, and a helmet-shaped head-dress, the front of which is also adorned with shells. The Maio are of the same race as the Baluba. They shave part of the head, file the teeth, and tattoo as fancy directs them. The dead are buried with a supply of food and drink, sufficient to last a month, for they are supposed to have a long journey before them, from which they may after a time return.

The country to the north of Kimbundo's, as far as the Lulua, is ruled by Kaluba chiefs, near whose villages are groves of plantains and bananas. Coffee grows wild in the forest-clad ravines through which the Katungakale and Lombéle take their course to the Luashima. The Baluba or Bashilanga welcome strangers to their country. They are split up into a large-number of small tribes. They file the teeth, tattoo, and either shave part of the head or wear tresses like the Kiboko. A bone, a ring, or other ornament is usually worn in the nose. Hemp-smoking and the drinking of palm-wine are carried to excess, and lead up to a state of frenzy, during which these afflicted run into the forest, and kill the first man they meet. The Baluba look upon the Moyo (a tributary of the Lulua) as the cradle of their race, and swear by it. The Moyo ceremony is a nocturnal orgie, the participators in which meet around a wooden post in the middle of the village, to which their arms are suspended, and near which a fire is kindled by the Kimubanda. After some chanting, in the course of which the word "Moyo" occurs frequently, a goat is sacrificed, its blood being spilt upon the ground. Eating and drinking then go on until the morning when the fire is put out, and the ashes are thrown into the river.

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\* Schütt (p. 150), who visited this chief, tells us that he is also known as Muene Kiluata. According to Captain Carvalho, Kiluata has since been succeeded by his brother Kamuanga.

This ceremony is practised by all the Baluba, as also by the Maio and Bakuba, and hence the territory inhabited by these tribes is known to the Bihénos as "Moyo."

Buyamba's village, at the ferry over the Kasai, occupies a high bluff at the confluence of that river with the Luashima. The Kasai is about 1100 yards wide, but its course is obstructed by rocks; the banks are wooded. Crossing this river in small boats, the caravan followed it as far as Batamissa's village, and then struck inland, reaching the Lulua in eight marches. The country traversed rises occasionally into hills, and there are forests of big trees. Mafuka (Shamafuko) who resided on the Kaboloba when Pogge visited the country, occupied a village near the Masasuri, and in the same district were the villages of his father Kihúla, of his brother Kitempo (Mueneputo), and of Katende. Joannes Bezerra Pinto Coelho was found established on the Masasuri as a trader. The Mabonde palm was one of the most conspicuous trees seen near these and other villages. It yields the fibre from which mabella cloth is made, and palm-wine in the eighth year of its growth. In the ninth year it dies.

The Lulua, where crossed, was only 120 yards wide, with wooded banks. Kapau, the village of Buia Kalunga, was only founded in 1877, and is inhabited by Tukete and a few Bakuba. Three hours beyond it the author reached Kapungo, the "Kisálla" or market, of Lokengo, the king of the Bakuba, which has about 3000 inhabitants.

The Bakuba say that they came from the country to the north of the lower Zaire, and Lokengo claims to be related to the king of Congo. They break out two upper front teeth, shave the top of the head, and wear a skull-cap made of straw. Tattooing is practised, the favourite pattern appearing to be two continuous stripes, carried from the insteps to the wrists. They have no fire-arms; the Tukete on the Lulua are their subjects. In concluding a bargain a curious custom, called Shikavandando, is observed. An offer having been made and accepted, the vendor plucks a leaf, presents it to the intending purchaser, who takes hold of it, and then cuts it asunder, when the two pieces are thrown behind. If this mode of confirming a bargain is neglected, the vendor can claim double the value of the ivory or other merchandise he intended to sell.

Senhor Silva Porto furnishes a few notes on tribes which he did not visit. The Tupende live under small hereditary chieftains; they file the teeth, shave the head, and are armed with guns, bows and poisoned arrows, mukuale (two-edged knives), and spears. They hunt and snare game. The Tubinshe and Kauanda (Kanyanda?) to the east, beyond the Kasai, are reputed to be cannibals. They shave the head, file the teeth, and tattoo rings round the eyes, introducing a mixture of charcoal and vegetable juice into the wounds. They make use of poisoned arrows. To the south of them live the Malundo, thus called after their large houses. They also file the teeth.

Further south still are met the Kizuata-shito,\* who file the teeth like their neighbours, but are more especially remarkable for the singular custom of pulling their skin until it covers their persons.

Senhor Silva Porto's "Lualaba" is evidently the Sankuru, and he states that it is known to the natives dwelling there as Mozamgoma or Lufamjimbo ("bush-bird"). Shanana is a nickname applied to the tribes living to the north of the Lulua.

The diary of the return journey is not given. We look forward with interest to the publication of further 'Diaries' kept with so much care by this far-travelled trader, and more especially to an account by him of the Kubango river, which Serpo Pinto tells us he descended in a boat to Linyanti.

\* Schütt ('Reisen,' p. 139) was told that the Quata-shito are dwarfs.

## GEOGRAPHICAL NOTES.

**The Society's Prizes for the Improvement of Geographical Education in Elementary Schools.**—With the view of encouraging the study of geography by the teachers, and thus improving the methods of teaching the subject in Public Elementary Schools, the Council of the Society, in completion of the scheme announced last year,\* offered a series of prizes to be competed for annually by the students in the training colleges of England and Wales and other candidates for teachers' certificates. The offer has now been accepted by the Education Department, and will be immediately carried into effect. The prizes will be first awarded after the next Christmas examination for certificates (1887), and will consist of:—An exhibition of the value of 15*l.*, and four other prizes consisting of books or maps, to male students of the first (or second) year; and the same, i. e. 15*l.* and four other prizes, to female candidates of the second year, who pass the best examination in geography.

**The proposed Australian Antarctic Expedition.**—Our Council, at its last meeting, decided on supporting the application of the Victorian to the Home Government for a grant of money in aid of their proposed reconnaissance expedition to the Antarctic Regions. A letter expressing the sympathy of the Society with the objects of the proposed expedition has been sent to Sir Graham Berry, Agent-General for Victoria, and the following letter to the Secretary of State for the Colonies.

16th November, 1887.

SIR,—I have the honour of bringing to your notice that the Council of the Royal Geographical Society have been recently informed by the Agent-General of the colony of Victoria that an application has been made to Her Majesty's Government from that Colony for a grant of 5000*l.* in aid of an expedition which it is contemplated to send out from Melbourne for the exploration of the Antarctic Ocean. The Council of our Society, having given due consideration to the character of the information that might be acquired through such an exploration, unanimously recognised its probably great value and importance from many scientific points of view, apart from any possible economical utility it might have, and they have requested me to convey to you a respectful representation of their hope that Her Majesty's Government may see fit to make the proposed grant, to be applied, together with a like sum to be contributed by the Colony, for the purposes of such an expedition.

The Council, I am to add, would see with much satisfaction the further development in the Australian Colonies of the spirit which has already led to much very valuable scientific research, directed entirely by the cultivators of science in those Colonies, and they entertain the belief that assistance such as that now asked for will greatly contribute to the development of such a spirit, and give valuable and needful support to the extension of local independent effort which is so much to be desired.

I have, &c.,

Rt. Hon. Sir Henry T. Holland, G.C.M.G.,  
Secretary of State for the Colonies.

R. STRACHEY,  
President R.G.S.

\* 'Proceedings R.G.S.,' 1886, p. 528.

**Ascent of a Peak in the Owen Stanley Range, New Guinea.**—The Rev. W. G. Lawes (Port Moresby) informs us that Mr. Cuthbertson, the leader of the expedition despatched by the Victoria Branch of the Geographical Society of Australasia, has succeeded in reaching the summit of Mount Obree, one of the culminating peaks of the Owen Stanley Range. He started from Kappa Kappa, a place on the coast about 30 miles south-east of Port Moresby, making up his caravan at Mr. Hunter's station a few miles inland, where he engaged 100 native carriers, and commenced his journey inland on the 2nd of August. The line of march lay through a very hilly country, and for a long distance up a mountain stream, over slippery boulders. The summit of Mount Obree was reached on the 30th. of August, and was found to be 8000 feet above sea-level; a result which seems to need confirmation as it differs much from that obtained by careful angular measurements by the *Rattlesnake* expedition, viz. 10,246 feet. The almost continual rain and heavy clouds interfered with the view from the summit, but Mount Owen Stanley was distinctly seen in the early morning looming above them.—Mr. Cuthbertson is an experienced surveyor, and his detailed observations and map will be looked forward to with considerable interest. His altitudes were taken by a boiling-point apparatus belonging to our Society, which was lent to him by Mr. Lawes. He states that he passed on his ascent the point reached by Messrs. Hunter and Hartmann\* and found it to be only 2500 feet above the sea. A small botanical collection was made by Mr. Sayer, the naturalist of the expedition. Pines were found at from 6000 to 8000 feet, and some beautiful rhododendrons at or near the summit.

**Population of New Zealand.**—According to the newly-issued report on the census of New Zealand, taken March 28th, 1886, the population, exclusive of Maoris, was 578,482. This was an increase of 88,549, or at the rate of 18·07 per cent. upon the number at the previous census of 1881. The rate of increase was considerably less than during either of the intervals between the previous census periods since 1871. Of the increase between 1881 and 1886, 67,205 consisted of the natural increase by excess of births over deaths. The death-rate in 1885 was only 10·61 per thousand. The population given above included 4527 Chinese, only 15 of whom were women. The total Maori population was 41,969, and 2254 half-castes living as members of Maori tribes.

**Northern Interior of British Columbia.**—Dr. G. M. Dawson sends to 'Science' a detailed account of his recent work in British Columbia. Leaving Victoria early in May, the expedition reached Fort Wrangel, from which point they proceeded up the Stikine river to Cassian. Mr. W. W. Ogilvie made an instrumental survey of the country from the sea-coast by way of the Lewis river, up the Yukon to the 141st meridian,

\* 'Proceedings,' ante, p. 621.

and his measurements will serve as the basis for further work in the district. The object of Dr. Dawson's researches was a thorough exploration of the tributaries of the Upper Yukon. The party proceeded up the Stikine river as far as Dease Lake. As soon as the ice broke up, June 18th, they left the lake, and went down Dease river into the fork of the Dease and Liard rivers. Here a party left to descend and survey the Liard and Mackenzie rivers. Dr. Dawson went up the Liard and Francis rivers to Francis Lake, which drains into the Liard and not into the Pelly river. Thence Dr. Dawson proceeded down the Pelly river to its junction with the Lewis river, which was ascended and a geological survey of the country made. Mr. Ogilvie, separating from the rest of the party, continued down the Yukon river. He intended wintering on that river, and resuming his work in the spring, continuing it over to the Mackenzie river. He will return next autumn to Winnipeg by way of that stream and the Hudson's Bay route to Carlton on the Saskatchewan. Mr. M'Connell will probably winter at Fort Simpson, on the Mackenzie river, and continue his explorations from that point next summer.

**Island of Saipan (Marianne Group).**—A recent visit paid to this little island by M. A. Marche, the French traveller, gives us some new information respecting it. M. Marche is engaged in exploring the whole archipelago, and has spent two months in Saipan. The maps of the island are by no means correct. M. Marche, after a thorough exploration, was unable to discover any trace of a volcano or volcanic rocks, although a volcano active or extinct has been reported to exist in the island. Tapochao, the highest peak, was formerly supposed to have an elevation of 2000 feet, but the traveller's two barometers show its height to be 1345 feet. The other hills do not exceed from 600 to 700 feet in height. The northern point of the island terminates in a mountain having the appearance of the cliffs at Dieppe, and forming a long narrow plateau. There is very little fresh water in the island; and absolutely none on the west coast, where the inhabitants drink the brackish water of the wells. The two fresh-water lakes spoken of by other travellers are nothing but ponds, the water of which is quite unfit to drink.

**The Emin Pasha Relief Expedition.**—The unfavourable rumours regarding the expedition sent to the relief of Emin Pasha which have lately found their way into the papers are not confirmed from Brussels. According to the 'Mouvement Géographique,' no news had been received from Stanley, on his march from the Aruwimi to the Albert Nyanza, since the 8th July, when he communicated with Major Barttelot by a Zanzibari messenger, saying that all was well. The steamer *Stanley*, which had accompanied the expedition up the Congo and returned again, left Léopoldville on July 4th with reserves of goods and a reinforcement of 125 men, and reached the camp of Yambuya, on the Aruwimi, in the first week of August. There everything was found in a most satisfactory

state; the native population showed an excellent disposition towards the Europeans, and not an Arab had been seen anywhere near. Tippu Tib, however, had failed to keep his promise of furnishing 600 porters to carry the loads left behind by the expedition, and Major Barttelot was sending to Stanley Falls to inquire about this.

**Dr. Krause in Upper Guinea.**—Dr. G. A. Krause writes to us on the 28th September last from Accra (Gold Coast), where he arrived on the 23rd September. He left Salaga, having rested for some weeks after his extensive travels\* in the north, on the 1st of June. His route lay in an easterly direction, and after crossing the large river Li and a mountain range of moderate height, he arrived at Soguede on the 15th of the same month. This town is inhabited exclusively by the Mohammedans of the tribe of the Tembia or Kotokoli. He states that if he could have foreseen the toils and sufferings which he was destined to endure on the march from Soguede to the Slave Coast, he would have continued his journey eastwards to the Niger. However, he turned his steps to the south, and travelled by way of Beleta or Angninga, the centre of the salt trade in these regions, and Gbeshi or Pekji to Atakpame. He had to cross the Mono twice in boats (the river is called Njele further north), and to wade through its western tributary, the Angai, three times. In Beleta, as in Gbeshi, which lies about four days' march from Agbome, opposition was made to the traveller's further progress. On two occasions he succeeded by nocturnal flights in pushing forward, but was compelled to leave his collections and baggage behind in Beleta. The latter town is inhabited by the Kimbulu, Gbeshi by the Koshi tribes of the Ewe, and Atakpame by the Anagos of the Joruba. From Atakpame a march of four days brought the traveller to Togodo, on the west bank of the Mono, which at this point commences to be navigable. On the way he had passed the town of Mono, where a greater river, the Amu-Tsu (?), had to be crossed. After a boat-journey of two days he reached the coast at Pla (Great Popo) on the 25th August. Without delay he marched along the coast to Bagida, and thence to Accra, ten days distant. He intended to despatch two men to recover, if possible, his lost collections, &c. The latter include from 600 to 800 plants, and seeds of numerous cultivated plants, a small number of beetles, butterflies, and other insects, and some remains of pre-historic settlements between Mosi and Timbuktu. Since leaving Salaga he had suffered from thirteen slight fever attacks, for which the fever-plant found by him in the country of the Gurunsi proved a sure remedy. Dr. Krause in his letter states that he is absolutely without means, even to pay his passage back to Europe.

**An Adventurous Journey in the Western Sahara.**—The Geographical Society of Paris has received a letter from M. Douls, giving particulars

\* 'Proceedings R.G.S.,' 1887, p. 511.

of a remarkable journey made by him through previously unexplored parts of the Western Sahara. The traveller, in the disguise of a Mussulman, landed from a Canary Island fishing-boat on the coast at a point between Cape Bojador and the Rio de Oro. The first Moors he encountered suspected him and made him prisoner. After being kept in chains for a long period, he managed by persevering in his rôle to save his life, and after being tried several times he was allowed his liberty and admitted as a "brother" into the tribe, which proved to be a section of the terrible Ulad Delim, the robbers of the Western Sahara. For five months in company with these Bohemians of the desert he wandered over unexplored steppes, continually on the march. In their company he reached the limit of the desert of Uarau and Djuf, the great depression of the Sahara. His compass and barometer having been returned to him, he was able to make some interesting observations. Then turning to the north, he passed near the sebka of Zemmur, of which he determined the exact position; Panet placed it far too much to the north. He surveyed also the course of the Saguiat-el-Hamra, which had not previously been ascended. At the end of March he was in Tendûf, the great slave-market of North Sahara. Since 1880 (time of Dr. Lenz's visit) this oasis, he states, has greatly increased in size. Returning in the direction of Cape Juby, he crossed the fertile and little known plains of the Ketana and the Tekna. Between Tarfaya and Uad Nun the monotonous surface of the Sahara changes its aspect, and becomes rugged and uneven, with valleys and rocky hills. These are the beds of former rivers destroyed by upheavals, and which must at one time have fertilised these now desolate regions. The chief of Uad Nun, on the recommendation of the Moors, accorded M. Douls warm hospitality. He took final leave of the nomads at Glimin; they went south along the steppes, while he proceeded north along the Atlas range. Coming from the south almost without clothing, and with the appearance of a nomad, he managed to pass through the country of the Berbers of Sus without attracting attention. Crossing the Atlas he reached the city of Morocco, and sought, as suggested by the chief of Uad Nun, an interview with Abidin, the brother of the latter, who, however, was suspicious of the traveller, and communicated with the Sultan. He, furious at the idea of a European having got into his country from the south, ordered M. Douls to be put in chains and thrown into a dungeon. By a happy coincidence, on the evening of his arrival, the English Embassy under Sir Kirby Green also reached the town. Upon the representations of the latter M. Douls was released, otherwise his position would have been a serious one. From this remarkable journey through country absolutely free from all contact with Europeans, the traveller has brought back a wealth of information, important alike to geography and ethnography.



**The Gulf-Stream.**—In 1886 M. J. Thoulet made a series of observations on the Gulf-stream, on the frigate *Clorinde*, from France to Newfoundland and back. On the basis of these, combined with the researches of Mr. Buchanan on board the *Challenger*, he prepared a series of sections, longitudinal and transverse, of the stream; and the results of his work, some of them rather novel, have just been presented to the Paris Academy of Sciences by M. Bouquet de la Grye. His observations were mainly with reference to the two great conditions of temperature and salinity, by means of which a sort of isographic plan of the ocean could be prepared, showing its currents gliding down the slope of one density to another. The Gulf-stream, M. Thoulet tells us, is like a river: its centre-line, sloping all along its length, has a steeper slope near its source than at its embouchure. A valley, with relatively abrupt slope, separates it on the left bank from the United States current coming from Newfoundland, and moving southwards. Its right flank, with a softer slope, turned obliquely towards the ocean, presents a much more considerable breadth, and thus is explained the conveyance of floating wood from America towards the north-west of Europe. The great St. Lawrence current, passing into the Atlantic between the little Island of St. Paul and Capé Breton island, collides with the Gulf-stream, lessens its speed, and leaves as a sort of submarine delta, the banks extending along the United States, to the Great Bank of Newfoundland. The eastern Polar current, coming from Baffin's Bay, skirts Newfoundland, and ends by striking the Gulf-stream at right angles. Contrary to what would be expected, its waters, though colder, are a little lighter, according to Mr. Thoulet, so that, instead of passing underneath the hotter waters of the Gulf-stream, it mixes with them, almost entirely arresting their speed. This mixture of waters is promoted by the melting and capsizing icebergs. After meeting with the eastern Polar current, according to M. Thoulet, the Gulf-stream no longer exists, so to speak. Its cooled waters are spread out, although they retain a general north-easterly direction. The Gulf-stream is then, M. Thoulet concludes, in the best condition to moderate the climate of Western Europe, but it has no longer any individuality; it has become a simple derivative without depth, and may be compared to a powerful river which is lost in the marshes. We may point out that M. Thoulet's views do not essentially differ from those of Mr. Findlay, the latter going even further than the former, arguing that the Gulf-stream actually ceased in the neighbourhood of Newfoundland, and that the mild climate of Western Europe was due entirely to other causes. Mr. Findlay's paper, 'Proc. R.G.S.,' vol. xiii. p. 102, with the interesting discussion which followed, is well worth studying. This is essentially the conclusion come to as a result of the *Challenger* investigations, though it will probably take a generation or two to eradicate the old erroneous notions of text-books and popular treatises.

**The Climates of the Globe.**—General de Tillo has presented to the Paris Academy of Sciences an account of his recent researches on the distribution of atmospheric temperature and pressure on the surface of the globe. Among other conclusions which he reaches are these: The northern hemisphere contains 14 per cent. of cold regions, 35 per cent. of temperate regions, and 51 per cent. of hot regions. Dr. Supan, by a different method, finds, for the same regions, 15, 32, and 53 per cent. respectively. The Continents as a whole are 3° Cent. colder than the Oceans, between 90° N. and 50° S. lat. The New Continent is 3° Cent. colder than the Old Continent. The Atlantic is 2°·6 colder than the Pacific. Thus the New Continent with the Atlantic is sensibly colder than the Old World with the Pacific; and all the Continents with the Atlantic are colder than the Pacific. General de Tillo gives the following classification of the Continents and Oceans according to their mean annual and monthly temperatures, in degrees Centigrade :—

Year.	Mean Temp.	January.	Mean Temp.	July.	Mean Temp.
Africa .. ..	+ 26·4	Australia .. ..	+ 29·4	Africa .. .. ..	+ 27·1
S. America .. ..	+ 23·0	S. America .. ..	+ 25·1	Old Continent .. ..	+ 24·5
Australia .. ..	+ 22·3	Africa .. .. ..	+ 23·7	Asia and Europe ..	+ 23·1
Indian Ocean .. ..	+ 20·4	All Oceans* .. ..	+ 17·9	All Continents .. ..	+ 22·9
Pacific .. .. ..	+ 19·6	All Continents* ..	+ 7·3	S. America .. .. ..	+ 20·9
All Oceans* .. ..	+ 18·3	Old Continent .. ..	+ 6·4	New Continent .. ..	+ 20·2
Atlantic .. .. ..	+ 17·0	New Continent .. ..	+ 5·3	N. America .. .. ..	+ 19·7
Old Continent .. ..	+ 15·8	Asia and Europe ..	- 3·0	All Oceans .. .. ..	+ 19·2
All Continents* ..	+ 15·0	N. America .. ..	- 8·7	Australia .. .. ..	+ 16·4
New Continent .. ..	+ 12·9				
Asia and Europe ..	+ 10·0				
N. America .. ..	+ 4·7				

\* Between 90° N. and 50° S. lat.

**Population of the Earth.**—Professor E. Levasseur has drawn up for the Journal of the International Statistical Institute a long and elaborate series of tables of the populations of the various continents and countries, and their subdivisions, which may be taken as a substitute for the long-deferred new issue of the 'Bevölkerung der Erde,' if indeed the latter has not been suppressed entirely. M. Levasseur gives the population of the latest census years, as also estimates (when there has been no census) for 1886. The following are some of the general results of M. Levasseur's work :—

Great Divisions of Globe.	Area in Thousands of Square Miles.	Percentage of Total Surface.	Population in Millions.	Density per Square Mile.	Percentage of Total Population.
Arctic Ocean .. ..	4,632	2·3	..	..	..
Antarctic Ocean .. ..	8,108	4·1	..	..	..
Atlantic .. .. ..	38,612	19·6	..	..	..
Indian .. .. ..	26,256	13·3	..	..	..
Pacific .. .. ..	66,799	34·0	..	..	..
The five Oceans .. ..	114,407	73·3	..	..	..
Europe .. .. ..	3,861	2	347	90	23·4
Africa .. .. ..	12,124	6·1	197	16	13·3
Asia .. .. ..	16,217	8·2	789	47	53·2
Oceania* .. .. ..	4,247	2·2	38	9	2·6
North America .. ..	9,035	4·6	80	8·8	5·4
South America .. ..	7,066	3·6	32	4·6	2·1
Five Land Parts of Globe ..	52,550	26·7	1,483	29·2	100·0
Total .. .. ..	196,957	100·0	..	..	..

\* Including Malaysia and Australasia.

In a communication to the Paris Academy of Sciences on the subject, M. Levasseur points out that nearly two-thirds of the human race live grouped on a relatively small area of 4,256,000 square miles (about one-twelfth of the land area), divided into three groups: Western, Central, and Southern Europe (about 245 millions of inhabitants and 1,351,000 square miles); the Indian Empire (245 millions of inhabitants and 1,380,000 square miles); China proper with Manchuria and Japan (430 millions of inhabitants and 1,544,500 square miles). Other conclusions M. Levasseur points out, some of them obvious. Thus the most populous regions are found along the great rivers, in many cases on the coasts; coal-basins attract a population far more than valleys; great cities exercise a sort of magnetic, or rather gravitating influence on people. In Europe especially, countries being in general peopled in proportion to their riches, when the social condition of their inhabitants is nearly the same, it is in the north-west and centre of Europe that we find the greatest density. High plateaus, the northern regions to the north of the parallel of St. Petersburg, and the barren steppes of the south-west, are but scantily populated.

**The Society's Educational Collection.**—A selection of objects from the Society's Exhibition of 1885-6, with others since added, is now arranged in a room at the Society's offices, 1, Savile Row, and is open for the inspection of teachers and others interested in geographical education.

**Geography at the approaching Brussels Exhibition.**—At the International Exhibition to be held in Brussels next year, a special section will be devoted to topography, geography, cosmography, and the related sciences. We are asked to draw attention to the classes of objects which are desired for contribution to the section. They are:—(1) Maps and atlases, topographical, geographical, geological, hydrographical, astronomical, &c. (2) Physical maps of all kinds, plans in relief, terrestrial and celestial globes and spheres. (3) Statistical works and diagrams, tables and ephemerids for the use of astronomers and navigators. (4) General treatises and classical works. (5) Instruments, aide-mémoires, and articles of equipment for explorers. Among the "Desiderata" are the following:—(1) The best map of the Congo, showing the most recent discoveries; (2) the best national map of any country; (3) utilisation of the sheets of a topographical map for the preparation of special maps on the same or on a different scale; (4) the execution of relief maps; (5) transference of relief to a plane surface; (6) construction of an apparatus suitable to demonstrate by experiments the various geographical features which may be presented by a river, such as torrents, lakes, cataracts, and rapids, erosions and alluvial accumulations, subterranean streams, islands, and backwaters (*fleuves morts*), freezing and breaking up of the ice, floods, formation of deltas, bars, &c.; (7) construction of a tellurium; (8) portable equipment for an explorer; (9) statistical atlases and globes. The President of the section is M. Wauvermans, and the Secretary, our Honorary Fellow, Professor Dr. Du Fief. The office is at 22, Rue des Palais, Brussels.

**Memorial to the late Admiral Sir Charles F. A. Shadwell, K.C.B., F.R.S.**—A fund is being raised by a committee, of which Admiral Sir

A. P. Ryder is the chairman, for the purpose of honouring the memory of Sir Charles Shadwell, by establishing an annual prize, consisting of surveying instruments, for useful marine surveys carried out and projected by officers of not higher rank than lieutenant, while employed in the general service. The late Admiral was distinguished in the Royal Navy for his many admirable qualities, and especially for his knowledge of practical marine surveying. The sum required is 1000*l*. A subscription list is open in the Map Room of the Society.

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## REPORT OF THE EVENING MEETINGS, SESSION 1887-8.

*First Meeting, November 14th, 1887.*—General R. STRACHEY, R.E., F.R.S.,  
President, in the Chair.

ELECTIONS.—*W. E. Garforth, Esq.; James T. Jarvis, Esq.; Captain Augustus Kent; Courtenay Lord, Esq.; Sir Alexander Meadows Rendel, K.O.I.E.; Colin D. Ross, Esq.; Benjamin Taylor, Esq.; Dr. R. Villavicencio (Consul for the Republic of Venezuela); William Wallace, Esq.; Spencer John Weston, Esq.*

PRESENTATION.—*Mr. M. V. Portman.*

The President opened the Session with the following address:—

In welcoming you on the occasion of the first meeting of the Society in the present session, I am satisfied that you will join with me in expressing the sincere thanks of the Fellows to the authorities of the University of London for their continued kindness in permitting us to make use of this hall for our meetings. I fear that, from the very nature of our mutual positions, it is not in our power to make any return to the University in a direct form, but perhaps we may consider that we in some measure discharge the obligation by the contributions which we make in various ways to the improvement of geographical education and the spread of geographical knowledge.

I have much satisfaction in stating that the lecturer on geography recently appointed by the University of Oxford—our Associate, Mr. Mackinder—has commenced his lectures under very favourable auspices as to their success, and with increasing indications of their being appreciated by the students for whom they are designed.

At the end of next month, moreover, the examinations under the Education Department will take place for the selection from the pupils at the Training Colleges of those to whom will be awarded the Society's Scholarships and Premiums, and early next year we shall be in a position to judge of the practical working of this part of our general scheme.

Among the events interesting to us as geographers, which have occurred since the last meeting of the Society, the progress of Mr. Stanley on his great expedition through Central Africa for the relief of Emin Pasha is the most important. It will be fresh in your

recollection that your Council contributed from the funds of the Society 1000*l.* towards the expenses of this expedition, with a view to that sum being applied in aid of the geographical exploration of the country traversed, and on being assured that the results of the exploration would be communicated to the Society. The route chosen by Mr. Stanley, up the Congo and its northern tributary the Aruwimi, as far as that river was navigable, and thence across to the Albert Nyanza, would lead him through some 400 miles of entirely new country, which could not fail to yield a rich harvest of new facts in geography. The expedition, as we have been informed from time to time by telegrams and letters which have been published in the daily papers, after an arduous journey up the Congo, reached the rapids of the Aruwimi on the 19th of June, only eight days later than the estimated time. After establishing a stockaded post at that spot, at which he left a part of his followers with Major Barttelot and Mr. Jameson (the naturalist of the expedition), Stanley, on the 28th or 29th of June, left with a selected caravan for his adventurous land march through the unknown country to the western shore of the Albert Lake. Details of this journey will be anxiously expected. Meantime Emin Pasha has been apprised by messengers sent to him from Zanzibar of the relief party, and all promises well for the success of this great expedition, so far as the geographical objects in view are concerned. What may be the intentions of the enterprising man in whose aid the expedition was planned is still somewhat matter of conjecture, but for my own part I have always doubted whether he ever really contemplated leaving the country over which he appears still to exercise rule with a courage and ability which is well worthy of our admiration.

With regard to other African explorations, the most striking event is the ascent of Mount Kilima-njaro in August last, by Dr. Hans Mayer of Leipzig, a traveller who has included a visit to the newly acquired German territory in East Africa, in his contemplated voyage round the world. The letter in which he has briefly described his feat to his friends in Germany, states that the ascent occupied five days and that he reached the edge of the crater on the summit of Kibo, the highest peak, but was prevented from descending into it, as we gather, by an overhanging glacier-wall 150 feet high. Great credit is due to Dr. Mayer for accomplishing what had foiled the efforts of all preceding travellers. He estimates the height of the summit of this mountain to exceed 19,500 feet.

The discovery of two new navigable rivers in British New Guinea, by one of our Fellows, Mr. Theodore Bevan, is another noteworthy event, intelligence of which has reached us since we last met. The journey was only preliminary to a more thorough exploration which this enthusiastic traveller has planned, and was limited in duration to six weeks, that being the time for which he was granted the use of a small steamer (from Thursday Island and back to Torres' Straits), by

the public-spirited firm of Burn, Philp, & Co. An account of the expedition, with a map, communicated to us by Mr. Bevan, has been published in the October number of our 'Proceedings.' News of another exploring journey in New Guinea has also lately reached us, namely, the ascent of the mountain range which stretches along the South-eastern Peninsula, of which Mount Owen Stanley is the culminating peak. This has been accomplished by Mr. G. Hunter and Mr. C. H. Hartmann, the former a Government official, long resident in New Guinea, and familiar with the native language. All previous attempts to reach the mountains have been made from Port Moresby, and have been frustrated by the extreme ruggedness of the country on approaching the main peaks in that direction, and the hostility of the inland tribes. Messrs. Hunter and Hartmann succeeded in reaching the summit of the range where its altitude is much less by taking a route to the south of Port Moresby. The travellers are said to have taken for altitude measurements only one aneroid with them, and that got out of order, so that the height reached was not ascertained. They attained a point, however, whence a view was obtained of open country inland, where exploration may be expected to be easier than on the densely wooded seaward slopes of the range.

I am indebted to Mr. Douglas Freshfield, one of our Secretaries, for the following notes on an expedition of much interest to us which he undertook during the summer in company with Mons. de Déchy, in the heart of the Caucasus. Their journey (in conjunction with those of M. de Déchy in previous years, and that of Messrs. Dent and Donkin, of the Alpine Club, last year) will help to establish the very complicated relations of the peaks, passes, and glaciers of the great central group or *massif* of this splendid chain. Of this group the position of two only of the peaks (Dikhtau, 16,925 feet, and Koshtantau, 17,095 feet), have as yet been fixed by the Russian Surveying Staff. These stand on a northern spur. Close to them, on or near the watershed, rise four more summits all exceeding 16,000 feet, which will be known in future to geographers as Shkara, Djanga, Tetnuld, and Gestola, some of them reaching possibly to more than 17,000 feet. All of these, and also the isolated towers of Ushba, exceed, or nearly equal in height, Kazbek (16,456 feet). Two current delusions of orographers must now be finally dismissed. The greatest icefields of the Caucasus do not surround Elbruz, but lie along the crest of the main chain between Suanitia and Kabardáh. This portion of the Caucasian chain is far more heavily charged with ice and snow than even the Pennine Alps. The statements so often made as to the comparatively small dimensions of the Caucasian icefields appear to have had no better foundation than the reports of tourists from the neighbourhood of the Dariel Pass, and are entirely misleading when applied to the western portion of the range, as will be conclusively shown by M. de Déchy's series of photographs. It may reasonably be expected that a country now within a week's journey of

England may become, like the Alps, a British playground, and that we may before long have full materials for a physical and geological comparison of the structure of these two "palaces of nature," above, as well as below, the snow-line.

The results of the expedition of the French savants, Messrs. Bonvalot and Capus, into Russian Turkistan, ending with their arduous journey across the Pamir plateau into Chitral, and thence into British India, will no doubt soon be given to the world, and may be expected to add much to our knowledge of these inaccessible regions.

You are possibly aware that a project has been formed in Victoria, which is understood to have received the general support of various scientific bodies in the Australasian Colonies, for undertaking an expedition into the Antarctic Ocean to investigate further the physical conditions of that very imperfectly known region.

Sir G. Berry, the Agent-General of the Colony of Victoria, has brought the subject before the Council, desiring the support of the Society to a request made to the Treasury on behalf of the Colony for a grant of 5000*L.*, to be applied with a like amount to be raised in Australia for the purposes of such an expedition; and the Council have to-day resolved to inform the Agent-General of their complete appreciation of the great value to geographical science of such an investigation as that projected, and their readiness to make a representation in this sense to H.M. Government.

During the session now opened we have promise of numerous papers relating to original exploration of more than average interest. At our next meeting a communication will be read from Mr. Carey on his very remarkable journey from Ladakh through Central Asia, and from Lob Nor across the Altyn Tagh into Northern Tibet. At our December meeting Mr. Daly, already known to us for his explorations in the Malay Peninsula, will read us a paper on his five years' surveys in the centre of North Borneo. After Christmas we expect papers on the Soudan by Major Watson; on Trade Routes from India to Tibet, by Mr. Elwes; on the Hudson's Bay, by Commodore Markham; and on an Exploration of the Basin of the Rio Doce in Brazil, by Mr. Steains.

The paper of the evening was "Explorations in Siam," by J. M'Carthy:—

In introducing Mr. M'Carthy to the meeting, the President said that his paper would be on the subject of the surveys which he has been conducting during the past six years in the kingdom of Siam. He was trained in the excellent school of the Survey of India, then under General Walker, and the results of his labours form a most remarkable contribution to exact geographical knowledge of a vast country, acquired under circumstances which greatly add to the credit due to him. Much additional interest attaches to the geography of Siam from its close connection with that of Burma, Western China, Cambodia and Tongking, of which no doubt we shall hear something in the discussion of the paper, in which we hope that Mr. Satow, the British Minister at the Court of Siam, who is here this evening, will take a part.

Mr. M'Carthy's paper and map will appear in a subsequent number of the 'Proceedings.'

**PROCEEDINGS OF THE GEOGRAPHICAL SECTION  
OF THE BRITISH ASSOCIATION.**

MANCHESTER MEETING, 1887.

*Tuesday, September 6th (concluded).*

**Second Report of a Committee for inquiring into the Depth of Permanently Frozen Soil in the Polar Regions.\*** By General Sir J. H. LEFROY, R.A., K.C.M.G. (Reporter).—The Committee have received a valuable communication from Dr. Percy Matthews, LL.D., coroner for the North-west Territories of the Dominion of Canada, and resident medical officer at York Factory on Hudson's Bay, of which an analysis is subjoined:—

*York Factory*, lat. 57° N., long. 92° 26' W. (No. 9 of Report of 1886). Surface about 51 feet above sea-level.

*I. Positive evidence of the depth of penetration of frost.*

- (1) 1879-1886. By the mean of seven measurements in the channel of Hayes river, at the mouth of which the factory is situated. Thickness of ice in January, February, and March, 6 feet 6 inches. Hayes river has been, on the average of the last 30 years, closed to navigation on the 26th November, and reopened on the 17th May.
- (2) 1882-3. By the mean of 485 measurements made in the course of a survey of the bed of Nelson river (about seven miles north of York Factory) under direction of Mr. H. Jukes, c.e., for the Winnipeg and Hudson's Bay R.R. Company. Thickness of ice, or penetration of frost, in December, January, and February, 5 feet 10 inches.
- |                 | Experiment. | Alluvial<br>Soil.<br>Inches. | Superficial<br>Thaw.<br>Inches. | Frozen<br>Soil.<br>Inches. |  |
|-----------------|-------------|------------------------------|---------------------------------|----------------------------|--|
| 1885.           | No.         |                              |                                 |                            |  |
| (3) April 14 .. | 514         | 22                           | None                            | 33                         | Boring continued to 17 feet.<br>Very dry soil.   |
| 1886.           |             |                              |                                 |                            |  |
| (4) May 4 ..    | 517         | 21                           | 2                               | 48                         | Boring continued to 17 feet.<br>Wet soil. 20 inches of<br>snow on surface.                   |
| (5) May 28 ..   | 519         | 21                           | 2½                              | 40                         | Wet soil.  |
| (6) June 4 ..   | 521         | 23                           | 7                               | 30                         | Boring continued to 18 feet.<br>Dry soil.  |
| (7) June 23 ..  | 526         | 21                           | 14                              | 31                         | Boring continued to 18 feet.   |
| (8) June 25 ..  | 527         | —                            | 65                              | 68                         | A stratum of three inches<br>of frozen water was found<br>at 65 inches, resting on<br>clay.† |
| (9) June 26 ..  | 528         | —                            | 14                              | 96                         | Boring continued to 21 ft.‡  |
| 1881.           |             |                              |                                 |                            |  |
| (10) July 23 .. | 14          | 20                           | 28                              | 38                         | Boring continued to 10 feet.<br>Dry soil.  |

\* *Vide* 'Proceedings R.G.S.,' 1886, p. 740.

† The MS. gives "frost penetration 3 inches," with the explanation, "a lodgement of 3 inches of frozen water over clay bed at 65 inches." Evidently, therefore, the frost had got down 68 inches. The boring was continued to 18½ feet.

‡ Dr. Matthews adds the following note to this observation:—Taken in a clearing



On 1st July, 1886, the soil of No. 528 was only thawed 20 inches, and in another spot within the clearing, 37½ inches. On 6th September following, at 140 yards north of this spot the soil was frozen to a depth of 102 inches, with 51 inches of thawed ground at the surface, and at 140 yards south of the same spot to a depth of 94 inches, with 42 inches of thawed ground. Other measurements of the thawed ground, September 4th and 10th, gave respectively 50 and 52 inches.

II. *Examples of excavation or boring without finding frozen soil, and of superficial thaw.*

1870, August, September. In excavating a dry dock at York no frost down to 36 feet.

1879, August 25th. 300 yards W.; 300 yards N.W.; 300 yards S. of York. In a swamp, no frost found down to 33 feet.

1880, August 10th. 100 yards S.; 300 yards S.; and 100 yards S.W. as before. No frost found down to 33 feet.

1882, August 30th (see below, Severn River).

„ September 10th. Six graves opened in an old Indian burial-ground. Depth of alluvial soil 48 inches. No frost down to 10 feet.

The burial-place in question has been disused for 50 years, and the results in surrounding ground which has never been disturbed are the same.

1884, July 30th. Four graves opened; depth of alluvial soil 40 inches. Thin sandy clay; no frost down to 16 feet.

1886, May 28th. In a garden at York, thaw 7½ to 9 inches.

*Landslips Hayes river.*

1884, July 15th. The thawed soil was 36 inches in depth.

1885, June 18th. The thawed soil was 29 inches in blue clay, 37 inches in white clay.

1886, June 14th. The thawed soil was 28 inches.

„ Sept. 10th. On a much exposed portion of the bank of Hayes river, dry soil, there was no frost down to 16 feet.

The following are also given as observed depth of thaw in or near York Factory, that of the frost below not having been measured.

1886, May 28th. Garden at York, in dry soil, 7½ inches; in wet soil, 9 inches.

„ May 31st. In a swamp 1000 yards south of the factory, 10 to 12 inches.

„ June 14th. Garden at York, average 18 inches.

„ July 1st. In the swamp, 36 inches.

„ „ 3rd. After two days' rain, 37 inches.

the barest and most bleak in the neighbourhood of York. It is nearly at all times freed from its winter's snow by the action of fierce winter gales sweeping over Hudson's Bay. So that its soil is fully exposed to the greatest degree of frost penetration possible, not only from above downwards, but from its position, laterally; therefore, having selected this, the most exposed site obtainable, I had a trench dug 10 feet in length down to the non-frozen subsoil. This experiment, together with subsequent ones, is in my opinion conclusive, inasmuch as I consider it indicates the greatest depth of frost penetration in and around York of late years, and may certainly be ranked as perpetual ice, but upon a scale so small as to be wholly comprised, as far as my experience goes, within 10 acres. To give an idea of quarrying in frozen ground in June, I may mention that I had an Indian working hard for three days to obtain the above information.

1886, Aug. 2nd.	In the swamp, 48 inches, 12 borings.
" " "	Open ground, 40 inches, 9 borings.
" " 15th.	In the swamp, 49 inches, 15 borings.
" " 20th.	" 56 " 12 "
" " 25th.	" 11 feet, 12 "
" Sept. 1st.	" 15 " 3 " after heavy rain.
" " 8th.	" 30 " 3 "

The general summary of the author from 8 years' observation, is—

The greatest depth at which the soil was found frozen was 102 inches.

" " " of thaw having frozen soil below it was 52 inches.

" " " reached without finding frost, 33 feet.

The mean temperature by 9 years' observations, is 17°·4 F.

Mean rainfall 22·98 inches.

" snowfall 47·91 "

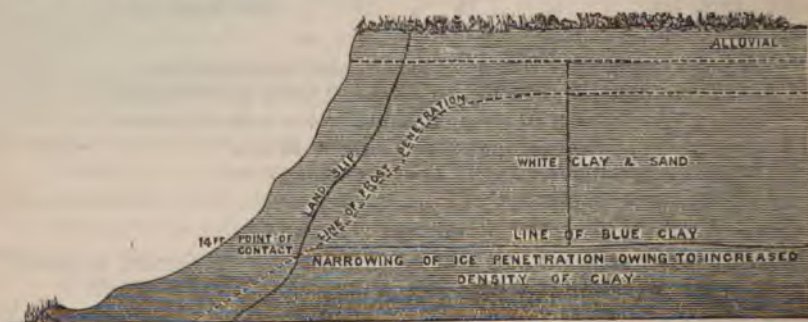
1882. At the river Severn, lat. 56° or 1° south of York Factory, in making a cutting for a jetty, in August, no frost was found at 15 feet down.

To his tabular statement the author has added the following "Notes on the table of experiments for ascertaining the depth of frost and thaw penetration, York Factory, Hudson's Bay"—

"In briefly examining the accompanying list of experiments, it will at once be realised that so many variable conditions have to be taken into consideration in connection with frost penetration, that it is impossible to form any estimate other than that based upon a series of experiments carried over a number of years. For, in the first place, the extent of the winter's frost must be dependent upon locality (including soil, exposure, drainage), season, and certainly from my experience, upon the snowfall, be it early or late, much or little; just as the depth of the summer's thaw, though subject in a negative sense to like conditions, is to a great extent dependent upon the rainfall. For instance, reverting to six experiments above catalogued (Nos. 14, 514, 517, 519, 521, 526) carried out in the York churchyard (a site which is protected by surrounding willows, pallsading, &c., and so thoroughly in the lee that, when the country lying beyond is bare, it maintains its covering of certainly 20 inches of snow throughout the winter), the soil is there found to be frozen to an average depth of three feet only, whereas within 350 yards, we learn from Experiments No. 528 and two others, that under exactly opposite conditions a depth of upwards of eight feet of frost is attained. Again, on the same principle, if the snowfall is late, the soil will naturally be found to be frozen far deeper than when it early covers the ground, even as the rainfall, if great during the summer, independently of season, exercises a considerable influence in determining both the rapidity and the penetration of the thaw.

"In venturing to offer some explanation of Sir John Richardson's statement 'that the soil was found frozen to a depth of nearly 20 feet at York Factory,' apart from the consideration of it being a severe season, which it undoubtedly was (for on referring to old records I find that the winter of 1834-5 was exceptionally severe), I would in all deference submit from observations of my own upon this point, that the measurement alluded to gave but a section of the lateral freezing of a landslip—for in sounding the 'face' of a perpendicular bank, say 40 feet in height for frost penetration, the frost will be found at its depth in relative proportion to the height of the bank, making all due allowance for the varying of its penetrative action in differing strata—but if the bank be not perpendicular, but sloping, the frost follows the declivity, and a portion of the thawed surface (probably due to heavy rains) slides over the frozen subsoil, and impinging on the denser structure, abruptly

breaks off at the point where the frost action is checked, and gliding on, thus exposes a thawed surface, leaving a deceptive frost-line far below the true one, which upon a cursory examination leads to the supposition that the ice penetration is greater than it really is. Though this is conjecture as regarding the statement in



Rough Diagram of Landslip in Hayes River: apparent frost penetration of over 14 feet proved to be only 4 feet.

question, I have the rather endeavoured to illustrate not only what I have witnessed myself, but that which may be an explanation of the depth of frost alluded to in this particular instance.\*

"But in further reference to Sir John Richardson's statement 'that the soil was found frozen to a depth of nearly 20 feet at York Factory,' I must not omit the fact that Mr. George Gladman, a chief factor of the Hudson Bay Company's Service, in his evidence before the Select Committee of the House of Commons in 1857, says, 'pits were dug there (York) with a view of ascertaining the depth of ground thawed during summer; repeated diggings showed about three feet of thawed ground, whilst the perpetually frozen ground was found to be 15 feet deep.' In this connection, although fully admitting its corroborative force, I cannot but point out a discrepancy of nearly 5 feet (4 feet 10 inches) existing between Sir John Richardson's experiment and those carried out by Mr. Gladman, *the same year*, plainly indicating that the site of Sir John Richardson's experiment must have been exceptional, as I have before inferred. In passing on to Mr. Gladman's experiments, it must be noted that the climate of York has undergone a considerable change, even within the last fifty years; indeed, quoting from Mr. Gladman's later evidence, he says that 'turnips and garden-stuff failed at York on account of the nearness of the sea, the severity of the seasons, and summer frosts.' Whereas now, speaking from a personal experience of upwards of eight years, I may say that no difficulty whatever exists in providing the establishment with very passable potatoes, excellent turnips, and several kinds of 'garden stuff,' and that many kinds of flowering plants thrive in the open air. The country surrounding York fifty years ago was thickly wooded, and more swampy than it now is; evidence of its being so is present to-day in the innumerable grassy hillocks dotted around the settlement,

\* It is to be observed of the above diagram, that if the line of fracture instead of being only some four or five feet back from the edge of the bank had been twice or thrice that distance, the whole frozen part would have disappeared and the section have disclosed the real depth of the frost, provided the slip occurred, as they usually do, at a period of the year too advanced for the new face to freeze to any depth.

formed by the decayed stumps of trees forced up out of the ground by the compressive action of frost. Therefore, under these altered conditions, not only would the frost penetration be deeper, the thaw be less, but 'perpetual ice' would extend at a greater depth over a much larger area than it now does. Something may also be attributed to a disposition which prevailed among the older generation of fur-traders to minimise the suitability of the North-west for agricultural settlement.

"I am not in a position to offer any very satisfactory explanation as to the frost penetration being so relatively small at York, considering the mean temperature of the year, beyond stating that the surrounding country contains numerous springs, which may be readily tapped at any time during the winter; that the subsoil is clay, though this perhaps hardly bears upon the question when closely examined. Doubtless, the inconsiderable height above the sea-level, and 'the immediate vicinity of a large body of unfrozen water,' are important factors, and do exercise a great influence upon the surrounding country, although I must not omit the more immediate bordering of some miles of frozen water for upwards of five months in the year. As to whether the peaty formation of much of its soil has any appreciable influence in absorbing and accumulating the intense tropical heat of summer is a question beyond my humble ken, but that the frozen subsoil acts as a 'provision' in the earlier part of summer, in counteracting the effects of such heat as regarding vegetation, is a fact that can be, in my opinion, incontestably proved in some parts of the country immediately surrounding York."

In a second communication, dated 27th July, 1887, Dr. Matthews, in answer to questions, reiterates his belief that no permanently frozen ground now exists at York Factory, with the slight qualifications stated above:—

"The climate has unquestionably changed, and the surface vegetation equally. The presence of grass, superseding moss, of itself would materially influence frost penetration, but with the drying up of the country, owing to many causes (uprising of the land, &c.), the frost penetration would be less. The surface vegetation is, in my opinion, a more important factor than water."

He quotes Indian testimony as well as comparison of records to prove that the rivers open about a week earlier and close about a week later than they did 50 years ago.

The Committee are indebted to Dr. J. Rae for the following communication:—  
The station in question is only a little north and east of No. 20 in the first report.

*Ice in ground.* By Frederick C. Baker, Binscarth, Manitoba.—Twenty-three observations taken in the prairie lands of Manitoba. Approximate position—Lat. 50° 40' N., long. 101° 20' W.; east of Assiniboine river.

Q. How deep does frost penetrate the ground, and how is depth affected by greater or less quantity of snow on ground?

A. On May 20th last year, 1886, frost was found whilst digging a cellar 5 feet below surface. High ground near a prairie. In June 1883, whilst digging a cellar of the Binscarth company's store, frost was met with at a depth of 9 feet.

On 20th April last year (1886) we drove fence-posts 2 feet into ground without touching frost.

Cannot say exactly how far depth of snow affects penetration of frost, but our creek got frozen to the bottom this winter (1886-7) for want of a good supply of snow on first ice, therefore suppose that want of snow on ground would facilitate the deeper penetration of frost.

Dr. Rae adds here:—"From my own knowledge, the bottom of pools which have been in winter frozen to the bottom, remain solid ice for a long time after much of the ice is thawed out of the land not covered by water.

Q. Have you heard of or seen any frost in ground in autumn? If so, how far down in the earth has it been?

A. Never heard of any of the old stock of ice remaining so long.

Q. At what time of the year does the ground become quite free from frost?

A. If you mean for farming operations, ploughing can generally be got at between the 10th and 15th April.

Q. How far have you usually, in your district, to dig for water?

A. Everything depends upon the locality. When shale is known to be under ground, water is sure to be got when it is reached, and good water too; seams of shale vary as to their depth. Wells range from 9 to 200 feet in depth. A well of the latter depth (200 feet) has just been dug at Birtle (March 1887) on the Manitoba and N.W. Railway, through *all clay*, but is on the high banks of the Birdtail river or creek, where a person would expect to have to go deep. At Binscarth Station the well is 84 feet deep through clay; this is also near the banks of a creek. My well is now 61 feet, also on the bank, with the creek 64 feet below. We struck a very slight spring at this depth, which gives us only about six inches of water, through a hard clay. We intend going down until a good spring is reached, which we expect to find below the level of the creek, *at least*. So much for the deep wells.

I know lots of wells about here from 9 to 40 feet. I think one may say the average is 30 feet.

There is never much difficulty in getting water at a reasonable depth on the ordinary level prairie *about here*. During the summer of 1883 we used water from a well not over six feet deep, but that was not a dry year.

Q. Do you know any explanation of the working of the willow in finding springs?

A. Both the openings of the well of Birtle and Binscarth were found by this method, and a number of others.

This evidence that Rhabdomancy has sincere believers in the Canadian prairies is not without curiosity.

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## PROCEEDINGS OF FOREIGN SOCIETIES.

**Geographical Society of Paris.**—November 4th, 1887: M. HAMY, Vice-President, in the Chair.—This was the first meeting of the Society after the vacation. The General Secretary announced the death of Captain Verzeaux, a promising young officer, who formed part of Rouvier's expedition to West Africa, and had special charge of the topographical work.—The Geographical Society of Lisbon intimated the death of its President, M. Antonio Augusto d'Aguiar.—The programme of the questions to be submitted to the Congress of learned Societies next year was forwarded by the Minister of Public Instruction.—Two letters were read announcing new expeditions—one from Dr. Colin, stating that he was on the point of starting for the Soudan; and the other from Dr. A. de Beausset in Chicago, intimating his intended departure on June 10th from New York on a journey of exploration in the Arctic regions.—The Minister of Foreign Affairs transmitted a collection of photographic views and a pamphlet, which had been forwarded to M. Rouvier, French Minister at Buenos Ayres, by M. J. Popper, with reference to his travels in Tierra del Fuego.—Some correspondence was received with regard to the work being done by Frenchmen in Tongking. Lieutenant de Fésigny was engaged in studying the navigation of the rapids of the Mekong, and the question of fluvial communication in Laos. Under his direction M. N. Pardoux with a party had successfully

reached the Kong rapids (Upper Mekong); on arriving at Stung-Treng, they met with a very cold reception from the Siamese general, the Khul, who refused them a pilot, but allowed them to proceed. They had great difficulty in further pursuing their voyage up stream to the village of Cosdam, in sight of the first falls of Khon. Some of the party were left to explore the rapids, while De Fésigny and Pardoux returned to Krattié. There is little trade at present in this region, owing to want of proper communication. The writer considers Khon and Stung-Treng to be the keys of all the commerce of Central and Eastern Indo-China.—An extract from a report by Dr. Verneau on the ancient peoples of the Canary Islands was read.—Dr. Rouire requested the insertion in the 'Compte Rendu' of a memoir relative to the lagoons on the shores of the Gulf of Hammamet (Tunis).—A letter, dated August 10th, 1887, from Loango, was received from M. J. Cholet, governor of the Niari district, announcing the sudden death of Captain Pleigneur through the capsizing of his canoe. Captain Pleigneur had done good work in completing our knowledge of this district by his surveys, and was engaged in preparing a detailed map of the Kulu-Niari region.—A communication was read from M. A. Bardey on the question of M. Henry's project for opening a new route to Harar by way of the Gadi Bursi. The same correspondent also wrote that he had just received a letter from M. A. Rimbaud, giving particulars of his route from Shoa viâ Harar to Zeila, and a description of the country.—Letters were received from M. H. Coudreau, announcing his arrival at Saint-Laurent on the Maroni (Guiana), whence he intended, in company with Apatou, the companion of Crevaux, making a thirty days' canoe-voyage to the Roucouyenne Indians, on the north slope of the Tumuc-Humac Range, about 2° 30' N. and 46° W.; he would then travel across the mountainous country from village to village.—An interesting manuscript with map was received from M. Olivier Ordinaire, the French Vice-Consul at Tarragona, containing notes on his journey from Lima to Iquitos (Peru), along the river Palcazu. This memoir will be inserted in the Quarterly Bulletin.—The Minister of Public Instruction announced the receipt of a letter dated June 12th, from M. Thouar, on his explorations in Bolivia. He had been shut up in Chaco since January, all means of communication having been closed; he was then marching to Paraguay.—The Chairman intimated that M. Custodio de Borja, late governor of Portuguese Guinea, was present at the meeting, and welcomed him. M. de Borja briefly replied. The Chairman also noticed in a few well-selected terms the presence of M. Ballay, Governor of Gabon, Dr. Paul Neis, M. E. Cotteau, who had returned from his short journey to the Amu Daria, and M. Chaffanjon, also returned from the Orinoco. M. Hamy said that a special meeting would be held in the Sorbonne Hall on November 22nd, to receive M. Chaffanjon, and another meeting in the same hall at an early date to welcome MM. Capus and Bonvalot. He concluded by announcing that, thanks to the efforts of the commanders in Upper Senegal, notably of Lieut.-Col. Gallieni, a French gun-boat had got up the Niger as far as Kabara, the port of Timbaktu.—In conclusion Dr. Labonne gave an account of his second journey to Iceland in discharge of the mission with which he had been entrusted by the Minister of Public Instruction.

**Geographical Society of Berlin.**—November 5th, 1887: Herr W. REISS in the Chair.—Professor Bastian welcomed Lieut. Wissmann on his return from his second journey across the African continent, and in the course of his remarks pointed out that highly important results accrued to science when explorers, who visited as the first Europeans a region previously quite unknown, made their ethnographical collections at once, because experience had taught us that the briefest contact with civilisation was sufficient to introduce the germ of death into the aboriginal conceptions of the native peoples. This authorised demand on the part of ethnology many travellers had disregarded, and for this they could hardly be

blamed, where they had had to struggle hard with the necessities of the moment. Wissmann, Kund, and Tappenbeck had laid ethnology under the greatest obligation, because they had brought home rich ethnographical collections from tribes formerly unknown; moreover, they had in consequence imposed upon themselves many personal privations in order to spare the necessary porters for the transport of the collections.—Lieut. Wissmann then gave a general report upon his travels in the South Congo basin, from the end of 1883 to the middle of 1887. He commenced with a very brief sketch of the first part of his journeyings, which consisted of the first voyage up the Kassai. He then gave an outline of the second part of his travels, viz. the journey of 1886 made after a short stay in the island of Madeira. By his last journey up the Kassai he has determined that the Kwango is the largest tributary of the Kassai. In  $3^{\circ} 41'$  S. lat. and  $18^{\circ} 40'$  long. (E. of Greenwich) he found the place where Lieut. Kund had crossed the river; this point had not been astronomically determined by the latter. The Sankuru has only half the volume of water possessed by the Kassai above the confluence of the two rivers, so that those who would designate the whole river system with the name of Sankuru are wrong. The great forward march of Wissmann into the unknown territory to the north of the Sankuru and the Lomani was commenced from Luluaburg with a caravan of about 1000 men. Sangula Meta, the sister of the Bashilange chief Kalamba, again joined the party, she having already accompanied the first expedition to Nyangwe. A lengthened stay was made on the Lubi, where punishment was inflicted on the powerful tribe of the Bena Ngonga, who had attacked and plundered Pogge on his return from the Lualaba in 1882. After this, the Sankuru was crossed at a point below its confluence with the Lubi; the party then entered the region of the mighty virgin forests. From the 15th to the 27th December, 1886, this extremely wearisome and painful march lasted. The woods are sparsely peopled by the savage Batetela and Batua, and the large caravan was unable to find sufficient food. Even elephants are not met with in these forests, where a gloomy silence reigns supreme. The Batua are, on an average, about  $4\frac{1}{2}$  feet in height, and are timid and shy. The Batetela are, like wild beasts, suspicious, and may be compared to savage dogs. The want of provisions compelled Wissmann to give up the march to the north-north-east, and to turn his steps to the south. He thus had to pass through the territory of the marauding Ben Mona, and this was only accomplished by the employment of force. From the 28th December, 1886, to the 23rd January, 1887, the caravan marched through the region of the gigantic villages met with on the first journey. Now the district was completely depopulated. War and small-pox had entirely devastated the country. The want of food was so great that Wissmann lost eighty men from hunger and small-pox on the journey from the Sankuru to Nyangwe. In the latter place he found conditions also very much changed in consequence of the events at Stanley Falls. The bearing of the Arabs towards the traveller was decidedly hostile. In view of the disorganisation of his caravan from hunger and sickness, Wissmann found himself compelled to abandon his intention both of travelling up the upper Lualaba and of proceeding to Muta Nzige. He therefore despatched his Bashilanges with his colleague Lieut. Le Marinell back to Luluaburg, while he himself set out on the route to the east coast, viâ Tanganyika, Lake Nyassa, and down the Zambesi (Lenz's route). It is not at present known whether Le Marinell has reached Luluaburg, no news having arrived. In the region between the Lomani and the Sankuru the conditions of trade have completely altered since 1884. Now glass beads, arms, and powder form the chief articles of barter, having replaced the earlier cowry shells. The former are supplied by the Bihé caravans in exchange with the Bassonge for slaves, which they then exchange with the Bakuba for ivory. The Bakuba buy the women slaves for their households, but the men for victims at their funeral solemnities.

## NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

## EUROPE.

**Aurich, H. [von].**—Historischer Ueberblick über die Kolonisation des Schwarzmeer-Küstengebiet des Kaukasus. 'Russische Revue,' xvi. Jahrgang. 2 Heft. 1887.

[**Europe.**]—Europäische Wanderbilder. Illustrated Europe. Zürich, Orell Füssli & Co.; London, C. Smith & Son. Price 6*d.* each number. [Presented by Messrs. Orell Füssli & Co.]

There are about 130 of these extremely handy, carefully compiled, and profusely and beautifully illustrated handbooks. As will be seen by the titles of those which Messrs. Orell Füssli & Co. have been good enough to send us, each relates to a very limited district, and as the average size is only about thirty pages, they are easily carried about. As will be seen from the titles, many of them have been translated into English, and we believe there are translations of several of them of which we have only the German editions. The following are the titles of those which have been sent us:—

- No. 1. The Arth-Rigi Railway.—No. 2. Die Uetliberg-Bahn. Von J. J. Binder. Zweite Auflage.—No. 3. The Vitznau-Rigi-Rail.—No. 5. Der Wallfahrtsort Einsiedeln.—No. 9. Zurich and its Environs.—No. 10. Constance and its Environs.—No. 11. Nyon and its Environs. By Aug. Testuz.—No. 12. Thuisis. By A. Rumpf.—No. 13. Lucerne and its Environs.—No. 14. Das Töstal. Von Dr. G. Geiffus.—No. 14. Florence. By S. H. M. Byers.—Nos. 15, 16. Milan. By J. Hardmeyer.—No. 17. Schaffhausen and the Falls of the Rhine.—No. 18. Ragaz-Pfäfers.—No. 19. Vevey, its Environs and Climate. By Alf. Ceresole.—No. 20. The Baths of Kreuth (Bad Kreuth) in the Bavarian Alps.—No. 21. Davos.—No. 22. The Baths of Reinerz. By P. Dengler.—No. 23. The Gruyère: The new mountain road from Vevey to Interlaken. By Bulle-Boltigen.—Nos. 24, 25, 26. The St. Gothard Railway.—No. 25. Eisenerz in der obern Steiermark. Von Johann Krainz.—Nos. 27, 28. Freiburg (Baden) and its Environs. By L. Neumann.—No. 28. Pyrmont. Illustriert und beschrieben von Robert Geissler.—No. 29. Villach in Kärnten und seine Umgebung. Von Heinrich Noé.—Nos. 29, 30. Gürbersdorf. Dr. Brehmer's Sanatorium for Consumptives. By R. Ortman.—Nos. 31, 32. Chaux-de-Fonds, Locle, Bregets, and their Environs.—No. 33. From Froburg to Waldenburg: An excursion among the mountains of Soleure and Basle.—Nos. 34, 35. The Bürgenstock (Lake of Lucerne). By Dr. W. Cubasch.—Nos. 36, 37. Neuchâtel and its Environs. By A. Bachelin.—Nos. 38, 39. Bad Krankenheil-Tölz im bayerischen Hochlande. Von Gustav Schaefer.—Nos. 38, 39. Battaglia, near Padua. By Edward Mautner.—Nos. 40, 41. Coire and its Environs. By Dr. E. Killias.—Nos. 42, 43. Das Vorchristliche Rom. Von Dr. O. Henne-Amrhyn.—Nos. 42, 43, 44. The line through Carynthia and the Pusterthal. By Dr. Henry Noé.—Nos. 44, 45, 46. Ajaccio als Winterkurort und die Insel Corsica. Von Rud. Gerber.—Nos. 45, 46, 47. From Germany to Italy. The Brenner Railway from the River Inn to Lake Garda. By Dr. Henry Noé.—Nos. 47, 48. Augsburg. Von Adolf Buff.—Nos. 48, 49, 50. From the Danube to the Adriatic: Vienna, Semmering, Jesie, Abbazia. By Dr. Henry Noé.—Nos. 49, 50. Bonn und seine Umgebung. Von Ludwig Lorbach.—Nos. 51, 52. Graz.—Nos. 53, 54. From Paris to Berne via Dijon and Pontarlier.—Nos. 55, 56. The Lake of Lucerne. By J. Hardmeyer.—No. 57. The Bergstrasse from Jungenheim to Auerbach. By Ernst Pasqué.—Nos. 58, 59. Aix-les-Bains and its Environs. By V. Barbier.—Nos. 60, 61. Heidelberg. By Carl Pfaff.—Nos. 62, 63, 64. Budapest. By Edmund Steinacker.—No. 65. Montreux (Lake of Geneva). From the French of Alfred Ceresole.—Nos. 66, 67, 68. Locarno and its Valleys. By J. Hardmeyer.—Nos. 69, 70, 71, 72. Canton Glarus and the Lake of Walenstadt. By Ernst Buss.—Nos. 71, 72. Durch den Arlberg. Von Ludwig von Hörmann.—Nos. 73, 74, 75, 76. From Paris to Milan via Mont Cenis (Fréjus). By V. Barbier.—Nos. 77, 78, 79. The Black Forest Railway (Grand-luchy of Baden). By J. Hardmeyer.—Nos. 77, 78, 79, 80. Konstantinopel und Umgebung. Von P. Leonhardt.—Nos. 81, 82. Wallis und Chamonix: Von der Furka bis Brig. Von F. O. Wolf.—No. 83. Bad Driburg: Aus dem Tagebuche eines Hypochonders. Von Dr. Theodor Riefenstahl.—Nos. 94, 95. Wallis und Chamonix. II. Heft. Brig und der Simplon. Von F. O. Wolf.—Nos. 99, 100, 101, 102. Wallis und Chamonix. III. Heft. Die Visperthäuser. Von F. O. Wolf.—Nos. 103, 104. Murten. Von Dr. F. Stock.—Nos. 105, 106, 107. Wallis und Chamonix. IV. Heft. Lütchen und Leukerbad. Von F. O. Wolf.—Nos. 108, 109, 110. Wallis und Chamonix. V. Heft. Die Thäler von Turman und Eifisch. Von F. O. Wolf.—Nos. 114, 115, 116. Lugano und die Verbindungslinie zwischen den drei oberitalienischen See'n. Von J. Hardmeyer.—Nos. 121, 122. Bad Cudowa (Provinz Schlesien): Einzige Arsen-Eisenquelle Deutschlands. Herausgegeben und bearbeitet von F. L. Martreb.—Nos. 123, 124. Die Hüllenthalbahn. Von Siegfried Bodenheimer.—No. 125. Friedrichshafen am Bodensee.

**Freshfield, D. W.**—A Skeleton Diary of Six Weeks' Travel in the Central Caucasus, in 1887. 'Alpine Journal,' November, 1887.

In Mr. Freshfield's notes, as well as in the numerous views and panoramas that accompany them, the geographer, as well as the Alpinist, will find much to interest him.



*Izvestija Imperatorskago Russkago geographicheskago obschestva.* Proceedings of the Imperial Russian Geographical Society, vol. xxiii. fasc. 3 : St. Petersburg, 1887.

This number contains an anthropological excursion across Asia Minor, by A. V. Eliséief; preliminary report on an expedition to Kan-suh by G. N. Potanin, with appendices: (1) Letter of M. M. Berezovsky; (2) Halting-places of the expedition and positions astronomically determined by Skassi; the Manytch and contiguous steppes of the Caucasus, by D. L. Ivanof; a contribution to the natural history of the northern Caucasus, by V. A. Fausek, with appendices including a note on the herbarium of Messrs. Ivanof and Fausek collected in the government of Stavropol; an explanation of the map of Prejevalsky's fourth journey into Central Asia, together with a list of barometrical heights determined by him. An English version of this map is published in our May 'Proceedings' for this year.

*Zapiski Imperatorskago Russkago geographicheskago obschestva.* Memoirs of the Imperial Russian Geographical Society, Section of General Geography, vol. xv. No. 3, pp. 48 : St. Petersburg, 1886.

On the results of a survey of Lake Baikal, by F. D. Chersky. The author thus sums up his article:—"Repeating the concluding words of my report for 1879, I will say once more that the Baikal is not a rift in the Jurassic deposits, nor a subsidence, nor the result of plutonic and volcanic disturbances. Known to have existed at the period of the desiccation of a pre-Silurian ocean, it has been formed by slow and gradual changes which have been acting from that time to the present, every minute adding something new to the peculiarities of its basin."

The same series (vol. xvi. No. 2, pp. 69, St. Petersburg, 1886) contains a physico-geographical description of the south-eastern part of the government of Olonets by the late J. J. Poliakof. The facts collected lead to conclusions adverse to the theory maintained by eminent geologists, and especially by M. Inostrantsef, that the White Sea and the Baltic were united in the Post-tertiary epoch.

*Zapiski, &c.,* Section of Ethnography, vol. xiv. No. 2, pp. 218, 1 plate : St. Petersburg, 1886.

Contains a treatise on the Votiaks of Sosnofsky, by Count Verestchagin. Sosnofsky is in the eastern part of the district of Sarapul in the government of Viatka, its chief village Sosnofka being about 40 miles from the river Kama. It is here that the Votiaks are mainly congregated, and have preserved relics of their heathenish practices. According to tradition they came hither from beyond the Kama to escape persecution by the authorities.

The same series (vol. xv. No. 7, pp. 57, St. Petersburg, 1886) contains a journey in north-eastern Persia, and the trans-Caspian region by A. M. Nikolsky. At the conclusion of his article the author gives a list of animals and plants of Azerbaijan, Fars and Turkomania with their native equivalents.—[E.D.M.]

#### ASIA.

**Forbes, Anna.**—*Insulinde: Experiences of a Naturalist's Wife in the Eastern Archipelago.* Edinburgh, Blackwood, 1887: 8vo., pp. xii. and 305. Price 8s. 6d. [Presented by the Publishers.]

Mrs. Forbes is the wife of the well-known naturalist and traveller, Mr. H. O. Forbes. She accompanied him during much of his wanderings in the Eastern Archipelago, and, as we know from Mr. Forbes' narrative, lived alone for some time among the hills of Timor. In this volume she has written a charming account of her experiences. She is an excellent observer, and as she was interested in many other things besides her husband's work, her book may be taken as to some extent supplementary to his. Her minute descriptions of the manners of whites and natives in these eastern colonies are such as only an observant woman could write, and they will be, to a large extent, new to many. She touches just on those points that many people desire to get information about, but cannot find it.

**Marche, Alfred.**—Luçon et Palaouan. Six Années de Voyages aux Philippines. Paris, Hachette, 1887: 8vo., pp. vi. and 406. Price 4 francs. [Presented by the Publisher.]

M. Marche is already known as a traveller in West Africa. The present volume gives some of the results of a scientific mission with which he was entrusted by the Minister of Public Instruction, and which kept him about the Indian Archipelago from 1879 to 1885. Besides the Malay Peninsula, M. Marche made excursions into various parts of the island of Luçon. After returning to Europe for a few months in 1882, he went out again, and devoted a considerable time to Palawan and the islands to the north-east, afterwards crossing over to Mindanao and the Sulu Archipelago. M. Marche seems to us a careful observer, and his work an important contribution to the geography, ethnology, and natural history of the region visited. There are numerous good illustrations and two small maps.

**Wilson, James Harrison.**—China: Travels and Investigations in the Middle Kingdom. A study of its civilisation and possibilities; with a glance at Japan. New York, D. Appleton & Co., 1887: cr. 8vo., pp. xx. and 376. [Presented by the Publishers.]

This volume gives a good general idea of the progress and present condition of things in China. The author visited the country more especially for the purpose of ascertaining the actual condition of affairs in respect to railroads and other modern improvements. He has much to tell us regarding the country and people. The following are a few of the subjects dealt with:—The Hoang-ho, or Yellow River, its inundations and embankments, and change of river-bed; the Yang-tse-Kiang, its navigation, tributaries, floods, &c.; the Chukiang or Pearl River; the Min; the Pei-ho and its tributaries; the Peh-tang; the New-chwang, and the Ta-wen-ho; the Grand Canal and its embankments, &c., &c. Besides visiting China and Japan, the author spent a week in Formosa, travelling over its northern end, examining its rivers and harbours, and studying its resources. There is a map of China illustrating the volume.

#### AFRICA.

**Anderson, Andrew A.**—Twenty-five Years in a Waggon in the Gold Regions of Africa. London, Chapman & Hall, 1887: two vols. 8vo. Vol. I., pp. x. and 307; Vol. II., pp. vi. and 253. Price 24s. [Presented by the Publisher.]

The leading results of Mr. Anderson's many years' journeyings in South Central Africa will be found in the 'Proceedings,' Vol. VI. (1884), p. 19, where also is given the map constructed from his observations. The present work is a rambling one, combining his own imperfectly-dated and loosely-recorded travelling experiences, with a large amount of information compiled from various sources on the countries embraced in this region. He says one object of his work is to instruct young readers and others in the physical geography of South Africa, the importance of which he rightly insists upon, as a basis both for the commercial and political development of the country. These volumes contain a fair amount of physical geography, and will be found useful on account of the general information they give on the various countries with which they deal. There is no map, no index, and a few extremely poor illustrations.

**Bayol [Dr.]**—Voyage en Sénégaubie. In 'Revue Maritime et Coloniale,' September–November 1887.

Dr. Bayol is Lieutenant-Governor of Senegal, and these 'Notes,' which are to be continued, give the results of his own experiences.

**Chavagnac, Maurice [De].**—De Fez à Oudjda. Bulletin, Paris Geographical Society, 3<sup>e</sup> Trimestre 1887.

Although the journey here described was made in 1881, still, as it deals with a region about which we know little, it is by no means out of date. It is accompanied by a good map.

No. XII.—DEC. 1887.]

**Crouch, Archer P.**—On a Surf-bound Coast; or, Cable-laying in the African Tropics. London, Sampson Low & Co., 1887: cr. 8vo., pp. xii. and 338. Price 7s. 6d. [Presented by the Publishers.]

Forms a portion of a diary kept during a cable-laying expedition down the West Coast of Africa, from the English settlement of Bathurst to the Portuguese town of St. Paul de Loanda. The present volume deals only with the first portion of the journey, down to the author's departure from Accra, which covers three only out of the six months occupied by the whole expedition. There is neither index nor map.

**Maurice, [Col.] J. F.**—Military History of the Campaign of 1882 in Egypt. Prepared in the Intelligence Branch of the War Office. London, Harrison & Sons, [1887]: 8vo., pp. vi. and 216. Price 7s. 6d. [Presented by the Intelligence Branch of the War Office.]

The value of this work is greatly increased by the number of maps, &c., which occupy a greater portion of the volume. These are:—Sketch of Formation for Attack on Tel el-Kebir. Map No. 1.—Sketch map of Lower Egypt, with plan of Cairo. No. 2.—Sketch map to illustrate the concentration on Ismailia from England, India, and the Mediterranean. No. 3.—Sketch of Country between Alexandria, Abukir, and Kafr ed-Dauar. No. 4.—Sketch of the Ramleh position. No. 5.—Sketch of the Tower Hill position at Ramleh. No. 6.—Plans of Ismailia:—(a) Previous to the disembarkation of the British Army. (b) Showing improvements effected subsequent to the disembarkation of the British Army. No. 7.—Map (in three sheets) showing country between Ismailia and Tel el-Kebir, viz.:—Sheet 1. Ismailia—Magfar. Sheet 2. Tel el-Maskhuta—Kassassin. Sheet 3. Tel el-Kebir—Aabasa Lock. No. 8.—Map (in four sheets), illustrating the action at Kassassin on the 9th September, 1882, and the Battle of Tel el-Kebir. No. 9.—Map showing Camps of British Troops on the Island of Bulak. No. 10.—Plan of the British Cemetery at Tel el-Kebir, with names of officers and men buried there.

**Messer [Dr.]**—Ueber seine in Gemeinschaft mit Rev. Grenfell unternommene Befahrung des Kuango bis zu den Kingundji-Schnellen. 'Verhandlungen der Gesellschaft für Erdkunde zu Berlin.' Band. xiv. No. 8. 1887.

This paper describes a journey made by Dr. Messer in company with Mr. Grenfell, on board the steamer *Peace*, up the river Quango in December 1886.

**Muller, Hendrik P. N.**—Een Bezoek aan de Delagoa-Baai en de Lijdenburgsche Gondvelden. Haarlem, H. D. Tjeenk Willink, 1887: 8vo., pp. 37, illustrations. [Presented by the Author.]

—Beknopt Verslag van de Voordracht over Oost-Afrika, gehouden door den Heer Hendrik P. N. Muller, naar aanleiding zijner Reizen in Afrika, op Maart 1887 in het Nederlandsch Aardrijkskundig Genootschap. Amsterdam, C. L. Brinkman: 8vo., pp. 7, map. [Presented by the Author.]

#### AMERICA.

**Brigham, William T.**—Guatemala, the Land of the Quetzal. London, Fisher Unwin, 1887: 8vo., pp. xv. and 453. Price 21s. [Presented by the Publisher.]

This is a welcome addition to our knowledge of a region about which we know comparatively so little. As Mr. Brigham points out, there are thousands of square miles of wholly unexplored territory between the low isthmus of Tehuantepec and the Lake of Nicaragua. Mr. Brigham has evidently considerable personal acquaintance both with Guatemala and the other Central American republics. He has drawn upon this as well as upon other sources in order to write a fairly complete and systematic account of the country; while, in the introductory chapter, he gives some useful notes on the neighbouring States,

in which, however, the statistics seem rather old. The author begins with a sketch of the old kingdom of Guatemala. He then in a series of chapters takes us around and across the country in various directions, beginning with the Atlantic Coast and its connections. He guides us across the continent westward to Coban, from Coban to Quezaltenango, and thence to the Pacific. One chapter is devoted to Guatemala city, and two others to the country between Guatemala and Quirigua by Esquipulas. Myth and history are dealt with in a chapter on the Olden Time, the Modern Republic in another chapter, while the two concluding chapters are devoted to vegetable and animal productions, and to earthquakes and volcanoes. In the last chapter the author gives a list of volcanoes in Central America, active and extinct, though he believes the list contains only a tithe of what exists. He also points out what a splendid field exists here for a young man with a strong constitution and a training in science. The book is enriched with numerous good illustrations, and contains five maps.

**Brinton, Daniel G.**—Were the Toltecs an Historic Nationality? Philadelphia, Maccalla & Co., 1887: 8vo., pp. 15. [Presented by the Author.]

Dr. Brinton maintains that the Toltecs are a myth.

**Buelna, Eustaquio.**—Peregrinacion de los Aztecas y nombres Geograficos Indigenos de Sinaloa. Mexico, 1887: sm. 8vo., pp. 140. [Presented by the Mexican Minister.]

**[New York and Pennsylvania Boundary.]**—Report of the Regents' Boundary Commission upon the New York and Pennsylvania Boundary, with the final report of Major H. W. Clarke, c.e., Surveyor for the Commission. Illustrated with numerous maps and sketches. Albany, Weed, Parsons & Co., 1886: 8vo., pp. 490.

**[United States.]**—Sixth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1884-5. Washington, 1885: imp. 8vo., pp. xxix. and 570. [Presented by the Director.]

Although this volume is dated 1885, it has only been quite recently issued. As usual with these reports, it abounds with the most beautiful illustrations and maps, many of which are quite as valuable for geographical as for geological purposes. The area surveyed and mapped during the year embraced in the Report, was 57,508 square miles, including Massachusetts, New Jersey, Appalachian region, Missouri-Kansas, Texas, Plateau region, Yellowstone Park, Northern California. In connection with the proposed new topographical survey of the States, the Director gives briefly the result of his investigations and experiments during four years, on methods of surveying and cartographic systems. The area of the States is so great, he points out, that economy is of prime importance. While the proposed map will be constructed primarily as a basis for geological work, the Director points out that it may be used for a great variety of purposes; that since the need for a topographical map is perennial, it should, once for all, be so constructed that the expense of frequent surveys shall be avoided. The map should be so simple that it may be used by all people of intelligence. The trigonometric work will only be sufficiently refined for map-making purposes. The hypsometric work is based on the railway levels of the country, which have been established with reasonable accuracy, and which form a regular network. The plan for the map contemplates sheets on three different scales, suited to the requirements of the various sections of the country, viz., 1:62,500, 1:125,000, and 1:250,000. The map is constructed in contours with vertical intervals of 10, 20, 50, 100 and 200 feet, varying with the scale of the map, and the magnitude of relief features. The map is to be engraved in sheets, of which the limit is to be the square degree. There are two sheets in the Report showing the various kinds of lettering to be used in the map, and the conventional signs which have been adopted for the various features, and which seem all clear and appropriate. Among the papers which accompany the Report, and which occupy the bulk of the volume, are several of special interest to the geographical student. Among them are Captain

Dutton's account of his survey of Mount Taylor and the Zuñi Plateau in New Mexico; Messrs. Chamberlain and Salisbury's preliminary paper on the driftless area of the Upper Mississippi Valley; and Professor N. S. Shaler's paper on the Sea-coast Swamps of the Eastern United States. Professor Shaler maintains that the development of the shore swamps of New England is intimately connected with the Glacial history of the district during the last Ice period. He therefore prefaces his account of these swamps with a brief statement concerning the effects of glacial action on New England territory. Captain Dutton, in his highly interesting paper on the Zuñi Plateau, points out that it is a mistake to infer from its name that it is a smooth and level region; it is one of the ruggedest portions of the West. The obstacles to travel are much greater than in the wilder parts of Colorado; but instead of mountains with sloping flanks, we find innumerable cliffs, often of great altitude and length, stretching across our pathway, or vanishing on either hand into the dim distance. For many leagues on either side of the Colorado river, the country is cut by numberless tortuous cañons, such as are never seen elsewhere. They are many hundreds of feet in depth, scores of miles in length, but their walls are precipitous in the extreme. While the illustrations are beautifully executed they are, we believe, absolutely true to nature, having been photographed on to the wood.

## OCEANIA.

**Finsch, [Dr.] O.**—Über Naturprodukte der Westlichen Südsee, besonders der Deutschen Schutzgebiete. Berlin, Verlag des Deutschen Kolonialvereins, 1887: 8vo., pp. 23.

**Guppy, H. B.**—The Solomon Islands and their Natives. Swan Sonnenschein & Co., 1887: 8vo., pp. xvi. and 384. Price 17. 5s. [Presented by the Publishers.]

— The Solomon Islands: their Geology, General Features, and Suitability for Colonisation. Same Publishers: 8vo., pp. vii. and 152. Price 10s. 6d. [Presented by the Publishers.]

These two volumes form one work, and should not have been divided. Mr. Guppy's name will be recognised as a frequent contributor to scientific journals during the past few years, written while in his cruise to the North Pacific as a naval surgeon on board the *Lark*. Mr. Guppy was appointed to his ship in 1881, partly on account of his natural history tastes. He took every opportunity during his long cruise of adding to the store of scientific knowledge, though we regret to learn that he had to undertake all his researches at his own expense, on the slender pay of a naval surgeon. The results, so far as the Solomon Islands are concerned, are contained in these two volumes, which deserve to rank with the best of the class to which they belong. He made himself quite at home in the islands, was received as a friend by the inhabitants, and had exceptional opportunities for acquiring detailed and accurate information. The first and larger volume deals with the anthropology, natural history, botany, and meteorology of the group, while the second volume is concerned mainly with the geology. Mr. Guppy does not adhere to any chronological narrative in describing the results of his observations. In his introductory chapter he gives a very graphic account of bush-walking in these islands, and the difficulties of exploring them thoroughly from this cause; difficulties, however, which he overcame with success. One half of the first volume is devoted to the ethnology of the islands, and treats of the natives in every possible aspect. As it records mainly the results of his own very careful observations, it is a valuable original contribution to a subject of much importance, besides being interesting reading. Mr. Guppy has done a great service to the history of discovery in translating and annotating the Journal of Gallego, to which so romantic an interest is attached. This forms one chapter of the first volume, which is followed by another chapter recounting the strange story of the disappearance of the islands from civilised ken for two centuries. To this chapter there is a useful geographical appendix. The remaining chapters of the volume deal with the natural history and the climate of the islands, the latter being pretty much what other tropical

climates are. The second volume is, in its way, quite equal in importance to the first. It deals with the geology of the group, and that in a very thorough manner. When he began work in this direction, in 1882, Mr. Guppy was influenced by the consideration that, since scarcely anything was known of the geological character of the large archipelagos of the Western Pacific, a knowledge of one group of islands might be in some measure extended to others. From this point of view the value of Mr. Guppy's observations is evident. They have a special interest in the fact that he maintains from his own investigations that Mr. John Murray's theory of coral reefs is much more consistent with the facts than Darwin's. In the first volume Mr. Guppy has some observations on the distribution of ocean depths in and around the Solomon group which are worth noting. After pointing out that the islands fall naturally into two great groups, those mainly volcanic and those mainly calcareous, and that the smaller volcanic islands divide into two classes—(1) Those partly composed of modern, and partly of ancient and often highly crystalline rocks; (2) those composed entirely or mainly of recently erupted rocks, sometimes exhibiting signs of activity—Mr. Guppy goes on to say that the large islands are often separated from each other by depths of several hundred fathoms. St. Christoval, for instance, is separated from the neighbouring islands of Guadalcanar and Malaita by straits in which casts of 200 fathoms fail to reach the bottom. On the other hand, the same 100-fathom line includes both Bougainville and Choiseul. It would appear, however, that depths of 400 fathoms commonly occur between the islands of the Solomon group. Although the soundings hitherto made in this portion of the Western Pacific go to show that this archipelago, together with New Ireland and New Britain, are included within the same 100-fathom line, which extends as a link from the adjacent borders of New Guinea, we can scarcely urge the fact, Mr. Guppy states, as evidence of a former land connection, seeing that one of the most interesting features in the geological history of the region is that of the enormous elevation which these islands have experienced in recent and probably sub-recent times. Mr. Guppy arrived at the conclusion that there had been a recent upheaval of at least 1500 feet, while the character of the deposits, according to Mr. Murray, indicate a far more extensive upheaval. Mr. H. B. Brady, indeed, states that the foraminifera of some of the Treasury Island rocks indicate depths of probably 1500 to 2000 fathoms. The volumes contain many illustrations and maps of some of the islands.

## GENERAL.

**Blackie, C.**—Geographical Etymology. A Dictionary of Place-Names, with an Introduction by John Stuart Blackie. London, John Murray: 8vo., pp. xxxix. and 243. Price 7s. [Presented by the Publisher.]

This carefully compiled dictionary ought to be of much service to teachers of geography who desire to add interest and thoroughness to their teaching. It is not so much a dictionary of place-names in the ordinary sense, as of the elements which go to the composition of such names in various parts of the world.

**Frazer, J. G.**—Totemism. Edinburgh, A. & C. Black, 1887: 8vo., pp. viii. and 96. Price 3s. 6d. [Presented by the Publisher.]

The basis of this little volume, Mr. Frazer tells us, was the collection of data for the article on the subject in the 'Encyclopædia Britannica.' In that article he could only use a selection of the great amount of material which he had collected. The subject of totemism is one which has the most intimate relations with the history of the development of society, and, therefore, Mr. Frazer has done excellent service in putting his carefully collected notes into accessible form, and accompanying them with the most copious references.

**Gambino, Giuseppe.**—Della Popolarità e Diffusione degli Studi Geografici. Pensieri e Suggestimenti ad Uso di chi Insegna e di chi Impara Geografia. Palermo, 1887: 8vo., pp. 100. [Presented by the Author.]

Signor Gambino is Professor of Geography at the Technical Institute of Palermo. In this brochure he gives some useful hints as to the teaching of

elementary geography, and the means of popularising the subject. He describes a Cosmograph of his own invention, intended to demonstrate the relations which subsist between the sun and the earth. A specimen of the Cosmograph Professor Gambino has presented to the Society's educational collection.

**Howorth, Henry H. [M.P.]**—The Mammoth and the Flood; An attempt to confront the Theory of Uniformity with the Facts of Recent Geology. London, Sampson Low & Co., 1887: 8vo., pp. xxxii. and 464. Price 18s. [Presented by the Publisher.]

As may be inferred from the title-page, Mr. Howorth's evident purpose in this massive volume is to prove that cataclysmic action has had much to do with the development of the globe. The special point around which he piles his evidence is his contention for a universal deluge, which, among other things, must have suddenly overwhelmed the Siberian mammoths and buried them deep in the resulting mud. It is of course perfectly legitimate to assail any scientific theory; and we know that there are still several people who maintain that the doctrine of the rotundity of the earth and the Newtonian system of astronomy are "frauds." At the same time it may be admitted that Mr. Howorth has done service by running a tilt against uniformitarianism, as it may compel geologists to reconsider the evidence in the light of the knowledge that has been accumulated since Lyell's days. Uniformitarians need have no fear of the result of the process. In the meantime it might be well to define precisely what is meant by "uniformitarianism," about which very erroneous conceptions are prevalent. The great value of Mr. Howorth's work, in our estimate, is the vast store of facts which he has accumulated, not only relating to the mammoth and Siberia, but to the remains of great animals in all parts of the world, and to the traditions of a great flood which are prevalent everywhere. From this point of view even geographers may find a good deal in the volume that will prove suggestive.

**Marcel, G.**—Note sur une Carte Catalane de Dulceri antérieure à l'Atlas Catalan de 1375. Lue à la Société de Géographie de Paris dans sa séance du 7 janvier, 1887. Paris, Société de Géographie, 1887: 8vo., pp. 12. [Presented by the Author.]

**Palgrave, W. Gifford.**—Ulysses: or Scenes and Studies in many Lands. London, Macmillan & Co., 1887: 8vo., pp. 385. Price 12s. 6d. [Presented by the Publisher.]

Mr. Palgrave is well entitled to adopt as a motto for this volume of varied contents Horace's often-quoted line "Qui mores hominum multorum vidit, et urbes." He leads us here from Anatolia and Georgia to Egypt, across the Atlantic to the West Indies, and thence across the Pacific to the Philippines. Under the heading of Phra-Bat we have a disquisition on Buddhism and other religions; then, after a visit to Hong Kong and Japan, we once more cross to America to follow Mr. Palgrave from Montevideo to Paraguay, the whole being rounded off with "Alkamat's Love," a stirring story of Nejd. The volume, as might be expected, is entertaining reading, but at the same time there is much in it of geographical interest. From this point of view, the paper on Turkish Georgia, and even that on Upper Egypt and Thebes, are well worth reading. The chapter entitled "West Indian Memories" describes Mr. Palgrave's visit to the Boiling Lake of Dominica; another chapter deals with Malay life in the Philippines; others, with Hong Kong, Kioto, and the journey from Montevideo to Paraguay, already referred to.

**[Russia.]**—Handbook for Travellers in Russia, Poland, and Finland, including the Crimea, Caucasus, Siberia, and Central Asia. 4th edition. London, John Murray, 1888: 8vo., pp. viii. and 571. Price 18s.

A new edition of Mr. Murray's 'Russia' was much wanted. Mr. F. Michell has evidently taken great pains to bring the book up to date, and for the

more frequented routes, his guidance will no doubt be found trustworthy. The addition of special maps of the Crimea, and Caucasus, and Siberia, would have improved the book. The sections dealing with Finland and the Caucasus have been enlarged. The tendency of the time in the matter of guide-books is towards small handy volumes, dealing thoroughly with a particular and limited district—and to this the most conservative editors will sooner or later have to bow. In the case of the Caucasus, it would perhaps be premature to publish a special guide. Yet its incorporation in a volume which surveys mankind from Warsaw to Vladivostock is unfavourable to any adequate treatment. There are some routes which surely required mention, even in the very restricted space that could be available in this volume. Attention might have been more prominently called to the fact that the new railroad to Novorossisk will serve (and was already used this year by visitors to the Caucasian Baths) as part of a circular tour of the country in conjunction with the Dariel, the Trans-Caucasian Railway and the Black Sea steamers. Some routes across the western mountains—notably the Mamisson Pass—might be inserted. It is at last being made passable for carriages. Excursions to Suanetia and the base of Elbruz are now easy to horsemen, and a few hints as to how to make them would be useful. The existence of the great central group of peaks and glaciers midway between Kazbek and Elbruz should be indicated by more than a single allusion to one of its summits. There is an excellent hotel (H. de France) at Vladikafkaz, and at the post-stations on the Dariel road good food and fair beds are procurable.

Throughout the section it appears to be often assumed that the traveller will be unable to ride, and such a restriction of course makes any visit to the Caucasus sadly incomplete. The works of Dr. von Radde should be among those recommended to travellers, and a suggestion that his advice should be sought at Tiflis, where he resides as Director of the Museum, might have been of assistance to travellers desirous of seeing what cannot be seen from the post-roads—the natural beauties of the Caucasus.

**Thompson, Charles M.**—Manual of the Sextant, containing Instructions for its Use in determining Time, Latitude and Longitude, and the Variation of Compass. London, John Bumpus, 1887: 8vo., pp. xiii. and 110. [Presented by the Author.]

In the preface the author states that his aim in publishing this work is to enable any person, even though he be entirely unacquainted with astronomical observations, to obtain reliable determinations of latitude, longitude, &c.; and by the concise manner in which he explains the construction and use of the sextant, as well as by the examples of the manner in which the desired results are to be computed, he has certainly done much to clear away difficulties, and attain the end he has in view. It is, however, a fact that, without some instruction, there are but few persons who have become competent observers and computers, the exceptions generally being those who have had previous experience in the use of other surveying instruments, and the advantage of a mathematical education.

There is one remark of Mr. Thompson's, with regard to the late Captain George's artificial horizon, which we cannot pass unnoticed. The author says that he has known instances of errors of as much as  $7' 33''$  in latitude, caused by carelessly floating the glass disc on the mercury. This would suppose an error in the double altitude of no less than  $15' 6''$ , which, if it existed, would at once lead to the rejection by all practical observers of this form of artificial horizon; but that such errors ever exist is entirely contrary to our experience, after having used this instrument constantly for the past twelve years, in preference to the older form of roofed horizon, which Mr. Thompson recommends as being the more reliable form.

The arrangement of examples, &c., is very much the same as that followed in the Society's 'Hints to Travellers,' and the author may be congratulated on having produced a book which on the whole is likely to be of service to those travellers who will take the trouble to read carefully, and follow the directions it contains.—J. C.



**Veth, P. J.**—Ontdekkers en Onderzoekers; zevental levensschetsen, ter tweede verbeterde en vermeerderde uitgave bijeenverzameld, door P. J. Veth. Leiden, E. J. Brill, 1884: 8vo., pp. xi. and 343. [Presented by the Author.]

Consists of a series of biographical notices of—I. Philippus Baldaeus. II. Samuel van de Putte. III. Caspar George Carl Reinwardt. IV. Jan Frederik Gerrit Brumund. V. Taco Roorda. VI. Wolter Robert van Hoëvell. VII. Jan Karel Jakob de Jonge.

— Hendrik Adriaan van Reede tot Drakestein. 8vo. [1887], pp. 101. [Presented by the Author.]

**Wilson, [Col. Sir] C. W.**—Extracts from a Paper on the Utilisation of the Ordnance Survey Maps, with special reference to Local Administration and the Sale and Transfer of Land, read at the Meeting of the British Association at Manchester, 6th September, 1887, by Col. Sir C. W. Wilson, K.C.B., K.C.M.G., F.R.S., R.E., Director of the Ordnance Survey. 8vo., pp. 16.

## NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

### WORLD.

**Johnston, W. & A. K.**—Commercial Chart of the World on Mercator's Projection from the latest and best authorities, containing the position of every place of commercial importance, showing the principal currents of the ocean and the chief steam-packet routes. With enlarged maps of Central Europe, the principal British Possessions, the Suez Canal and Nile Delta, Isthmus of Panama, &c. Equatorial scale 5° to an inch. 4 sheets. Edinburgh and London, W. & A. K. Johnston, 1887.

It is now two years since the last edition of this excellent map was published, and in the present issue necessary corrections have been made. These, however, are but few in number, as great care had been taken in the production of the previous issue. Nearly every place of commercial importance has been laid down, and the names of insignificant places which are so often crowded into maps of this description, have been wisely omitted. For the purposes of general reference in the office or library this Chart of the World is quite equal to any published in England. It shows all means of communication by rail, steamer, and telegraph, the directions of ocean currents, the minimum depth of water on sandbanks, the depth of the sea in various positions, the distances in nautical miles of the routes followed by mail steamers, and much other matter of interest. Enlarged maps of Central Europe, the principal British Possessions, the Suez Canal and Nile Delta, and the Isthmus of Panama, are also given.

### EUROPE.

**Deutschen in Europa.**—Übersichtskarte der Verbreitung der —, für den deutschen Schulverein zusammengestellt von H. Kiepert. Berlin, Dietrich Reimer, 1887. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Price 2s. (*Dulau.*)

**England and Wales.**—Popular Map of —, 1887. Scale 1:700,000 or 9·5 geographical miles to an inch. Mason & Payne, London, E.C. Price 10s. 6d.

In this map all the railways and main roads have been carefully laid down, and the population of towns which in 1881 exceeded 5000, and from that number to 100,000 or above, are indicated in four series, by means of coloured lines drawn under the names of the places. In addition to this the boundary of the Metropolitan Board of Works is laid down, and a table is given, compiled from

the census of 1881, showing the populations, areas, gross rental, poor-rate, and number of paupers in each county of England and Wales. The map is clearly drawn, and the lettering is distinct.

**Murg.**—Touristen-Karte vom oberen Murg- und Renththalgebiet, 1:50,000 or 1·4 inches to a geographical mile. Von A. Wälde. Reutlingen. Price 2s. (*Dulau.*)

**Scandinavien.**—Politische Wandkarte von —. Scale 1:1,500,000 or 20·4 geographical miles to an inch. Richard Kiepert's Schul-Wand-Atlas der Länder Europa's. Achtezehnte Lieferung. Berlin, Dietrich Reimer, 1887. Price 9s. (*Dulau.*)

**Südost-Europa.**—Karte von —, die Staaten der Balkan-Halbinsel, sammt Theilen v. Oesterreich-Ungarn bis Budapest u. Wien und den übrigen angrenzenden Ländern. Redigirt u. beschrieben v. A. Steinhauser, k. k. Regierungsrath. Verlag von Artaria und Comp. in Wien, 1887. Scale 1:2,000,000 or 27 geographical miles to an inch. Price 4s. 6d. (*Dulau.*)

### ORDNANCE SURVEY MAPS.

Publications issued during the month of October 1887.

#### 1-inch—General Maps:—

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## ASIA.

**Asien.**—Wandkarte von —. Scale 1:6,700,000 or 90·4 geographical miles to an inch. *Physikalische Ausgabe* von Karl Bamberg. 16 sheets. Berlin, Clinx. Price 15s. (*Dulau.*)

## AFRICA.

**Abyssinia, &c.**—Rore (Altipiani), Habab, Asghedè, Bogos ed Abissinia Setten-trionale. Carta Provvisoria costrutta dal Cap. Manfredo Camperio e disegnata dall' Ing. U. Ugolini secondo le ultime carte pubblicate delle "Geogr<sup>ica</sup> Mitteilungen" di Gotha ed i rilievi degli S. M<sup>te</sup> Inglese ed Italiano ed altri dati originali, Settembre 1887. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Istit. Cartog. Ital. L. Rolla, Roma. (*Dulau.*)

**Afrika.**—Neue Handkarte von —. Scale 1:30,000,000 or 411 geographical miles to an inch. Mit vier Kartons: Kamerun, Süd-Afrika, Nilländer, Ost-Afrika. H. Kiepert's Kleiner Hand-Atlas, No. 13. Gezeichnet von Richard Kiepert. Berlin, D. Reimer. Price 1s. (*Dulau.*)

— Special-Karte von — im Massstab von 1:4,000,000 or 55·5 geographical miles to an inch. (10 Blatt.) Entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. Zweite Auflage. IV. Lieferung. Inhalt: Sektion Central-Sudan (5) nebst Bemerkungen von H. Habenicht. Sektion Delagoa-Bai (10) nebst Bemerkungen von Dr. R. Lüddecke. V. (Schluss-) Lieferung. Inhalt: Sektion West-Sahara (1) nebst Bemerkungen von B. Domann. Sektion Ägypten (3) nebst Bemerkungen von H. Habenicht. Gotha, Justus Perthes, 1887. Price 3s. each part. (*Dulau.*)

With the issue of these two numbers the second edition of this map is completed. Among the most important corrections and alterations which have taken place are the following:—On sheet 1 the western boundary of Algeria, which was shown as definitely fixed on the previous edition, is now marked as approximate only, the boundary of Morocco is extended farther south, new steamer lines are laid down, and the routes in the Sahara have been in some instances changed. The interior boundary of the French possessions is shown, and more detail in the Western Sahara given. On sheet 5 the British Niger Company's territory is shown as extending farther up the river Binuè; alterations have also been made in the German boundaries in the Cameroon district. The surveys of M. G. de Brazza and Mr. Grenfell are laid down, Dr. Junker's work is shown, and several corrections have been made in the region north of the Congo. Two additional inset maps of Reunion and Mauritius are given on sheet 10, and new work is shown south of the Zambesi. The boundaries of the New Republic are given, and those of Zulu-Land have been altered.

The above are only some of the numerous corrections which have been made, and the map as it now appears is without doubt the best general map of Africa that has ever been published.

## AMERICA.

**Canada.**—Map of the Dominion of —, corrected to January 1887. Scale 1:6,200,000 or 85 geographical miles to an inch. Department of the Interior. E. Deville, Surveyor General, Dominion Lands Lithographic Office, Ottawa.

**United States.**—Map of the Western —. Scale 1:2,900,000 or 39·7 geographical miles to an inch. Mason & Payne, London, E.C., 1887. Price 10s. 6d.

This map includes parts of Alabama, Indiana, Michigan, and all the States and territories west of them. The railways appear to have been laid down with care, and all county boundaries are given.

## CHARTS.

**United States Charts.**—No. 1016. West Coast of Central America. San Juan del Sur to Judas Point, 1887.—Pilot Chart of the North Atlantic Ocean, November 1887. U.S. Hydrographic Office, Washington, D.C. Commander J. R. Bartlett, U.S.N., Hydrographer to the Bureau of Navigation.

## ATLASES.

**Bengal, Bay of.**—Charts of the —, and adjacent sea north of the Equator, showing the Mean Pressure, Winds and Currents, in each month of the year. Published by order of His Excellency the Viceroy and Governor-General of India in Council by the Meteorological Department of the Government of India.

This atlas contains a set of charts, exhibiting the meteorological conditions in the Bay of Bengal for every month in the year. The data from which they have been compiled are the marine observations recorded over the Bay of Bengal between the years 1855 and 1878, which were supplied by the London Meteorological Office to the Meteorological Department of India, and were prepared for publication by Mr. W. L. Dallas. The methods adopted by the London Meteorological Office in discussing corresponding data for the seas adjacent to the Cape of Good Hope, have in general been followed in these charts, the distribution of pressure has, however, in this atlas been shown by isobars, instead of curves of "relative frequency" as given on the Cape charts, and the observations have been corrected to the mean of the day. The direction and frequency of the winds are shown by wind-roses, Roman figures indicate the percentage of gales, as compared with the total number of winds from all points of the compass, the space to which each wind-rose refers is enclosed by thick rectangular lines, and the number of observations on which the wind-rose is founded is shown by figures within the fiducial circle.

Small black arrows show the actual observations of those marine currents which amounted to 15 miles and upwards in twenty-four hours. The arrows indicate the directions in which the currents flow, the length of each arrow showing the rate of the movement, according to the scale given. A page of explanatory and statistical letterpress accompanies each chart.

— Charts of the —, and adjacent sea north of the Equator, showing the Specific Gravity, Temperature and Currents of the Sea Surface. Published by order of His Excellency the Viceroy and Governor-General of India and Council, by the Meteorological Department of the Government of India. Price 3s. 4d.

This is a supplement to, and covers the same area as the series of barometric wind and current charts. They are four in number and represent: (1) The mean specific gravity of the sea-water; (2) The mean temperature of the sea-surface; (3) The general resultant direction of all current observations; they are divided into rectangular areas of two degrees of latitude, and two degrees of longitude.

**Oesterreich-Ungarn.**—Physikalisch-Statistischer Hand-Atlas von —, in 24 Karten mit erläuterndem Text, unter Mitwirkung von Vincenz v. Haardt, Prof. Dr. Anton Kerner Ritter v. Marilaun, Ministerialrath Dr. J. Lorenz Ritter v. Liburnau, Dr. Franz Ritter v. Le Monnier, General-Major Carl Sonklar v. Instätten, Prof. Dr. Franz Toula, herausgegeben von Dr. Josef Chavanne und ausgeführt in Eduard Hölzel's Geographischem Institute. VIII. Lieferung. Inhalt: Nr. 7. Die Vertheilung der Hagelfälle (mit 3 Cartons zu Karte Nr. 18, 20, 23). Nr. 14. Florenkarte. Nr. 17b. Abgrenzung und Eintheilung der Militär-Territorial-Bezirke, nach dem Stande vom Januar 1883 (als Ergänzung zu Karte Nr. 17 gratis). Nr. 19. Karte der Dichtigkeit der Bevölkerung. Wien, Eduard Hölzel, 1887. Price 7s. (*Dulau*.)

This is the concluding issue of the Austro-Hungarian Statistical and Physical Hand Atlas. It contains seven maps and explanatory letterpress. On the

first sheet four supplementary maps are given, showing the numbers of townships to the square mile, the distribution of swine, the frequency of hail-storms, and the state of education; from this latter it will be seen that a very large proportion of the population can neither read nor write. The next is a botanical map of the Empire on which is shown the distribution of flora. The two remaining maps have reference to the military districts, and density of population.

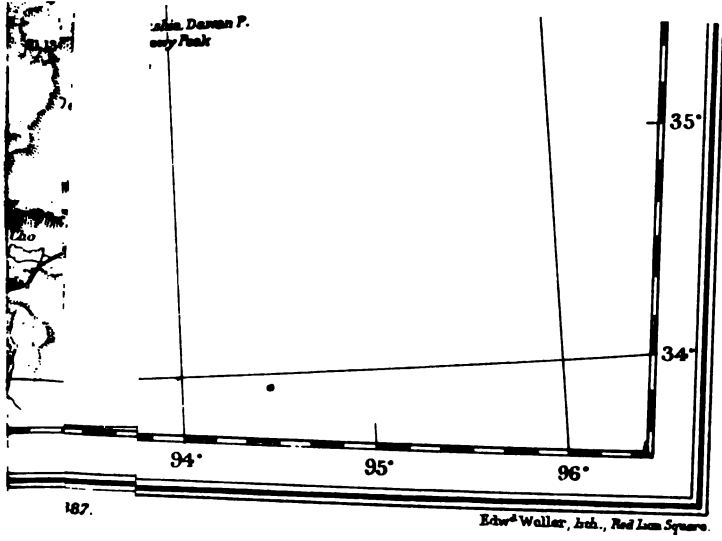
**Peru.**—Nuevo Atlas Geografico del ——. Dedicado á la Juventud Perruana. Obra posthuma del Dr. Mariano Felipe Paz Soldan. 1887. Lima, Libreria Francesa Cientifica J. Galland, Calle de Palacio 24.

This atlas is the work of a son of that well-known geographer, the late Sr. Dr. Don Mariano Felipe Paz Soldan, to whom we are indebted for the large atlas of Peru, which previously has been the only reliable work to which reference could be made by those who wished to enquire into the details of the geography of many parts of the Republic. In the present atlas many corrections and alterations will be found, as the author has had at his disposal the results of explorations and route surveys which did not exist when his father was engaged in the production of his atlas. In addition to the maps of each department, a general map of Peru, statistics with reference to the railways, and a list of the principal towns, &c., are given. There is much contained in this atlas which is highly interesting, and it forms a valuable addition to the Map Room collection.

**Statistical Atlas of Commercial Geography.**—The ——, by E. J. Hastings. W. & A. K. Johnston, Edinburgh and London.

This atlas contains a series of diagrams illustrating the principal facts in connection with the commerce of the United Kingdom and its dependencies, and also of other leading countries. The plan on which the diagrams are constructed is at once simple and effective. The approximate amount of exports, imports, &c., being represented by squares, the value or quantity of each is stated on every sheet, and in this manner any person can see at a glance what are the principal products and resources of each country, and will also be able to form a very accurate estimate on the important question of supply and demand. The statistics on which the diagrams are based have been compiled by Miss Hastings from Parliamentary and official returns. Those referring more immediately to the United Kingdom are chiefly for the year 1886, but the mineral statistics and those referring to the colonies and foreign countries have been given for 1885, no returns on the subject being available for a later date.

The need of such an atlas as this has been much felt, and the convenient form in which it has been published will also greatly add to its value.





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