THE SCOTTISH GEOGRAPHICAL MAGAZINE.

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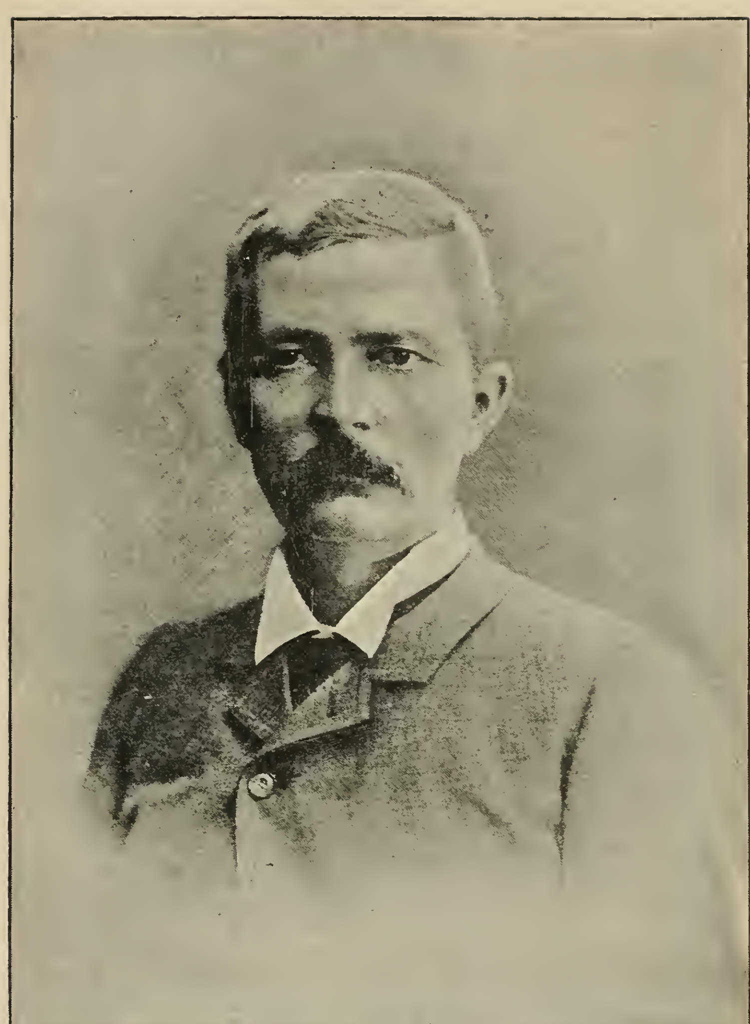

Henry M. Stanley

THE SCOTTISH GEOGRAPHICAL MAGAZINE

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HUGH A. WEBSTER AND ARTHUR SILVA WHITE

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Branches of the Society have been established in Glasgow, Dundee, and Aberdeen, where periodical Meetings are held.

The Membership at the close of the year 1885 was 1045.

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

INAUGURAL ADDRESS

Delivered before the Scottish Geographical Society at Edinburgh, 3rd December 1884,

By H. M. STANLEY.

Ladies and Gentlemen,—Concerning the merits of a Geographical Society there are numbers of eminent men in your own city more qualified to speak than I. But since you care to hear my ideas upon the subject, with your very good leave let me ask you to join me in viewing geographical science as it affects Africa, from an African traveller's stand-point.

And first of all let us look well at the position whence we propose to take our view of geography. We know that London has a very powerful Geographical Society under Royal patronage. It is a matter of course that, as the metropolis of this British Empire, it should have a hall wherein all that appertains to the science should be diligently studied, and a body of men devoted to it. But it appears to me that London, large as it is, possesses no more intrinsic interest in the study than does Liverpool, Manchester, Glasgow, Edinburgh, Newcastle, Hull, Bristol, or Plymouth. The reasons why London should be interested in it are also applicable to every large seaport or manufacturing town in this kingdom. Their ships, or their products of loom and forge, are despatched to every point of this globe possessing a mart; and to an enterprising shipowner, or an enterprising manufacturer, if he wishes to know his business well, it is essential that he should know something of geography; and why should it not be a subject of interest to the merchant's clerk and book-keeper, or to the manufacturer's assistants, employés, clerks, and packers

—ay, even down to the smallest boy of the factory; and to extend the question further, why should it not be studied by every resident, male or female, of this country?

We are told that there are 35,000,000 of people in Great Britain and Ireland. Take the larger and lesser island, and the people that its area of cultivable soil is able to support cannot exceed 6,000,000. The remaining 29,000,000, or by this time 30,000,000, are consequently fed by what is imported from abroad.

What is abroad? To give a geographical definition of this one word would require a portentously large volume; but if you picture or delineate it on a map, the outlines of abroad could be sufficiently made known to you on a small sheet, whereon you would see, printed in large letters, Europe, Asia, Africa, America, and Australia, with the large oceans named Atlantic, Pacific, Indian, Antarctic, and Arctic, while, set apart and isolated from the large area of land, there would be a mere dot or dots, as it were, called the islands of Great Britain and Ireland, which, as you all know, have nearer relations with the other places marked on the outskirts of those continental configurations before you than any other small dot or dots found there. Those small island dots at the northern part of the Atlantic Ocean represent this United Kingdom with its millions of cunning workmen, its thousands of screaming locomotives darting across from shore to shore, its thousands of groaning factories, its never-dying hum and murmur of labour, and rush and rapid movement of earnest life. On such a small sheet how, for instance, without a microscope, could you discover the locality of this city of Edinburgh? That local knowledge which you have of your city may be called geographical knowledge of an infinitesimal quantity. Supposing this knowledge be also extended to London, at once you realise the picture presented by Mayhew of the "strange incongruous chaos of the most astounding riches and prodigious poverty, of feverish ambition and apathetic despair, of the highest charity and the darkest crime, the great focus of human emotion, the scene of countless struggles, failures, and successes, where the very best and the very worst types of civilised society are found to prevail, where there are more houses and more houseless, more feasting and more starvation, more philanthropy and more stony-heartedness than in any other spot in the world!" To you who have been there, and know what London means, this picture seems nothing exaggerated.

To many a beginner in life, in this island of yours, London appears to be the place best suited to his ambition, because he has a dim perception that there he will find the best market for whatever merits he may be endowed with. He has heard of London from his fellows, his relatives, his friends; he has read of London in books and journals, and the hope is inspired in him from the knowledge thus gained that there he may dispose of himself to the best advantage. As London, or, in fact, any great city, presents itself to the mind of the ambitious and well-meaning rustic, so the knowledge gained by the capitalist, the manu-

facturer, the shipper, the civil engineer, the mechanic, the miner, of abroad, or the world at large, is sought to be utilised, with the same view and purpose. There are great enterprises requiring the capitalist's assistance waiting to be accomplished, there are markets abroad for the manufacturer, there are ports requiring ships from the shipowner, there are countries to be surveyed by the civil engineer, bridges and railways to be constructed, there are forges elsewhere for the deft mechanic, mines of precious ore and coal for the miner, and there are large areas to be tilled by the agriculturist and farmer. Some kind of geographical knowledge is necessary before any of these hopes can be realised. To him or to those who possess it, the configurations on the world-chart appear as clearly defined as though they were the outlines of a man's real estate—the world is only a huge breeding-farm, and the various ports round about the shores are like so many stalls at a market-place—and the people therein are only so many vendors and buyers.

It was by some recognition of this fact that the study of geography had a practical value and benefit for the fathers of the modern English people; that those islet dots in the North Atlantic came to have intimate relationship with the world at large, and little Britain expanded into that mighty dominion over islands and continents known as Greater Britain; that your gallant youths and brave men forsook home and kindred, and sailed over the seas to found empires in Eastern Asia, republics in America, and colonies in the West Indies, Australia, and the Cape of Good Hope. Why should Captain John Smith, or the Pilgrim Fathers, or that bold boy, Robert Clive, have gone away from their warm hearths straight to their various destinations, had they not known somewhat of the lands they were bound for? And if those men in the olden time, with their modicum of geographical knowledge as to their destinations, produced such great results, why may we not expect that, by the diffusion of this knowledge of the yet unknown earth and its products among the masses of the people, the souls of other men may be stirred to strive for those advantages gained by the enterprising?

I am told that at No. 1 Savile Row, London, the Royal Geographical Society possesses charts rolled up and snugly stored away all in due order, enough to cover acres upon acres of ground if they were spread out; and their collection is monthly growing larger. But that great metropolis, great as it is, is but a small portion of Great Britain, and I should say that Liverpool, or Glasgow, or Birmingham, or Manchester, has as many business correspondents in various parts of the world as London has, and that if a Geographical Society is useful for London, a Geographical Society would be no less useful for any great seaport and manufacturing city in Great Britain. You will observe that I am speaking of a society of geography, not as an ornamental addition to a great city, but from an utilitarian point of view: I should wish it to be of real use and interest to you; otherwise I should admit that the Royal Society of Geography was sufficient for the United Kingdom, and that one museum of maps

and books relating to the topography, hydrography, geology, and ethnography of the countries of the world was quite enough. I should wish to disseminate this knowledge of geography among you and the people of other great cities in Britain, in order that any time you should feel a desire to extend your enterprises to foreign shores, you might, by reference to the maps and books of your local society, be able to know how to set about it—what hopes the country you had in mind offered to your enterprises, what difficulties you would have to encounter, and what rewards were in store for you. I should wish you to be able to follow the promoter of any mercantile enterprise intelligently, each with his own best judgment, not blindly or rashly, and to measure justly the value of the advantages he offers. It has been told to you before, doubtless, and it may be said again, that geographical knowledge clears the path for commercial enterprise, and commercial enterprise has been in most lands the beginning of civilisation. Cæsar was the first explorer in this limited kingdom, but geographical knowledge of Britain took longer time to be diffused among the people of Rome than that of Africa will take among the people of England and Scotland. For centuries after Cæsar's invasion and Agricola's circumnavigation of the island, the young patricians of Rome regarded with horror expatriation from their sunny land, amid the fogs and aguish colds of Britain, just as the patricians of Britain to-day would regard compulsory service under the equatorial sun of Africa.

For centuries, Marco Polo's dictum respecting a fertile and commercial region now occupied by French soldiers, and exploited by French merchants—I refer to Tonquin—was accepted as true until French and English explorers proved it to be the reverse. Said he—"The country is wild, and hard of access, full of great woods and mountains which it is impossible to pass, the air is so impure and unwholesome, and any foreigner attempting it would die for certain." How many places have been reported in a similar manner to have such impure air, and to be so unwholesome, until exact exploration proved the old stories to be no better than "old granny's fables" about the invisible bug-a-boos and hobgoblins which frightened our childhood. Take up any old map of Africa, and glance at the antique and grotesque creations of the Portuguese missionaries and travellers of the 15th and 16th centuries, and compare it with that of to-day, illustrated by the travels of nearly 800 explorers. It is only now that we begin to have a rational idea as to what Africa is, and whether commercial enterprise is in any way possible. Before, it lay a huge unshapely mass, grimly outfigured on all maps, with an exasperating mystery and blankness about it, here and there relieved by illustrations which might be either lions or cats, by elephants, and nameless antelopes. It had an enormous coast-line of some 11,000 miles in length, sadly deficient in harbours and navigable rivers; and from a spot not far removed from the Cape of Good Hope, from a wide branching head, there winded the Nile along a circuitous course of about 10,000 miles towards the Mediterranean. Very few in those old days ever reasoned that, if the

Nile rose in such close proximity to the Cape of Good Hope, its top-head must surely be in the very highest of high mountains. Yet there must have been some reasoning of the kind to account for the manner in which the "Mountains of the Moon" were so persistently adhered to in the maps of our youthful days. And, at any rate, it is strange that some De Soto or Speke did not strike across from Natal and launch a boat on its waters to float down past the towers and towns so plentifully disfiguring the old maps.

I am not a very old man, yet I remember very well that until late years my conception of the regions under the equator, and down to within the neighbourhood of Bechuana Land, was that a desert similar to that of the Libyan in colour and quality monopolised what I now know to be of matchless fertility.

Just think what the geographical knowledge of Africa that we possess to-day has cost in human life! Of those 800 explorers, who left comfortable bed and board to gain it for us, nearly two-thirds have perished from disease or by murder. From Mungo Park down to Livingstone no continent that we know of can show such strenuous endeavour and persistent effort to clear the mystery and let light in on the unknown. It is nearly ninety years ago since Mungo Park left the English factory of Pisania on the Gambia for the Niger. Ten years later he was drowned, while descending the Niger, in the rapids of Bussa, 500 miles from its mouth. Decade after decade witnessed the victims which the river demanded as the price of the knowledge of its course, until Richard Lander, with his brother John, floated from Bussa, down the Niger, to the sea.

The geographical knowledge thus dearly bought led the way to the commercial enterprise of Macgregor Laird, in 1832. Scheme after scheme followed, ending in disaster, owing to the general ignorance of how to live under those new climatic conditions, until now the National African Company has established itself on a solid basis, and the enterprise is rewarded by a remunerative profit.

Let us look at the Cape of Good Hope. Bartholomew Diaz, in 1486, was the first navigator who reached that distant point of Africa. He planted a cross at Algoa Bay on the 14th September of that year, just 398 years ago. One hundred and sixty-six years later the Dutch East India Company sent 100 colonists to found a settlement there. Seventy-two years later the colonists had reached the Great Fish River. In 1815, by the Treaty of Paris, this country was ceded to the British Government; and since then British authority, following fast after exploration and geographical knowledge, has extended to the twenty-eighth parallel, and —with the exception of the territory occupied by the Orange Free State —right across Africa. The value of the commercial intercourse with this region is now, in round numbers, £17,000,000 annually, though there are only about 300,000 whites in the 3,000,000 population which contributes to this trade.

But preceding this extension of commerce were the scientific, sporting, and missionary explorers. In reading their researches and travels, we are struck by the number of incidents attending each journey, and are filled with admiration and pity as we learn how they wagoned across great expanses of arid regions, with cattle dying by dozens from thirst, how disaster overtook them in the shape of onslaughts from savages and attacks from wild beasts, while timid Hottentots scurried away from every peril, and left the brave Anglo-Saxon hearts all alone in the danger; and yet, despite all their numberless mischances, they bring away, one after another, that little handful of geographical knowledge which is required before a step is advanced by the civilisation which is invited to follow them. And, after the considerate pause, we see it gather courage and press still further onward, to halt once more on the threshold of the unknown until the self-formed Intelligence Department has received exact information of the regions beyond from its exploring scouts, who have wandered far a-field with sextant and chronometer and prismatic compass.

When you have rounded the Cape you are directly on the route which Vasco de Gama took in his little ships when he led the way to India 387 years ago. While we mentally contemplate the length of wild sea-water that stretches from Cape St. Francis, in South Africa, to Cape Comorin, at the southern extremity of India, let us think of the prodigious commerce that has followed the geographical knowledge given us by the bold Portuguese navigator and his successors. With India, China, Australia, Japan, the Dutch East Indies, the East Coast of Africa, the Persian Gulf, Mauritius, Madagascar, and Natal, and the French possessions, United Europe had a trade, in 1882, of the value of nearly 450 millions of pounds sterling. The discovery of America by Columbus in like manner has caused a commerce to spring up during nearly a similar period, which, in 1882, was of the value of £600,000,000.

I have hitherto sought to excite your regard for geography by showing you as vividly as I can what the purpose of the study is, how it has been and is intimately connected with the growth of the British Empire and with the rapid increase in population and importance of your own city. The effect and result of the travels, researches, and explorations of a host of bygone travellers is visible to-day in every great centre of industry and commerce throughout the British Empire. Now, if you duly appreciate the summit of grandeur to which you have attained, and can thoroughly divine the cause and large effect of what has already been accomplished by a few lessons in rudimental geography, and desire to maintain that supremacy in devising and doing, you must now turn your attention to other fields, because your success has excited the envy of many nations, and they have become competitors for whatever gifts of fortune enterprise can win. The Americans are now manufacturing their own cottons, and India exports some £16,000,000 worth of cotton fabric every year, and every nation in Europe manufactures its own cottons, mainly, and this

process will go on each year until there will be very little left of the world for a market for your handiwork. Education of all peoples is growing and spreading, and with it development of handicraft skill. Lowell competes with Manchester, Pittsburg with Birmingham, the Delaware with the Clyde, New York with London and Liverpool, and in the course of a few decades there will be a hundred competitors in the market; therefore you must not lay the flattering unction to your souls, that, because you are unsurpassed to-day in your enterprise and skill, it will remain ever thus. With you, as well as with the rest, there must be progress, enlightenment, advance, or the day is not far distant when you will be outstripped. And whereas you owe so much to geographical knowledge, you must cherish that knowledge, and go on acquiring it; you must teach it to your youths, that when they arrive at manhood each may know that beyond these islands there lie vast regions where they also may carve out fortunes as their forefathers did in the olden time. You must extend it among the mature men, that they may be led to reflect, if in some little-known part of this world there may not lie as rich markets as any now so earnestly competed for. That this knowledge may be accessible, and easy to obtain with all the light necessary for a perfect comprehension of it, some of your thoughtful and lofty-minded men of Edinburgh have proposed to form a Geographical Society right in your very midst. I earnestly wish it the fullest success; and it is for this reason that I consented to show you some new markets in long-forgotten Africa, and to expatiate upon them with what knowledge I may possess.

If you look upon a map of Africa you will find that it is dotted around with names of sea-ports, and landing-places, and sea-shore villages thickly enough; that here and there—as in the neighbourhood of the Nile and the northern coast of Africa, and at Cape Colony—more or less advance has been made towards the great body and heart of the continent. Round about the coast-line measures about 15,000 English miles, and if we measured 200 miles direct inland all round as the average depth of the country thoroughly exploited by commercial men, we should find that an area of about 3,000,000 square English miles is already contributing its produce and stuffs in exchange for European manufactures. But as Africa altogether contains an area of nearly 13,000,000 square English miles, we have a balance of 10,000,000 square miles open for us, and yet undeveloped. About 2,000,000 square miles of this must be set aside as untillable, by which we have 8,000,000 left—an area nearly two and a half times larger than Europe. It would be impossible to state accurately the population of this area, but, after having travelled and explored across Africa over some thirty-two degrees of longitude, and up and down some ten degrees of latitude, I have estimated, after various efforts at reasonable exactitude, that the population may be at the average rate of twenty-two souls to every square mile, which would give us a total of 176,000,000. In some favourable localities the population much exceeds this, as in Uganda, Urundi, and in large portions of the Congo and Niger basins.

In the latter basin we find the native towns of Egga with 30,000 people, Sansanding about the same, Jenné with 10,000, Kano with 30,000, Yakoba with a population estimated at 150,000, and Birnie, in the Chad district, with 60,000. The Sokoto Empire is estimated to have a population of 13,000,000, which would give sixty souls to each square mile of its area. On the Congo we have clusters of villages extending along the banks from five to fifteen miles, as Bolobo, Lukolela, and Mangala; and in Irebu we have a small compact district, where the natives are so dense, that 100 to the square mile may be a fair estimate.

I should divide this 8,000,000 area and its population in this manner:— The Niger basin, with an area of 700,000 square miles, 23,000,000; the Nile basin, exclusive of Egypt, 900,000 square miles, with a population of 36,000,000; the Zambezi basin, 700,000 square miles in extent, with 10,500,000; the Congo basin, 1,300,000 square miles, with 39,600,000; and the basin of the Chad and Shari, 300,000 square miles, with 15,000,000. You have then a population of 50,000,000 to be divided over the remaining large area of 4,000,000, because this would embrace all the less favoured territories, the slopes of the mountain ranges, the wide but thinly-peopled territories of the Masai, the Kalahari desert, Fezzan and the Galla Land, and the western portion of Somali territory, the basins of the Juba and Limpopo.

Now the great river basins, the Niger and Chad-Shari, Nile, Zambezi, and Congo, are each accessible by widely different routes. The Niger and Chad-Shari market can best be reached by the delta of the Niger. A powerful company, called the National African, with a capital of £2,000,000, has been formed with the view of supplying this populous market. It is just thirty-two years since the commercial traffic—which only now begins to be remunerative—was properly started by Mr. Macgregor Laird. When we think of the prospects before it, its advance appears to be extremely slow. The natives are warlike and insolent, and seem inclined to dispute the advance of the trader. The middle-men, who thrive upon the commissions they collect during the passage of the goods from the hands of the original sellers to the ultimate buyers, argue that if the white men are allowed to trade freely with those above them their occupation will be gone. On such people the best argument would be the presence of a Government Official who could guarantee the payment of a small subsidy on the one hand—conditional upon free passage up and down the river—and on the other could show a small police force to punish the refractory. The result would be an immediate increase in the trade, and a steady advance into the populous interior, where, possibly, we might hear of some railway undertaking to Kuka on Lake Chad, and steam communication up the Shari. A railway, 300 miles in length, to reach a navigable river 500 miles in length and a lake 10,000 square miles in extent, for a trade with 15,000,000 of semi-civilised people, appears to me a very desirable project.

Then there is the Niger itself. A railway of 150 miles long, from a

point below Bussa to near Yauri, would give you 1000 miles of the Upper Niger, by which you could supply some 18,000,000 of people above Bussa, as far as Timbuktu, Yawaru, Jenné, Sansanding, and Sego, where the Niger is as broad as the Thames at Westminster. Or a railway, 300 miles long, from the head of navigation on the Rokel River, at the mouth of which Sierra Leone is situated, would take you to the Niger, and furnish you with a river navigation of 1000 miles. The great kingdoms of Waday, Bagirmi, Bornu, and Sokoto would become commercial tributaries to this country by these railway enterprises, which any half-a-dozen rich capitalists of Scotland could cause to be made. That some effort has not been made is probably due to your ignorance of the little-known geography of these regions, and to the indefinite and uncertain ideas which possess you generally respecting Western Africa. I fear also that the Government is a little to blame for its proneness to cast cold water upon such projects, fearing the increasing obligations that would be entailed by any sudden expansion of commercial thought and extension of enterprise of this kind. Where there is a will, however, there is always a way, and if your rich people take to such projects kindly, as in the olden time your forefathers amplified their businesses and built up this wide-spreading empire, the project I have indicated to you will seem but small compared to the rewards which always follow such high-spirited and broad-minded ventures.

That such a scheme is not impossible is proved by the fact that the French are actually building a railroad from the Senegal to Sego, to absorb a trade which should have been British. When it is completed they will have an opportunity to increase their trade to the extent of £30,000,000 annually. We may therefore, if you please, consider the major portion of the Nile Basin as closed to you, unless you may be prompted to run a race with the French. Though you are actually in possession of the lesser portion of the Nile Basin, I think you are as likely as not to lose some portion of the trade there, for the stout-hearted and persistent Germans have planted their standard, and propose to found a colony on its southern edge, and if their Government will subsidise this infant settlement judiciously, they can easily tap the upper portion of the Cross River, and the Binue, the main affluent of the Niger.

Let us glance at the Nile basin. You are happily situated just at this juncture to be able to take an intelligent and lively interest in the study of the basin. Though powerless to exert any influence, I fear, upon the policy of the Government, yet since your countrymen are there in such numbers, urged forward to the rescue of great Gordon, it is a curious question which we may well ask, whether all the vast expense now being incurred will be productive of interest to industrious cities like your own? I am not one of those who would wish to subjugate populous tribes and conquer regions solely for the sake of commerce, were it only that it is altogether unprofitable. Should the Government, while pursuing its own policy, indirectly promote commerce, then it would be a matter for

congratulation; or, in other words, should the Government see fit to retain Khartoum for high politic reasons, then undoubtedly such a course would indirectly promote commerce. But if it be argued that the Government ought to retain Khartoum because it would be advantageous to commerce, it does not follow that in the end it would be so. Commerce cannot thrive when based on unjustifiable violence.

But supposing that Egypt were permanently occupied and annexed to this Empire, it would be politic for Egypt's sake to retain Khartoum, and I should see no injustice in the step, because it is in reality a city in an upper province long ago annexed to Egypt. You might then be congratulated upon it, because it would thus be profitable to construct a railway from Suakim to Berber, by which you would gain easy access to a navigable river course over a thousand miles long to beyond Gondokoro, and some 500 miles up the Bahr-el-Ghazal and its branches, and some 200 miles to Senaar, altogether about 2000 miles. It is a populous basin, and its products are manifold and various, and altogether, as a commercial field, a most profitable one.

The third great basin we have to consider is the Zambezi basin. This river is the third largest stream in Africa, the largest that issues out of Africa on the east, and has a length of 1400 English miles. It is not so free of rapids as the other great African rivers; still, under a pushing government, it might be utilised to a great extent. Two or three long stretches of navigable water might be connected, and in this way a means of communication opened up to take one two-thirds of the way across Africa. But though explored by Livingstone in 1854, and again by Livingstone and Kirk in 1859, the Zambezi yet remains in its pristine state of undevelopment and inutility. An affluent of it, called the Shiré, taking its rise in Lake Nyassa, is interrupted by rapids at a distance of about 70 miles, and, after an impassable course of a similar length, flows uninterruptedly a course of 300 miles to the sea south of Kilimani. A Scottish philanthropist, Mr. Stevenson, appears to have taken this affluent into his own hands, and by admirable perseverance, aided by the Free Church of Scotland, has succeeded in inaugurating a commercial development, now prosecuted successfully, I am told, by the African Lakes Trading Company of Glasgow. From the Murchison Falls to the northern end of Lake Nyassa, a distance of 420 miles, a steamer called the *Ilala* runs periodically. A carriage road, 210 miles in length, has been lately made to connect this lake with Lake Tanganika, which will give an additional waterway 360 miles long.

In this growing and promising development in the Shiré and Nyassa region you see an authentic illustration of what follows geographical knowledge and exploration. It is twenty-five years since Livingstone and Kirk first ascended the Shiré, and discovered the Nyassa. That the development has been so tardy is owing entirely to the hostility of the Portuguese. It was only after the repeated and persistent efforts of the Free Church of Scotland and Mr. James Stevenson, of Glasgow, that a

commencement could be made. The Court and Government of this country were wearied with the diplomatic tactics of the Portuguese, who protested and wrote, and presented the usual folios of traditions, and the contents of elastic and perennial archives to defraud Livingstone of the honour of the discovery of Lake Nyassa, and retard, if not check outright, all progress and civilisation. In the end, however, the restrictions placed by them on the Lower Zambezi were removed, and now it is a free river as far as the Shiré. The Zambezi River, however, and its entire basin—though it is a thousand pities that such things should be—is no less an authentic illustration and evidence that no portion of Africa is susceptible of civilisation if it be barred by a hostile tariff.

Fourthly, and finally, we have to consider the Congo and its basin. Before we enter this broad domain, let us take an outside view of it, that we may consider its external aspect. And to do this properly, let us begin at the Cape, and take a mental view of its physical aspects, as we run north, along the west coast; and I may as well tell you in passing that the eastern coast is, so far as height is concerned, its counterpart. Beginning, then, at the Cape, we view a mountain mass called Table Mountain, of some 3500 feet, flanked by a massive feature called the Lion's Head and Rump. It continues in an irregular line against the sky, when seen from the sea; advancing at certain points into a mountainous cape or receding inland beyond view, to unite with a range called the Bokkeveld Range, then, dipping down into the Olifants River and rising again into the Karree Range, it runs northward, forming the south-western ranges which bound the Orange River basin on that side. Along the sea-coast are uplands of 200 or 300 feet above the ocean, pierced by various unimportant streams. North of the Orange River we enter Great Namaqua Land, extending north to the Portuguese possessions with a waterless and sandy coast. A mountainous and apparently valueless territory, and with no good harbours, it rises at a considerable distance inland into a plateau, which has an elevation of 4000 feet above the sea, while some higher peaks attain an altitude of 7000 and 8800 feet. North of this land is that of Damara, extending to the Cunene River; all of it, from a distance, presents a most uninviting aspect—not even a tree to be seen from Cape Frio to a distance south of the Orange. A low terrace along the sea-board is backed by another slightly higher, and beyond the second a third rises into a mountain altitude.

From the Cunene River northward to the Congo this bareness of the coast is slightly improved, but there is nothing approaching to a forest; shrubs, isolated, unhealthy-looking trees, dot a long line of reddish-coloured land, of an average height of between 150 and 300 feet, rising inland into a lofty plateau wall, very irregular, deeply indented by gullies, ravines, and chasmic depressions. This line of rufous colour takes a bold sweep inland, and, running east about seventy miles, begins to rise to a height of about 500 feet. A mile farther north is a parallel line of similar altitude, and between these opposing lines lies the Congo, a deep and fast-flowing

river of a dark brown colour. The river's mouth is about seven miles wide, with a current of six knots in the centre, and a depth of 1312 feet. To your right, as you look up, you see Shark's Point; to your left, or north, you see the sandy spit, known as Banana Point, covered from end to end with long, low, white-washed magazines, and four or five white flagstaffs, each with a different flag, indicating the nationality of the traders who own the mass of long low buildings.

We have seen sufficient from the outside to suspect that Africa generally is a plateau continent of from 1000 to 4000 feet above the sea, with a sea-front all around, descending to the sea, either in successive terraces or suddenly (as in the neighbourhood of the Cape, or along the Red Sea), and rimmed in the main by an irregular mountain line, with a descent often rapid and deep seaward, and a gentler, easier, descending slope to the river-basins inland.

The river Congo has a course of 2900 miles from the Chibalé Range S.S.E. of Lake Tanganika, to Banana Point, on the south-west coast of Africa. Close to the twelfth parallel of S. latitude, across eighteen degrees of longitude, there runs an elevated ridge of from 6000 to 9000 feet high, at one part narrowed into a mountain range, at another expanded into a table-land. This is the dividing line between the Zambezi and Congo basins. Out of the furrows, recesses, and folds of its slopes issue the streams flowing in opposite directions—northward into the Congo, southward into the Zambezi. Near the parallel of 4° N. latitude you must look for the dividing line of the waters of the Bahr-el-Ghazal and Shari, which flow north, and of those which flow southward into the Congo. Draw a line north and south about the meridian of 16° E. longitude, from lat. 4° north to lat. 12° south, and a slightly diagonal line from 4° north to 12° south, running from the meridian of 30° east to 32° east, and within this vast, compact area you have the basin of the Congo. Its greatest length is a line drawn from south-east to north-west, 1400 miles, its greatest breadth 1200. The number of English square miles that this area contains is 1,300,000.

How comes such a short-course river as this to send down a volume of water such as no other river can excel, except it be the Amazon? Because it is a true equatorial river—like the South American stream. If you take a pair of dividers in hand to measure the length of the Congo on some chart of Africa, you will find its length to be 2100 miles. Apply the same mode of measurement to the Amazon, you will find it to be only 2300 miles from its source to the meeting of the salt and fresh waters; apply it to the Mississippi, reported to be 4400 miles long, and you will discover that from its issue into the Gulf of Mexico to the extreme source of the Missouri it is only 2400; and if the Nile, which is really the longest river in the world, be measured in the same manner, it will be found to have a length of only 3000 miles. Mere length of river does not imply largest volume; as, for instance, the Nile has a course of about 1500 miles through an almost rainless country, which does not supply a

single affluent, and its measured volume does not exceed 600,000 cubic feet per second. Three and a half Niles, or the Mississippi and the Nile together, would scarcely equal the Congo's tribute of water to the ocean.

From the folds of the Chibalé Mountain group, south of the Tanganika Lake, the Congo issues into the hollow of the table-land lying between the Tanganika and the eastern extremity of the Mushinga range, and, swollen by myriads of small streams into a great river, flows westward into an oval depression, where it forms a lake called Bangweolo, under the native name of Chambezi. At the western extremity of this lake, an arm of it, like an estuary, extends north. Thence the river issues under the name of Luapula, similar in width to the Thames at London ; and for a hundred miles it continues its course northward till it empties into a lake called Mweru, covering a superficial area of 2100 square miles. Issuing from the northern shore of Mweru, the Luwa, as it is now called, enters a rent in the mountain fold of Southern Rua, and descends by a series of falls and rapids into a much lower level, whence, by the numerous accessions it receives—notably from a lacustrine river called the Lualaba—it flows a mighty stream north-north-west, every league of its course receiving tributaries from the east and west. From the right enter the Lofunzo, the Luindi, the Luigi, and the Luclama, which the mountain barrier that encloses on the western side the lake basin of the Tanganika sends westward ; and through a gap in this barrier the Tanganika, that has collected over a hundred rivers in its capacious bosom, empties its surplus waters by the Luindi and the Lukuga, into the broad Lualaba. From the left the chain of lakelets—known as the Kowamba, Kahando, Abimbe, Ziwambo, and Kassali—after gathering from weeping forests and spongy areas, discharge their collected strength into the large and ample river.

Now that we understand the course of the Congo—or Lualaba—it is not difficult to understand the character of its basin, and the cause of the almost unrivalled amplitude of waters discharged by the Congo into the sea. On the south, the east, and the west, the three mountain walls, or barriers of table-land, discharge their numberless streams into a plain-like basin furrowed by the courses of five noble rivers running northward in nearly parallel lines with the Lualaba, draining a level 800 miles broad. After a course varying from 600 to 1100 miles they issue into the Congo in its transverse flow from east and west. Towards the north a table-land descends gradually into another level 600 miles broad, and 200 miles deep, furrowed by four rivers flowing southerly into the wide river. On the whole, then, we may compare it to a huge meat dish, nearly square, surrounded by a low, broad rim with corners rounded off. It is as though, in very ancient times—the days of great inland seas—this capacious and ample basin formed a great lake three times greater than the area of the Caspian Sea.

Since that period, some volcanic agency, it may be, cracked and sundered the hilly rim to the west, and the waters flowed through to the

Atlantic Ocean, and the even bottom of the lake was exposed, which we see now to be furrowed by the voluminous affluents—Kwa, Mbihé, Ikelemba, Lulungu, Lubiranzi, Lumami, and Kamolondo—flowing from the south to the Congo as it flows westerly.

At Nyangwe, 1700 miles by river from the sea, and near 1300 miles from its source, the river is about a mile wide, with a volume of 230,000 cubic feet per second. But lower down it receives the Lowwa, the Biyere, the Lubiranzi, the Lulungu, and the Kwa, which alone swells this volume to a million cubic feet per second.

From Nyangwe it has a northerly course of four degrees of latitude; when reaching the equator it deflects N.N.W. to above 2° N. One degree north of the equator—so numerous have been the streams and rivers shed by the western versant of its eastern mountain boundary—the Congo widens, disparts into ten or twelve channels, and from shore to shore of the main river it is as much as sixteen miles in its greatest breadth. With an average width of four or five miles it flows direct west for two degrees, then S.S.W. across two and a half degrees of longitude, when it gathers itself together, and in one united stream, gradually narrowing to a mile in width, in depth from fifty to two hundred feet, flows with a strong current, in the centre, of about five knots, until it expands again at Stanley Pool, which is eighteen geographical miles in length by fourteen miles greatest width. At the lower extremity of the Pool, 1147 feet above the sea, the navigability of the Congo ceases. It first precipitates itself with awful force down a five-mile slope, a succession of leaping waves, which from crest to crest might be about 300 feet apart: then by a series of mad rapids, separated by short stretches of swift but steady flows, for seventy-seven miles, all of it confined by the towering rock barriers of a deep cañon from 300 to 600 feet below the level of the opposing summits of the cleft land; then for eighty-eight miles tolerably safe to navigation, followed by another sixty miles' rush of a distracted river, with roaring cataracts alternating with noisy rapids, through the deep, rocky heart of the grim and solemn-looking hills, until, finally, the last plunge has been made down the Yellala Falls. A few miles lower down it issues out of the sinuous and rocky gullet a navigable and useful river for 110 miles; flows by factories and villages and townships, to be presently vexed by the churning screws of ocean steamers and panting tug-boats.

Seven years ago the character of this basin and utility of the river were made known for the first time. The geographical knowledge then acquired cost about £12,000 in English money, and the lives of 173 men. It was given to the world freely in about twelve numbers of the *Daily Telegraph* and the *New York Herald*, each costing about one penny, and afterwards in book form with maps and pictures illustrating the geography and life of the peoples. Then I came to you, and in this and similar cities I personally expounded to you the possibilities that might accrue were the prospects held out to you reflected upon intelligently. You rejected the notions, condemned them as altogether crude and unworthy

of acceptance by practical men. An Association, headed by the King of the Belgians, invited me to Brussels, and there I was eagerly accepted after many protracted discussions, and it was proposed to me to return to this region and show what I could do with it, and discover what further could be learned.

And this is what we have acquired of further information. From the mouth of the Congo a steamer drawing fifteen feet can steam up 110 miles, and opposite to this spot, on both sides of the river, we have built stations—that on the north or right bank being the principal. Hence we take a land journey of fifty-two miles, where we have constructed another station. We then take boats, and steam or row up eighty-eight miles to a point opposite which there are stations constructed on each side of the river. We now make a land journey of ninety-five miles, and reach a place lately built, called by us Leopoldville, whence we can steam up 1060 English miles. The large affluents enable us to steam a distance of 2000 miles more, and by a short road past Stanley Falls we could proceed further up the river 350 miles, and a portage of two miles would give us 650 miles. Another short portage, past the cataracts of one of the main affluents, would give us another navigable length of 1100 miles. Along the main river we have constructed thirteen stations in the most likely places and amid peaceful tribes, with whom we are on terms of familiar intercourse, and who have welcomed us as brothers. To us the river has become as familiar as the Mississippi is to its navigators. The banks and its peoples are well known. The great basin now lies mentally mapped out; it has lost its mystery, and, deprived of its power to awe, to us it is no longer a region of fable and myth. We can gauge its powers of productivity and its value, and we are disposed to attract the world to it by connecting the upper river with the lower river by a railway, over which commercial men may travel with their barter goods with ease and safety, which will quite obviate the necessity of looking at it as an inaccessible region and daunting those disposed to enterprise—provided, of course, that no insane jealousy thwart the project.

If you are wise you will not quarrel with us for entertaining such a project, nor look askance at it, but encourage and rather co-operate with us; for to you, as to others, it appears to me to be fruitful of advantages. We have no concern in it further than to see a region so long neglected brought within the fold of the civilised world. Our satisfaction will be in witnessing its growth and watching it mature into usefulness. Long have you and I gazed upon that white blank in the old maps; long have we wondered what it contained. And now we are satisfied that the region is of unexampled fertility, watered by mighty rivers, which have their perennial sources in deep, woody recesses on the flanks of the mountain barriers which ring the region round about. We know that wide plains, growing pasture fit for cattle, separate these rivers; and vast spaces, fit for thrifty and industrious colonists, promise rewards to those who seek them. The river-marges show wide belts of forest; in their deep

frondent shade clusters of villages lie nestled, and close by are the prolific gardens and fields, blessing the careless, happy people with a profuse abundance. Here and there, like islets in the rich expanse, rise the grove-clad hills with who knows what store of fossil gum on the surface, and useful minerals in their bosoms. And through all, in easy sinuosities, wind the native foot-wide paths, dipping into dell and dingle and lovely twilight, and anon rising from the cool shade of tropical umbrage into the glare and view of far-reaching plains, where you see on the verge of the horizon the smoke denoting the distant village.

Nor are spacious lakes wanting, with their broad expanses lightened by brightest sunshine, to diversify this extensive prospect of tropic land. Within its confines lie Tanganika, with 9300 square miles, Bangweolo with 8800 square miles, Mweru, Kasali, Leopold, Mantumba, Muta Nzige, and two or three others reported to exist, but not yet explored; a known area of lake waters approaching 30,000 square miles in extent—which may be increased to over 40,000 square miles after more definite knowledge of them has been obtained. Consider how these may in the coming years be rendered useful to the laden steamboat of commerce, and the swift screw-launch bearing to each shore of their waters the gospel of peaceful intercourse between vari-coloured peoples.

I dare say that by this time you have some notion how I should wish this newly-constituted Society to take up the study of Geography—not as a science to be relegated to your sedentary hours, but as a science brimful of interest to you as living men with warm sympathetic hearts, desirous of increasing your fellowship with humanity in general; as a science replete with lessons of practical wisdom; as a science which may best be called the admonitor to commerce; as a science wherein there is nothing barren or sterile to any man with eyes to see and ears to hear; as a science which points with commonest inductions to those fields wherein manly effort is needed, and those paths which commerce ought to follow; as a science which delimits the valuable heritages to which all the sons of Adam are born, and directs willing hearts to profitable labour. It is your duty as children of a foremost nation, nourished to ample grandeur by a wise, thoughtful, and earnest ancestry, to know the extent of those toil-won conquests achieved by your sires, and to know how to prepare the minds of your own descendants to wear their honours nobly, and, if possible, to add to them. If exploration adds a newer field, a larger extension to your knowledge of the surface of the earth, you should endeavour to devise and study of what further use it is to you and other nations. Avoid the cant of senility, and the babbling of confessed impotence which tells you that you have done enough, that you are by far too rich, that your estates are by far too many already; such talk belongs to a people smitten with paralysis and bedridden with old age. Wherever I look around me in this country I see no signs of that among you. I see you creating new machinery, and building new ships, and laying the foundations of new cities; there is weaving and mining, delving

and hammering, going on from morning till night in every corner of the kingdom. You are building new schools and moulding young heroes without pause, and prosperity and good fortune seem to have blessed you. Therefore gather yourselves together into Geographical Societies to impart the knowledge of the science more widely, that it may quicken energy and inspire enterprise. The study of Geography ought to lead to something higher than collecting maps and books of travel, and afterwards shelving them as of no further use. I should like to see the maps in men's hands to be studied as generals study them before planning campaigns. I should like to see the manufacturer or merchant study them with the view of planning commercial campaigns, the man of capital pondering over them like one who intends constructing a railroad across a country, or a military engineer designing defensive works.

Had your Government, some months ago, followed such advice as I have given you to-day, there had never been a treaty made to close the Congo basin, and you would never have needed me to tell you how monstrous the Portuguese claims were.

The Royal Geographical Society of London has long done excellent work, all will admit: as soon as an explorer has brought home, and submitted to it his budget of geographical facts, it has been forward to recognise their value without regard to his nationality; it has been a fit centre of effort to pierce the mystery of unknown Africa, and all that we know of the old continent may be attributed to its influence and continuous exertions to excite interest in geography. But at this stage of progress it is time that the study of geography should be taken up by the large cities which profit by it, in order that it should not only contribute to the natural thirst for knowledge, but that, like other studies, it should bear fruit.

SCOTLAND AND GEOGRAPHICAL WORK.

> "Scottish energy and enterprise have sent Scotsmen to all countries of the world as pioneers of discovery, as founders of thriving colonies, as successful merchants and traders, and as useful missionaries and philanthropists."
>
> "Scotland has produced many world-famed scientific men, travellers, geographers, and cartographers."

THESE sentences are quoted from the Prospectus of the Scottish Geographical Society. The statements are strong, even boastful, in their character. Can they be made good?

Their accuracy has not been called in question; but an inference has been drawn from them, in some quarters, directly the reverse of the con-

clusion which they were intended to support. It has been said that as Scotland has done so much for exploration, colonisation, and the science of geography without a Geographical Society, a Scottish Geographical Society is wholly unnecessary.

That the objection has not had much force may be held to have been proved by the remarkable success which the new Society has already achieved. It is not yet *three* months old, and already its membership numbers 800, and includes all grades of society—noblemen and country gentlemen, men of science and men of letters, professors and schoolmasters, merchants and shippers, clergymen, lawyers, and physicians; and women as well as men. Nothing else, surely, is needed in order to prove that the Society has met a felt want, and that the opportunity of wiping out a reproach to Scotland has been eagerly seized by all classes of the community.

The objection, however, admits of another answer. If the voluntary, unaided, and undirected efforts of Scotsmen have done so much in the past, much greater achievements may surely be expected in the future from exertions which will be well regulated and judiciously encouraged. The truth is that Scottish explorers and Scottish geographers have hitherto been working under tremendous disadvantages. They have received no properly organised assistance from their own country, and they have had to contend with the greatest discouragements, the chief of which have sprung from the ignorance and consequent indifference of their fellow-countrymen. It is not too much to hope that, with the formation of the Scottish Geographical Society these natural hindrances will disappear, and that henceforth the efforts of Scots abroad will be materially aided and encouraged by the support of Scots at home.

It is worth while, nevertheless, to answer the question:—What have Scotsmen done for geographical exploration, and for scientific geography?

The maritime adventure of the Scottish nation dates from the close of the fifteenth century, when King James the Fourth laid the foundation of the Scottish navy, and sent forth stout Sir Andrew Barton in the *Great Michael*, the largest ship then known in the world, to scour the northern seas. Another famous Scottish admiral of those days was Sir Andrew Wood of Largo, in whose ships, the *Flower* and the *Yellow Carvel*, King James himself often made adventurous voyages. The Scottish navy of those days was quite a match for that of England, and a stiff sea-fight in the Downs, in which Barton was killed, and his flag-ship, the *Lion*, was captured, was one of the causes of the quarrel which ended so disastrously for Scotland on the field of Flodden.

The record of successful Scottish colonisation begins with the early part of the seventeenth century. In 1624 King James the Sixth and First granted to the Right Hon. Sir William Alexander, gentleman-usher to his son Prince Charles, a concession of Cape Breton and the adjoining peninsula of Acadia, and all the lands between the Bay of Fundy and the river St. Lawrence. Sir William was a Scottish knight, and ultimately

became Earl of Stirling and Viscount Canada, in the peerage of Scotland. He was an intimate friend of Drummond of Hawthornden, and was himself a bit of a poet. His lively imagination, coming to the help of his patriotism, suggested the idea of founding a new fatherland on the other side of the Atlantic. He had heard of a New England, a New France, and a New Spain. Why should there not also be a New Scotland? Hence Nova Scotia was the name which the new settlement was to bear. Alexander sent out a squadron freighted with Scotsmen to take possession of the country. He divided it into two provinces—Caledonia and Alexandria. The river forming part of the boundary between New Scotland and New England—it was only four years after the migration of the Pilgrim Fathers—was called St. Croix by the French, but Alexander must needs call it the Tweed. The river St. Jean in like manner became in his fancy the Clyde, and the Gaspé Peninsula appeared as Argyll. It was no wonder, surely, that King Charles, in the year of his accession, confirmed his father's grant to this patriotic Scot, and established the order of Knights-baronets of Nova Scotia as a means of inducing capitalists at home to send out settlers to the new country.

We hear very little more of Scottish maritime enterprise till we come to the records of the ill-starred Darien Scheme, at the close of the seventeenth century. It was not the fault of the Scotsmen who took part in that adventure that it resulted in abject failure. Even in the face of disaster, brought about by the jealousy of the English and Dutch trading companies, the Darien expedition affords splendid testimony to the enterprise and courage and endurance of Scotsmen, who sacrificed hundreds of lives and half a million of money before they would admit their discomfiture.

Towards the close of the next century we find another Scotsman stamping his name on the far north of the American continent. This was Sir Alexander Mackenzie, the first European who ever crossed North America from ocean to ocean. In 1789 he made his way from Fort Chipewayan along the shores of the Great Slave Lake, discovered by John Hearn eighteen years before, to the great river, since known as the Mackenzie River, which flows into the Arctic Sea. Three years later he undertook his memorable overland journey. Pushing his way up the Peace River and across the Rocky Mountains, he emerged on the tableland of British Columbia and the valley of the river Fraser, and at length reached the Pacific coast at a point opposite Vancouver Island, where, on a stupendous rock facing the Georgian Gulf, he inscribed in bright vermilion the record of his exploit in these modest words:—"A. Mackenzie, arrived from Canada, 22d July 1792." The record soon disappeared, but the fame of the intrepid pioneer will last as long as the continent which he explored.

In 1808 the chief river of British Columbia was explored through the greater part of its course by another Scot, Simon Fraser, whose name it now bears. Its basin has become famous as a gold-bearing region, and that is another triumph which must be put to the credit of Scottish explorers.

The earliest settlement in the great North-West was on the Red River, in the very heart of the continent, in the middle of what is now the Prairie Province of Manitoba. Here also a Scotsman was the pioneer. In 1811 the Earl of Selkirk purchased from the Hudson Bay Company a large tract of country along the courses of the Red and Assiniboine Rivers. He sent out a party of Scotsmen as pioneers, who were afterwards joined by some Norwegians and French Canadians. The colony was known sometimes as Red River, sometimes as Selkirk, Settlement. The failure of their first crops exposed the settlers to great privations, and the attacks of prowling Indians increased their peril; but, being for the most part robust and active Highlanders, they persevered and endured; and, the soil proving wonderfully fertile, they triumphed in the end. Manitoba is now one of the most prosperous provinces in the Dominion. It is a favourite resort of Scottish emigrants, and especially of Hebridean Highlanders, few of whom probably are aware of the historic ground on which it may be claimed as a Scottish colony.

We pass, by an easy and natural transition, from the exploration of the continent of North America to that of the Arctic regions. There also we find Scotsmen taking a foremost place. Sir John Richardson, the friend and companion of Franklin in his early voyages, was a native of Dumfries, and an Edinburgh medical student. He began his career as an assistant surgeon in the navy. He accompanied Franklin in his Arctic voyages of 1819 and 1825, in the latter of which he explored the coast between the mouths of the Coppermine and Mackenzie Rivers; and his last voyage was made in a search expedition for Franklin in 1848. Sir John Ross was a son of the parish minister of Inch in Wigtownshire. He spent four winters (1829-33) in the Arctic regions, and made in the course of them important discoveries; and his last service was in connection with a Franklin search expedition in 1850. His nephew, Sir James Clark Ross, who also took part in the search for Franklin, was of Scottish family, though born in London. His most valuable contributions to geographical and physical science were made in the course of his memorable expedition to the Antarctic Ocean with the *Erebus* and the *Terror* (1839-43), when he discovered Victoria Land and the great volcano to which the name Mount Erebus was given.

No account of the physical aspect of the American continent would be complete which did not recognise the value of the labours of Alexander Wilson, the ornithologist; and Wilson was a native of Paisley.

If we turn now to Africa, we find that Scotsmen have borne the greatest and the foremost share in the work of letting in light on "the dark continent." First in the long list of explorers and philanthropists comes the name of James Bruce, the Abyssinian traveller; and James Bruce was a Scottish laird. He was born at Kinnaird House, Stirlingshire, in 1730, and he died at the same place in 1794, and was buried in Larbert Churchyard. From 1762 till 1765 he was British Consul at Algiers, and during these years he explored the interior of Barbary. In

1767 and 1768 he was located in Syria, when he penetrated the Syrian desert, and succeeded in reaching Palmyra and Baalbec. Then followed his travels in Egypt and Abyssinia, on which his fame chiefly rests, though, as has been the case with other travellers, at first his account of his achievements was received with distrust, and even with ridicule.

In the *Travels in the Footsteps of Bruce* of Lieut.-Col. Playfair, British Consul-General at Algiers, many of the traveller's statements were verified, and some of his original drawings were reproduced. Colonel Playfair is himself a Scotsman who has added materially to our knowledge of Algeria and its people.

Next in order of time comes Mungo Park, the discoverer of the Niger; and he too was a thorough-bred Scot. He was born at Foulshiels near Selkirk, and in that Border town his statue testifies to this day to the pride of his countrymen in his short but eventful career. Like Richardson, he began life as a naval surgeon. He was but twenty-four years of age when he first explored the basin of the Upper Niger; and he was only thirty-four when, in his second expedition, he forfeited his life to his geographical zeal at Bussa.

Bruce and Park had worthy successors in Major Dixon Denham and Captain Hugh Clapperton, who together crossed the Sahara in 1822 from Tripoli to Bornu. Clapperton, who afterwards penetrated as far as Sokoto, was a Scotsman, having been born at Annan. The brothers Lander, who explored the course of the Lower Niger, were not Scotsmen, but Macgregor Laird, who, along with Mr. Oldfield, published the narrative of Richard Lander's unfortunate expedition, and who helped to explore the mouth of the great river, was certainly a Scot, as both parts of his name sufficiently testify. Hope Waddell, a Scottish missionary, spent nearly the whole of a long and useful life at Old Calabar, in the neighbourhood of the Cameroons Mountain, and made valuable additions to our knowledge of the country and the people in that little-known region.

If we pass to South Africa we find that we are indebted to Scotsmen for our earliest knowledge of the interior of the country north of the Orange River. One was an Edinburgh man, the Rev. John Campbell of Kingsland, London. He was sent out in 1812, by the London Missionary Society, to visit their stations in South Africa, and on his return in 1814 he published his *Travels*, of which there was a second edition in 1815. He was sent on a similar mission in 1818-21, and published again in 1822. Another was Sir James Alexander, whose narrative of a year's journeyings in the interior of South Africa was published in 1838. In 1816, the year after Campbell published his first book, Robert Moffat, the hero of the desert, had taken up his abode in the same region, which was for fifty years the scene of his missionary and philanthropic labours. He published his *Missionary Labours and Scenes in Southern Africa* in 1840, and he summed up his life work in a memorable speech in the Free Church Assembly of 1877.

It was at Kuruman, Dr. Moffat's station, that David Livingstone, the

prince of African travellers, served his apprenticeship as a missionary and explorer. Livingstone became Moffat's son-in-law, and thus served himself heir to his fame, which he was destined to transcend even during the lifetime of the patriarch. It was from Kuruman that Livingstone started on his first expeditions, when he crossed the Kalahari Desert and discovered first Lake Ngami, and afterwards the Upper Zambesi and the Victoria Falls. Livingstone's title to be considered the greatest of African travellers rests on the wonderful extent of ground that he covered, and on the practical value of his discoveries. He explored the Zambesi almost from its source to its mouth. He discovered Lake Nyassa, Lake Tanganyika, Lake Bangweolo, and the Lualaba River, which proves to be the Upper Congo; and thus he led the way to the discoveries of Cameron and Stanley, which have promoted the Congo to the first rank among the great rivers of Africa. Any one who desires to know what David Livingstone did for geographical exploration in Africa has only to compare a map of 1840, the year in which he began his labours, with a map of 1873, the year in which he died at Ilala. In place of a desert there is a fruitful field; in place of a wide tract labelled "Unknown," there is an array of lakes, rivers, and fertile valleys which it is marvellous to contemplate.

Among the direct successors of Livingstone, Scotsmen take high rank. Young Keith Johnston, the son of the famous Scottish cartographer, deserves a foremost place, because he sacrificed his life in the work of exploration. Next to him comes his companion-in-arms, Joseph Thomson, a native of Thornhill, Dumfriesshire, who scaled the heights of Kilima-Njaro, and brought to proof the pretensions of the fabulous Mountains of the Moon. The flourishing colony of Livingstonia, at the south end of Lake Nyassa, is distinctly a Scottish colony; and the leading spirits in that adventure have been Scotsmen—the brothers Moir, sons of Dr. Moir of Edinburgh, who have not only connected the Lake Nyassa basin with the Zambesi, but have also established a practicable trade route between Lake Nyassa and Lake Tanganyika.

Blantyre, another missionary colony in the same region, between Lake Shirwa and the river Shiré, is also a Scottish settlement, as is testified in the fact that it was named after the birthplace of David Livingstone. The Blantyre Mission is directly under the charge of the Church of Scotland. The mission of the English Universities, carried on in the same region during Livingstone's lifetime, was organised by Bishop Mackenzie, and Bishop Mackenzie was a Scotsman. The Free Church of Scotland has a similar missionary settlement at Lovedale in Kaffirland, which was organised and is carried on by Scotsmen.

Scotsmen have also had their share in solving the perennial problem of the Nile. James Augustus Grant, who, along with Speke, discovered the Victoria Nyanza in 1864, was born at Nairn.

If we turn to Australia, we encounter another array of Scotsmen. John M'Douall Stuart, who was the first man to cross the Australian con-

tinent from south to north, was a Scotsman. Sir Thomas Livingstone Mitchell, who explored Australia Felix, and traced the course of the Red River and the Darling River, was a native of Stirlingshire. Captain Grant who explored the coast of Victoria in 1800, Lieutenant Murray who discovered Port Philip in 1802, and Mr. Cunningham, the botanist, who accompanied Oxley and Evans in their expedition down the Lachlan River in 1816, were all Scotsmen. Sir Thomas Makdougall Brisbane, who, as Governor of New South Wales, did so much to encourage exploration and scientific research, especially in the departments of botany and astronomy, was a native of Ayrshire, and an Ayrshire landlord. The influence of Scotsmen in Australia is further indicated by the occurrence of such names as Perth, Brisbane, and Murray.

In the same way, Scotsmen have left their mark on the geography of New Zealand. Otago was first colonised by emigrants belonging to the Free Church of Scotland. Even if this were not a well-known fact, the Scottish origin of the province might be inferred from its oldest settlement being Invercargill, and from its capital being called Dunedin, which has its High Street, its Princes Street, and its Queen's Drive, just as Edinburgh, its prototype, has.

In like manner, we may trace the guiding hand of Scotsmen in Tasmania in the geographical nomenclature, in its Ben Lomond, its river Forth, and its North and South Esk.

If we pass now to the wide and varied field of exploration in Asia, we meet with a similar result. One of the earliest adventurers in this field was John Bell of Antermony, a Scottish physician, who was for many years attached to the court of the Czar of Russia. Between 1715 and 1722 he accompanied Russian expeditions to Persia and to China—the latter by way of Siberia and the deserts of Tartary. He also went with Peter the Great on his expedition to the Pass of Derbent in the east of the Caucasus, and he wrote *Travels in Asia*, abounding with interesting and amusing information. In 1815, Mountstuart Elphinstone, another Scot—a son of the eleventh Baron Elphinstone, and a native of Edinburgh—published his account of the Cabool kingdom. James Baillie Fraser, of Rulick, explored the snowy range of the Himalayas in 1825-26. Ten years later he made a winter journey on horseback from the eastern shore of the Bosporus to Teheran. Another Scotsman, whose name is indelibly written on the record of exploration in Persia and Afghanistan, is Sir Alexander Burnes, who was born in Montrose. In 1831 he was sent on a peaceful mission to Lahore, in the course of which he made extensive and important investigations. In subsequent years Burnes travelled in Afghanistan, and crossed the Hindu-Kush Mountains to Persia and Bokhara. The account of his explorations was given to the world in 1834. His great work on Cabool was published in 1842, the year after his perfidious murder at the Afghan capital. One of the earliest explorers of Tibet was George Bogle, a Scotsman, sent there on a special mission by Warren Hastings in 1774. John Wilson, of

Bombay, the famous missionary, the friend of Livingstone, and author of *Cave Temples of India*, and *Religious Excavations of Western India*, was a Scotsman—a native of Lauder. His son, Andrew Wilson, made a long and perilous journey through the Upper Himalayas, an account of which he wrote, under the title of *The Abode of Snow*.

Turning to the east of Asia, we find there also traces of Scottish footsteps in Lieutenant Alexander Murray's *Doings in China;* in the *Wanderings in China* of Robert Fortune, the botanist—a book abounding with valuable information regarding the social state and habits of the Chinese; in J. F. Campbell's *Circular Notes* about Japan and the Japanese; and, most famous of all, in Captain Basil Hall's *Voyage of Discovery to the West Coast of Corea and the Great Loo Choo Islands.* Basil Hall came of a well-known Scottish family, being a son of Sir James Hall of Dunglass. Another account of the same voyage was written by Mr. Macleod, surgeon of the *Alceste;* and he also was a Scot. Excellent work has also been done in Burmah by Scotsmen, among whom may be mentioned Colonel Yule, one of the Vice-Presidents of the Scottish Geographical Society, and Dr. Anderson, author of *Mandalay to Moulmein.* Mr. A. R. Colquhoun has shown in *Across Chrysê*—a record of travel in the border lands of China, Burmah, and Tonquin—how largely the spirit of adventure and of inquisitiveness survives in Scotsmen of the present day.

The list of Scotsmen who have increased our knowledge of European countries would occupy too much space. Brief mention may, however, be made of Joseph Forsyth, whose *Italy* is still a standard work; of Henry David Inglis (Derwent Conway), who travelled in Norway, Sweden, and Denmark, as well as in the south of Europe, early in the present century; of Robert Bremner's *Excursions in the interior of Russia and in Scandinavia;* of Samuel Laing's *Residence in Norway:* of the famous works on Greece—partly historical, partly descriptive—by George Finlay and Colonel Mure of Caldwell. It has been pointed out, as a remarkable circumstance, that the best description of the topography of the Plain of Troy was written by a man who never visited the scene. That was Charles Maclaren, a well-known Scottish geologist and political economist, and an Edinburgh journalist.

The most important contributions to our knowledge of the physical geography of the sea have also been made by Scotsmen in more recent times. The man who worked hardest, and who achieved the greatest results, in this interesting region was Sir Charles Wyville Thomson, of Edinburgh University; and he was a native of Linlithgowshire. His researches in the *Lightning* and the *Porcupine* strengthened his belief that animal life existed at great depths; but that and other matters of interest were put beyond reach of doubt by the results of the famous *Challenger* voyage, of which he was the chief. That expedition, in which other Scotsmen took a prominent part, not only revealed forms of animal life previously unknown, but added immensely to our knowledge of the physical character of the great oceans.

A brief reference must suffice to what Scotland has done for geographical literature and cartography. The *Physical Geography* of Mrs. Mary Somerville was the earliest systematic exposition of the subject in the English language, and the authoress was a Scotchwoman, a native of Roxburghshire—daughter of Vice-Admiral Sir William Fairfax, of Camperdown fame. The best modern works on the same subject have been written by Scotsmen—Professor Archibald Geikie, Keith Johnston, junior, and Professor John Cleland, of Glasgow. Keith Johnston also found time, in the intervals of his active labours as an explorer, to produce an admirable historical, physical, descriptive, and political *Geography of the World*, and the volume on *Africa*, in Stanford's series of Geographical Compendiums. Note must be taken, in this connection, of the valuable service done to geography, on its physical side, by Sir Roderick Murchison, not only by his geological researches and writings, and by the part he took in founding the Royal Geographical Society of London, but also by his endowment of the Chair of Geology in the University of Edinburgh. Nor should we forget the splendid geological work of Hugh Miller, in whose writings science and literature were wedded as they had never been before. The Edinburgh Cabinet Library, begun in 1830, is a valuable storehouse of geographical and historical knowledge. Many of the volumes were written by Scotsmen, James Baillie Fraser of Rulick contributing the accounts of Mesopotamia and Assyria. Hugh Murray, the historian of British India, which included an excellent sketch of the natural features of the country, was a native of North Berwick. He was also the author of an *Encyclopædia of Geography*. The most complete work of that kind, however, is Keith Johnston's *Gazetteer of Geography*. Keith Johnston devoted a long and laborious life to the diffusion of geographical knowledge, and he made Edinburgh famous as a centre for the production of accurate and artistic maps and atlases. It is, I believe, a mere matter of fact, capable of statistical proof, that one-half of all the maps produced in the world at the present day are prepared and printed in Edinburgh, the houses of Johnston and Bartholomew taking the lead. The most valuable storehouses of fact in the region of geography are the standard encyclopædias; and the standard encyclopædias are Scottish productions. Foremost in the list is the *Encyclopædia Britannica*, a work of world-wide repute, which is entirely the outcome of Scottish energy and enterprise. Next to it, and more popular in character, are Chambers's *Encyclopædia*, and *The Globe Encyclopædia*, in both of which geography has a prominent place. Of older date are the *Edinburgh Encyclopædia* and the *Encyclopædia Metropolitana*—the latter the production of a Glasgow house. It is only necessary to add that Scotland has produced some of the best text-books of general geography in common use, in order to warrant the statement that there is no department of geographical work in which Scotsmen have not taken a prominent and honourable share.

THE PHYSICAL FEATURES OF SCOTLAND.

By Professor James Geikie, LL.D., F.R.S., etc.

Scotland, like "all Gaul," is divided into three parts, namely, the Highlands, the Central Lowlands, and the Southern Uplands. These, as a correctly drawn map will show, are natural divisions, for they are in accordance not only with the actual configuration of the surface, but with the geological structure of the country. The boundaries of these principal districts are well defined. Thus, an approximately straight or gently undulating line taken from Stonehaven, in a south-west direction, along the northern outskirts of Strathmore to Glen Artney, and thence through the lower reaches of Loch Lomond to the Firth of Clyde at Kilcreggan, marks out with precision the southern limits of the Highland area and the northern boundary of the Central Lowlands. The line that separates the Central Lowlands from the Southern Uplands is hardly so prominently marked throughout its entire course, but it follows precisely the same north-east and south-west trend, and may be traced from Dunbar along the base of the Lammermoor and Moorfoot Hills, the Lowthers, and the hills of Galloway and Carrick to Girvan. In each of the two mountain-tracts—the Highlands and the Southern Uplands—areas of low-lying land occur, while in the intermediate Central Lowlands isolated prominences and certain well-defined belts of hilly ground make their appearance. The statement, so frequently repeated in class-books and manuals of geography, that the mountains of Scotland consist of three (some writers say five) "ranges" is erroneous and misleading. The original author of this strange statement probably derived his ignorance of the physical features of the country from a study of those antiquated maps upon which the mountains of poor Scotland are represented as sprawling and wriggling about like so many inebriated centipedes and convulsed caterpillars. Properly speaking, there is not a true mountain-range in the country. If we take this term, which has been very loosely used, to signify a linear belt of mountains—that is, an elevated ridge notched by cols or "passes" and traversed by transverse valleys—then in place of "three" or "five" such ranges we might just as well enumerate fifty or sixty, or more, in the Highlands and Southern Uplands. Or, should any number of such dominant ridges be included under the term "mountain-range," there seems no reason why all the mountains of the country should not be massed under one head and styled the "Scottish Range." When the geologist sees such a motley assemblage of heights as Goat Fell, the Lowthers, the Cheviots, the Pentlands, and the Lammermoors grouped together as a "range," as they are in some school-books, he may be excused for protesting warmly against such a preposterous travesty of nature. A mountain-range, properly so called, is a belt of high ground which has been ridged up by earth-movements. It is a fold, pucker, or wrinkle in the earth's crust, and its general external form coincides more

or less closely with the structure or arrangement of the rock-masses of which it is composed. A mountain-range of this characteristic type, however, seldom occurs singly, but is usually associated with other parallel ranges of the same kind—the whole forming together what is called a "mountain-chain," of which the Alps may be taken as an example. That chain consists of a vast succession of various kinds of rocks which at one time were disposed in horizontal layers or strata. But during subsequent earth-movements those horizontal beds were compressed laterally, squeezed, crumpled, contorted, and thrown, as it were, into gigantic undulations and sharper folds and plications. And, notwithstanding the enormous erosion or denudation to which the long parallel ridges or ranges have been subjected, we can yet see that the general contour of these corresponds in large measure to the plications or foldings of the strata. The long parallel ranges and intermediate hollows of the Jura, for example, are formed by undulations of the folded strata—the tops of the long hills coinciding more or less closely with the arches, and the intervening hollows with the troughs. Now folded, crumpled, and contorted rock-masses are common enough in the mountainous parts of Scotland, but the configuration of the surface rarely or never coincides with the inclination of the underlying strata. The mountain-crests, so far from being formed by the tops of great folds of the strata, very often show precisely the opposite kind of structure. In other words, the rocks, instead of being inclined away from the hill-tops like the roof of a house from its central ridge, frequently dip into the mountains. That is to say, the mountains are often built up of a series of strata arranged like a pile of saucers, one within another.

There is yet another feature which brings out clearly the fact that the slopes of the surface have not been determined by the inclination of the strata. The main water-parting that separates the drainage-system of the west from that of the east of Scotland does not coincide with any axis of elevation. It is not formed by an anticlinal fold or "saddleback." In point of fact it traverses the strata at all angles to their inclination. But this would not have been the case had the Scottish mountains consisted of a chain of true mountain-ranges. Our mountains, therefore, are merely monuments of denudation, they are the relics of elevated plateaux which have been deeply furrowed and trenched by running water and other agents of erosion. A short sketch of the leading features presented by the three divisions of the country will serve to make this plain.

The Highlands.—The southern boundary of this, the most extensive of the three divisions, has already been defined. The straightness of that boundary is due to the fact that it coincides with a great line of fracture of the earth's crust—on the north or Highland side of which occur slates, schists, and various other hard and tough rocks, while on the south side the prevailing strata are sandstones, etc., which are not of so durable a character. The latter, in consequence of the comparative ease with which they yield to the attacks of the eroding agents—rain and rivers, frost and

ice—have been worn away to a greater extent than the former, and hence the Highlands, along their southern margin, abut more or less abruptly upon the Lowlands. Looking across Strathmore from the Sidlaws or the Ochils, the mountains seem to spring suddenly from the low grounds at their base, and to extend north-east and south-west, as a great wall-like rampart. The whole area north and west of this line may be said to be mountainous, its average elevation being probably not less than 1500 feet above the sea.

A glance at the accompanying orographical map of Scotland, reduced by Mr. Bartholomew from the contoured sheets of the Ordnance Survey, and therefore affording a correct view of the physical relief of the country, will show better than any verbal description the manner in which our Highland mountains are grouped. It will be at once seen that to apply the term "range" to any particular area of those high grounds is simply a misuse of terms. Not only are the mountains not formed by plications and folds, but they do not even trend in linear directions. It is true that a well-trained eye can detect certain differences in the form and often in the colouring of the mountains when these are traversed from south-east to north-west. Such differences correspond to changes in the composition and structure of the rock-masses, which are disposed or arranged in a series of broad belts and narrower bands, running from south-west to north-east across the whole breadth of the Highlands. Each particular kind of rock gives rise to a special configuration or to certain characteristic features. Thus, the mountains that occur within a belt of slate often show a sharply cut outline, with more or less pointed peaks and somewhat serrated ridges—the Aberuchill Hills, near Comrie, are an example. In the regions of gneiss and granite the mountains are usually rounded and lumpy in form. Amongst the schists, again, the outlines are generally more angular. Quartz-rock often shows peaked and jagged outlines; while each variety of rock has its own particular colour, and this in certain states of the atmosphere is very marked. The mode in which the various rocks yield to the "weather"—the forms of their cliffs and corries—these and many other features strike a geologist at once; and therefore, if we are to subdivide the Highland mountains into "ranges," a geological classification seems the only natural arrangement that can be followed. Unfortunately, however, our geological lines, separating one belt or "range" from another, often run across the very heart of great mountain-masses. Our "ranges" are distinguished from each other simply by superficial differences of feature and structure. No long parallel hollows separate a "range" of schist-mountains from the succeeding "ranges" of quartz-rock, gneiss, or granite. And no degree of careful contouring could succeed in expressing the niceties of configuration just referred to, unless the maps were on a very large scale indeed. A geological classification or grouping of the mountains into linear belts cannot therefore be shown upon any ordinary orographical map. Such a map can present only the relative heights and disposition of the mountain-masses, and these

last, in the case of the Highlands, as we have seen, cannot be called "ranges" without straining the use of that term. Any wide tract of the Highlands, when viewed from a commanding position, looks like a tumbled ocean in which the waves appear to be moving in all directions. One is also impressed with the fact that the undulations of the surface, however interrupted they may be, are broad—the mountains, however they may vary in detail according to the character of the rocks, are massive, and generally round-shouldered and often somewhat flat-topped, while there is no great disparity of height amongst the dominant points of any individual group. Let us take, for example, the knot of mountains between Loch Maree and Loch Torridon. There we have a cluster of eight pyramidal mountain-masses, the summits of which do not differ much in elevation. Thus in Llathach two points reach 3358 feet and 3486 feet; in Beinn Alligin there are also two points reaching 3021 feet and 3232 feet respectively; in Beinn Dearg we have a height of 2995 feet; in Beinn Eighe are three dominant points—3188 feet, 3217 feet, and 3309 feet. The four pyramids to the north are somewhat lower—their elevations being 2860 feet, 2801 feet, 2370 feet, and 2892 feet. The mountains of Lochaber and the Monadhliath Mountains exhibit similar relationships; and the same holds good with all the mountain-masses of the Highlands. No geologist can doubt that such relationship is the result of denudation. The mountains are monuments of erosion—they are the wreck of an old table-land—the upper surface and original inclination of which are approximately indicated by the summits of the various mountain-masses and the directions of the principal water-flows. If we in imagination fill up the valleys with the rock-material which formerly occupied their place, we shall in some measure restore the general aspect of the Highland area before its mountains began to be shaped out by Nature's saws and chisels.

It will be observed that while streams descend from the various mountains to every point in the compass, their courses having often been determined by geological structure, etc., their waters yet tend eventually to collect and flow as large rivers in certain definite directions. These larger rivers flow in the direction of the average slope of the ancient table-land, while the main water-partings that separate the more extensive drainage-areas of the country mark out, in like manner, the dominant portions of the same old land-surface. The water-parting of the North-west Highlands runs nearly north and south, keeping quite close to the western shore, so that nearly all the drainage of that region flows inland. The general inclination of the North-west Highlands is therefore easterly towards Glenmore and the Moray Firth. In the region lying east of Glenmore the average slopes of the land are indicated by the directions of the rivers Spey, Don, and Tay. These two regions—the North-west and South-east Highlands—are clearly separated by the remarkable depression of Glenmore, which extends through Loch Linnhe, Loch Lochy, and Loch Ness, and the further extension of which towards the north-east is indi-

cated by the straight coast-line of the Moray Firth as far as Tarbat Ness. Now this long depression marks a line of fracture and displacement of very great geological antiquity. The old plateau of the Highlands was fissured and split in two—that portion which lay to the north-west sinking along the line of fissure to a great but at present unascertained depth. Thus the waters that flowed down the slopes of the north-west portion of the broken plateau were dammed by the long wall of rock on the "up-cast," or south-east side of the fissure, and compelled to flow off to north-east and south-west along the line of breakage. The erosion thus induced sufficed in the course of time to hollow out Glenmore and all the mountain-valleys that open upon it from the west.

The inclination of that portion of the fissured plateau which lay to the south-east is indicated, as already remarked, by the trend of the principal rivers. It was north-east in the Spey district, nearly due east in the area drained by the Don, east and south-east in that traversed by the Tay and its affluents, westerly and south-westerly in the district lying east of Loch Linnhe.[1] Thus, a line drawn from Ben Nevis through the Cairngorm and Ben Muich Dhui Mountains to Kinnaird Point passes through the highest land in the South-east Highlands, and probably indicates approximately the dominant portion of the ancient plateau. North of that line the drainage is towards the Moray Firth; east of it the rivers discharge to the North Sea; while an irregular winding line, drawn from Ben Nevis eastward through the Moor of Rannoch and southward to Ben Lomond, forms the water-parting between the North Sea and the Atlantic, and doubtless marks another dominant area of the old table-land.

That the valleys which discharge their water-flow north and east to the Moray Firth and the North Sea have been excavated by rivers and the allied agents of erosion, is sufficiently evident. All the larger rivers of that wide region are typical. They show the orthodox three courses—namely, a torrential or mountain-track, a middle or valley-track, and a lower or plain-track. The same is the case with some of the rivers that flow east from the great north-and-south water-parting of the North-west Highlands, as, for example, those that enter the heads of Beauly Firth, Cromarty Firth, and Dornoch Firth. Those, however, which descend to Loch Lochy and Loch Linnhe, and the sea-lochs of Argyllshire, have no lower or plain-track. When we cross the north-and-south water-parting of the North-west Highlands, we find that many of the streams are destitute of even a middle or valley-track. The majority are mere mountain-torrents when they reach the sea. Again, on he eastern watershed of the same region a large number of the valleys contain lakes in their upper and middle reaches, and this is the case also with

[1] The geological reader hardly requires to be reminded that many of the minor streams would have their courses determined, or greatly modified, by the geological structure of the ground. Thus, such streams often flow along the "strike" and other "lines of weakness," and similar causes, doubtless, influenced the main rivers during the gradual excavation of their valleys.

not a few of the valleys that open upon the Atlantic. More frequently, however, the waters flowing west pass through no lakes, but enter the sea at the heads of long sea-lochs or fiords. This striking contrast between the east and west is not due to any difference in the origin of the valleys. The western valleys are as much the result of erosion as those of the east. The present contrast, in fact, is more apparent than real, and arises from the fact that the land-area on the Atlantic side has been greatly reduced in extent by subsidence. The western fiords are merely submerged land-valleys.[1] Formerly the Inner and Outer Hebrides were united to themselves and the mainland, the country of which they formed a part stretching west into the Atlantic, as far probably as the present 100 fathom line. Were that drowned land to be re-elevated, each of the great sea-lochs would appear as a deep mountain-valley containing one or more lake basins of precisely the same character as those that occur in so many valleys on the eastern watershed. Thus we must consider all the islands lying off the west coast of the Highlands, including the major portions of Arran and Bute, as forming part and parcel of the Highland division of Scotland. The presence of the sea is a mere accident; the old lands now submerged were above its level during a very recent geological period—a period well within the lifetime of the existing fauna and flora.

The old table-land of which the Highlands and Islands are the denuded and unsubmerged relics, is of vast geological antiquity. It was certainly in existence, and had even undergone very considerable erosion, before the Old Red Sandstone period, as is proved by the fact that large tracts of the Old Red Sandstone formation are found occupying hollows in its surface. Glenmore had already been excavated when the conglomerates of the Old Red Sandstone began to be laid down. Some of the low-lying maritime tracts of the Highland area in Caithness, and the borders of the Moray Firth, are covered with the sandstones of that age; and there is evidence to show that these strata formerly extended over wide regions, from which they have since been removed by erosion. The fact that the Old Red Sandstone deposits still occupy such extensive areas in the north-east of the mainland, and in Orkney, shows that the old table-land shelved away gradually to north and east, and the same conclusion may be drawn, as we have seen, from the direction followed by the main lines of the existing drainage-system. We see, in short, in the table-land of the Highlands one of the oldest elevated regions of Europe—a region which has been again and again submerged either in whole or in part, and covered with the deposits of ancient seas and lakes, only to be re-elevated, time after

[1] It is not often that the writers of Geographical Class-books attempt to explain the origin of physical features, but when they do they occasionally make remarkable statements. Thus, in one manual we are told that the indentations so numerous on the west coasts of Norway, Scotland, and Ireland are due to the stormy waves of the Atlantic. From another we learn that the smallness of the Scottish lakes, as compared with those of Switzerland, is "owing to the deep indentations of the ocean!"

time, and thus to have those deposits in large measure swept away from its surface by the long-continued action of running water and other agents of denudation.

The Central Lowlands.—The belt of low-lying ground that separates the Highlands from the Southern Uplands is, as we have seen, very well defined. In many places the Uplands rise along its southern margin as abruptly as the Highlands in the north. The southern margin coincides, in fact, for a considerable distance (from Girvan to the base of the Moorfoots) with a great fracture that runs in the same direction as the bounding fracture or fault of the Highlands. The Central Lowlands may be described, in a word, as a broad depression between two table-lands. A glance at the map will show that the principal features of the Lowlands have a north-easterly trend—the same trend, in fact, as the bounding lines of the division. To this arrangement there are some exceptions, the principal being the belt of hilly ground that extends from the neighbourhood of Paisley south-east through the borders of Renfrewshire and Ayrshire, to the vicinity of Muirkirk. The major part of the Lowlands is under 500 feet in height, but some considerable portions exceed an elevation of 1000 feet, while here and there the hills approach a height of 2000 feet—the two highest points (2352 and 2335 feet) being attained in Ben Cleugh, one of the Ochils, and in Tinto. Probably the average elevation of the Lowland division does not exceed 350 or 400 feet. Speaking generally, the belts of hilly ground, and the more or less isolated prominences, are formed of more durable rocks than are met with in the adjacent lower-lying tracts. Thus the Sidlaws, the Ochil Hills, and the heights in Renfrewshire and Ayrshire, are composed chiefly of more or less hard and tough volcanic rocks; and when sandstones enter into the formation of a line of hills, as in the Sidlaws, they generally owe their preservation to the presence of the volcanic rocks with which they are associated. This is well illustrated by the Lomond Hills in Fifeshire, the basal and larger portion of which consists chiefly of somewhat soft sandstones, which have been protected from erosion by an overlying sheet of hard basalt-rock. All the isolated hills in the basin of the Forth are formed of knobs, bosses, and sheets of various kinds of igneous rock, which are more durable than the sandstones, shales, and other sedimentary strata by which they are surrounded. Hence it is very evident that the configuration of the Lowland tracts of Central Scotland is due to denudation. The softer and more readily disintegrated rocks have been worn away to a greater extent than the harder and less yielding masses.

Only in a few cases do the slopes of the hill-belts coincide with folds of the strata. Thus, the northern flanks of the Sidlaws and the Ochils slope towards the north-west, and this also is the general inclination of the old lavas and other rocks of which those hills are composed. The southern flanks of the same hill-belt slope in Fifeshire towards the south-east—this being also the dip or inclination of the rocks. The

crest of the Ochils coincides, therefore, more or less closely, with an anticlinal arch or fold of the strata. But when we follow the axis of this arch towards the north-east into the Sidlaws, we find it broken through by the Tay valley—the axial line running down through the Carse of Gowrie to the north of Dundee. From the fact that many similar anticlinal axes occur throughout the Lowlands, which yet give rise to no corresponding features at the surface, we may conclude that the partial preservation of the anticline of the Ochils and Sidlaws is simply owing to the greater durability of the materials of which those hills consist. Had the arch been composed of sandstones and shales it would most probably have given rise to no such prominent features as are now visible.

Another hilly belt, which at first sight appears to correspond roughly to an anticlinal axis, is that broad tract of igneous rocks which separates the Kilmarnock coal-field from the coal-fields of the Clyde basin. But although the old lavas of that hilly tract slope north-east and south-west, with the same general inclination as the surface, yet examination shows that the hills do not form a true anticline. They are built up of a great variety of ancient lavas and fragmental tuffs or "ashes," which are inclined in many different directions. In short, we have in those hills the degraded and sorely denuded fragments of an ancient volcanic bank formed by eruptions that began upon the bottom of a shallow sea in early Carboniferous times, and subsequently became sub-aërial. And there is evidence to show that after the eruptions ceased the volcanic bank was slowly submerged, and eventually buried underneath the accumulating sediments of later Carboniferous times. The exposure of the ancient volcanic bank at the surface has been accomplished by the denudation of the stratified masses which formerly covered it, and its existence as a dominant elevation at the present day is solely due to the fact that it is built up of more persistent materials than occur in the adjacent low-lying areas. The Ochils and the Sidlaws are of greater antiquity, but have a somewhat similar history. Into this, however, it is not necessary to go.

The principal hills of the Lowlands form two interrupted belts, extending north-east and south-west, one of them, which we may call the Northern Heights, facing the Highlands, and the other, which may in like manner be termed the Southern Heights, flanking the great Uplands of the south. The former of these two belts is represented by the Garvock Hills, lying between Stonehaven and the valley of the North Esk; the Sidlaws, extending from the neighbourhood of Montrose to the valley of the Tay at Perth; the Ochil Hills, stretching along the south side of the Firth of Tay to the valley of the Forth at Bridge-of-Allan; the Lennox Hills, ranging from the neighbourhood of Stirling to Dumbarton; the Kilbarchan Hills, lying between Greenock and Ardrossan; the Cumbrae Islands and the southern half of Arran; and the same line of heights reappears in the south end of Kintyre. A well-marked hollow, trough, or undulating plain of variable width, separates these Northern Heights from the Highlands, and may be followed all the way from near Stone-

haven, through Strathmore, to Crieff and Auchterarder. Between the valleys of the Earn and Teith this plain attains an abnormal height (the Braes of Doune); but from the Teith, south-west by Flanders Moss and the lower end of Loch Lomond to the Clyde at Helensburgh, it resumes its characteristic features. It will be observed also that a hollow separates the southern portion of Arran from the much loftier northern or Highland area. The Braes of Doune, extending from Glen Artney south-east to Strath Allan, although abutting upon the Highlands, is clearly marked off from that great division by geological composition and structure, by elevation and configuration. It is simply a less deeply eroded portion of the long trough or hollow.

Passing now to the Southern Heights of the Lowlands, we find that these form a still more interrupted belt than the Northern Heights, and that they are less clearly separated by an intermediate depression from the great Uplands which they flank. They begin in the north-east with the isolated Garlton Hills, between which and the Lammermoors a narrow low-lying trough or hollow appears. A considerable width of low ground now intervenes before we reach the Pentland Hills, which are in like manner separated from the Southern Uplands by a broad low-lying tract. At their southern extremity, however, the Pentlands merge more or less gradually into a somewhat broken and interrupted group of hills which abut abruptly on the Southern Uplands, in the same manner as the Braes of Doune abut upon the slate hills of the Highland borders. In this region the greatest heights reached are in Tinto (2335 feet), and Cairntable (1844 feet), and, at the same time, the hills broaden out towards north-west, where they are continued by the belt of volcanic rocks already described as extending between the coal-fields of the Clyde and Kilmarnock. Although the Southern Heights abut so closely upon the Uplands lying to the south, there is no difficulty in drawing a firm line of demarcation between the two areas—geologically and physically they are readily distinguished. No one with any eye for form, no matter how ignorant he may be of geology, can fail to see how strongly contrasted are such hills as Tinto and Cairntable with those of the Uplands, which they face. The Southern Heights are again interrupted towards the south-east by the valleys of the Ayr and the Doon, but they reappear in the hills that extend from the Heads of Ayr to the valley of the Girvan.

Betwixt the Northern and Southern Heights spread the broad Lowland tracts that drain towards the Forth, together with the lower reaches of the Clyde valley, and the wide moors that form the water-parting between that river and the estuary of the Forth. The hills that occur within this inner region of the Central Lowlands are usually more or less isolated, and are invariably formed by outcrops of igneous rock. Their outline and general aspect vary according to the geological character of the rocks of which the hills are composed—some forming more or less prominent escarpments like those of the Bathgate Hills and the hills behind Burntisland and Kinghorn, others showing a soft rounded contour like the

Saline Hills in the west of Fifeshire. Of the same general character as this inner Lowland region is the similar tract watered by the Irvine, the Ayr, and the Doon. This tract, as we have seen, is separated from the larger inner region lying to the east by the volcanic hills that extend from the Southern Heights north-west into Renfrewshire.

The largest rivers that intersect the Central Lowlands take their rise, as might be expected, in the mountainous table-lands to the north and south. Of these the principal are the North and South Esks, the Tay and the Isla, the Earn, and the Forth, all of which, with numerous tributaries, descend from the Highlands. And it will be observed that they have breached the line of the Northern Heights in three places—namely, in the neighbourhood of Montrose, Perth, and Stirling. The only streams of any importance coming north from the Southern Uplands are the Clyde and the Doon, both of which in like manner have broken through the Southern Heights. Now, just as the main water-flows of the Highlands indicate the average slope of the ancient land-surface before it was trenched and furrowed by the innumerable valleys that now intersect it, so the direction followed by the greater rivers that traverse the Lowlands mark out the primeval slopes of that area. One sees at a glance, then, that the present configuration of this latter division has been brought about by the erosive action of the principal rivers and their countless affluents, aided by the sub-aërial agents generally—rain, frost, ice, etc. The hills rise above the average level of the ground not because they have been ridged up from below, but simply owing to the more durable nature of their component rocks. That the Northern and Southern Heights are breached only shows that the low grounds now separating those heights from the adjacent Highlands and Southern Uplands formerly stood at a higher level, and so allowed the rivers to make their way more or less directly to the sea. Thus, for example, the long trough of Strathmore has been excavated out of sandstones, the upper surface of which once reached a much greater height, and sloped outwards from the Highlands across what is now the ridge of the Sidlaw Hills. Here then, in the Central Lowlands, as in the Highlands, true mountain- or hill-ranges are absent. But if we are permitted to term any well-marked line or belt of high ground a "range," then the Northern and Southern Heights of the Lowlands are better entitled to be so designated than any series of mountains in the Highlands.

The Southern Uplands.—The northern margin of this wide division having already been defined, we may now proceed to examine the distribution of its mountain-masses. Before doing so, however, it may be as well to point out that considerable tracts in Tweeddale, Teviotdale, and Liddesdale, together with the Cheviot Hills, do not properly belong to the Southern Uplands. In fact, the Cheviots bear the same relation to those Uplands as the Northern Heights do to the Highlands. Like them they are separated by a broad hollow from the Uplands, which they face—

a hollow that reaches its greatest extent in Tweeddale, and rapidly wedges out to south-west, where the Cheviots abut abruptly upon the Uplands. Even where this abrupt contact takes place, however, the different configuration of the two regions would enable any geologist to separate the one set of mountains from the other. But for geographical purposes we may conveniently disregard these geological contrasts, and include within the Southern Uplands all the area lying between the Central Lowlands and the English Border.

If there are no mountains in the Highlands so grouped and arranged as to be properly termed "ranges," this is not less true of the Southern Uplands. Perhaps it is the appearance which those Uplands present when viewed from the Central Lowlands that first suggested the notion that they were ranges. They seem to rise like a wall out of the low grounds at their base, and extend far as eye can reach in an approximately straight line. It seems more probable, however, that our earlier cartographers merely meant, by their conventional hill-shading, to mark out definitely the water-partings. But to do so in this manner now, when the large contour maps of the Ordnance Survey may be in any one's hands, is inexcusable. A study of those maps, or, better still, a visit to the tops of a few of the dominant points in the area under review, will effectually dispel the idea that the Southern Uplands consist of a series of ridges zigzagging across the country. Like the Highlands, the area of the Southern Uplands is simply an old table-land, furrowed into ravine and valley by the operation of the various agents of erosion.

Beginning our survey of these Uplands in the east, we encounter first the Lammermoor Hills—a broad undulating plateau—the highest elevations of which do not reach 2000 feet. West of this come the Moorfoot Hills and the high grounds lying between the Gala and the Tweed—a tract which averages a somewhat higher elevation—two points exceeding 2000 feet in height. The next group of mountains we meet is that of the Moffat Hills, in which head a number of important rivers—the Tweed, the Yarrow, the Ettrick, and the Annan. Many points in this region exceed 2000 feet, others approach 2500 feet; and some reach nearly 3000 feet, such as Broad Law (2754 feet), and Dollar Law (2680 feet). In the south-west comes the group of the Lowthers, with dominant elevations of more than 2000 feet. Then follow the mountain-masses in which the Nith, the Ken, the Cree, the Doon, and the Girvan take their rise, many of the heights exceeding 2000 feet, and a number reaching and even passing 2500 feet, the dominant point being reached in the noble mountain-mass of the Merrick (2764 feet). In the extreme south-west the Uplands terminate in a broad undulating plateau, of which the highest point is but little over 1000 feet. All the mountain-groups now referred to are massed along the northern borders of the Southern Uplands. In the south-west the general surface falls more or less gradually away towards the Solway—the 500 feet contour line being reached at fifteen miles, upon an average, from the sea-coast. In the extreme north-east the

high grounds descend in like manner into the rich low grounds of the Merse. Between these low grounds and Annandale, however, the Uplands merge, as it were, into the broad elevated moory tract that extends south-east, to unite with the Cheviots—a belt of hills rising along the English Border to heights of 1964 feet (Peel Fell), and 2676 feet (the Cheviot).

The general configuration of the main mass of the Southern Uplands—that is to say, the mountain-groups that extend along the northern portion of the area under review, from Loch Ryan to the coast between Dunbar and St. Abb's Head—is somewhat tame and monotonous. The mountains are flat-topped elevations, with broad, rounded shoulders and smooth grassy slopes. Standing on the summit of some of the higher hills, one seems to be in the midst of a wide, gently undulating plain, the surface of which is not broken by the appearance of any isolated peaks or eminences. Struggling across the bogs and peat-mosses that cover so many of those flat-topped mountains, the wanderer ever and anon suddenly finds himself on the brink of a deep green dale. He discovers, in short, that he is traversing an elevated undulating table-land, intersected by narrow and broad trench-like valleys that radiate outwards in all directions from the dominant bosses and swellings of the plateau. The mountains, therefore, are merely broad ridges and banks separating contiguous valleys; in a word, they are, like the mountains of the Highlands, monuments of erosion, which do not run in linear directions, but form irregular groups and masses.

The rocks that enter into the formation of this portion of the Southern Uplands have much the same character throughout. Consequently there is less variety of contour and colour than in the Highlands. The hills are not only flatter atop, but are generally much smoother in outline, there being a general absence of those beetling crags and precipices which are so common in the Highland regions. Now and again, however, the mountains assume a rougher aspect. This is especially the case with those of Carrick and Galloway, amongst which we encounter a wildness and grandeur which are in striking contrast to the gentle pastoral character of the Lowthers and similar tracts extending along the northern and higher parts of the Southern Uplands. Descending to details, the geologist can observe also modifications of contour even among those monotonous rounded hills. Such modifications are due to differences in the character of the component rocks, but they are rarely so striking as the modifications that arise from the same cause in the Highlands. To the trained eye, however, they are sufficiently manifest, and upon a geologically coloured map, which shows the various belts of rock that traverse the Uplands from south-west to north-east, it will be found that the mountains occurring within each of those separate belts have certain distinctive features. Such features, however, cannot be depicted upon a small orographical map. The separation of those mountains into distinct ranges, by reference to their physical aspect, is even less possible here than in the Highlands. Now and again, bands of certain rocks, which are of a more durable character

than the other strata in their neighbourhood, give rise to pronounced ridges and banks, while hollows and valleys occasionally coincide more or less closely with the outcrop of the more readily eroded strata; but such features are mere minor details in the general configuration of the country. The courses of brooks and streams may have been frequently determined by the nature and arrangement of the rocks, but the general slope of the Uplands and the direction of the main lines of waterflow are at right angles to the trend of the strata, and cannot therefore have been determined in that way. The strata generally are inclined at high angles —they occur, in short, as a series of great anticlinal arches and synclinal curves, but the tops of the grand folds have been planed off, and the axes of the synclinal troughs, so far from coinciding with valleys, very often run along the tops of the highest hills. The foldings and plications do not, in a word, produce any corresponding undulations of the surface.

Mention has been made of the elevated moory tracts that serve to connect the Cheviots with the loftier Uplands lying to north-west. The configuration of these moors is tamer even than that of the regions just described, but the same general form prevails from the neighbourhood of the Moffat Hills to the head-waters of the Teviot. There, however, other varieties of rock appear, and produce corresponding changes in the aspect of the high grounds. Not a few of the hills in this district stand out prominently. They are more or less pyramidal and conical in shape, being built up of sandstones often crowned atop with a capping of some crystalline igneous rock, such as basalt. The Maiden Paps, Leap Hill, Needs Law, and others are examples. The heights draining towards Liddesdale and the lower reaches of Eskdale, composed chiefly of sandstones, with here and there intercalated sheets of harder igneous rock, frequently show escarpments and terraced outlines, but have a general undulating contour; and similar features are characteristic of the sandstone mountains that form the south-west portion of the Cheviots. Towards the north-east, however, the sandstones give place to various igneous rocks, so that the hills in the north-east section of the Cheviots differ very much in aspect and configuration from those at the other extremity of the belt. They have a more varied and broken outline, closely resembling many parts of the Ochils and other portions of the Northern and Southern Heights of the Central Lowlands.

The low-lying tracts of Roxburghshire and the Merse, in like manner, present features which are common to the inner region of the Central Lowlands. Occasional ridges of hills rise above the general level of the land, as at Smailholm and Stitchell to the north of Kelso, while isolated knolls and prominences—some bald and abrupt, others smooth and rounded —help to diversify the surface. Bonchester Hill, Rubers Law, the Dunian, Penielheugh, Minto Hills, and the Eildons may be mentioned as examples. All of these are of igneous origin, some being mere caps of basalt resting upon a foundation of sandstone, while others are the stumps of isolated volcanoes.

In the maritime tracts of Galloway the low grounds repeat, on a smaller scale, the configuration of the lofty Uplands behind, for they are composed of the same kinds of rock. Their most remarkable feature is the heavy mountain-mass of Criffel, rising near the mouth of the Nith to a height of 1800 feet.

Everywhere, therefore, throughout the region of the Southern Uplands, in hilly and low-lying tracts alike, we see that the land has been modelled and contoured by the agents of erosion. We are dealing, as in the Highlands, with an old table-land, in which valleys have been excavated by running water and its helpmates. Nowhere do we encounter any linear banks, ridges, or ranges as we find described in the class-books, and represented upon many general maps of the country. In one of those manuals we read that in the southern district "the principal range of mountains is that known as the Lowther Hills, which springs off from the Cheviots, and, running in a zigzag direction to the south-west, terminates on the west coast near Loch Ryan." This is quite true, according to many common maps, but unfortunately the "range" exists upon those maps and nowhere else. The zigzag line described is not a range of mountains, but a water-parting, which is quite another matter.

The table-land of the Southern Uplands, like that of the Highlands, is of immense antiquity. Long before the Old Red Sandstone period, it had been furrowed and trenched by running water. Of the original contour of its surface, all we can say is that it formed an undulating plateau, the general slope of which was towards south-east. This is shown by the trend of the more important rivers, such as the Nith and the Annan, the Gala and the Leader; and by the distribution of the various strata pertaining to the Old Red Sandstone and later geological periods. Thus, strata of Old Red Sandstone and Carboniferous age occupy the Merse and the lower reaches of Teviotdale, and extend up the valleys of the Whiteadder and the Leader into the heart of the Silurian Uplands. In like manner Permian sandstones are well developed in the ancient hollows of Annandale and Nithsdale. Along the northern borders of the Southern Uplands we meet with similar evidence to show that even as early as Old Red Sandstone times the ancient plateau, along what is now its northern margin, was penetrated by valleys that drained towards the north. The main drainage, however, then as now, was directly towards south-east.

Many geological facts conspire to show that the Silurian table-land of these Uplands has been submerged, like the Highlands, in whole or in part. This happened at various periods, and each time the land went down it received a covering of newer accumulations—patches of which still remain to testify to the former extent of the submergences. From the higher portions of the Uplands those accumulations have been almost wholly swept away, but they have not been entirely cleared out of the ancient valleys. They still mantle the borders of the Silurian area, particularly in the north-east, where they attain a great thickness in the moors

of Liddesdale and the Cheviot Hills. The details of the evolution of the whole area of the Southern Uplands form an interesting study, but this pertains rather to Geology than to Physical Geography. It is enough, from our present point of view, to be assured that the main features of the country were chalked out, as it were, at a very distant geological period, and that all the infinite variety in the relief of our land has been brought about directly, not by titanic convulsions and earth-movements, but by the long-continued working of rain and rivers—of frost and snow and ice, supplemented from time to time by the action of the sea.

The physical features more particularly referred to in this paper are of course only the bolder and more prominent contours—those namely which can be expressed with sufficient accuracy upon sheets of such a size as the accompanying orographical map of Scotland. With larger maps considerably more detail can be added, and many characteristic and distinguishing features will appear according to the care with which such maps are drawn. In the case of the Ordnance Survey map, on the scale of 1 inch to a mile, the varying forms of the surface are so faithfully delineated as frequently to indicate to a trained observer the nature of the rocks and the geological structure of the ground. The artists who sketched the hills must indeed have had good eyes for form. So carefully has their work been done, that it is often not difficult to distinguish upon their maps hills formed of such rocks as sandstone from those that are composed of more durable kinds. The individual characteristics of mountains of schist, of granite, of quartz-rock, of slate, are often well depicted: nay, even the varieties of igneous rock which enter into the formation of the numerous hills and knolls of the Lowlands can frequently be detected by the features which the artists have so intelligently caught. Another set of features which their maps display are those due to glaciation. These are admirably brought out, even down to the smallest details. A glance at such maps as those of Teviotdale and the Merse, for example, shows at once the direction taken by the old *mer de glace*. The long parallel flutings of the hill-slopes, *roches moutonnées*, projecting knolls and hills with their "tails," the great series of banks and ridges of stony clay which trend down the valley of the Tweed—these, and many more details of interest to specialists, are shown upon the maps. All over Scotland similar phenomena are common, and have been reproduced with marvellous skill on the shaded sheets issued by the Ordnance Survey. And yet the artists were not geologists. The present writer is glad of this opportunity of recording his obligations to those gentlemen. Their faithful delineations of physical features have given him many valuable suggestions, and have led up to certain observations which might otherwise not have been made.

With such admirable cartographical work before them, how long will intelligent teachers continue to tolerate those antiquated monstrosities which so often do duty as wall-maps in their school-rooms? Surely more advantage ought to be taken of the progress made within the last thirty or

OUTER HEBRIDES
Flannan Is
Butt of Lewis
Stornoway
Eye Peninsula
Lewis
Harris
Sound of Harris
N. Uist
Benbecula
South Uist
Barra
Barra Head
North Minch
Little Minch
Gulf of the Hebrides
Pt. of Aird
L. Snizort
Skye
Raasay
Canna
Cuillin Sound
Rum
Eigg
Sound of Sleat
Ardnamurchan Pt.
Coll
Loch Torridon
Loch Broom
Cape Wrath
Loch Eriboll
Tongue
Ben Hope
Ben More
Loch Shin
Shin
Ben Dearg
North West Highlands
Ben Attow
Glen More
Ben Nevis
Ben Alder
Pentland Firth
Dunnet Hd.
Duncansbay Hd.
John o'Groats
Thurso
Wick
Helmsdale
Dornoch
Dornoch Firth
Tain
Tarbat Ness
Moray Firth
Black Isle
Nairn
Inverness
Findhorn
Elgin
Banff
Kinnaird Hd.
Fraserburgh
Peterhead
Buchan Ness
Ythan
Don
ABERDEEN
Dee
Stonehaven
Strath Spey
Spey
HIGHLANDS
Ben Macdhui
Balmoral
Lochnagar
South East Highlands
L. Rannoch
Tummel
N. Esk
S. Esk
Montrose
Forfar
7
6
5
4
2
58
57

forty years in our knowledge of the physical features of our country. It is time that the youth in all our schools should be able to gather from their maps an accurate notion of the country in which they live—that they should see the form of its surface depicted with an approach to truth —and learn something more than that so many principal rivers flow in so many different directions. With a well-drawn and faithful orographical map before him the school-boy would not only have his labours lightened, but geography would become one of the most interesting of studies. He would see in his map a recognisable picture of a country, and not, as at present is too often the case, a kind of mysterious hieroglyphic designed by the enemy for his confusion.

HONORARY MEMBERS OF THE SCOTTISH GEOGRAPHICAL SOCIETY.

Leopold II., King of the Belgians.

It is not as King of the Belgians that Leopold II. appears as the first Honorary Member of the Scottish Geographical Society. His title to occupy such a position is altogether independent of his crown and sceptre, and consists in the simple fact that, in spite of the trammels of state-craft and political etiquette, he has shown himself one of the truest and most liberal patrons of geographical exploration and research. To him is due the existence of the International African Association. On September 12, 1876, a Geographical Conference was held at his invitation in the Royal Palace at Brussels. All the six Great Powers, as well as Belgium, were represented: Germany, by Dr. Nachtigal, Dr. Schweinfurth, Dr. Rohlfs, and Baron von Richthofen; France, by M. Henri Duveyrier, the Marquis de Compiègne, M. d'Abbadie, M. Maunoir, etc.; England, by Sir Henry Rawlinson, Commander Cameron, Lieutenant-Colonel Grant, and Sir Bartle Frere; Austria, by Dr. Hochstetter; Russia, by M. Semenoff; and Italy, by Commander Negri. "The subject," said the King, "which brings us together to-day is one of those which most deserve the attention of the friends of humanity. To open to civilisation the only part of our globe where it has not yet penetrated, to pierce the darkness in which entire nations are shrouded, is, I venture to say, a crusade worthy of this century of progress. Among those who have most studied Africa there are many who think that it would promote their common aim if they could meet and consult each other for the purpose of arranging their march, combining their efforts, utilising all their resources, and avoiding the waste involved by two doing the same piece of work. It has occurred to me that Belgium, a neutral and central State, would afford a suitable rendezvous for such a meeting. . . . I place myself at your disposal, and wish you cordially welcome." Two days later the *International African Association* was founded; and, on the motion of Sir Bartle

Frere, the King of the Belgians was declared President. On June 21, 1877, a committee of the Association adopted a blue flag, with a gold star in the centre. This is not the place to enter into details in regard to the work of the Association; nor do we require at present to rehearse the steps by which, at the Berlin Conference of 1884-5, the Association, already recognised as a territorial government by the United States and Germany, successively obtained similar recognition from England, Italy, Austria-Hungary, etc. We may add a few facts of a personal kind in regard to the King. Leopold II.—Leopold Louis Philippe Marie Victor—is the son of Leopold I. (of Saxe-Coburg, and widower of the Princess Charlotte of England), who was chosen to fill the Belgian throne in 1831. He was born at Brussels April 9, 1835, married the Archduchess Maria of Austria, August 22, 1853, and succeeded his father, December 10, 1865. His Majesty has made a tour through Europe, Egypt, and part of Asia Minor. In England he is known as a frequent visitor.

Mr. Henry Morton Stanley.

Mr. Henry Morton Stanley has long been so prominently before the public, that the main facts of his life must be familiar to all. The Americanised English-speaking Welshman, who is now by a kind of poetic justice the head of the International Association, had done no small amount of hard and successful work before he sprang into world-wide fame as the "Finder of Livingstone." Born in the little town of Denbigh in 1840, John Rowlands—for that was his baptismal name—had, through the death of his father, to content himself with such education as slender means could supply. Finding his way to America when about sixteen years of age, he obtained his present name from a merchant who adopted him; but by his death he was again left to shift for himself. During the American war he saw active service, first on the Confederate side under General Johnstone, and afterwards (having in the meantime been made a prisoner and escaped) on the Federal side, where he rose to be a naval ensign on board the *Ticonderoga*. On board this vessel he visited Constantinople and Smyrna, and obtained furlough for the purpose of going to see his mother at Denbigh. As correspondent of the *Missouri Democrat* and the *New York Tribune*, he joined General Hancock's expedition against the Cheyenne and Kiowa Indians, and on his return journey he descended the river Platte on a raft to its junction with the Missouri. In the interests of the *New York Herald*, he accompanied the English expedition to Abyssinia, and distinguished himself by his despatch as well as by his despatches. His report of the capture of Magdala reached New York before the official report reached London. A journey through Asia Minor and Persia to India further fitted him for the work of an explorer; and he was acting as war correspondent in Spain when the telegram arrived that devoted him henceforward to Africa. The success of his Livingstone search expedition (1871-2) was followed by the more remarkable journey "through the Dark Continent," 1874-8, with its primary discoveries in

regard to the wonderful course of the Congo. Since 1879, his interests have been identified with the International Association, whose claims he has powerfully supported at the Berlin Conference. We have been asked by several of those who heard his speech at the Edinburgh banquet to reprint the following passage :—

"Africa—that dark-forgotten continent rimmed around by mountain-ranges of an altitude from 1000 to 9000 feet high, divided into fair and fertile basins, and watered by mighty rivers, and peopled by countless millions! A fleet of Arab vessels sailing across the Red Sea ; an army of these fanatics debark ; they climb the steep passes of Abyssinia, and surmount the lofty plateau. They are mounted on fleet dromedaries, with coverings of velvet, adorned with gold and silver filigree, on coursers of Yemen and white asses of Arabia. They unfurl their standards, and with banners streaming, they advance against Paganism, with the fierce cry of 'Death to the Unbeliever—there is no God but God, and Mohammed in his prophet.' Terror precedes them, death accompanies them, desolation follows them. The Apostle of Islam knows no mercy. Ages elapse, and this creed overruns North Africa ; from Guardafui to Cape Juby the Crescent is triumphant. The Libyan Desert and the Sahara are traversed, and, invincible and dauntless, the proud riders advance towards the Equator, when suddenly the camels are stricken down as by a pestilence, the high-spirited steeds become nerveless and die, and the white asses shrink under this mysterious change of Nature. Baffled, they return, to resume their conquests over the dry deserts and rocky plateaux of Northern Africa, leaving the southern half of Africa to other influences, and to higher nations. That is one picture.

"The other is of a more modern period. From the Cape of Good Hope advances a Christian missionary, with a meek and humble following of Hottentot servants, a wagon, and a few teams of oxen. He advances northward towards the untravelled wilds of Southern Africa. He seeks the heathen in his home. To his astonishment, he hails him as a brother. He soothes the benighted man with our vision of a Heaven, comforts him with the assurance of a Redeemer, and infuses into him the hope of salvation. And ever as he advances northward he repeats the song of the angels, which they sang over Bethlehem : 'Peace on earth and goodwill towards men.' This same Christian arrives finally on the banks of the Zambezi, and thence directs his path westward to the Atlantic Ocean. Back again, whence he came, he retraces his wearied steps ; and he halts not until he has viewed the waters of the Indian Ocean ; and along all that vast route he has dropped the sweet words of Peace and Love, and on whomsoever he gazed with those eyes, radiant with loving fellowship, he has blessed him with the view of a good man made perfect by trial in the wilderness. After a short pause among his own kind, he returns to Africa, and for fifteen years more he continues to move among the lost nations, loving and loved, blessing and being blessed, and at last surrenders his life in their midst on the shore of Bangweolo ; and as we turn to the map of Africa, to regard the traces of his footsteps, we behold the outlines of the Cross of the Redeemer drawn by Livingstone during his thirty-two years of travel in the southern half of Africa.

"There was pomp and majesty in the proud advance of Mohammed into Abyssinia, but the picture of the lone Christian wandering in those untrodden wilds of South Africa, with charity and good-will for his motto, is almost divine. It is grand to think of the brave undaunted Arabs, so invincible in war, carrying the Crescent flag from the Red Sea to the Atlantic, but it is still grander to think of the large conquests achieved by this meek and patient follower of Christ by the simple power of Christian love. Give due meed to the Arabs for the valour

and matchless courage with which they carried their faith over many a thousand leagues in Northern Africa; but the undying constancy, the persistent resolution, the patient fortitude of this lone soldier of the Cross, during his long and blameless crusade in the strongholds of Paganism, is sublime.

"Well, then, since this Christian, with all his unrivalled goodness and piety, has declared that the end of the geographical feat is the beginning of commercial enterprise, do you wonder that I, the last of his race and colour who talked with him, should take up his work with the view of redeeming Africa from its forlornness and squalid poverty by initiating legitimate commercial enterprise? If even Brummagem ware be the means of awakening the Africans from their torpor, let Brummagem ware be consecrated as the means which caused Livingstone's hopes to be fulfilled."

Lord Aberdare, President of the Royal Geographical Society.

The Right Honourable Henry Austin Bruce, Lord Aberdare, is neither a famous traveller nor a professional geographer; but in a long and useful political career—for he was born in 1815, was called to the bar in 1837, entered the House of Commons in 1852, and was raised to the peerage in 1873—he has displayed a steady interest in the general progress of education and science, and since 1880 has rendered more special service to Geography as President of the Royal Geographical Society of London. To that Society the world at large owes a debt which it will possibly only begin to realise when it looks back on the nineteenth century with that wider knowledge and wisdom to which the work of the Society will have contributed not a little. It has hitherto stood alone in the country, without assistant, as without rival; but we hope it will yet appear as the proud parent of a vigorous company of geographical societies, whose rivalry will be the eager but filial rivalry of sons intent upon adding to the common inheritance of the house. Lord Aberdare's name will be perpetuated through the Aberdare Range, discovered by Mr. Thomson in 1883.

Mr. Joseph Thomson.

The career of Mr. Joseph Thomson has been at once successful and romantic. That a youth who in 1877 was quietly attending classes at the Edinburgh University should, three years later, appear before his countrymen as one of the most notable explorers of the day, was, in itself, remarkable enough; but those who know the whole history of the circumstances by which this transformation was brought about are aware that all the wonder of the matter does not lie on the surface. There are incidents to which we can only allude that appear almost as the visible workings of destiny. Mr. Thomson was born at Thornhill, Dumfriesshire, in 1858. His father is lessee of Gatelaw Quarry, which was at one time held by the original of "Old Mortality;" and the brother, to whose literary experience and taste he confesses himself indebted in connection with his books of travel, is the Rev. J. B. Thomson, minister of a United Presbyterian church at Greenock. Accidentally observing in a newspaper

paragraph that the Royal Geographical Society was sending out an African expedition, under Mr. Keith Johnston, he offered his services, and obtained an appointment as geologist to the expedition. By Mr. Johnston's death he was unexpectedly obliged to take command shortly after the journey into the interior had commenced; but, instead of returning, as a weaker man might have done, he pushed on to the north end of Lake Nyassa, and thence, by the shores of Tanganyika, till he was within ten miles of the Congo. That his prudence was equal to his courage was abundantly shown by the fact that when he again reached the coast, after an absence of fourteen months, his party had lost only one man by death and none at all by desertion. He discovered Lake Hikwa in April 1880, and named it Lake Leopold, after Prince Leopold. *To the Central African Lakes and Back*, as he entitled the two volumes published in 1881, showed that Mr. Thomson could describe as well as discover.

In 1881 he again went out to East Africa to "examine the so-called coal region of the Rovuma basin for the Sultan of Zanzibar," but "failed either to find or make the valuable mineral;" and between January 1883 and May 1884 he was engaged on that wonderful journey *Through Masai Land*, which is described in our notices of new books. At present Mr. Thomson is, we believe, pushing his way inland from the Lower Niger to the kingdom of Sokoto, in the interests of a commercial company. His scientific training renders him fit to be much more than a pioneer, and we hope he has a long life before him.

INTERNATIONAL CONGO ASSOCIATION.[1]

List of its 45 Stations.

(Extracted from *Les Belges au Congo.*)

I.—LOWER CONGO.

Vivi (Lat. 5° 40′, Long. 13° 49′), on the right bank of the Congo, 6 or 7 miles below Yellala Falls. Founded by Stanley, January 1880.

Boma (Lat. 5° 47′, Long. 13° 10′), on the right bank of the Congo, there about 13,000 feet across, at the mouth of the small stream called the Crocodile, or Kalamu. It is the seat of half-a-dozen European factories, and of the sanitarium under Dr. Allan, and the central post-office of the Association. A pier for the steamers stretches out 260 feet into the river. The sanitarium stands on an eminence, and is built on piles 6 feet high; it is the largest and most comfortable of the European buildings on the Congo.

Ikungula (Lat. 5° 42′, Long. 13° 55′), on the right bank of the Congo, opposite Nokki.

Nokki (Lat. 5° 43′, Long. 13° 45′), on the left bank of the Congo, below the influx of the Mpozo.

Nuam-Mpozo (Lat. 5° 34′, Long. 14° 3′), on the left bank of the Congo, at the mouth of the Mpozo.

[1] Much of the territory in which these stations are situated has been assigned to other powers by the Berlin Conference.

II.—KUILU.

Grantville (Lat. 4° 35′, Long. 11° 46′), on the coast, at the mouth of the Kuilu. Founded in 1883 by Captain Grant Elliot.

Rodolfstadt (Lat. 4° 30′, Long. 11° 42′), on the coast, at the mouth and on the right or north bank of the Kuilu. Founded by Captain Grant Elliot and Lieutenant Van de Velde.

Alexandraville, on the coast, to the south of the mouth of the Kuilu. Founded in 1884 by Captain Grant Elliot.

Massabe (Lat. 4° 55′, Long. 12°), on the coast, at the mouth of the Chiloango.

Nyanga (Lat. 3° 0′), on the coast, at the mouth of the Nyanga River. Founded in 1884 by Captain Grant Elliot.

Mayumbe (Lat. 3° 20′), on the coast, to the north of the estuary of the Banya. Founded in 1884 by Captain Grant Elliot.

Sette-Cama (Lat. 2° 40′), on the coast, at the mouth of the small stream called the Setté. Founded by Captain Elliot in 1884.

Baudouinville (Lat. 4° 8′, Long. 12° 0′), on the right bank of the Kuilu, 60 kilomètres (37 miles) from its mouth.

Tountonville (Kitabi), on the left bank of the Kuilu, opposite the first rapids.

Stanley-Niadi (Lat. 3° 51′, Long. 13° 3′), on the left bank of the Kuilu.

Franktown (Lat. 3° 30′, Long. 12° 45′), on the left bank of the Kuilu, opposite the confluence of the Luasa.

Sengi, on the left bank of the Luasa, a right-hand affluent of the Kuilu.

Stephanieville (Lat. 3° 59′, Long. 13° 15′), on the left bank of the Kuilu, at the confluence of the Ludima. Founded by Captain Grant Elliot.

Strauchville (Lat. 4° 32′, Long. 13° 4′), at the sources of the small river Leummé. Founded in 1884.

Philippeville (Lat. 4° 18′), on the left bank of the Kuilu, at the confluence of the Yabuanza.

M'boke (Lat. 50° 0′, Long. 13° 43′), on the left bank of the Ludima, affluent of the Kuilu.

Mukumbi (Lat. 4° 38′, Long. 14° 30′), in the interior, near the sources of the Kenga, a right-hand affluent of the Congo.

Arthurville, just founded in the interior : details not yet known.

III.—MIDDLE CONGO.

Leopoldville (Lat. 4° 20′, Long. 15° 48′), at the outlet of Stanley Pool, on the right bank. Founded December 1881 by Mr. Stanley and Captain Braconnier.

Isanghila (Lat. 5° 12′, Long. 14° 13′), on the Congo, opposite the falls of the same name. Founded in February 1881 by Stanley and Nève.

Rubytown, in the interior, on the left bank of the Luvu, a left-hand affluent of the Congo.

Voonda (Lat. 5° 15′, Long. 14° 15′), on the left bank of the Congo, below the confluence of the Eluala. Founded in 1884.

Lukunga (Lat. 4° 50′, Long. 14° 53′), on the left bank of the Congo, above the confluence of the Eluala.

North Manyanga, on the right bank of the Congo, 1½ miles below the fall of Ntombo-Mataka. Founded in May 1881 by Mr. Stanley and Lieutenant Harou.

South Manyanga, on the left bank of the Congo, 1½ miles below the Fall of Ntombo-Mataka.

Ngumbi (Lat. 4° 49′, Long. 15° 22′), on the left bank, a little higher up than South Manyanga.

Lutete (Lat. 4° 49′, Long. 15° 10′), on the left bank of the Congo, opposite the Falls of Eisa.

Ngoma, on the left bank of the Congo, below the Kalulu Falls.

Kinchassa (Lat. 4° 12′, Long. 15° 47′), on the south side of Stanley Pool.

Kimpoko (Lat. 4° 9′), on the south side of Stanley Pool.

Msuata (Lat. 3° 28′), on the left bank of the Congo, 20 miles above the upper end of Stanley Pool.

Kuamouth (Lat. 3° 14′, Long. 16° 42′), on the left bank of the Congo, at the confluence of the Koango (right bank).

Bolobo (Lat. 2° 13′), on the Congo left bank, 40 miles above the confluence of the Koango. Founded by Captain Hanssens in 1882.

Lukolela (Lat. 1° 7′), on the left bank of the Congo, 30 miles above the confluence of the Alima. Founded by Mr. Stanley in September 1883.

Ngondo (Lat. 0° 4′), on the left bank of the Congo, below the confluence of the Irebu. Founded by Captain Hanssens in 1884.

IV.—UPPER CONGO.

Equateur (Lat. 0° 6′ N.), on the left bank of the Congo, 3 miles below the confluence of the Ruki.

Bangala (Lat. 1° 50′ N.) on the right bank of the Congo, above the confluence of the Mbundgu. Founded by Captain Hanssens in May 1884.

Upoto, on the right bank of the Congo, above the confluence of the Ngala. Founded in June 1884 by Captain Hanssens.

Aruhuimi or **Aruwimi** (Lat. 1° 10′ N., Long. 23° 30′), on the right bank of the Congo, at the confluence of the Aruhuimi. Founded by Captain Hanssens in June 1884.

Stanley Falls (Lat. 0° 10′ N., Long. 25° 0′), in the island Wana Rusani (Congo), 2½ miles from the last of the Stanley Falls. Founded in December 1883 by Mr. Stanley.

THE SCOTTISH GEOGRAPHICAL SOCIETY.

Report of Proceedings from October 28 to February 10.

Strongly impressed with the necessity of giving greater attention to the study of geography as one of the most important branches of knowledge to a commercial and scientific people, the promoters of the "Scottish Geographical Society" resolved by a vigorous and determined effort to do what they felt ought to have been done long ago—to found a special institution in Scotland, dedicated to the promotion of geographical work and study. It was with this purpose that, after having received about 200 promises of support to their project, they held their first meeting in the Edinburgh Chamber of Commerce on the 28th October 1884. There was a large and influential meeting, and the Right Hon. Sir George Harrison, LL.D., Lord Provost of the city, presided.

After a short opening address from the Chairman, Professor James Geikie, LL.D., F.R.S., moved the first resolution :—

> "That this meeting, recognising the scientific and general utility of a National Society for the promotion of Geography, resolves that a Geographical Society for Scotland be now formed."

This he heartily supported in a speech on cartography and the scope of geographical work. The resolution was seconded by Mr. James Currie of Leith, President of the Chamber of Commerce, and further supported by Mr. W. C. Smith, Advocate, and by Dr. Clyde. Sir George Campbell, in a speech on the importance of the teaching of geography, then moved the appointment of the President and Vice-Presidents, which was seconded by Dr. George Smith and Mr. Ralph Richardson, W.S. On the motion of Professor Calderwood, seconded by Mr. Adam Black, fifty gentlemen were elected members of Council, Mr. John George Bartholomew was appointed interim Honorary Secretary, and Mr. A. L. Bruce interim Honorary Treasurer. The proceedings then terminated with a vote of thanks to the Chairman by Mr. Bruce, who announced that three gentlemen present had already subscribed 175 guineas to the reserve fund of the Society.

Thus was the Society launched under the most hopeful auspices. The notices of the press being all most favourable and encouraging, the promoters felt that their efforts had been well rewarded, and with their newly-elected Council set to work with an enthusiastic will to build the Society which had just been founded.

Suitable rooms were now taken by the Society at 80A Princes Street, and while they were being specially furnished and fitted, it had, through the generosity of the Council of the Chamber of Commerce, the free use of their rooms in Melbourne Place. It was now resolved to establish branches at suitable centres throughout Scotland, and the first was formed at Dundee on November 26th.

Through the influence of Mr. and Mrs. Bruce it was arranged that Mr. Stanley should come to Edinburgh to deliver the Inaugural Address, an announcement which at once brought the Society more prominently before the public, and no doubt contributed in no small degree to its primary success. Mr. Stanley's address, which is printed as our first article, was delivered in the Music Hall, Edinburgh, on December 3, 1884—the Right Hon. Lord Balfour of Burleigh, Vice-President, occupying the chair. At the close of the meeting, on the motion of Dr. Milne-Home, His Majesty the King of the Belgians and Mr. H. M. Stanley were elected the first honorary members of the Society. On December 4th, the day following, in the presence of an assemblage of ladies and gentlemen, Mr. Stanley opened the rooms of the Society at 80A Princes Street. On the evening of the 5th, the Society entertained Mr. Stanley at its inaugural banquet, held in the Waterloo Rooms, Edinburgh—Mr. James Currie, President of the Chamber of Commerce, occupying the chair. In replying to the toasts of their healths, Mr. Stanley and Mr. Joseph Thomson made interesting speeches on the future of Africa. On the 7th, a meeting of the recently formed branch at Dundee was held in the Kinnaird Hall, when Sir John Ogilvy presided, and Mr. Stanley delivered an address. The inauguration of the Society was then celebrated in Glasgow by a banquet to Mr. Stanley, on the 8th, and a large meeting of members, in the St. Andrew's Hall—the President, the Right Hon. the Earl of Rosebery, in the chair—when Mr. Stanley again spoke on the prospects of African commerce.

The inauguration meetings of the Society, thus successfully carried out, were followed, on the 19th of January, by an address in the Masonic Hall, Edinburgh, from Mr. H. O. Forbes on his recent travels in the East Indian Archipelago and his intended expedition to New Guinea, to the expenses of which the Society voted £25. At this meeting, on the motion of Sir George Harrison, LL.D., Vice-President, the Right Hon. Lord Aberdare, President of the Royal Geographical Society, and Mr. Joseph Thomson, F.R.G.S., were elected Honorary Members of the Society. On the 28th of January, Mr. Forbes addressed the Dundee Branch, and on the 3d of February he also addressed the members of the Society at Aberdeen, at which meeting—the Right Hon. the Earl of Aberdeen presiding—an

Aberdeen Branch of the Society was formed. The next meeting in Edinburgh was held on the 3d of February, in the Masonic Hall, Mr. John Cowan of Beeslack, Vice-President, in the chair, when papers were read by Mr. Frederick L. Moir, on the Eastern Route to Central Africa; by Captain Brandon Kirby, on his recent expedition to Ashantee; and by the Rev. James Gall, on Cylindrical Map Projections. On February 10th a special committee of the Council appointed Mr. Arthur Silva White acting Secretary and Editor. Mr. White, who has spent many years abroad—chiefly in diplomatic and official circles—is, from his extensive knowledge of modern languages and experience in literary and geographical work, ably qualified for the office. In the absence of an acting editor, the first number of the magazine has been prepared under the superintendence of the Hon. Editor, Mr. H. A. Webster, and the Publications Committee. These are briefly the chief points in the career of the Scottish Geographical Society from its commencement, four months ago. There is still much preliminary work to be done; but when the Society is further organised, the plan of its working arrangements completed, and relations established with other Geographical Societies and with eminent travellers and geographers at home and abroad, an endeavour will be made to arrange frequent meetings for the members at suitable centres throughout Scotland, which, together with the medium of the monthly magazine, will, it is hoped, contribute to fulfil the popular aims of the Society.

JOHN GEORGE BARTHOLOMEW,
Junior Honorary Secretary.

QUERIES AND REPLIES.

Chiarenza.—"Niger" inquires where this place, mentioned by Boccaccio as a harbour of note, was situated?

[Chiarenza is the Italian form of the more familiar Klarentza. An interesting passage in reference to this spot will be found in Mr. Tozer's *The Franks in the Peloponnesus*, reprinted from the *Journal of Hellenic Studies*, October 1883, vol. iv. No. 2. The castle is situated on the northern extremity of the promontory of Khlemoutzi or Khloumoutzi, on an extensive level ground surrounded on three sides by the sea. A rectangular enclosure, it extends about 1000 feet from east to west, and perhaps about two-thirds of that length from north to south. Of the outer wall little remains but the foundations. The modern village of Klarentza was formerly regarded as the site of Cyllene, the arsenal of the Eleians. At the time of the French conquest it bore the title of Haghios Zacharias, and afterwards became the chief point of communication between the settlers in the Peloponnesus and their compatriots in Western Europe. It is a matter of dispute whether or not it gave the title to the Duke of Clarence; and the probability is that the foreign title was derived through Hainault from the Morea, and was combined with and adapted to the earldom of Clare in Suffolk. Philippa of Hainault was the wife of Edward III., and it was his son who received the title when he inherited the estates of Gilbert, Earl of Clare and Gloucester.]

Omoa.—R. B. wishes to know how this foreign-looking word found its way to the west of Scotland as the name of a station?

C. D. inquires whether the names, Green River, White River, etc., in the Colorado district, were given on account of the actual colour of their waters?

GEOGRAPHICAL NOTES.

Sula Sgeir.—A visit paid to this member of the Outer Hebrides by Mr. John Swinburne, in 1883, is described in the *Proceedings of the Royal Physical Society*, Session 1883-4. Sula Sgeir—*i.e.* "Gannet Rock" (the scientific name of the gannet is *Sula Bassana*)—is about half a mile long, by about 300 yards wide at the narrowest part. The western end forms a steep rocky bluff; in the centre there is a depression; and at the eastern end rises a round mass of rock. On the western portion are a number of huts built by the Lewis men, who visit the island yearly to capture the young gannets, which they carry off to the number of 2000, or even 3000. They are strange-looking erections, consisting of huge blocks of stone piled up together, and generally having no other opening but the door. Most of them measure about 8 ft. by 5, and are 4 ft. high. At the time of Mr. Swinburne's visit they were tenanted chiefly by cormorants.

Rona.—This island, also visited by Mr. Swinburne, lies 38 miles N.E. of the Butt of Lewis, and has a greatest length and greatest breadth of about a mile. It has long been known as the seat of a very ancient cell or chapel (St. Rona's), 11 ft. 6 inches by 7 ft. 6 inches, and 9 ft. 3 inches high, according to Mr. Muir's measurements in 1872. About 1600 it was occupied by five families, or thirty souls; but since 1844 it has been uninhabited, except during the annual sheep-shearing. Mr. Swinburne has added to the interest of the spot by discovering that the ruins of the old houses form one of the principal breeding stations of the fork-tailed or Leach's petrel (*Procellaria leucorrhoa*) in the Western Hemisphere.

Foula, Shetland.—Mr. John Sands of Vaila, Walls, writes to us as follows:—"The Iron Age began in Foula about a century ago, when the proprietor, Mr. Scott of Melby, sent a blacksmith to the island to make spades and other implements for the inhabitants, who had been obliged to use clam and horse-mussel shells for hoes and toggles for fish-hooks. There is an old man, Christopher Thomson by name, who is in his eighty-ninth year, residing in this island. He is a native of Foula, and informs me that he remembers the blacksmith well, but that he settled in Foula several years before he, Christopher, was born."

Herm.—*Chambers's Journal*, 1884 (February), contains a brief account of this little island (450 English acres in extent), which, with its ancient keep, rude stone monuments, granite quarries, and stationary community of less than forty souls, has passed into the possession of a Scotch firm, Messrs. Linklater & Co., Leith, which intends to use it as a station for curing and drying fish caught in the northern seas.

Serk.—This interesting member of the group of the Channel Islands, recently celebrated in glowing verse by Mr. Swinburne, is the subject of a pleasant paper by Mr. Charles Grindrod (*Good Words*, February 1885), in which he claims for it the possession "of the most remarkable sea-caves in Europe." After describing the Boutiques, the Moie Mouton, and the Gouliot caves, and other well-known features of the coast, he chronicles his discovery of what he calls the Red Cave or Cave Rouge on the east side of the island, between Banquette Point and Les Fontaines Bay. "This," he says, "is one of the hardest caves to reach, whether by land or sea, as it can only be visited during the lowest tides, and after a stiff scramble over rocks and boulders. The entrance is between two black sharp-sided, jutting rocks; but this soon opens into a narrow chamber of impressive height, and divided about 20 feet from the floor by a double arch, springing from a central column like an old Norman pier, with base and capital in rough resemblance. . . . The uniqueness of the place is the colour of this column and its arches, and, to a less extent, of the

walls on either side of them. Bright red in itself, the stone is everywhere covered with a smooth velvety alga, as fine to touch and sight as the down of the most delicate moss, and of the deepest blood-red crimson—a hue so subtle yet splendid, when the morning sun is shining on it, as almost makes the sense ache to look on it." There are woodcuts reproducing photographs of Brecqhou, Le Grand Autelet, The Coupée, and the entrance to the Creux Derrible, etc.

Swiss Alps: Flora.—According to Professor Oswald Heere, author of an elaborate study on the flora of the higher region of the Alps, about half of the plants are of Arctic origin, and probably entered the Alpine region from Scandinavia at the Ice Age. 337 phanerogamous are found below 8000-13,000 Paris feet, and 12 of these appear above 12,000. The richest snow flora is that of Monte Rosa.—*Jahrbuch der Schweizer Alpenklub*, Band xix., 1883-4.

Patmos.—*The Scottish Review*, January 1885, contains a very interesting article on this famous but little-visited island, which at once, in its bareness and beauty, is not unlike a bit of Scottish scenery from the north-west coast. Cultivable land is confined to the bays and a few glens; and the inhabitants, about 3000 in number, cannot grow corn enough for their own consumption. They are all Christians, and Hellenes by race and language; and, in spite of their poverty, they pay £200 annually to the Porte, and £100 to the monastery. The women, like those of our own islands, add to their earnings by diligent knitting of socks. Two striking features of the island are the long lines of stone walls with which it is streaked, and the immense number of churches scattered about singly or in groups. Readers of Dean Stanley's *Sermons in the East* should note the correction of his geography on p. 104.

Tiryns.—Our readers will find, in the *North American Review* for December 1884, a sketch from his own pen of Dr. Henry Schliemann's discovery of the Palace of the Kings at Tiryns (now Palæocastro), "the mythic birthplace of Hercules, and the residence of many mighty legendary kings." He proves that the building, largely constructed of sun-dried bricks, was lavishly adorned with sculptures, wall paintings, and various devices, such as the insertion of pieces of blue glass into a frieze of alabaster. The fire by which it was destroyed reduced the quarry stones of the walls to lime, and turned the clay to terra-cotta. About three thousand years later a Byzantine chapel was erected at the southern extremity of the citadel. The supposition that *in classical times* the sea came up to the walls of Tiryns, Dr. Schliemann thinks disproved by the fact that there are "cyclopean remains of a prehistoric city and its mole on the sea-shore, about a mile and a quarter away."

Crete.—Dr. F. Halbherr, a pupil of Domenico Comparetti's, has just discovered a long boustrophedon inscription, dating probably from the 4th century B.C., on the site of the city of Gortyra.

Latest Rumanian Census.—With reference to the "latest" reckoning of the population of Rumania, which we copied, says the *Globus*, from the *Times*, it is to be observed that an official letter, dated 2d October 1878, and addressed to the *Gotha Almanac*, stated (and the statement has since been confirmed) that no census had been taken since 1859-60, and that the population of the country, within its present limits (*i.e.* including the Dobruja), was estimated at 5,376,000.

Through Traffic from Paris to St. Petersburg.—An arrangement has at length been effected between the German and Russian railway companies, by which, from the 1st April next, an express train shall be run daily from Berlin to St. Petersburg,

in connection with that from Paris to Berlin. It is intended that the entire distance shall be performed in fifty-six hours, a reduction of eighteen hours upon the time now necessary to accomplish the journey.—*La Gazette Géographique*, Jan. 12, 1885.

Railway between Philippopolis and Bourgas.—The Government of Eastern Rumelia is occupied at present with the project of establishing a railway connection between Philippopolis, the capital, and the harbour of Bourgas, on the Black Sea, in a direct line by Chirpan and Eski-Zagra. The object in view is to make Bourgas a seat of the export trade, which it has to a great extent lost since Dede-Agatch, on the Ægean Sea, was connected by rail with Adrianople, and in spite of its bad roadstead, was preferred by the mercantile world for exportation. The transport of goods could certainly be more simply and cheaply effected if only the lines were laid between Bourgas and Jamboli, which already communicates with the capital by a railway passing entirely through Eastern Rumelian territory.—*Globus*, No. 4, 1885.

German Colonies in Palestine.—*Haifa, Joppa, etc.*—During the years 1840 to 1850, a movement was set on foot in "pietistic" circles in Würtemberg, the aim of which was to found colonies in Palestine. In 1849 the matter was taken up by pastor Dr. Christopher Hofmann, and soon afterwards he and his adherents formed themselves into an independent religious society under the name of *German Templars*. By 1858 the sect had so far spread that it was able to raise funds for the purpose of sending three pioneers to the Holy Land, who should report as to the capabilities of the soil for agriculture, and especially for the cultivation of the vine. Their report proving sufficiently satisfactory, the first band of emigrants, mostly young people, set out in 1860 from their homes for Palestine, and were followed six years later by a larger company, consisting of several families. These people established themselves on the Plain of Jezreel; but they were unable to cope with the difficulties of the climate and those arising from the inland situation of the colony. The first permanent settlement was begun on 6th April 1868, at Ḥaifa, at the foot of Mount Carmel, and about the same time a second station near to Joppa, under the leadership of Dr. Hofmann himself. Three years later, land (partly cultivated, partly uncultivated) situated on the ancient Plain of Sharon, about 3 miles or so east of Joppa, was purchased from the Turks, at the price of from £5 to £6 the *hectare* (nearly 2½ English acres), and the name of Sarona given to the colony. In 1873 a further settlement was made near Jerusalem. Meanwhile the numbers of the German Templars increased from 3000 in 1861, mostly in Würtemberg, to 6000 in 1882, scattered through Würtemberg and in Syria, and also in North America (Buffalo, Machias, New York) and Southern Russia (Orbelianovka, Tempelhof, and Schönfeld). In Syria the population of the five settlements of the sect—Ḥaifa, Joppa, Jerusalem, Sarona, and Artas—amounted to about 2300 in 1884. Of late years the emigration from Swabia (Würtemberg) has largely fallen off: in 1879, there landed at Joppa 113; in the following year the number fell to 80; in 1881, to 44; in 1882, to 19; and in 1883, only 8 emigrants arrived.

The settlers are almost wholly engaged in cultivating the soil. Of the village near Joppa, oranges, lemons, olives, dates, figs, grapes, etc., are the principal products, wine and fruits being exported to the annual value of £250,000. Wheat, maize, and cotton are also grown. The colonists of Ḥaifa have nearly 700 acres under cultivation, growing wheat, potatoes, peas, beans, and grapes for wine. At the agricultural settlement of Sarona more than 1230 acres are under cultivation, notwithstanding the difficulties this colony had to contend against in its infancy, when it lost many members from fever and dysentery. Wine is the principal product of the Jerusalem colony: several well-kept vineyards stretch alongside the road

leading from the Holy City to Bethlehem. The wines are exported to Egypt, Constantinople, Vienna, and Germany. The chief harvest of oranges takes place in February. The grain is reaped in July. From the end of March, when the rainy season terminates, until the middle of October there is continual sunshine, the heat in August and September sometimes reaching 122° Fahr. at noon; but during these two months the soil does not require much attention. In October and November the sowing season commences. Storms of hail and rain do not occur to damage the crops, though locusts sometimes work considerable havoc.

As is usual with German education, the schools in the settlements are good; they receive a small yearly contribution from the Imperial Government at Berlin. The people continue to speak their native language, and promote social intercourse in German fashion by several clubs and societies.—*Aus Allen Welttheilen*. Sept. 1884.

An Italian Expedition to Siberia.—There has been published at Florence a volume, by Signor Sommier, entitled, *Un Estate in Siberia* (Florence, 1885), and a *résumé* of it by Dalla Vedova forms a paper in the *Nuova Antologia* for January. It was in June 1880 that Signor Sommier left Moscow, and before his return in October he had visited Nizhnii-Novgorod, descended the Volga, ascended the Kama to Perm, proceeded by rail to Yekaterinburg, thence by tarantass to Tyumen, by steamer to Tamarova, and so down the Ob till it grows salt with the tidal current at Nizhnii-Ostroff—a journey altogether of 6000 kilomètres (3726 miles) in four months and five days. He was the first Italian to visit the Ob countries. The flora and the ethnology of the districts through which he passed received the principal share of his attention.

Between the Lena and the Amur.—From a letter from M. Joseph Martin, read before the Paris Geographical Society, 7th November 1884, it appears that, in the course of six months, he accomplished a journey of 2500 versts (1657 English miles), over 600 of which the road had to be cleared hatchet in hand. All the horses and seven of the dogs belonging to the expedition were lost; two men died, and one became insane. The country is a very fine one; it abounds in game, there are lakes of great beauty, and the streams are fishful. This is the first time that the mountains between those rivers have been crossed.

Siberian Sulphur.—The *Novosti* informs us that the Department of Mines is fitting out an expedition to Western Siberia, for the purpose of thoroughly examining the sulphur deposits which were lately discovered there. The report of their existence was first brought to Russia by Lieut. Kalitin, and afterwards in a single hill as much as 500,000,000 puds (1 pud = 36 lbs.) were discovered by the mining engineer Konshin. There are known to be more than ten hills which show unmistakable signs of their possessing sulphur. Rich deposits of sulphur are, generally speaking, rare, and up to the present time Europe has been mainly supplied with this commodity from Sicily. Within the Russian dominions sulphur deposits have been hitherto worked in Dagestan, and also in Chirkot, not far from Petrovsk. The *Novosti* thinks that in a short time the Siberian sulphur will enter into a strong competition with the Sicilian. The expedition which has been planned is to start from St. Petersburg in the course of this month (February 1885).—*Globus*, No. 4, 1885.

British Trade with Tibet.—At present there is practically none. The Indian railway system, except what passes through Nepaul and Cashmere, has been pushed north from Calcutta to Darjeeling, which is only 100 miles from the Tibetan borders; but the stream of commerce which would thus be naturally carried into Tibet is stopped, not by physical difficulties, but by the traditional exclusiveness of

Tibetan policy inspired from Pekin. The people of Tibet prize broad-cloth above all things, are learning the virtues of piece goods, are ready purchasers of hardware, use indigo largely, smoke tobacco, and drink tea as almost their only beverage. With all these things British India could supply them ; and the tea-growers of Darjeeling and Assam especially ought to have no difficulty in competing with China, which has to send its produce not a few hundred miles, but about one thousand two hundred miles. In return Tibet can give us gold, musk, the delicate fleeces of its shawl-goats and sheep. The recent visit of Mr. Colman Macaulay to the Governor of Kombajong seems to give good hope of a re-adjustment of relations along the Tibeti-Indian frontier. Mr. Macaulay was well received, and the British and Tibetan officers were photographed in a group. As the Tibetans, it is said, believed that Her British Majesty is an incarnation of Tara (Wisdom), it may surely be expected that her offers for further intercourse will not be rejected if Chinese interference can be prevented.

Ptolemy's Geography of India.—We are glad to learn that the papers by Mr. J. W. M'Crindle, which have recently been appearing in *The Indian Antiquary* (1884-5), are to be published separately. The amount of patient and scholarly work which they indicate is of the kind that we are rather accustomed to look for from a German *savant*, and can hardly be properly appreciated by one who does not know by experience the difficulties of such investigations. We shall have the pleasure of reviewing the volume when it appears.

Longitude of Batavia.—According to Dr. J. A. C. Oudemans, the longitude of Batavia has been determined by telegraphic observation as 106° 48′ 25″·3 W. of Greenwich. See *Indian Almanac*, 1884, or *Natuurkundig Tijdschrift voor Ned.-Indië*, Deel xliii.

Exploration in the Malay Peninsula.—In order to complete his inquiries on the practicability of constructing a canal across the Malay peninsula, M. F. Deloncle and a scientific party, attended by a Siamese Commissioner, left Bangkok in February last. After having surveyed the peninsula from the Isthmus of Kraw as far as Sunggora, and visited the little-known archipelago of the Samnie Islands, the expedition penetrated into the large lagoon behind Tantalam Island, which they entered by broad and deep channels. Here the party disembarked, and were provided with elephants by the Rajah of Talung to cross the peninsula. They first traversed a magnificent plain, 12 miles broad, covered with rice fields, on the edge of the Klong Talung, and afterwards crossed the chain of the Luang Mountains, which forms the back-bone of the peninsula, at the pass of Khan-Phra, descending into the basin of the Tsang river, which flows to the Sea of Bengal, and, finally crossing another rice plain, reached the town of Trang. From thence the expedition proceeded to Pinang, making a survey of the coast. In April the engineers of the party recrossed the Talung Isthmus, to make a more complete inspection of it, from which they returned in June, having fully explored several native states. Geological sections have been made of all this region, and specimens which they brought back have been analysed at the School of Mines, disclosing the existence of numerous beds of auriferous quartz, tin, and iron, in this *terra incognita*. Some observations on the ethnography of the Sam-Sam (the progeny of Siamese and Malays), their political institutions, and their piratical habits have also been collected.—*La Gazette Géographique*, January 22.

Abolition of Slavery in Cambodia.—The first number of the *Bulletin Officiel* of Cambodia publishes two important decisions of the Governor—the first stipulating that all slaves be liberated, but that at present they be not entirely discharged from all legal obligations towards their former masters ; the second suppressing the tax

upon the paddy (rice) harvest of 1884, an impost which had been very unpopular with the Cambodian peasantry, and has frequently been the cause of much tumult.—*La Gazette Géographique*, 5th January 1885.

The Lüderitz Expedition into Herrero Land returned on the 3d of October of last year to the coast. The leader, Lieutenant Israel, writing therefrom, says:—"Kamahexeno, of Okahandje, King of the Damaras, has issued a proclamation, by which he places under his own protection the whole territory belonging to the Topnaars, Bastards, and Swartboys. The territory belonging to the Topnaars (recognised by the English Government) can nevertheless be purchased for the account of Lüderitz. We have found copper in great quantity, and consider the land to be extremely valuable." Okahandje, according to the *Globus*, from which the above has been quoted, is a mission station, which lies about 250 kilomètres (155 miles) inland from Walfisch Bay, under the 23d degree of S. lat. The Topnaars are settled immediately to the east of the English territory on Walfisch Bay, the Swartboys a degree farther north.

Ascent of Cameroon.—Dr. Hugo Zöller, accompanied by two Poles, Von Rogozinski (Schultz) and Jenikovski, reached, on December 12, 1884, the summit of the peak of Great Cameroon, 14,000 feet high, called by the natives Mongo-ma-loba (Mountain of the Gods). Starting from the small island of Mondoleh, situated in the Bay of Ambas, on the morning of 8th December, they landed at the village of Bota, whence they made their way through the rank tropical vegetation of the forest, with the thermometer at 97° Fahr., to Boando, the last group of human habitations on this side of the mountain. Half the following day was spent in securing natives to clear a road through the thickets and forest undergrowth, so that night found them at a cave called Issuma, only on the further side of Little Cameroon. On the third day, at a height of 6890 feet above sea-level, they emerged from the bush (though not from the forest), and after another hour's climb came to Mann Spring, the last place whence a supply of water could be obtained. This spring is named after the botanist Mann, who, after his unsuccessful attempt in 1860, had better fortune when he ascended the Cameroon peak with Burton, 19th December 1861 to 2d February 1862. The attention of the travellers was specially struck by two things during this part of their journey—the frequency of the quite fresh elephant tracks and the large numbers of wild coffee-trees, loaded with fruit, not of the Liberian, but of the Arabian kind. Throughout the greater part of the ascent they also met with many antelopes, about the size of park deer, which exhibited scarcely any fear at their presence. On the fourth day the path led over grassy hills and across old and disintegrated lava-beds, up to a height of 9187 feet above sea-level. Starting at daybreak on the last day of the ascent (December 12), they came, at about 11 o'clock, to the edge of a lava-field nearly two miles in width. There the Europeans were obliged to leave their native bearers behind; for, in spite of all the wrappings that could be procured before starting on the expedition, they suffered considerably from the cold and the rarefied atmosphere. About an hour after noon the mist lifted, and the travellers saw before them the "Mountain of the Gods" with its three peaks rise up from amidst the numerous craters of the Cameroons. A difficult and laborious climb of two hours and a half brought them at length to the highest summit, whence they had a wide view of the hills, clouds, and extinct volcanoes lying below them. Only half of the wall of the former crater remains, the rest having caved in; but no signs of recent volcanic activity could be detected either on the summit itself or on any other part of the Cameroons that came under their observation, although some of the extensive lava-fields that they crossed appeared to be of comparatively modern date. Indeed in 1868 the captain

and passengers of a passing steam-vessel out at sea reported that they saw flames and pillars of smoke rising from the top of the Cameroons. Nor did Dr. Zöller and his companions discover the solfatara mentioned by Burton. The thermometer registered 37° Fahr. on the summit, but they were unable to determine its exact height, owing to the barometer which was taken up for that purpose proving insufficient. Dr. Zöller lost his powers of speech during the final part of the ascent, and only recovered them after resting a while on the edge of the water, which was visited by a furious storm during that time. The return journey occupied three days. In 1847 Merrick made an attempt to ascend this same mountain, but after reaching the grassy slopes he was driven back by cold and thirst. Besides Burton's ascent, already mentioned, the feat was performed by an English missionary named Comber, in eight days, in April 1877.—*Kölnische Zeitung*, 5th February 1885. [Another account is given by Rogozinski in the *Mouvement Géographique* for February 22.]

Spanish Annexation in West Africa.—The *Imparcial* of Madrid states that the delegates of the Spanish African Society, sent out in July last to Africa, announce that the Germans having taken possession of the coast, they, in their turn, intend to occupy a zone situated in the interior of the country, having a superficial area of nearly 6000 square miles, comprising the Sierra Cristal, and said to be very fertile. They have concluded a treaty with eighty chiefs and ten tribes, who have recognised the sovereignty of Spain.—*La Gazette Géographique*, 5th January 1885.

New Spanish Possessions on the West Coast of Africa.—Replying to a question before the Cortes, Don José de Elduayen, the Minister of Foreign Affairs, declared that the Spanish Government had taken under its protection the establishments recently founded on the African coast between Morocco and Senegal by a commercial company, and that he had signified this resolution to foreign powers.—*La Gazette Géographique*, January 22.

Somali Country—East Africa.—A scientific expedition, under Dr. Philippe Paulitschke, and well equipped by the munificence of Dr. Dominique Kamuel, of Hardegger, left Europe at the end of December last for Zeila, to explore the Somali country between the southern coast of the Gulf of Aden and the neighbourhood of Harar.—*La Gazette Géographique*, 12th January 1885.

Kilimanjaro—H. H. Johnston's Expedition.—As the Scottish Geographical Society expects to hear Mr. Johnston's account of his exploration from his own lips at an early date, it is enough for us in the meantime to record that a series of papers from his pen began to appear in the *Daily Telegraph*, Saturday, 10th January, and that on 10th February he read a paper on the people of Eastern Equatorial Africa—the Wa-Taita, Akamba, Wa-Tarata, Masai, etc., before the Anthropological Institute. (See *Nature*, 19th February).

Messrs. Giraud and Kerr at Lake Nyassa.—Dr. Scott, medical missionary at the Free Church Livingstonia Mission headquarters on Lake Nyassa, writes on 4th November 1884 to the secretary, Dr. George Smith :—" The new obstruction of the Lower Shiré has caused tremendous losses to the African Lakes Company and Blantyre Mission, as well as to us. The chance is small of getting any compensation from the Portuguese, whom we have more to fear than the natives. In the meantime, the Mission will be dependent upon the African Lakes Company for a supply of calico.

" We have had a visit from M. Léon Giraud, the French [Belgian] traveller, who has been exploring Lakes Bangweolo [Bemba], Moero, and Tanganika. He has availed himself of this route to return home.

" Mr. Kerr, a Scotchman, who had travelled overland from the Diamond Fields

in South Africa, was hospitably entertained by the natives at Cape M'Clear, and taken care of when suffering from a severe attack of dysentery. He stayed there until the arrival of the steamer from the north. Though by no means favourably disposed to mission work, he remarked, "I have come across many tribes of Africans, but the natives here are the best Niggers I have ever met."

Map of the Suakin-Berber Route, by General Gordon.—Mr. Stanford has just issued a map of unusual interest at the present moment; it is a facsimile of a map drawn by the late General Gordon at Khartoum, March 17, 1874, of his route from Suakin to Berber and Khartoum. The map was transmitted by Gordon to a friend in England, who has rightly allowed it to be reproduced and rendered accessible to the public. Mr. Stanford has made an exact reproduction of the original, even to an error in the scale, probably caused by an omission of the figure 1. The scale is 1 : 1,325,000, or 21 miles to an inch, whereas Gordon has marked it as 1 : 425,000. The map is a very careful record of each day's route, from the time Gordon left Suakin on February 28 till he arrived at Khartoum on March 13. The times of his arrival and departure at each station are given; the undulating, sandy nature of the country graphically brought out; the frontier of the Eastern Soudan indicated; the available wells marked; occasional notes recorded as to special features; and the character of the river from Berber to Khartoum indicated. Much of the unoccupied space on the map is filled with writing by Gordon. "We left Cairo," he states in one place, "Feb. 21; arrived Suez, Feb. 21; left Suez, Feb. 22; arrived at Suakin, Feb. 26; left Suakin, Feb. 28; arrived Berber, March 8; left Berber, March 9; arrived Khartoum, March 13. The vegetation having opened out, we ought to be at Gondokoro, leaving Khartoum on March 22, about the 15th of April." Again he makes the following remarks on the route from Suakin to Khartoum:—"The road from Suakin to Berber is through an arid, mountainous country; as far as Ariab it is sparsely covered with dwarf trees of stunted growth. The wide plains are partly sand and partly black basaltic stone. From Ooback to Berber the plain is generally sandy. The wells are mere holes scratched in the beds of the rivers. During November heavy showers fall, but they are soon sucked up. Price of camel hire from Suakin to Berber, 1½ Nap. Hire of boat from Berber to Khartoum, 7 or 8 Nap. The Nile rapids are dangerous to pass at night. Packages for camels ought to weigh about 150 or 120 lb. The climate is very dry, hot during the day and cold at daybreak." Then follows an outline sketch of the arid country, with the remark:—"*N.B.*—The worst part of journey between Suakin and Berber is the latter half, the wells being so far apart. The stations are from Suakin—1. Handenbu, 3 hours; we took 3 hours. 2. Hondoukh, 10 hours; we took 5 hours. 3. Goloos, 10 hours; we took 7 hours. 4. Haritree, 10 hours; we took 7 hours. 5. Hyab, 10 hours; we took 9 hours. 6. Muttah, 3 hours; we took 3 hours. 7. Ariab, 16 hours; we took 9 hours. 8. Ooback, 24 hours; we took 23 hours. 9. Berber, 24 hours; we took 22 hours." Thus what usually takes 110 hours, Gordon characteristically did in 88; the distance, he states, is 288 miles; "sheep can be bought *en route*." As a memorial of our lost hero the little sketch is of interest; but it will have its value independently of this association.—*The Times of 19th February.*

Suakim.—From the sketches of Juan Maria Schuver, the unfortunate Dutch traveller who recently lost his life in the Soudan, we extract the following description:—"Suakim is, after Khartúm, not only the most important town of Nubia, but also the most important harbour of the Sudan and of the whole west coast of the Red Sea. It passed in 1865 from the Turkish to the Egyptian Government, along with Massowah and some other places in the vicinity, and thus it appears again as part

of the Egyptian possessions, to which it belonged in earlier times. The town proper lies on a small island $8\frac{3}{4}$ miles long in its greater axis, and separated by a small arm of the sea from the mainland. In population it is exceeded by the suburb of El Gêf on the mainland, which has very irregular streets, with houses no better than huts, but possesses a very lively bazaar and (in the north-west quarter) barracks. On the outskirts of the suburb, and surrounded by gardens and date-trees, lie the wells from which the population derive a supply of drinking water, rendered so brackish by the vicinity of the sea that it can be used by Europeans only under the stress of absolute necessity. El Gêf is, in fact, an oasis, for inland for many miles round stretches a sandy saline and arid desert."

Juan Maria Schuver.—The following letter by Mr. J. M'Lachlan in regard to this Dutch traveller appears worth reprinting from the *Scotsman* newspaper:—"Last week, in a notice in the *Scotsman* of a book by Colonel Colborne, I read with painful interest an account of the sad end of Schuver, the Dutch explorer. In the spring of 1880 that gentleman came from Paris to Edinburgh to study land surveying and kindred subjects. During the two months he was here I had frequent opportunities of conversing with him—so often, indeed, that quite a feeling of friendliness sprung up between us. On his finally leaving town, in answer to an inquiry as to where he purposed going, he said that wherever there was fighting he would be heard of. Looking out since then with some anxiety, the notice in your review is the first news I have heard of him since he left. His life seems to have been full of adventure, and many incidents in his career were related in his very interesting conversations. When only a boy he travelled with his father—a Dutch merchant of note—in the East, and when in Jerusalem he managed to secrete himself in the Holy Sepulchre, unknown to the attendants, and when the hour of midnight came, invoked the Deity to appear to him, *if there was one*, and relieve his mind of the doubts he had. No answer was given, and he seemed to infer that the experiment came near to proof that there was no such Being. He often argued on the subject here with remarkable earnestness and vigour. Dangerous adventure had great attraction for him. When under twenty years of age he was among the Communists at the bombardment of Paris; again, in Plevna, where he was correspondent of the *Standard*, he took every opportunity he could of gratifying his dislike to the Russians by helping to point the guns of the Turks. Taken prisoner at the fall of the place while attempting to leave, a Russian general kept him in his own quarters over a day without food, when he was released. The last fighting in Spain, in the Don Carlos affair, attracted him thither. He said that he had a presentiment that he should yet be required as a ruler over some half-civilised people, and accordingly had picked up a surprising amount of scientific and practical information to help him—when the time came—to be of service to his subjects. He was an accomplished linguist. His sympathies were generous, and amidst all his love of adventure he longed to do some prominent service to the world.—I am, &c., J. M'Lachlan."

America and Europe.—In a rollicking but excellent paper, "*De Banana*," in the *Cornhill* (February), an anonymous writer discourses learnedly and laughingly about the food-stuff which supports hundreds of millions of our "beloved tropical fellow-creatures." He adopts the somewhat doubtful hypothesis that, though originally a Malayan plant, the banana had already reached the mainland of America and the West India Islands long before the voyage of Columbus, seeing that (apart from the evidence of Garcilaso and other historians of the conquest), beds composed of banana leaves are said to have been discovered in the tombs of the Incas. And as the plant is practically seedless, and is unknown in the wild state in the

Western Continent, he argues that it must have been transported by man, as must also have been the case with the American sweet potato, naturalised in China about the early part of the Christian era. The article as a whole may be recommended to readers of records of tropical travels ; but is it amusing or advisable to speak, even in a rollicking article, of "people finding that Columbus himself was an egregious humbug"?

Steamer Route between England and the Canadian North-West.—Since the return of the expedition sent this year by the Canadian Government to secure further light as to the possibility of a direct route for steamers from England by Hudson Straits to Port Churchill on Hudson Bay, Dr. Bell, who was with the expedition, has published his opinion that the route is probably feasible for four months in the year. The importance of such a result being established is plain, when it is considered that Port Churchill is near the heart of North America. It is only 400 miles by land from the greatest wheat-field of the world, and is actually nearer Liverpool than either Montreal or New York. The distance from Churchill Harbour to Liverpool by Hudson Straits is about 2926 miles, while from Montreal it is 2990, and from New York 3040 miles. The traveller who goes from Britain to the Canadian North-West by Quebec, makes a round-about of some 1500 miles.

Mistassini Lake, Labrador.— At the meeting of the British Association last year, in Montreal, the attention of the Geographical Section was naturally directed, somewhat more specially than at other meetings, to questions connected with the continent of America. One item of interest referred to by the President of the section in his survey of the progress of Geography during the year was the revived rumour as to the enormous size of Lake Mistassini, in the interior of Labrador. A member afterwards quoted reports that this inland sea was little inferior in size to Lake Superior. In this connection it should be remembered that similar reports used to be current with regard to Lake Nipigon. Dr. Robert Bell, of the Canadian Geological Survey, who surveyed Nipigon in 1870, has, after reviewing all the evidence on the subject, gathered since the first ineffective expedition sent thither in 1871, published his opinion that Lake Mistassini will not prove anything like so large as Lake Superior ; nor does he believe that large tracts of land fit for settlement will be found on its shores.

Roraima, British Guiana.—At the same meeting Mr. Im Thurn, then preparing for an expedition, since successfully accomplished, to the mysterious mountain of Roraima, on the frontiers of British Guiana, gave an account of all the known attempts of Europeans to reach that remarkable pillar-like, flat-topped sandstone mass.

Proposed Canal in Florida.—The dangers to which navigation is exposed on the coasts of Florida, owing to the innumerable banks, reefs, and islets, have long attracted attention, and a society has been formed in the United States to construct a canal in the northern part of the peninsula. It is intended to commence at a point on the Suwanee River (the Swanee River of the Christy Minstrels), which enters the Gulf of Mexico, and to terminate at Jacksonville, near the mouth of the St. John River, on the Atlantic. The distance from sea to sea is about 130 miles ; the country is almost entirely flat, and in parts marshy, presenting few or no natural obstacles. The expenses are estimated at £9,000,000, of which over £7,000,000 would be expended on the construction of the canal and the two ports. The New York Chamber of Commerce computes the traffic by the Strait of Florida as three times that of the Suez Canal. During the last five years 362 vessels have been wrecked on the coasts of Florida, and the total loss in ships and merchandise is said to amount to £1,000,000 annually. The distance from New York

to Pensacola, a naval station on the Gulf of Mexico, would be diminished 680 miles, and to New Orleans 560 miles, whilst a saving of 473 miles would be effected between this latter port and Liverpool.—*La Gazette Géographique*, January 22.

The Tehuantepec Ship Railway.—*Engineering* (January 9th and 23d) contains a very full account of this marvellous project, which promises, for example, to shorten the sea-distance between New York and Hong-Kong by 5343 miles *via* the Cape of Good Hope, and by 1994 miles *via* the Suez Canal ; that between New York and San Francisco by 10,797 miles ; and that between Liverpool and San Francisco by 7527 miles. Mr. Eads, the originator of the scheme, was born May 23, 1820, at Lawrenceburgh, Indiana, and is well-known for the celerity with which, in 1861, he built the seven iron-clad gunboats that played so important a part in the civil war, and also for the successful carrying out, since 1875, of a great engineering enterprise at the mouth of the Mississippi, which " has raised New Orleans from being the eleventh to be the second export city in the Union." He now proposes to lay down in straight lines across the Isthmus of Tehuantepec, a triple railway track, along which a team of engines will draw a vast car of peculiar construction, bearing the strange freight of a fully equipped vessel, lifted bodily out of the water of one ocean, and ready to slip into the welcoming water of the other. That he has devised satisfactory means of overcoming the obvious difficulties of the enterprise is admitted by many eminent engineers. He has secured a concession of a right of way across the isthmus, about a quarter of a mile in width, exemption from taxes, a grant of 1,000,000 acres of public lands, and various other privileges. The northern terminus of the proposed railway is at the town of Minatitlan, about 25 miles up the Coazacualco River, which, when the 15-foot bar has been deepened, will afford a deep channel for this distance inland. " The line ascends by gradients of 42 feet to the mile over the Atlantic plains for about 35 miles. It then enters a gently undulating table-land, from which it passes by a series of broad valleys to the summit level of the Tarifa plains, 726 feet above the sea. The descent from this point to the Pacific plains has a uniform grade of 1 in 100. From the base of the mountains to the Pacific terminus at Salina Cruz, on one of the lagoons extends a nearly level country."

The Pilcomayo, La Plata River System.—How vast an expenditure of effort is sometimes requisite for settling even a secondary geographical problem is well shown by the list of failures which M. Thouar has drawn up in connection with the exploration of this right-hand tributary of the Paraguay. Between 1556, when Andres Munzo and all his soldiers were massacred on its banks by the Chinguduos, and 1882, when the great French explorer, Dr. Crevaux, fell a victim to the Tobas, fifteen attempts were made to follow its course either upwards from the mouth or downwards from its source ; and the Bolivian expedition of September 1882 and Dr. Fontana's were equally unsuccessful. Happily M. Thouar, under the auspices of the Bolivian Government, has, to a certain extent, been more fortunate, though he was not able to keep close to the line of the stream during the lower part of its course.

Antiquity of Human Races.—After an elaborate survey of all the available evidence—and this is much more extensive than might be supposed—Professor J. Kollmann of Basel (Bâle) states his conclusions as follows :—1. The varieties of the human species in America exhibit, in the Diluvial period, the same facial and cranial peculiarities as at the present day. They already bear the characteristics of Indians. 2. Consequently man is not only a long-established guest in America, but he has possessed since the Diluvial period the same racial characteristics. 3. These characteristics must date from an earlier epoch. 4. They have not been altered by

external environment. 5. Zoologically there is little probability of a future modification of racial type.—*Zeitschrift für Ethnologie*, 1884, Heft v.

Otago.—*Engineering* (January 23) contains a plan of the port of Otago, New Zealand; and states that the Harbour Board appointed in 1874 had, up to 31st December 1883, expended £446,239 on works, plant, and land in connection with the improvement scheme. Vessels of 18 feet draught can find their way to Dunedin Wharf by a course which, a few years ago, was partly dry at low water.

Exploration of the Amberno River, Northern New Guinea.—At more than one point along the north coast of New Guinea, a great body of discoloured water and masses of floating timber indicate the embouchure of a large river. Of such rivers the Amberno is assumed to be the largest, owing to the greater distance from its mouth of any mountain-range, and the extent of level country which it presumably waters. Hitherto the few attempts which have been made to enter the river have failed owing mainly to the character of the coast, the formidable bar, and the broken water caused by the meeting of the river and the sea.

The expedition contemplated last year by Mr. Wilfred Powell proposed to ascend this river as far as the great central range, and then to follow the course of the mountains to their supposed termination near Cape King William. The honour of the first ascent of the river has, however, to their great satisfaction, fallen to the Dutch, and we must not grudge it to them. In September 1883 Mr. Van Braam Morris, Resident of Ternate, returning from a cruise to the eastward, discovered two great mouths to this river. The most easterly had only two fathoms of water on the bar, though there was a much greater depth inside, but there was no current, and no discoloration of the sea outside. This entrance was therefore supposed to be an old channel, now silted higher up. Another mouth was however found, a little farther west, but still to the east of Point D'Urville. The steamer failed to make the entrance, but a channel, with a depth of water nowhere less than three fathoms, was found by her boats; and, last July, as we learn from the first number for 1885 of the *Bijdragen tot de Taal- Land- en Volkenkunde van Nederlandsch Indië*, Mr. Van Braam Morris, in the steamer *Havik*, succeeded in passing the mouth of the river, and ascending as far as 2° 20′ S., *i.e.* through more than a degree of latitude. On the 18th of July the first attempt to enter the river failed owing to the strength of the current—the *Havik* is of fifty horse-power nominal, and draws 10½ feet—but she succeeded next day, after some difficulty, in finding the channel again. The width at the mouth was about half a mile, and the greatest depth 7 fathoms (five over two-thirds of the width)—the current about 3 miles an hour. The banks were low and muddy. A few small villages and scattered houses were passed, the inhabitants of which had fled; but at the village of Pauwi they were at last reassured, came on board after the interpreter had given himself as a hostage, and allowed themselves to be photographed. They were interested most of all by the cattle on board, though much alarmed till they found they were harmless. They closely resemble the inhabitants of Geelvink Bay, their *jidakos* and ornaments being identical, and they possess iron utensils, which they obtain from Kurudu, an island off the eastern shores of the bay, which they reach by an outlet of the Amberno. From Pauwi hills were visible to the S.S.E., about 20 miles distant.

They anchored for the night (22d) at Morris Island, and the second day proceeded at 8.30 A.M., when the fog lifted. The banks now became steeper, and in the afternoon they entered the hills which they had sighted the day before. The river diminished in width, the depth remaining at about 6 fathoms, and the windings of the stream becoming very sharp. About 3 P.M., after passing to the west of an

island, the current became much stronger, the river shallowed to 2½ fathoms, and the vessel, having shortened steam to look for a deeper channel, was driven upon a bank, and remained in some danger for two days, the crew bivouacking ashore. Fortunately no natives appeared. At this, the farthest point of the voyage, the Dutch arms were erected, and in the afternoon the downward voyage commenced, drifting before an anchor, for the strength of the current made steaming impossible, and at night two anchors barely kept the vessel stationary. On the 26th they proceeded, and met with some fierce-looking natives, armed with bows and arrows, who would not allow them to land, but performed a dance for them. Before approaching, these people poured water over their chests and stomachs; an interesting fact, for a similar practice—pouring water over the head as a sign of peace—has been observed on the south coast, a thousand miles away, and it is recorded by Cook as occurring at Malilolo in the New Hebrides. After a little barter they were persuaded to go on board. On their heads they wore a chaplet of pig's teeth and beads, or the hair was tied up and ornamented with cassowary feathers. They wore no jidakos, but instead a thin cord tightly wound some twenty times round the lower part of the body. In the lobe of the ear they carried small boxes of plaited sinnet, and had the septum of the nose pierced by a bone ornament. All the above customs and modes of ornamentation are distinctly Papuan. The name of this village is given as Kukunduri, the tribe as Udambessu (Kundambesu), and the district Kérési (Kaësri). At Mawa, a village they found deserted when they passed up, the inhabitants came forward with objects for barter, among others coco-nuts. No coco palms were visible, and the nuts were said to be brought from the west. The travellers were allowed to enter the village, but the women kept in the background. At Pauwi too the people were now more communicative. They mentioned that there were several villages in the neighbourhood, and that they were acquainted with the Tabirezen, a people who live to the eastward, but only accessible to them by the coast, as there is no way across the country.

Mr. Morris says that the name Mamberan, by which the Amberno is also known, signifies "Great River."[1] From this he argues that there is no other great river in this region, and he asserts that it has only one embouchure; but even if no great discoloration of the water is observed off the eastern shores of Geelvink Bay, it is pretty certain that there is a considerable discharge through the creeks in that direction. On one of these, the Kei River, which the natives say communicates with the Amberno, a village is built across the stream, implying an absence of bandjirs ("bore," or sudden swell of the river).[2] It has hitherto been supposed that the extensive tract of land enclosed in the angle of which Point D'Urville forms the apex, is in great part the delta of the Amberno, and this is not yet disproved. Mr. Morris is much disappointed at the size and navigable qualities of the river, and is perhaps disposed to minimize its importance. That the channel which the *Havik* ascended is the main channel is probable, and from the statement of the natives that no water-way exists to the eastward, we may possibly infer that it forms the eastern limit of the delta.

Since the Papuans ordinarily build their houses on piles, it is supposed that the bulk of the population of the district lives in the sheltered lagoons and creeks rather than on the banks of the great stream, and that they only visit this temporarily for the sake of the sago which grows there.

[1] Mr. Van Hasselt, an accomplished Papuan scholar, says the proper spelling is Mamberaminu, meaning "the great water."

[2] The recurrence of the name Kei, the name of a well-known group of islands off the south coast, is worth pointing out.

At the highest point reached by the *Havik*, the stream was running at 4½ miles an hour; the water was muddy and greyish, and the soil at the bottom black, staining the hands like coal. This recalls the fact that on the opposite (southern) coast, near the foot of the mountains, great bands of plumbago are found. Many veined pebbles of a sandstone formation were found on the island, suggesting, it was thought, that the river somewhat higher up cuts through a rocky barrier, though, as the river was some 500 yards wide, its sources may still lie far in the interior of the island. As to this it may be noted that from off the eastern coast of Geelvink Bay, between 2° 30′ and 3° 30′ S. lat., high mountains are to be seen. The upper course of the river therefore not improbably trends to the east and south of these mountains. But the character of the interior here is absolutely a matter of conjecture. The island at this point is 400 miles across from north to south. From the *Havik's* observations, it may be supposed that a high range will be found not more than 100 miles from the north coast, and we know that another is visible at about this distance from the sea on the south. It may therefore be conjectured that a high valley or table-land lies between;—the source not only of the Amberno, but of other considerable rivers, which are known to debouch southwards between the meridians of 136° and 138°. E. M.
C. T.

Papua or Papuwa: Origin of the Name.—J. G. F. Riedel writes to Professor Virchow (*Zeitschrift für Ethnologie*, 1884, Heft v.) that this name is, he believes, derived from the Seerang or Ceram word *hahua* or *fofua* fungus of the *Arenga saccharifera*, the hair of the Papua children having a great likeness to this growth. The letters *h* and *f* are interchangeable in the languages of the Moluccas (*hatu*, stone, in Serang; *vatu* in Buru, and other islands), and the Malays who came to the Moluccas by Ternate and Buru, having no *f*, change this sound into *p*, Dutch *veel e.g.*, becoming *peel; verzoeken, persuken*, etc. "Resident" Riedel sent the Professor a specimen of the fungus. Before the arrival of Europeans in Indonesia, many Papuan children had been brought as slaves to Serang, and it was on Seranglao, or East Serang, that the Malays first came into contact with the race.

Tahiti of To-day.—From a paper, with this title, by the Rev. A. Pearse, Raiatea, in the February number of *The Chronicle of the London Missionary Society*, we extract the following:—Tahiti contains a motley population of 9551,—6820 being natives of the island or of the Society group, 982 natives from almost every other island in the Pacific, 1343 Europeans of various nationalities (mostly traders, mechanics, and farmers), and 406 Chinese. The use of opium is spreading from the Chinese to the native women, and the French monopolist can afford to pay to the Government 75,000 francs per annum. In other respects the people are daily becoming more European in tastes and habits. Between 1844 and 1878 Tahiti was only a French protectorate; but it has since become a French possession. Full freedom of worship is now enjoyed, and the French rule is generally mild and just. The island is well supplied with schools, and the Government encourages secular education. Protestants (who are ten to one as compared with the Roman Catholics among the native population) have eighteen churches with 2377 members; Roman Catholics, ten churches and 200 members. There is a grand Roman Catholic Cathedral built by the Government in Papeete, the chief town.

Circumnavigation.—The first volume of De Amezaga's voyage round the world (*Viaggio di Circumnavigazione*), performed during 1881-4, by the royal corvette *Caracciolo*, has just been issued by Forzani & Co., and contains the technical description of the expedition.

Varieties of the Human Species.—*Nature* (February 7, 1885) contains a report of part of Professor W. H. Flower's Presidential Anniversary Address to the Anthro-

pological Institute of Great Britain and Ireland, January 27th. The following is the scheme of classification proposed by this able exponent of anthropological science :—

I. Ethiopian or Negroid Races—Melanian or Black type :
   - *A.* African or typical Negro.
   - *B.* Hottentots and Bushmen.
   - *C.* Oceanic Negroes or Melanesians.
   - *D.* Negritos.

II. Mongolian Races—Xanthous or Yellow type :
   - *A.* Eskimo.
   - *B.* Typical Mongolians : (*a*) Northern or Mongolo-Altaic group.
     (*b*) Southern group (China, Tibet, Burmah, Siam).
   - *C.* Malay.
   - *D.* Brown Polynesians, Malayo-Polynesians, Mahoris, Sawaioris or Kanakas.
   - *E.* American Indians (if not raised to the rank of a fourth primary division).

III. Caucasian or White Races :
   - *A.* Xanthochroi or Blonde type, mostly in Northern Europe (Lapps and Finns a cross between this type and Mongoloid people).
   - *B.* Melanchroi or Dark type, in Southern Europe, Northern Africa, South-Western Asia (Aryan, Semitic, and Hamitic families) ; Dravidians, in India ; probably Ainos, of Japan ; Maoutze, of China ; Egyptians, ancient and modern.

The peculiar characteristics of the Australians Professor Flower is disposed to explain hypothetically by their being either a mixture of frizzly-haired Melanesians with a low form of Caucasian Melanchroi, or mainly the direct descendants of a very primitive type from which the frizzly-haired Negroes may be an offset. The broad outlines of this scheme of classification, he says, scarcely differ from that proposed by Cuvier nearly sixty years ago, and that the result of the enormous increase of our knowledge during that time has caused so little change is the best testimony to its being a truthful representation of the facts.

GEOGRAPHICAL LITERATURE IN 1884.

PART I.

As it is intended, in the critical department of this Journal, to supply henceforward a complete record of works bearing on Geographical subjects, it seems meanwhile desirable to preface the critical section of this first number with a short *résumé* of works of the kind which have been published within the last twelvemonth.

Asia.—The geography of South-Eastern Asia has recently attracted increased attention from two important causes :—1*st*, The commercial question of the rival trade routes proposed to connect Yunnan and the neighbouring provinces with the sea ; and 2*d*, the political question raised by the policy of France in Tongking and the adjacent States of "Further India."

Mr. A. R. Colquhoun's narrative of his adventurous journey *Across Chrysê*, though hardly falling within our limit as to its date of appearance, has an explicit bearing on each of these not altogether distinct questions, and his promised account of previous and subsequent travel in the Shan States will probably be of considerable importance.

Captain C. B. Norman's *Tonkin; or France in the far East*, gives a short topographical description of the kingdom of Annam ; but his book consists chiefly of a history of French doings in those parts from the time of Louis XIV. and the early Jesuit Missions down to the present time. The tone of the book is strongly anti-French. Some excuse for this may perhaps be found in the markedly anti-English tone of the French officials, whose despatches, as quoted by Captain Norman, show that a persistent determination to create a rival power to British India is one of their chief motives of action.

Tungking, by W. Mesny, Major-General in the Chinese Army, is mainly a short *résumé* of the history of the country, showing that it has been, except at certain irregular intervals, a recognised dependency of China ever since the year 2500 B.C.—the writer's aim being to justify the protest of China against the French annexation. The details are derived from native sources not readily accessible ; and the author promises a work on China, founded on his own experiences, which ought to be exceptionally interesting.

M. Edmond Cotteau (*Un touriste dans l'extrême Orient*), on his return from Siberia, whither he had been sent on a scientific mission from France, visited Tongking, and writes hopefully of the prospects of French settlers there and in Saigon, whence he also visited Angkor. His description of his travels in Japan shows him to be a witty and intelligent observer.

In *Temples and Elephants*, Mr. Carl Bock describes his ascent of the Menam, the great river of Siam, to its head-waters, the Meping. Hence he crossed over to Kiang Tsen, on the Mekong, but was prevented from penetrating farther to the north by reports of war between the Burmese Ngious or Shans and the tribes under Siamese sovereignty. Being under a promise to the Siamese Government, in return for assistance afforded him, to say nothing about political matters, he is not as communicative as we could wish in regard to the state of affairs on the frontier. Dr. Neïs, writing from the Luang Prabang district, on the Upper Mekong, speaks of a general movement southwards of the "Ho" and other tribes, whom he considers to be Chinese. Speaking generally, however, it would seem that emigration, carrying Siamese influence with it, is gradually spreading northwards and north-east, into Kiang Hung. This province, indeed, which extends east, like a wedge, between Siam and China proper, as far as the frontier of Annam, has, we believe, become definitely Siamese, and should therefore no longer be set down in the maps as belonging to Burmah. The value, in the interests of peace, of such a "buffer" between Burmah and the now, in a political sense, French province of Annam (whose frontier, Mr. Colquhoun states, does not extend west of 102° 30′ E.), need hardly be pointed out. Mr. Bock gives some geographical notes in a short appendix, and usually describes the country along his route ; but he devotes more attention to the customs and habits of the people, and to his own adventures, which are amusing enough. On the question of trade we do not learn much from him, beyond some remarks on the considerable numbers of caravans trading with Yunnan to the north-east, and the Burmese Shan States to the north-west. Much valuable information, however, may be shortly expected from Mr. Holt Hallett, who has been surveying the country very thoroughly in various directions, usually from Zimmé as a starting point, and with special reference to a trade route from British Burmah towards Yunnan. The line proposed by Mr. Bock, from Bangkok up the river to Raheng, some 300 miles, would rather act as a feeder than as a rival to this line. It is understood that, with a little encouragement from the Indian Government, the Siamese would gladly assist in the formation of a railway system which would bring

them into communication with British Burmah, if only to escape the alternative of a forced connection with a French system on the other side.

Sir Richard Temple's *Oriental Experience* contains two geographical papers of value, on the Central Plateau of Asia and on the birthplace of the Mahrattas, beautifully illustrated.

Mr. Charles Marvin's *Region of the Eternal Fire* gives an account of the petroleum region of the Caspian, showing its great economical value, and the consequent accession of strength and increased facilities afforded to Russia for her advance towards Merv and Afghanistan.

The Russians at Merv and Herat, by the same author, also deals with the Russian advance towards India, and with the causes of the great increase of the material strength of Russia along the Persian and Afghan frontier. Much of the book is from Russian sources, and contains some pungent criticism by Russian officers on recent campaigns of the Indian army. It also reprints M. Lessar's account of his remarkable survey of the country between Askabad and Herat, showing the non-existence, so far westward, of the supposed lofty Paropamisan barrier.

Savage Svánetia, by Mr. Clive Philipps-Wolley, is an account of a shooting expedition in the wild and, even by the Russians, little-known mountain district about the head-waters of the Ingour and Rion rivers. The book contains a good deal of curious matter relating to the life and habits of this isolated people, and also as to the nature of their country, one of the last districts of the Caucasus conquered by the Russians.

M. Vambéry's *Life and Adventures*, besides their great autobiographical interest, include much of the famous Central Asia journey, the whole cast in a form very attractive to the general reader.

The River of Golden Sand, by the late Captain Gill, condensed by E. C. Baber, with memoir and introductory essay by Colonel Yule, is in every way a valuable book. The original narrative bears condensation, and it could not have been done by more competent hands than Mr. Baber's. Colonel Yule's essay on the Tibeto-Chinese river system is distinguished by its lucidity, judgment, and mastery of the subject; and his singularly felicitous and graceful biographical notice of his friend would alone make the book worth having.

In the Himalayas and the Indian Plains, by Miss Gordon Cumming, without being a contribution to geography, contains some picturesque descriptions of Himalayan scenery, and varied notes on popular habits and customs.

The Accursed Land, etc., by Colonel Colvile, already known by his enterprising trip to Morocco, describes a hurried but successful attempt to survey the Wady Arabah from the head of the Gulf of Akabah, in connection with the Jordan Valley Canal scheme. The character of the country and the conditions of the problem are very clearly pictured.

Among other records of work or exploration in Asia, may be mentioned the discovery or measurement of some fresh peaks in the Himalayas, probably higher than Mount Everest, by Mr. W. Graham; Mr. M'Nair's interesting visit to Kafiristan; and a very able paper on Asia Minor in the *Royal Geographical Society's Proceedings* for June by Sir Charles Wilson. The Russian Pamir Expedition of 1883, and Dr. Regel's visit to Darwáz and Shughnán, throwing light on various disputed points of topography, are noticed in the *Royal Geographicaogl Society's Proceedings* for March.

Travels in the East, by Prince Rudolph of Austria, follows only the beaten

track of the tourist on the Nile and in Palestine, with some notice of the less familiar Jordan valley between the Dead Sea and Gennesareth. The illustrations are above the average.

Oceania.—*The Wreck of the Nisero*, by W. Bradley, describes the landing on the west coast of Sumatra, about 100 miles from its north extremity, of the shipwrecked crew, and their subsequent march to Tenom and residence a short distance in the interior. Their adventures are well and simply told, but the book contains little topographical information.

Aperçu Politique et Économique sur les Colonies Néerlandaises aux Indes Orientales, par M. Joseph Jooris, Ministre Résident de S. M. le Roi des Belges, is a useful *résumé* of historical events, and of the economical history of these colonies, describing the transition, cautiously and on the whole ably conducted, from the exclusive and oppressive *régime*, no longer tenable, of the seventeenth century, to the comparatively liberal but as yet unremunerative system of the present day.

Among the latest voyages in the Pacific is that of Mr. Wilfred Powell, whose *Wanderings in a Wild Country* records some important original surveys and observations of interest in New Britain. This enterprising traveller has also touched at points on the north coast of New Guinea, unvisited by any other European. His proposed journey of exploration, by way of the Amberno River, into the interior of New Guinea, has unfortunately been postponed for want of funds. Some short journeys have been made into the interior of the Eastern Peninsula by the missionaries, Messrs. Lawes and Chalmers, and by parties organised in Australia.[1]

The *Voyage of the Wanderer* (Lambert) contains some interesting, if superficial, notes on Tonga, the Paumotu, Tahiti, and Leeward groups.

Mr. Alfred St. Johnston, in *Camping among Cannibals*, has some pleasant notices of the people of Tonga and Samoa, and his march across the great island of Viti Levu describes country seldom visited.

The Western Pacific, by Mr. Walter Coote, has some useful notes on the Melanesian group.

Samoa, by Dr. George Turner, is the result of many years' acquaintance with his subject. It deals entirely with the people,—their myths, traditions, religious and social customs, and to the comparative mythologist is a work of very great value.

Les Polynésiens, leurs Migrations, leur Origine, leur Langage, par le Dr. A. Lesson, tome iv. This voluminous work, now completed, though mainly occupied with ethnological speculation, touches geography at several points. The writer's theory, briefly, is that the Polynesian race originated in New Zealand, and spread thence throughout the Pacific. The book contains much ingenious speculation, based on geographical and linguistic considerations, on the physical character of the peoples, on myths and traditions, but resting not unfrequently, it must be admitted, on slender foundations or mistaken premises.

The knowledge and information shown is very great for the time when Lesson wrote, but the editor has not always brought it up to date; and though some of the arguments are weighty, we believe we are fully justified in regarding the case

[1] The *Royal Geographical Society's Proceedings* for April contains a summary, by Mr. Coutts Trotter, of our present knowledge of the whole island.

as not proven. There is a great amount of repetition throughout, lengthening the book needlessly.

Kritisch Overzicht der reizen naar Nederlandsch Nieuw Guinea, in de Jaren 1879-82, by Mr. Robidé Van der Aa, is a continuation of his large volume of *Reizen*, published in 1879. This accomplished author has long made a special study of New Guinea geography, and his book—dealing, however, only with the western half of the island—is the fullest and best authority on the subject.

Mr. H. O. Forbes's exploration of "Timor Laut," and rectification of the map of that group, is worth recording. (See *Proceedings Royal Geographical Society*, March 1884).

America.—*The Cruise of the Falcon*, by E. F. Knight, describes a voyage in an eighteen-ton yacht to Buenos Aires, and up the Paraná and Paraguay rivers to Asunçion; also a land journey *via* Cordoba to Tucuman, and some of the wilder districts in the north-west of the Argentine Republic. Perhaps the most remarkable spot visited, however, was the island of Trinidad, off the Brazilian coast, in 20° 30′ S. and 11° 49′ W., with its accumulation of the wrecks of ages, and its mysterious dead forests—killed, the writer thought, by recent volcanic action; but they were seen in the same condition by Ross's expedition in 1839.

Across the Pampas and the Andes, by R. Crawford, a journey undertaken in 1871, for the purpose of surveying a line of railway from Buenos Aires to Chile. An appendix gives some information as to the passes leading over the Andes into Chile, and on the present state of the Argentine railways.

Among the Indians of Guiana, by Everard Im Thurn, contains a mass of information, carefully collected by a competent observer, on the relations of the races inhabiting the country, on their manners, customs, and beliefs. The general appearance of the country is illustrated by descriptions of the more typical vegetation and of the fauna, and there is a detailed description, with illustrations, of the Kaieteur Falls. The author has since ascended the strange mountain Roraima, on the borders of British Guiana, latitude 5° 30′ N. and longitude 60° 45′ W., the lower slopes of which, with suggestions for an ascent, were described by Mr. H. Whitely in the *Royal Geographical Society's Proceedings* for August.

The increased attention lately given to Mexico by emigrants and speculators has produced a number of books on the country, chiefly by Americans :—

Mr. F. A. Ober's *Travels in Mexico* professes to give a complete description of the country, including its history and social condition, past and present, its geography and antiquities. There is a good deal of information in the book, though not very well condensed; the copious illustrations, especially of architectural and other remains, add much to its value.

Mr. W. H. Bishop's *Old Mexico and her Lost Provinces* seems the work of a more practised *littérateur*. The vast extent of the provinces lost by Mexico to the United States, extending from Texas to California inclusive, is indicated on a map. The salient features of society, both in the old and new countries, are well described, and there are some opportune remarks on commercial and industrial prospects. This volume, like the preceding, is copiously supplied with effective and evidently cheap illustrations.

Mexico To-day, by Mr. T. U. Brocklehurst, an English traveller, may also be mentioned as a well and pleasantly written description of matters which attract the intelligent observer. The volume contains numerous illustrations of archæological interest.

Two guidebooks to Mexico may also be mentioned, one by Leonidas Le Cenci Hamilton, published in London, and the other (*Appleton's Guide*, Second Edition) by Alfred R. Conkling. The former has no map, the latter only a very slight sketch.

Granite Crags, by Miss Gordon Cumming, is an eloquent description of the beauties of the Yosemité Valley, where the author made a lengthened stay.

Hayti, or the Black Republic, by Sir Spenser St. John, K.C.M.G., is the fruit of several years' residence in the island as Consul-general. Besides a *résumé* of its history, the writer gives a full description of the people from a social and political point of view. His verdict is that they are steadily retrograding, owing to the discouragement of the white element (Whites are forbidden to hold land) and consequent breeding back to the Negro type. There is a curious chapter on the still widely prevalent Vaudoux (African) religion, with its undoubted tendency to cannibalism.

NEW BOOKS.[1]

Europe. By F. W. Rudler, F.G.S., and George G. Chisholm, B.Sc., Edited by Sir Andrew C. Ramsay, LL.D., F.R.S., with Ethnological Appendix by A. H. Keane, M.A.I., forming the last volume of Stanford's *Compendium of Geography and Travel*, based on Hellwald's *Die Erde und ihre Völker*. London: Edward Stanford, 55 Charing Cross, S.W. 1885. Pp. xviii., 618. Published price, £1, 1s.

It is by a happy accident that this volume appears first on our list of new books. Though the last, it is not in importance the least of the series to which it belongs. The very fact that we all know, or are presumed to know, more about our own continent than about the others, renders the task of description all the more difficult and delicate. By the conditions of their work it is almost impossible to apportion praise or blame to the several writers whose names appear on the title-page, but in whatever measure they have contributed to the final result they must be congratulated on the general success of their co-operation. If it be to Mr. Rudler, as seems probable, that we are mainly indebted for the sketch of the geological history of the continent, which forms the first section of the work, he deserves no small credit, for it would not be easy to find the leading facts more lucidly arranged and illustrated. That the statistical portion was intrusted to Mr. Chisholm will appear, to those who know him, only a fitting recognition of his highly-trained faculty of accuracy. The ethnological appendix, by Professor Keane, would do well to be expanded and printed in a little handbook by itself, or along with the corresponding appendices from the companion volumes; his work is so conscientious that we never read any of his expositions of his favourite subject without regretting that our country has, in its abodes of learning, no chamber of study and chair of teaching where such a man would be free to devote his energies exclusively to that which he loves best and can do best without having to drudge at translations of German and task-work for the publishers. Here and there in the volume we have observed a few misprints or oversights; thus, Musjik is quite misleading as a representation of the Russian word for peasant, which can best be rendered to the English eye by Múzhîk or Moozheek; Kriwoi Rog is a survival from the German; Pituyse, on p. 265, should be Pityuse. At p. 456 the Established Church of Scot-

[1] Some of the volumes here noticed belong to 1884, and would naturally have appeared in our brief *résumé* for that year; an exception has been made in their favour, because the publishers sent them for review.

land is omitted, while the Free Church and the United Presbyterian are mentioned. That the characterisation of the peoples is due to Hellwald, and not to his English adapters, ought to be especially remembered in the case of the Hungarians or Magyars, who will read some of the statements as we read those of Max O'Rell. On the other hand, the sketch of the Dutch is done with true appreciation of their many excellent qualities. We hope that the publisher will issue a cheaper edition of the whole series of volumes: they deserve to be much more popular than they have any chance of being at their present price. When he does so, let him altogether cancel a number of the woodcuts or supply their place with others which serve some better purpose than the mere exclusion of letterpress. The maps are good illustrations or light-givers to the work; the illustrations so-called are sometimes darkness visible. Compared with those which appear in the volumes of M. Reclus's *Géographie Universelle*, for example, they are poor indeed.

The Clyde. By James Deas, C.E., Clyde Navigation Engineer, Glasgow. Wilson & M'Cormack, St. Vincent Street. 1884. Pp. 29.

With the exception of one page and a half of historical and descriptive matter, this reprint from *The Shipping World*, twenty-nine octavo pages in all, is a slight but interesting monograph, showing, with the aid of statistical tables, that the world is right in connecting the wonderful progress of Glasgow, during the last hundred years, with the conversion of the Clyde below Glasgow Bridge from a shallow river into a deep navigable canal. Mr. Deas writes :—"The bed of the river from Glasgow to Port-Glasgow is now virtually level throughout." The illustrations are unimportant,—a view of the Broomielaw, and the like, and a chart of the river showing the sites of the shipbuilding yards, but destitute of figures of depth. The style is always lucid, though at times inflated. One interesting fact is made clear at pp. 9, 10, viz., that by dredging out the incline of an estuary, the levels at the upper end of it are changed, the high-water level being raised and the low-water level being lowered. It would be well if Mr. Deas, with his professional knowledge and access to original documents, were to give us a study of the *régime* of the river in its entirety, more worthy in quantity and scope of the simple but sufficient title, *The Clyde.*

Murray's Handbook for Travellers in Greece, the Ionian Islands, the Islands of the Egean, Crete, Albania, Thessaly, and Macedonia. Fifth Edition. Thoroughly revised and corrected. Two volumes. 1884. Published price, 24s.

The last edition was published in 1872 in one volume. It is an open secret, and we might indeed gather the fact from the light and delicate touches, that on the occasion of this revision Athene has been represented by one of her own sex, and that a long residence in the capital of Greece has specially fitted for the task a lady equally at home in the Italian, German, and Greek languages—the accomplished daughter of an accomplished father. Thoroughly to appreciate the excellence of these volumes it is necessary to have known Athens thirty years ago, and to have visited it for a second time last year. It is as impossible to read a handbook for travellers continuously from the first to the last page as to read a cyclopædia, but an idea of the value of such a book can be gathered by judicious reference to a score of chapters or sections, and a consideration of the plan which has been adopted. The compiler has carefully picked up the crumbs that have fallen from her predecessors in the general work, and from the specialists who have devoted themselves to one particular portion—from Pausanias, the earliest antiquarian tourist on record, to Leake, Wordsworth, Schliemann, Kaupert, Dorfield, Curtius, and Adler. As

usual, the Germans have done the greater part of the work that has been done, and the Greeks have done the least, or in fact none at all. Those who have already paid their visit to Greece (and it does not happen to many to repeat the experience) have reason to regret that they had not the advantage of this handbook as their guide, companion, and friend, although possibly they may have had the privilege, now no longer possible, of coming upon the fair compiler in the midst of her labours. The advance of knowledge about Greece, and the general progress of that country, have, during the last decade, been so great that the fourth edition, without any reflection on Sir George Bowen, left much to be desired ; and, as far as we can judge, the fifth edition at this moment leaves little to be desired, though in another lustrum the march of events and the excavator's spade will have left this behind also, but not to so great a degree.

As was to be expected, Athens, with its environs, occupies nearly one-third of the whole work, and nowhere else has it ever been so fully set before the English reader. It had been the fashion to leave small collections of antiquities scattered in different parts of the city, or even kingdom, but gravitation of particles is now commencing towards central museums. Schliemann's discoveries at Mykênê are stored in their own museum : many of the smaller dépôts in Athens have been absorbed, or are under process of absorption ; though, alas ! we fear that the magnificent monuments of Olympia will remain in a local museum, and therefore unseen except by a very few. So far is Athens still behind the ordinary requirements of culture that, until the appearance of this guidebook, there was no catalogue of the contents of any museum available to the student. The obliging and accomplished possessors were ready to conduct strangers over the collections, and to give life to the dead masses ; but it is fresh and pleasant to read the details here supplied. The Government of Greece is exceedingly inert, impecunious, and unsympathetic ; what has been done has been generally done at the expense of enthusiastic foreigners. Thus the Venetian tower has disappeared from the Acropolis at the expense of Schliemann, who also excavated Mykênê at his own cost, and took nothing. Olympia has been excavated by means of funds provided by Prussia. The Archæological Society of Athens is supposed to be excavating at Eleusis, but nothing is known as to its proceedings. There is virgin soil in every quarter, and the islands have lately supplied most interesting contributions, and may prove an almost inexhaustible quarry.

The many vicissitudes through which the great city has passed are faithfully recorded in the first volume, from the time of Theseus to the time of King George. The description of the monuments which still give to Athens a glory unequalled in the world is most full and fascinating. Ancient Rome has been crushed and buried by the barbarous utilitarianism of the builders of the mediæval city ; the same fate has befallen Constantinople ; Carthage, Alexandria, Antioch, Syracuse, and other great cities of antiquity have been entirely or partially destroyed ; but the city of Athene has preserved to the present day its ancient outlines, and well deserves the sympathetic treatment which it has here received.

Other well-known spots in Greece have been equally favoured. Delos, Dodona, and Delphi, though their fame and importance have long since passed away, are brought back to life in these pages. The latest and best authorities are quoted in the accounts of Olympia and Mykênê : it would be worth the voyage from Patras to Katakolo by steamer, and the short journey iuland, to see the newly-found statue of Hermes, with the child Dionysus on his arm, which was described by Pausanias as the work of Praxiteles, but had disappeared for centuries. Thebes, the solitary temple at Bassæ, Corinth, Tanagra with its figurines, and the mines of Laurium, have each and all a sufficient and agreeable description. Great attention has been

paid to topographical details. In the general introduction, the architecture, language, geology, history, and ethnology of Greece and the Greek people are sufficiently noticed. The description of the island of Crete is remarkably full, and, we believe, quite unique of its kind.

We cannot too highly approve of the continuous pagination throughout the two volumes, which greatly lessens the chance of misquotation, and of the presence of a complete index of the whole work in each volume. And we would notice one other negative excellency in the absence of such common-form expressions as the "most glorious view in the world," "the most magnificent object of antiquity," which flow so readily from the pen of the "single country" critic, who has seen little of the world beyond the limits of the particular *corpus vile* on which he is dilating. Still if any view be entitled to such praise, it is the one which meets the eye from the top of Pentelicus, or from the steps of the temple of the Unwinged Victory on the Acropolis, where old Ægeus stood, looked, and died. If any survival of past ages may justly be called magnificent, it is the Parthenon, unrivalled in its decay. The compiler of this graceful handbook felt that it was not necessary to say that which men of all nations and all time admit.

Annuario Statistico Italiano, Anno 1884. Roma, Tipografia Eredie Botta.

This volume of more than 750 pages is a striking proof of the energy with which the Statistical Department of the Italian Ministry of Agriculture, Industry, and Commerce is conducted. Here we have accessible, with the least possible trouble, the main results of all the statistical inquiries instituted by the Government: topography and hydrography, climatology, population, political elections, commerce, navigation, mercantile marine, education, finance, banks, the army, the navy, sanitary statistics, live-stock, mineral productions, prices of food, and, in short, nearly all the aspects or departments of national activity are represented in clear and intelligible digests. Italy is a young nation, and Great Britain an old one; Italy is poor and Great Britain is rich; and yet it appears that Italy can do what we cannot afford to do—provide her own citizens and the world with a ready means of estimating her position and progress. We publish no end of blue-books and Government reports of one kind and another; but in various ways we take care they shall be of as little use as possible. Is it too much to hope that even we may by and by have a General Office of Statistics, to collect, in serviceable form, the large totals with which the student of comparative sociology is most concerned? When such a consummation has been reached, the head of the new department will do well to consider what has been accomplished by Professor Luigi Bodio, his Italian predecessor.

Sketches in Spain from Nature, Art, and Life. By John Lomas. Edinburgh: Adam & Charles Black, 1884. Pp. 417. Published price, 10s. 6d.

Who or what Mr. Lomas is we do not know; but he has produced a volume on Spain, which, while treating for the most part only of the familiar cities of the grand tour—San Sebastian, Burgos, Valladolid, Avila, Madrid, and so on—stands, if we may use the expression, head and shoulders above the average tourist's record, with its hash of guidebook erudition and frivolous remark. In nearly every page there is something to show that he has looked with his own eyes, and exercised his own judgment and taste. And if his attention is largely occupied with Art and Life, he has a right also to print Nature on his title-page; as witness the following: "Dull—unredeemably dull—is this great plain of Castile for a railway journey. But to put under one's feet it is just delicious, with its short crisp turf, its exhilar-

ating air, its clearly defined distances, its undulating sweeps of hillside, that remind one of Sussex Downs, and the ever-changing lights and shadows that sweep across it. And then the flocks of sheep, with their tinkling bells, the birds not yet hushed by winter, the little groups of shepherds, with their fluttering *mantas*, and picturesque broad-brimmed hats, and their hearty 'Vaya usted con Dios, caballero!' give just the contrasting life and cheerfulness that one wants." The chapter on Gibraltar and Tangiers might almost have been spared, if it were not that we cannot have too often brought before the English reader the hideous facts of Morocco life, in the hope that by and by a sense of shame may lead us as a nation to use some of the influence which we undoubtedly possess over the Sultan, to mitigate, if we cannot abolish, the horrors and abominations of his festering prisons. It is not only the ruined harbour of Tangiers that is a monument of our national selfishness. Tclemsin, on page 262, should of course be Telemsin. We hope Mr. Lomas will yet go further afield in the Peninsula.

Through Masai Land: A Journey of Exploration among the Snow-clad Volcanic Mountains and Strange Tribes of Eastern Equatorial Africa; being the Narrative of the Royal Geographical Society's Expedition to Mount Kenia and Lake Victoria Nyanza, 1883-1884. By Joseph Thomson, F.R.G.S., Hon. Mem. Scottish Geographical Society, Leader of the Expedition. London, 1885. Pp. xii., 580, Index. Published price, £1, 1s.

Through Masai Land is the title which Mr. Joseph Thomson has chosen for the narrative of his recent most successful journey from Mombasa to the Victoria Nyanza, by way of Kilimanjaro and Kenia. The appearance of the book has been awaited with no little interest and curiosity; and it may be said at once that, alike as a record of first-hand discovery and as a story of thrilling adventure, it betters even the high expectations formed of it. No more notable piece of purely geographical work than is described in these pages has been done since Mr. Stanley's first exploration of the Congo basin; and as regards the fresh and unexpected light which it has thrown on problems of African geology and ethnography, it would be difficult to exaggerate its importance. In brief, the volume amply justifies—were justification needed—the selection of this young Scotsman as among the first to be placed on the roll of the honorary members of the Scottish Geographical Society. Of the literary qualities of the work it is also possible to speak in decided terms of praise. Mr. Thomson writes, as he marches, with buoyancy and energy. For a certain "lop-sidedness" in the narrative he is probably not mainly responsible. We are carried more than half-way through the volume before we lose sight of Kilimanjaro and a neighbourhood with which the journeys of previous travellers have rendered us comparatively familiar. The later movements of the expedition, over ground of exceptional interest, and in great part never before trodden by a European foot, have the air of being more hurriedly recorded. Publishers' reasons of haste and of space probably explain this; and also the more regrettable fact that Mr. Thomson has been compelled to omit the chapters he had intended to write on the "commercial aspects of the expedition," the "game of the country," and "the geology of Masai Land," which, however, he promises will appear in a future edition. It may be remembered that the expedition—equipped by the Royal Geographical Society, which has voted first and last the sum of £3000 to meet the expenses—had, as its primary object, to ascertain "if a practicable direct route for European travellers exists through the Masai country from any one of the East African ports to Victoria Nyanza, and to examine Mount Kenia." Mr. Thomson's choice of Mombasa as a starting-point has been vindicated by the results. One marked advantage it

possesses over the other Swahili ports, from whence travellers have set out to the interior—behind it there is neither the broad belt of low-lying and pestiferous coast-land, nor the steep mountain scarp, which have wrecked so many promising expeditions before they reached the great plateau region, where the work of exploration actually begins. This is strongly insisted upon by Mr. Thomson; and the importance that attaches to the question of the easiest and safest line of attack on the central lake region of Africa is such that we may quote part of his retrospective survey of the country between Kilimanjaro and the coast:—

"We have met," he says, "with no pestilential coast region, and, though travelling in the height of the wet season, we have found no swamps or marshes. On the contrary, we suffer hardships for want of water, as we travel upon the whole a singularly arid region. Neither have we been called upon to ascend any plateau escarpment or cross any mountain-range. A gentle rise, not noticeable to the eye, has carried us over a smooth or slightly undulating country culminating at Taneta in a height of 2350 feet. We have crossed, it is true, a narrow low-lying area close to the coast, and made a sudden ascent of some 700 feet to Rabai; but this is in no sense comparable to the features described further south."

In point of fact the want of water constitutes the only serious physical difficulty to be encountered in a march from Mombasa to the Nile lakes, until the great folds of mountains enclosing the basin of the Victoria Nyanza are reached. An obstacle of another and more formidable kind has, however, to be overcome; the trader's route from Kilimanjaro to Lake Baringo passes through almost the whole length of the Masai country. No previous traveller has been able to do more than penetrate a little way inside one or other of the "doors" of this robbers' reserve. The crowning merit of Mr. Thomson's remarkable journey is that, by a happy combination of tact and resolution and good luck, he was enabled, with a minimum of bloodshed and friction, to run the gauntlet of the Masai spears, and to reach in safety the base of Mount Kenia and the western margin of the Victoria Nyanza. In Mr. Thomson's notes on Masai manners and customs there is ethnographical spoil of great richness and interest. The tribe, as he says, is one of the most singular in the African continent, or, for that matter, in any continent; it is also one of the most formidable and unpleasant, at least from the point of view of the explorer. Of more strictly geographical interest are the physical features of the Masai country, now revealed for the first time; these are as strange and enigmatical as the features of the race. We have here a district in which the evidences of volcanic energy are more marked, more recent, and more abundant than in any other part of the African continent. To say nothing of the twin snow-crowned giants, Kilimanjaro and Kenia, there are isolated peaks scattered all over the region—the cinder-heaps of volcanic fires that, speaking geologically, have only recently gone out. Thermal springs, steam vents, and other traces of plutonic energy, not yet extinct, abound; but most noteworthy among Mr. Thomson's discoveries is that of the "meridional trough," marking a grand fault or line of subsidence in this part of the African continent. This depression, sharply marked on the east and west by parallel lines of escarpment, has been followed by our traveller from the latitude of Kilimanjaro to 1° north of the Equator, and the positions and outlines of its chains of isolated lakes —Navaisha, El-Meteita, Nakuro, and Baringo—have been clearly laid down. Its limits southward and northward have yet to be determined. It is the characteristic of a pioneer's work that he raises more fresh problems than he sets at rest. Thus the light which Mr. Thomson throws on the geology and natural history of Masai Land, and on the water-system of east Central Africa, the reports he collected regarding the unvisited salt lake, Samburu, and a great fresh-water basin lying to the west of it, and the particulars supplied concerning the wonderful rock caves

of Elgon, only whet the desire to learn more. Setting out from Mombasa on the 15th of March 1883, driven back to his base in the beginning of the following June, by Masai hostility and want of supplies, Mr. Thomson had successfully completed his great land journey and more than fulfilled the task committed to him by the Royal Geographical Society by the 25th of May last year. He has lost neither his time nor his labour; and the least that stay-at-home geographers can do is to warmly commend him and his book to the public.

In the Trades, the Tropics, and the Roaring Forties. By Lady Brassey. Longmans, Green & Co., 1885. Pp. 520, Index. Published price, £1, 1s.

This is another of those pleasantly written, profusely illustrated, and altogether attractive volumes, which her readers now know to expect from Lady Brassey. The picture-mounted maps are very pretty combinations of the work of the cartographer and the artist. Lady Brassey tells how she sailed from England to Madeira, and thence to Trinidad; how she was charmed with the marvellous plant-life of the island, and shuddered as she crossed the hideous-looking Pitch Lake; how she touched at La Guayra, and travelled to Caracas by the strangely sinuous railway route; how she crossed the island of Jamaica from Spanish Town to Ocho Rios Bay; how she visited the coral reefs and caverns of the Bahamas; how she saw all the sights of Bermuda from Walsingham Cave to Massa Bertram's collection of Bermudian curiosities; and how she made her way home across the Sargasso Sea to the Azores and England. And so much of the freshness of her personal enjoyment is preserved throughout the whole that the reader is lured on even over ground which he already knows. It is, perhaps, a pity that in her notice of the Sargasso Sea, she did not take the trouble to give her readers a little more of the results of recent research, and find out the recognised names of the plants distinguished "for the moment" as *Sargassum uvoides*, etc. The "Roaring Forties" is a term usually restricted by seamen and meteorologists to the Southern Hemisphere. Our readers will find an explanation in Mr. Buchan's article "Meteorology" in the *Encyclopædia Britannica*, vol. xvi. p. 146.

A Lady's Ride Across Spanish Honduras. By Maria Soltera. With Illustrations. William Blackwood & Sons, 1884. Pp. 320. No Index.

The lady who writes under the *nom de plume* of Maria Soltera here recounts the adventures into which she was led between June and October 1881, by trusting to the pamphlets and promises of a certain Dr. Pope, an agent of the Honduras Government. He engaged her to be schoolmistress to a colony he had established at San Pedro Sula, and failed to give her warning that the whole enterprise had ended in smoke. There is not much geography in the volume; but the sketches of places along the route, though slight, are well done, and possess a certain additional value from the fact that books on Spanish Honduras are not very common. Landing at Amapala, Maria Soltera took boat to the custom-house at Aceituña, and thence travelled right across the country by Goascaron, Arimesine, and San Juan del Norte, across the San Juan river, by Comayagua (where she visited the bishop), across the Rio Blanco, by Santa Yzabel, Maniobar, Coalcar, San Pedro Sula (where her worst fears in regard to her contract with Dr. Pope were realised), Santa Cruz, Vera Cruz, Potrerillos, and Puerto Cortez. It seems a pity that a book otherwise so well "got up" should not be provided with even a route map, especially as most of the places mentioned are not to be found in an ordinary atlas. The number of interesting particulars scattered throughout the narrative is great

enough to justify an index. The following passages show the writer's style, and are worth reprinting here :—

"Acapulco is the one of the Mexican ports at which we touched on our way down the coast, of which I shall ever retain a pleasant memory. We arrived in its lovely harbour in the early morning; and the sight of the picturesque little town, over the red roofs of which the thin veil of the mists was slowly clearing itself away, reminded me of the face of a friend determined to wear a smile. Its situation between two irregular and projecting tongues of land, with the background gradually widening and rising towards the hills, invests it with an air of coziness, and of being, at the same time, thoroughly well protected.

"A few trees, dotted about in all the beauty of unprecision, serve to relieve the whole landscape from the appearance of aridity so common to the majority of sea-board towns. Several broken rocks of peculiarly vivid colour jut out like an advanced guard to the right of a long pier at the entrance, and upon this pier the natives, in full costume or in little costume, stand out in pleasing relief. Add to these the bright-coloured fruit and fish, lying in baskets of every shape and elegant texture, shrouded partially in grand green leaves, which of themselves suggest the idea of sheltering trees. Not overlooking, either, the delicate shell-work held up for sale in the hands of the loveliest female peasantry of the world; the wonderful flowers; the boats covered with every variety of gay awning, with the Mexican flag at their prow, dancing here and there on the liquid emerald of the sea.

"Puerto Cortez is not much better than a sandy swamp, only waiting an opportunity to slip into the sea and be lost for ever as a human dwelling-place. Its only sight is at the shed which forms the terminus of the railway communication between it and San Pedro Sula. There, piled up in rust and dust, are to be seen heaps of material imported to form the railway of Honduras. Bolts, tires, wheels, rails, chains, and various other of the material necessary to make a railway, are to be found piled up in profusion in this place; and the Hondurian points at it with a kind of grim delight as he tells you that thousands of pounds are rotting there.

"Let us hope that this waste is only temporary. Late letters inform me that Dr. Fritz Gartner and Mr. Shears, American citizens, have entered into a contract with the Government of Honduras for the navigation of the Ulua River and its tributaries the Venta and the Blanco. This accomplished, the reconstruction of the railway is sure to follow."

Timbuktu, Reise durch Marokko, die Sahara und den Sudan. Von Dr. Oskar Lenz. Leipzig: F. A. Brockhaus. 1884. Two vols. Pp. xvi. 430, x. 488. Index. Published price, £1, 4s. (Messrs. Williams & Norgate.)

This is the complete narrative of the journey which Dr. Lenz performed between November 1879 and November 1880, a brief outline of which was one of the most valuable papers in the Journal of the Berlin Geographical Society in 1881. In the north of Morocco, he passed through a well-known country from Tangiers to Fez (Fáz), from Fez by Mequinez (Miknáza) to Rabat, and from Rabat to Morocco (Marrakesh); but, striking south from the capital, he not only skirted the northern flanks of the Atlas, as several travellers had done before him, but succeeded in crossing the range and descending into the district known as Wad Sus, so called from a stream of this name. He then held southward across the Anti-Atlas, and at length, on July 1, arrived at Timbuktu, after a journey across the Sahara of fifty-one days. From Timbuktu to Saint Louis, the capital of Senegambia and the terminus of his route, he proceeded *viâ* Bassikunu, Sokolo, Bakhuinît, Futa Nioro, Kuniakari, Medina, and Bakel, and so down the Senegal. The two volumes are full of fresh material, and we hope that before long they will appear in a satisfactory English translation, unmutilated and with the original maps and

illustrations. It is too common a habit with our English publishers to lighten the ship by throwing overboard what, in the eyes of the scientific student, is the most valuable portion of the freight.

In the Lena Delta (by GEORGE W. MELVILLE: London, Longmans & Co., 1885) rehearses the story of the *Jeannette*, already known from poor De Long's own journal; details Mr. Melville's heroic efforts to succour De Long and his ill-fated company; and records his share in the Greeley Relief Expedition. Altogether, it is a most moving history.

Geographisches Jahrbuch. Begründet 1866 durch E. BEHM. Band x. 1884. Erste Hälfte. Unter Mitwirkung von O. Drude, G. Gerland, J. Hann, Th. v. Oppolzer, L. K. Schmarda, K. Zöppritz, herausgegeben von Hermann Wagner. Gotha: Justus Perthes. 1885.

This admirable year-book is so well known to every one who takes a scholarly interest in geographical work, that it is enough to call attention to the publication of this new part. Professor Dr. K. Zöppritz contributes a survey of recent researches in all departments of what the Germans call geophysic, a term embracing all matters relating to the earth as a physical individuality—its shape, density, nutation, rotation, tides, internal condition, and movements of elevation or subsidence, volcanic activity, the structure of mountains, classification of rivers, lakes, etc. etc. Meteorology has a chapter to itself contributed by Professor Hann. Geodetic Surveys in Europe, with the questions relating to sea-level, etc., are treated by Professor Oppolzer. The Distribution of Plants is the subject of a long article from the practised pen of Professor Oscar Drude; and the Distribution of Animals is handled on a similar scale by Professor Schmarda. And, finally, Professor Gerland summarises the results of ethnological inquiry.

Life and Work in Benares and Kumaon, 1839-1877. By JAMES KENNEDY, M.A., late Missionary of the London Missionary Society, etc. With an Introductory Note by Sir William Muir, K.C.S.I., LL.D., D.C.L. Illustrated. London, T. Fisher Unwin. 1884. Pp. xxix., 392. No Index.

This is a very unpretentious, and on that account all the more valuable, record of missionary life in India, the results of long and intimate acquaintance with country and people. Besides a large amount of information about Benares, we have notices of other cities in the valley of the Ganges, of Ceylon, Kumaon, the leper asylum at Almora, of Ranee Khet, and Nynee Tal; as well as several chapters on general questions affecting India. Altogether, Mr. Kennedy must be thanked for his contribution to our missionary shelf.

A Compendium of Modern Geography, Political, Physical, and Mathematical, etc. With eleven Coloured Maps. By the Rev. ALEXANDER STEWART, LL.D. Thirty-third Edition. Revised and enlarged. Edinburgh, Oliver & Boyd. 1885.

The Thirty-third Edition! A cynical critic might call up a terrible picture of the amount of human misery which this one book must have produced; and, without being cynical critics, we doubt whether it is constructed in such a way as to minimise the terrors of geography to the youthful mind. We can recollect the feelings with which we regarded its serried array of cold geographical facts in our own school-days. But as an array of geographical facts the work is distinctly a

good one, and the product of very considerable labour and care. The coloured maps are a great improvement on those in the earlier editions. At p. 196 allowance has not been made for the increased area of Montenegro mentioned in next page.

The Encyclopædia Britannica: a Dictionary of Arts, Sciences, and General Literature. Ninth Edition. Vol. xviii. Edinburgh: Adam & Charles Black, 1885. Pp. 858. Eleven maps. Published price, £1, 10s.

To review this volume as an integral part of an encyclopædia is happily not our present task. It would take one long familiar with the methods of encyclopædia-building to judge how far the editors have been guided by architectural principles, and how far by accidental occurrence of material and men. Instead of attempting to criticise the general plan and perspective of the imposing pile, it is our simpler duty to call attention to certain features of that portion which is still "white from the mason's hand." We have only, in other words, to point out those articles in the present volume which appeal most directly to the geographer. How large a proportion of the total space is devoted to matter more or less strictly geographical may be gathered from the mere table of contents, which comprises Oudh, Oxus, Pacific Ocean, Persia, Palestine, Palmyra, Patagonia, Pekin, Pennsylvania, Peru, Philippines, Phœnicia, Phrygia. Perhaps the most important, as it is certainly the most extensive article, is that on Persia; but when the sections on history, literature, and language are abstracted, the purely geographical portion, by the well-known diplomatist and traveller, Major-General Sir Frederick Goldsmid, is not executed on an extravagant scale. It is the long tract of time through which Persia has played a part in world-history which gives it a claim to exceptional treatment. "The Pacific," by Mr. Murray of the *Challenger*, and "Palmyra," by Professor Robertson Smith, are, each in its own way—the one scientific, the other historical—admirable examples of what encyclopædia articles should be—compact and comprehensive, and thoroughly in harmony with the latest results of investigation. Every one must be grateful to the publishers for the increased attention they have recently bestowed on the maps and illustrations. Some of those in the present volume, such as *Paris*, by J. Bartholomew, and the *Pacific Ocean*, by W. and A. K. Johnston, are particularly attractive to the eye, and others show an attempt to incorporate quite original information not elsewhere to be found in English sources. Here and there are articles (such as Oudh, Oxus, and Palmyra), which seem to call for some of the cartographic illustration which others have so liberally received.

NEW MAPS.

Letts' Popular Atlas. Letts, Son, & Co., London. Cloth, £2, 2s.

This atlas may be otherwise described as a new edition of the *Useful Knowledge Society Atlas*, which was published more than fifty years ago. After a most useful and honoured life, during which the *U.K.S. Atlas* has made the acquaintance of more than one publisher, it is now, in its old age, being chaperoned to the front by the enterprise of Messrs. Letts & Co. Credit is at least due to the publishers for the considerable ingenuity which they have displayed in the art of "Cosmetic Geography,"—the process whereby the too evident signs of old age are disguised and hidden from the ordinary observer's eye by a judicious application of paint and surface adornment. The maps, however, embody many new features, not to be found in other atlases, and which, if reliably shown, are of great value and interest.

The Handy General Atlas. By John Bartholomew, F.R.G.S. George Philip & Son, London. Half morocco, £2, 2s.

This atlas, in its new edition, is to a great extent remodelled ; several important new maps have been added, which make the representation of the British Colonies one of its special features. The maps appear to have been well brought up to date, and, with the addition of a new index, it may now be said to meet all the requirements of a good reference atlas for the present day.

The Cosmographic Atlas. W. & A. K. Johnston, Edinburgh and London. Cloth, £1, 1s.

The Cosmographic well deserves its name, inasmuch as it fairly represents almost all branches of Geography. It is a very complete collection of good maps, and is certainly one of the best educational atlases now published.

British Isles (New Large-scale Quarto Atlas of the), from the New Ordnance and Special Surveys, with an Alphabetical Index to 50,000 Towns, Villages, etc. G. W. Bacon, London. 1884. Cloth, £1, 15s.

It is rather a misleading statement to the public for Mr. Bacon to announce in his prospectus of this atlas, that "his great work" is now completed. It would seem as if Mr. Bacon had just finished, after great labour and expense, some splendid new atlas of the British Isles, reduced, as he states, "from the New Ordnance Surveys, and being virtually the entire ordnance of the three kingdoms condensed into a neat quarto volume." Possibly Mr. Bacon knows less about the antecedents of his atlas than other people do, for we fail to see how he can support the above statement. The plates now published by Mr. Bacon were issued with the *Despatch* newspaper in 1860, they were afterwards sold to Messrs. Cassell, and, after publication by that firm, were then again sold to Mr. Bacon ; so that Mr. Bacon's "great work" consists perhaps in this purchase of the old plates of the *Despatch Atlas.* When the plates were engraved in 1859 and 1860, the Ordnance Survey of the British Isles being then only partly published, it was quite impossible that all these plates could have been reduced from it, so that instead of being reduced from the New Ordnance Survey, they were not all even from the Old Survey. We state these facts to show how the public may be misled by a system of enterprising advertisement. Although the production of new atlases is not actuated by mere motives of mercantile success, yet there is little prospect of great progress in cartography until good maps so far repay the great cost of their production, and compete in sale with the cheaper reprints of old plates.

Perthes' Taschen-Atlas. Justus Perthes, Gotha. Cloth, 2s.

Among atlases, the *Pocket Atlas* of Messrs. Perthes is something quite unique, the maps are beautifully engraved, and although they perhaps have not the clearness which would make them popular in this country, yet to a geographer the atlas is "a cartographical gem."

Atlas Universelle : Vivien de Saint-Martin. Hachette et Cie., Paris.

This is certainly one of the most ambitious cartographical works ever attempted, and, if completed, will do much to restore France to the coveted place which she once held as the foremost geographical nation in Europe. The first part of the work was issued in 1877, and now in 1885 we have not yet got beyond the fourth. At this rate of progress, and seeing that the atlas is to contain 112 maps, it is very

doubtful if we shall ever see the completion of it. So far as they have been issued, we may confidently say that each map is a rare combination of the science of geography with the arts of draughtmanship, engraving, and printing.

Österreich-Ungarn: Physikalisch-statistischer Handatlas. Lief. v. Bl. 5. Karte der Verteilung der Niederschlagshöhen in den 4 Jahreszeiten, 6 Verteilung der Gewitter, 11 Bodenkarte. Eduard Hölzel, Wien.

Fifteen of the twenty-four maps which complete this important work have now been issued. Edited by Dr. Josef Chavanne, and produced in Hölzel's geographical establishment in Vienna, it has been progressing rather slowly for the last two or three years, but the result is certainly a most valuable addition to the geography of Austria-Hungary.

Länder der Ungarische Krone: Ethnographische Karte. Justus Perthes, Gotha.

This map is prepared by Ignaz Hatsek to illustrate a paper in Petermann's *Mitteilungen* by Dr. Josef von Jekelfalussy on "The Nationalities of Hungary."

The Soudan and Khartum. Bartholomew's War Map. John Menzies & Co., Edinburgh. Price 6d.

Drawn on a scale of 16 miles to an inch from the official surveys, this map embraces the complete field of military operations on the Nile, and extends to Suakim on the Red Sea. It appears to contain the names of all the places at present before the public, and is certainly published at a popular price.

South Africa: illustrating Sir C. Warren's Commission. W. & A. K. Johnston, Edinburgh and London. Price 1s.

This map will serve all the requirements of newspaper readers in following out the South African question.

Stella-Landes. R. A. Lavertine. Justus Perthes, Gotha.

This map appears in Petermann's *Mitteilungen*, to illustrate a paper on Stella-Land by H. Wichmann; it is based on the map in the South African Blue-Book, April 1884.

Süd-Ost Afrika: Geologische Uebersichtskarte. H. Haevernik. Justus Perthes, Gotha. (Petermann's *Mitteilungen.*)

This map, extending from the Zambesi to the Orange River, shows the geology of the Orange Free State, Transvaal, and the Matabele Kingdom, compiled from the works of Jeppe, Mauch, Hübner, Cohen, and others.

NORTH ATLANTIC OCEAN
MEDITERRANEAN SEA
BLACK SEA
CASPIAN SEA
Aral Sea
Adriatic Sea
RED SEA
PERSIAN GULF
GULF OF ADEN
FRANCE
SPAIN
PORTUGAL
ITALY
AUSTRIA
HUNGARY
TURKEY
TURKEY IN ASIA
ASIA
PERSIA
ARABIA
SYRIA
ALGERIA
Algerian Sahara
MAROCCO
TUNIS
TRIPOLI
FEZZAN
Libyan Desert
SAHARA
Tawarek or Imoshagh
Tiboo
Igdi Desert
Tropic of Cancer
EGYPT
NUBIA
Nubian Desert
EGYPTIAN SOUDAN
KORDOFAN
DAR-FUR
WADAI
BAGIRMI
BORNU
SOKOTO
GANDU
Songhay
MASINA
BAMBARRA
SENEGAMBIA
ABYSSINIA
SOMALI
GALLA
ADAMAWA
ASHANTEE
DAHOMEY
Mandingoes
Kong Mts
Madeira Is
Canary Is
Cyprus
Crete
Sicily
Sardinia
Corsica
Balearic Is
Socotra

AFRICA
BY J. BARTHOLOMEW, F.R.G.S.
English Miles
Kilometres
SOUTH ATLANTIC OCEAN
INDIAN OCEAN
GULF OF GUINEA
SOUTH GUINEA
Equator
Tropic of Capricorn
Meridian of 0 Greenwich
Longitude East 40 of Greenwich
BASIN OF THE CONGO
MADAGASCAR
MOZAMBIQUE CHANNEL
TRANSVAAL
ORANGE FREE STATE
CAPE COLONY
GREAT NAMAQUA LAND
DAMARA LAND
Kalahari Desert
Bechuana Land
Zanzibar
Suahili Coast
Samburu LAND
St. Helena
Ascension
Annobon
CAPE TOWN
Cape of Good Hope
C. Agulhas
Angola
Loando
Benguela
Mossamedes
Lunda
Bemba
Tanganyika
Victoria Nyanza
Albert Nyanza
L. Nyassa
Matebele
Sofala
Mozambique
C. Delgado
Kilwa
Mombasa
Antananarivo
Reunion or Bourbon I.
Pretoria
Kimberley
Durban
Port Elizabeth
East London
Zulu
Gaza Country
Delagoa Bay
Comoro Is.
C. Amber
C. Ste Marie
C. Palmas
Bight of Biafra
Princes I.
St. Thomas
Loango
Congo
Ovampo
Cape Frio
Walwich B.
Port Nolloth
J. Bartholomew, Edinr.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

RIVERS AND RIVERS.

By James Clyde, M.A., LL.D.

Definition of River.—Neither brook nor river is defined by Johnson, when he explains the former with reference to river, and explains river as "a land current bigger than a brook." An exact definition will be possible, when a hard and fast line has been discovered between the river-form and all other forms in which water descends from a higher to a lower level on the earth's surface. But, to use the words of J. S. Mill when renouncing metaphysical nicety of definition in respect of wealth, and with substitution of river for wealth, "every one has a notion, sufficiently correct for common purposes, of what is meant by river."

For uncommon purposes, an uncommon meaning may be read into the word. In 1877-8, there was a Scotch suit about the rights of boating, fishing, and fowling on Fionn Loch and Dubh Loch, Wester Ross; in the course of which, an engineer witnessed that the lochs were geographically two, and not one, as was contended on the other side, alleging that they were connected by a river of the following dimensions:—North bank, 150 feet; south bank, 50 feet; average length of waterway, 100 feet; width of waterway, 244 feet. "When was it heard of," exclaims the Lord Ordinary in the note appended to his interlocutor of 4th June 1877, "that a river was broader than it was long!" The recall of this interlocutor, on legal grounds, left untouched the Lord Ordinary's geographical finding:—"The river is really a thing of the imagination."

A river, then, is just a river. Yet rivers differ from one another in respect of source and outfall; and not only whole rivers, but parts also of one and the same river differ from one another in respect of the flow, colour, and taste of their waters, and of the services and disservices they render to man.

Head-Streams.—*The* source of a river means only its principal source, for the sources are countless, being indeed all the points in the ridge of the watershed which divides the basin of the river in question from the basins contiguous to it. The principal source must be the source of the principal head-stream; and that one of the head-streams is the principal one which, besides being longer and larger than any of the others, also comes down from a greater height, and lies more nearly in the line of the river-course. But all these qualifications are seldom found united; and sometimes there is not even a preponderance of them in favour of any one in particular. Who shall decide whether *the* source of the Yorkshire Ouse is to be found up the Swale or up the Ure; that of the Rhine up the Vorder- or up the Hinter-Rhein; that of the Danube up the Brege, or up the Brigach in the Black Forest? Generally, however, the balance favours some one head-stream. The Missouri, for instance, is preferred to the Upper Mississippi, as head-stream of the waters delivered by the Lower Mississippi into the Gulf of Mexico, because, though deviating markedly from the line of the lower river-course, it is both larger and longer than the Upper Mississippi, and comes down from a much greater height. The name Mississippi travelled up stream with exploration, and came to be the name of the shorter and smaller of the two confluents, because exploration happened to ascend the shorter and smaller one first. On the other hand, the Marañon is preferred to the Ucayale as head-stream of the Amazon, though it be a dozen or a score of miles shorter, because the main direction of the river-course continues up the Marañon far beyond the confluence of the Ucayale, and the Marañon rises very much farther west than the Ucayale, or any other affluent.

The Source.—When the principal head-stream makes its first appearance as the outflow of a glacier, or as the overflow of a spring welling from out the bowels of the earth, there, without any indefiniteness or question, is *the* source of the river itself; for popular language ignores the previous sub-glacial or subterranean flow of the waters. The Rhone Glacier has thus a perfect title to be called *the* source of the river Rhone. Fairly well represented in these islands is such a source by the frozen snow-beds from under which issue the head-waters of many a Scottish river during the greater part of the year. Well-sources are few compared with glacier-sources. The most copious one in Great Britain was St. Winifred's Well, Flintshire, so long as it delivered 21 tons of water per minute. According to information furnished by the Vicar of Holywell for this article, that quantity has of late years decreased by about 9 tons per minute, so that steam-power is now used for work which previously needed only the water-power supplied by the well, and by a brooklet which joins the well-stream about 50 yards from the well itself. The well-stream joins the estuary of the Dee after a course of 1 mile 3 furlongs, with a total fall of 245 feet, which allows its waters to be used

over and over again for driving the machinery of public works. More famous is the fountain of Vaucluse, so called from being situated at the head of a *Vallis clausa*, where "No thoroughfare" is written in rock letters steep and high. The river Sorgues, which flows from the fountain, joins the Rhone 5 miles north of Avignon. Rivers adult at birth are reported by Joseph Thomson as issuing from the east side of Kilimanjaro. He writes of them: "These streams are remarkable for the way in which they well forth at the base of Kilimanjaro. In this respect, they differ wholly from the Chaga streams, which rise high up on the mountain."

Of a pool-source, there could not be a better example than Shannon Pot, as the natives call it, in County Cavan, whence flows the largest river of Ireland. In the hollow of a well-grassed upland, within a few minutes' walk of a farm-steading, opens in the deep soil a round hole measuring several yards across; and at the bottom of the hole lies a pool with a rather swift outflow of 2 to 3 feet in both breadth and depth. Such is Shannon Pot; at any rate, such is an eleven-year old impression of it, read off without notes.

Lake Sources.—Most rivers that rise at a moderate elevation in the temperate zone put in their first appearance as an upland brooklet fed by the down-trickling drainage; and no one spot can be pointed to at all seasons, and in all weathers, as that where the head-stream takes its rise. In this sense, the head-stream, and consequently the river itself, have no source. Some lake or lakelet, situated far up a river, is in such cases usually accepted as *the* source; and a human convention passes at length for a fact in nature. Even travellers worry over "the true source," where nature offers only a choice of conventional sources; so strongly are men drawn to Realism even when the facts declare for Nominalism. Thus, in the *Proceedings of the Royal Geographical Society* for December 1884, p. 722, Her Majesty's Consul at Mozambique discusses whether "the true source of the Lujenda River must be looked for" in Lake Shirwa or Kilwa, which in high floods may feed it; or in lakes Amaramba and Chiuta, which feed it regularly; or in the swamps Mtambo and Mtorandenga, which again feed these lakes by the stream Namiguru. Lakes of which the influents are nearly on a par, not one of them forming a considerable river, are well defined lake-sources. Such is the small lake giving rise to the Spey, a longish river for Scotland: such is Loch Maree, a large lake with the Ewe for outlet, a river only one mile long. Such, too, is Glazier Lake, which, in consequence of having been recently found to lie a few feet higher, now supplants Itasca Lake, as source of the Upper Mississippi. So, Lake Lauricocha may pass as the source of the Amazon. But when some one influent is long and large, the inquirer may decline to stop at the lake, and insist upon placing the source of the river that drains the lake at the head of its principal feeder. In this way, the source of the White Nile is not Victoria Nyanza, but the source of the Shimeeyu, which

feeds Victoria Nyanza; and the source of the Congo is not Lake Bangweolo, but the source of the Chambezi, which feeds Lake Bangweolo.

The River-Course.—In respect of flow, rivers differ from one another, and the same river varies at different parts according as the flow is more or less circuitous; is quick, with the incidents of rapids and waterfalls, or slow, with the incident of expansion into lakes; is above or below the general level of the country, and, in the latter case, is more or less deep down below it, or even subterranean; finally, is more or less liable to floods. The destructiveness of rivers, also their serviceableness as navigable waterways, and their availableness for irrigation, all depend on the manner of the flow.

The water-courses of a country are determined, in the first instance, by its original relief, by the ups-and-downs of the primeval surface. A range of hills or mountains is not necessary to a watershed. A continuous swell of the surface, provided only it rise decidedly higher than the highest flood on either side of it, parts the waters as surely as does a lofty range: witness the watershed between the St. Lawrence and Hudson Bay, so gentle that the ridge of it cannot everywhere be traced. And provided the mass of the watershed be ample, it matters nothing, so far as the general direction of the river-course is concerned, whether its slopes be formed of rock or of looser material. Flowing water has assisted in scooping out whole valleys, and every river works out the details of its own course. Niagara River, for instance, flows eastward in obedience to the relief of the country; but it flows at the bottom of a deep rocky gorge below the falls, because of its own action in wearing, loosening, and carrying away the rocky bottom of its original bed. Except at waterfalls, however, a river must be in flood to modify perceptibly the details of its course. It then abrades and undermines its own banks, so that portions of them fall in, with whatever may be growing thereon, and all this material it deposits at the head of some lake, or distributes over the flats which, in its ordinary state, it merely traverses.

Circuitous Rivers.—Of rivers whose whole course is circuitous the Devon is a capital example. Rising inside the Ochils, it escapes from them eastward, and, turning westward at the Crook, flows outside them to the Forth, which it enters, after a course of 26 miles, at a point only 6½ miles, as the crow flies, from its source. The Nile, again, is a river with a pretty direct course on the whole, in which, however, there occurs one great bend, extending from Korosko up stream to Abu Hamed, and containing the second, third, and fourth cataracts. The journey between these two points is 500 miles longer by the Great Bend than straight across the desert.

Twin-river Bends.—Here may be mentioned the bends of the twin-river system characteristic of Asia. The Obi and Yenisei, the Yangtze-

Kiang and old Hwang-ho—*i.e.* the Hwang-ho as it reached the sea prior to the floods of 1851-3—both rise, and fall into the sea, near to each other; again, the Euphrates and Tigris, the Ganges and Brahmaputra, rise near to each other, and fall into the sea together; but all these twin-rivers give to each other a very wide berth between source and mouth. So the Severn and Wye, rising at the distance of only about a mile from each other on Plynlimmon, and uniting their waters at length in the Bristol Channel, follow widely divergent courses in between.

Inosculating Rivers.—Twins, and even *trins*, at the source alone, are numerous. Akin to these are rivers that flow out of the same lake-source, or whose head-waters inosculate; but such rivers do not necessarily form a circuit. The Amazon and the Orinoco, which inosculate on the grandest scale by means of the Rio Negro and the Cassiquiari, describe between them a highly bent bow through the heart of South America. According to Anderson's map of South Central Africa, in the *Royal Geographical Society's Proceedings* for January 1884, there is a like inosculation there. Just as the head-stream of the Orinoco divides its waters, at the Cassiquiari parting, to north and south, so does Back River, which rises in Brinus Mountains, divide its waters to east and west, connecting thereby the Hygap and Great Fish River, two tributaries to Orange River on the right bank, and forming with them a highly bent bow in the heart of South Africa. In North America, on the other hand, Columbia River and Mackenzie River, which receive contributions from opposite ends of the same lake in Athabasca Pass of the Rocky Mountains, flow in so nearly opposite directions that their courses form, in the main, a pretty straight line, the lowest reach of the Columbia excepted, which makes a right angle with the rest of its own course. Similarly the courses of the Tweed and Clyde, which have been known to inosculate in great floods, by the inundation of boggy ground at the head of Biggar Water, lie nearly in the same straight line.

Winding Rivers.—Natural counterforts, succeeding each other on opposite banks, do make the river deviate now to left, and immediately thereafter to right. But windings so caused want the multiplicity and intricacy of those which a river creates for itself, as the Links of Forth, with the added phenomenon of aits, as often as a *link* is completed into a loop. British rivers, comparatively gentle in themselves, are also now so well embanked that they exemplify but feebly the modifications wrought annually by a river liable to floods on the details of its course. Yet all our holms and *haughs* are their work. The windings of to-day are the survival of countless old channels of various dates, which here and there interlaced, and here and there got filled up, the line of least resistance being everywhere that which the river followed in forming, as flood after flood subsided, its permanent channel. The *links* of the Scottish Meander measure 20 miles for a direct distance, between Stirling and

Alloa, of 7 miles. Equally definite information is not to hand about the original Meander; but its windings were said by the ancients to have given to Daedalus his first idea of the labyrinth, and they were described as tracing over and over again, upon the plain, the most intricate letters of the Greek alphabet. The windings of the Achelous, the largest river in Greece, are less numerous, but on a larger scale. For miles at a time, this river returns, through its own alluvial deposit, towards the mountains from which it brings down, with every flood, one layer more to a plain fertile as the Nile delta. To see the like stupendous return of a water-course upon itself on British ground, one must look below high-water mark, where rivers serpentine the end of their ways through the immense of sand revealed at low water in the Solway Firth or Morecambe Bay.

Nearly level tracts of sand and *alluvium* occur most often towards the mouth of a river, because there the river-basin usually widens, and the carrying power of the stream is reduced to a minimum: there also, in the case of tidal rivers, the upward flood twice a day aids the downward flood of the river in distributing equally the materials of the deposit. But instances are not wanting of winding rivers far inland. Pimichin River, in the Rio Negro region of South America, is mentioned by A. R. Wallace as traversing a flat sandy tract, with "an extraordinary number of bends and doubles." And few rivers meander more or farther than the Tonke, that entirely inland river of South Central Africa, whose alternating flow now to, now from, Lake Ngami will be noticed by and by.

Rate of Flow.—Another distinction among rivers is based on the rate at which they flow. The rivers of Scotland generally, headed in this respect by the Spey, are swift; the rivers of England generally, excepting those of the six northern counties, are slow. The rate varies directly with the decline of the bottom, and inversely with the area of the river-section. Precisely the same quantity of water is passed on per minute over inch by inch of the brattling shallow or roaring gully, as over inch by inch of the quiet pool or lake immediately above. The slower rate of movement in the pool or lake is compensated by the larger area there of the moving section. The problem is like that of passing equal quantities of water in equal times through funnels of which some have the orifice large, and others have it small: the water must pass through the small orifice at a quicker rate than through the large one.

Navigable Rivers.—Slow, deep, and straight are the qualities of a navigable river. Sir Charles Lyell mentions, in his *North American Travels*, that General Washington is said to have selected, for the capital of the United States, the site where Washington City now stands, partly because of its being at the head of navigation on a great river; and then he adds:—"But unfortunately the estuary of the Potomac is so long and winding, that to ascend from its mouth to Washington is said often to

take a vessel as long as to cross from Liverpool to the mouth of the river." The rivers of the Argentine Republic, the Parana itself not excepted, exemplify on a large scale the conditions which, though not barring navigation, impede it. Immense are their windings through the plain; then their great breadth shallows the waterway, and allows of its division into channels, which, again, are not constant: the navigable channels, and the banks or shoals dividing them, change with every flood.

The river-flow is a help to craft sailing down, but a hindrance to craft sailing up; and there is a rate of movement at which the hindrance becomes a barrier. To shoot the Lachine rapids is an amusement with visitors to Montreal; but the shooting is always down stream. In the up-voyage, a canal is preferred. The enormous difference to the traveller between up-stream and down-stream appears in the report which Mr. John M. Cook gave, on the 5th January 1885, to the Royal Geographical Society, of his share in the British expedition up the Nile. After stating that, on his return from Dongola, his boat was steered successfully by a Canadian through all the cataracts and rapids, he added, "to give an idea of the different rate of travelling, he might say that a distance of 75 miles (between Sarras and Sakarmatta), which had taken thirteen days in ascending, was covered in eleven hours on the return journey."

Canalised Rivers.—Rivers are navigable in proportion as they resemble canals, and the supply of water may be ever so scanty, provided only the river-bed contain a breadth and depth of water sufficient to float the required craft. Many rivers are canalised. The Thames, from Lechlade, where it connects by a canal with the Severn, down to the first lock at Twickenham, a distance of 150 miles, is a canal. Even quite insignificant streams are canalised, when the decline of the bottom is slight, and the prospect of traffic good; witness the Gippen or Ippen in Suffolk, so insignificant a stream that, although Ipswich is named after it, that town is never described as at the mouth of the Ippen, but always as on the Orwell, estuary of the Ippen. The Clyde, from Glasgow Bridge to Port-Glasgow, is now a tidal canal; for its natural bed has been dredged to one level for that distance, with the interesting result that the high-water level has been raised and the low-water level lowered from Glasgow Bridge downwards. There is no steepness of fall in any of the Scottish rivers, but could be surmounted by a Neptune's Staircase, such as admits to the south end of the Caledonian Canal, or by mechanical-lifts, which are sometimes preferred to locks: some of them even offer facilities. The Aberdeenshire Dee, for instance, holds a pretty straight course, with a moderate fall, all the way from the Linn, 6 miles above Castleton of Braemar. The Galloway Dee, again, offers 8 miles of lake-water, which is nearly a fourth of its length above the estuary; and the writer of a prospectus for its canalisation would be entitled to add the $4\frac{1}{4}$ miles of

lake-water in Loch Ken, which would raise the above proportion of nearly one-fourth to fully one-third. Scottish rivers are not canalised simply because, in their case, *le jeu ne vaut pas la chandelle.*

Rapids and Falls.—Navigation is impeded by rapids; it is stopped by falls. A perpendicular waterfall is no part of the river-course, for it is not in the river-bed, and falling water is not subject to the laws of flowing water. In the river-bed, water flows faster in the middle than at the sides, and on the surface than at the bottom. In the perfect, *i.e.* the perpendicular waterfall, particles in the middle descend no faster than particles at the sides; those that were lately at the surface, and those that were lately at the bottom, descend at the same rate; all obey now the mere force of gravity, modified only by the resistance of the air. The greater the navigability of a river but for waterfalls, the greater the disservice they render. Yellala Falls, at the head of the estuary of the Congo, together with the rapids and cataracts that succeed one another for over 200 miles above it, shut out the trader from 3000 miles of navigable waterway offered by that river and its tributaries above Stanley Pool. The Nile, again, is innavigable, for the most part, from the second or Great Cataract to Berber, a distance of 700 miles; and thereby the trader is shut out from nearly 2000 miles of navigable waterway on the Nile and its tributaries above Berber. The like is true of African rivers generally; for that continent may be described as a table-land of lacustrine saucers 1000 to 4000 feet above the ocean-level, with a rim of coast-ranges, 100 to 200 miles distant from the sea. The great rivers issue from the interior by gaps in the rim, and the steepness of the descent from each gap to the sea necessitates cataracts and falls. To this state of matters, America presents a contrast. There the great rivers of the Atlantic slope have floated European enterprise up to the plains of the far interior; whereas in Africa roads and railways are required to convey European enterprise from the coast, in order that it may be floated on the inland waters.

Log-floating Rivers.—Many rivers, not navigated or navigable, are yet equal to the floating of logs down stream. Even mere brooks, dammed back at intervals, are pressed into the woodman's transport-service. The value of such aid may be understood by what happens when it is absent. For 100 miles along the south coast of Cape Colony stretches the forest of Knysna, with an average breadth of 25 miles, the largest forest in the colony. But there are neither rivers to float down the timber, nor natural harbours convenient for loading it on shipboard—the carriage is overland with bullock-teams; and the consequence is that, not only does Cape Colony not export timber, but at Cape Town Norway deals are cheaper than the native timber.

Irrigating Rivers.—Rivers as such, *i.e.* irrespective of floods, are often said to water the countries through which they flow. Of themselves,

rivers water a country to a quite insignificant extent. In warm climates, no doubt, it is the "tree planted by rivers of water" that "bringeth forth his fruit in his season." The tourist in Greece knows from far, by the green riband of oleanders wandering athwart the landscape, that a river-course is there; but the green riband is narrow, and on either edge of it begins again the ashen grey of bare and thirsty ground. The hand of man is needed to effect a beneficent distribution of river-water on an extensive scale; for the proper function of a river is to receive and pass on drainage. The moistening of its banks is, as in the case of any open drain, only a slight incident of its proper function. The Euphrates and Tigris still flow through the plain of Shinar; and it is the disappearance, not of the irrigating water, but of the irrigating men, that has changed that once fruitful field into a desert. The same is true even of Arabia. The ancient dwellers bored deep wells through rock as well as through earth, securing them with masonry, and made dams in favourable spots: the Arabs of to-day make no dams; their only digging tools are their hands and a stick; and they are clay-builders.

The rivers which lend themselves most readily to irrigation are, of course, those which flow at a higher level than the land to be irrigated. But this specialty in rivers is always man's work, though nature begins the process; for rivers that regularly overflow embank themselves more or less, as has been observed in the Amazon, and still more in the Mississippi. The heavier sediment being deposited, during inundation, at the shorter distance, and the lighter sediment being both carried farther away, and spread over a wider area, the immediate banks are raised more rapidly than the surface of the land behind them; and a landward slope is established, less steep of course than the slope towards the river. But this self-embankment is imperfect and irregular; and only by man's device and work are river-banks raised and maintained so as to prevent destructive inundation. Now, as soon as a turbid river begins to slacken its rate of flow, which it necessarily does on reaching a champagne country, it begins also to deposit the earthy matter with which it is laden; and when such a river is confined within banks, the deposit becomes an addition to the river-bed, which consequently rises. In this way it is that the bed of the Po has come to be higher than the adjacent land; so that, by sluices in the banks, the meadows of Lombardy, and the rice-fields of Venetia and Emilia, are inundated at pleasure. In like manner, the Nile below the first cataract flows on and within an embankment, through which the flood-waters are allowed to escape only where arrangements have been made for their distribution.

Easy also is irrigation from rivers which flow only a little way below the surface of the land, as do the classic streams Cephisus and Ilissus. A shallow cutting in the bank up-stream taps the water-supply, and conveys it to the lands lower down. The plain of Athens glooms with olive-groves, because, wherever stands an olive tree, thither has man led a "river of water." But this mode of irrigation becomes increasingly difficult with

the depth below the surface at which rivers flow; and it is soon found preferable to lift, by manual labour or with the aid of a wheel, the water of the river up to the surface of the ground. It is this laborious irrigation that accounts for the gardens, vineyards, and date-groves which even now bedeck, at intervals, the immediate banks of the Euphrates and Tigris. The fertility that fringes the Nile above the first cataract is due to the same cause.

Sunken Rivers.—Many rivers flow so far below the surface that irrigation out of their depths would not pay expenses. Such are most rivers in Cape Colony; and the consequence is that the Great Karroo, for example, though traversed by three considerable rivers, Zout, Lion, and Dwyka, with their tributaries, remains a merely pastoral region, growing chiefly the shrub called by the natives *karroo*, of which, fortunately, the flocks are fond. With irrigation, the somewhat saline reddish clay of this region would yield corn and wine. Sunken, too, are the rivers of the Canadian North-West. On the second prairie level, they flow 150 to 200 feet below the general surface; and on the third prairie level, near Medicine Hat, the South Saskatchewan flows 293 feet below the general surface. Irrigation is not wanted in that quarter, but the usual amenity of river-navigation would be welcome, whereas the self-made river-troughs are so narrow, that the view from a steamer ploughing their waters is little better than the view from a train speeding through a deep cutting. A favourable example of this formation in Scotland is the "Trough of the Clyde," which, beginning a short way below Lanark, extends 12 miles down stream. But this river-trough is 6 miles wide, with *haugh*, and slope, and hill on either side up to the plateau of the general surface, so that even the tourist is pleased with the trough. The most stupendous example on the globe of a sunken river is the Rio Colorado, United States of North America, with its tributaries. These all flow at the bottom of deep and precipitous gorges, called *canyons* after the Spanish name. In the Grand Canyon of the Rio Colorado itself, extending for 200 miles down stream from the confluence of Little Colorado, the river flows, between nearly perpendicular walls, at a depth of 4000 to 7000 feet below the surface of a country barren for want of water.

Underground Rivers.—In limestone regions, because of the fissures and caverns characteristic of that rock, rivers are apt to disappear, and of course also to reappear. But the deeper any such river descends into the bowels of the earth, the less is known of its subterranean course, and the less certain becomes the point of its reappearance. For example, the Stymphalus, after flowing 2 miles towards the edge of the Arcadian table-land, disappears in a καταβόθρα, as the modern Greeks call such river-chasms; and it is certain that, about 20 miles from this καταβόθρα, several streams, issuing low down near the sea-level from the rocks of Mount Chaon, unite and form the Erasinus, the one permanent

river of the Argive Plain. But whether, according to both ancient and modern opinion, Erasinus be *Stymphalus redux*, is uncertain. So Eregli Lake, on the Anatolian table-land, north of Taurus, is supposed to find outlet, south of Taurus, in the sources of the Cydnus. The best-known underground rivers are of course those which flow nearest to the surface, as that brook which, rising near Hebron, flows by Gerar to the sea, and supplies water to as many of the inhabitants all along as tap it by digging a well; or again as the Guadiana, which, after flowing 30 miles above ground, disappears, and for the next 30 miles reappears at intervals in lakelets known as the *ojos*, *i.e.* eyes of the Guadiana. The best place in the British Isles for observing underground flow is Cong, County Galway. Lough Mask drains into Lough Corrib by underground streams, which are accessible at various points in their four-mile course, wherever a lime-sink has developed into a complete break-down of the surface. One of these, called Pigeon Hole, gives access, at a depth of 60 feet, to a stream that has its outflow within the demesne of Cong Abbey. Other streams come to the surface at the Rising Waters in Cong village; and others still at less notable outlets. The cause of all this in the nature of the rock is illustrated by the "Big Blunder," as it is called in the neighbourhood—a canal-bed cut through the limestone between Lough Corrib and Lough Mask in 1847-8, as a Government relief-work. The water leaked away as it was let in; and the canal-bed remains empty. Inspection, wherever practicable, attests that rivers behave in precisely the same way under ground as above ground. Underground rivers swell and subside according to the weather, like rivers of the upper air: it is after continuous heavy rains that the Peak Cavern, Derbyshire, shows a torrent fed by furious cataracts.

Diminishing Rivers.—In rainless countries, like Egypt, and in countries with a dry season, like India, rivers diminish in volume towards the mouth. The Nile is the most conspicuous example. Its last considerable tributary is the Atbara, which joins it 1200 miles from the Mediterranean; and from March to June, this tributary shows, in the last 50 miles of its course, only a series of deep pools, the retreat of crocodiles, hippopotami, turtles, and fish. The consequence is that, what with evaporation under a burning sun, leakage into the banks, and the withdrawal of water for irrigation, the Nile becomes smaller and smaller from the confluence of the Atbara downwards. Like causes account for the like effect in the Indus, from the confluence of the Panjnad downwards. In the interior of Asia and Australia, diminishing rivers are the rule. Many of them are even intermittent, flowing only after rains; and in Australia, the course of many such rivers is marked, not by a channel properly so called, but by a succession of wide flats subject to inundation. Every country abounds with intermittent water-courses: after heavy rain, they gather in our streets, and hasten to the nearest opening prepared for them, just as they spout forth from our hillsides, and hurry down to the

nearest loch or river. But careful observation might show that some of our recognised rivers are liable to diminution, as they flow, during long-continued drought. The observation would have to include the rate of flow as well as the depth of water; for the slackening of the former, while the latter remains unchanged, is the earliest form of diminishing flow.

Back-flow.—The only regular back-flow in British rivers is that caused by the tide. In the Amazon, the tide never overpowers the seaward current; and careful observation might discover the same phenomenon in other large rivers, and even in some British rivers when these are in flood. At Santarem, where the Tapajos joins the Amazon, about 500 miles from the Atlantic, the Amazon, at 100 yards from the banks, streams away seaward, at the very time when its side-waters, raised by the tide, are flowing yellow up the blue Tapajos. The supposition is that the waters of the Atlantic creep up along the bottom of the river-channel, so that the main Amazon rides over them to the ocean. Independently of the tide, and far inland beyond its reach, some back-flow takes place up tributaries, wherever the main river rises in consequence of rains that have not extended to the basins of the tributaries, a down-flow producing the same side-movement as an up-flow. Back-flow—at least stagnation—from this cause occurs for several hundred miles up the Rio Negro early every year when the Amazon rises.

It is not the back-flow itself, but the rise of waters in the back-flow, that is important to the navigators of an estuary, and to the farmers on its banks. Warping by tidal waters is practised in both the Old World and the New; and the words in *Evangeline*, written of the dikes which regulate the fertilisation of Grand-Pré, Nova Scotia, by the Bay of Fundy tide, red with suspended marl, are fairly descriptive of like works on the English Humber and Trent:—

> "Dikes, that the hands of the farmers had raised with labour incessant,
> Shut out the turbulent tides; but at certain seasons the flood-gates
> Opened, and welcomed the sea to wander at will o'er the meadows."

Alternating Flow.—Lake Ngami, a shallow, reedy sheet of water, 50 miles by 8 to 18 miles, occupying the flat of an upland saucer in South Central Africa, is a centre of alternating flow. Its chief influents, Zouga from the south-east and Tonke from the north-west, are in flood at different seasons. Zouga in flood avails to make the lake overflow into and up Tonke, which is then very low; Tonke in flood avails to make the lake overflow into and up Zouga, which is low in its turn. When Lake Ngami contains more water than can be disposed of by this alternating flow, the excess escapes northwards by an off-set from Zouga called Malabe, which branches out, so as to meet the Chobé, a tributary to the Zambesi, at five points. In the dry season, the Malabe is waterless: in the wet season, it flows north or south according as Lake Ngami is

brimming to overflow, or not. Substitute for Lake Ngami the Amazon, sea-like in extent for about half the year, and always lake-like in gentle flow, and the right and left-bank tributaries of the Amazon for the Zouga and Tonke respectively—a like alternating system is there. In February and March, the right-bank tributaries of the Amazon swell the Amazonian sea to such a degree, that the waters press up the left-bank tributaries, which are then at their lowest. In June, the left-bank tributaries, swollen in their turn, send like pressure up the right-bank tributaries, which by that time have fallen considerably. A still more manifold system of alternating flow is due to the enormous rise of the waters of Tali-Sap Lake on the confines of Cambodia and Siam, with plains immense all round. This lake measures 60 miles by 20 miles, and its waters, from being 3 to 4 feet deep, rise annually till they are 40 to 50 feet deep. In the wet season, the lake serves as a back-water to the Me-kong, stems the current of its own feeders, and, rising above many a low watershed, flows into shallow valleys and saucers not belonging to its own basin, absorbing local drainage into the general inundation. During subsidence, some of the waters return to the lake, flowing back from all the points of the compass towards it; but others, becoming disconnected from the Tali-Sap basin, as the overflowed watersheds emerge, flow down valleys, or settle in saucers, as before the inundation.

Colour of Rivers.—Black and white are the commonest colour-names of rivers. The ancient Greeks had in their peninsula six rivers called Μέλας, Black, and one called Λεῦκος, White, the accent of the adjective λευκός being changed here according to the usual rule for proper names. But Greece had more than one river rolling white waters to the sea: hence the Homeric epithet applied to the Peneius and other streams, ἀργυροδίνης, which lexicons render "silver-eddying." In the Peneius at any rate, the silver whirled along in eddies is the dirty-white earth of its own overflowed banks. The Achelous is, for that same prosaic reason, called in modern Greek Aspro-potamo, *i.e.* White River. Our own Blackadder and Whitadder are true colour-names; but *white* in Whitadder means *clear*, and *black* in Blackadder denotes the coffee-brown of moss-begotten water. The equatorial region of South America is the classic country of black and white waters: the Rio Negro and its tributary, Rio Branco, represent two sets of rivers, black and white respectively. The whiteness of the Rio Branco, like that of the white rivers in Greece, is the whiteness of earthy matter in suspension, for the colour of the water itself, when the sediment has settled, is pale olive, which is also the colour of Rio Negro water as seen in a wine-glass. It is because of the great depth, that the Rio Negro looks black as ink at its confluence with the Amazon; and the pale olive colour, which deepens into black, is due to the decomposition of vegetable matter. White waters are turbid, because of the presence of earthy matter in them; and white must be interpreted widely, as including, at any rate, yellow. The black waters, on

the other hand, are remarkably clear; through them, the pure white sand of the bottom looks golden, and small fishes can be watched at a depth of 20 to 30 feet. Rivers may be called black or white irrespective of the colour of their waters. Sour Milk Ghyll Force, Cumberland, is so called merely because of the momentary whiteness which belongs to broken water; and, at page 391 of *Through Masai Land*, Joseph Thomson mentions Guaso N'Erok, *i.e.* Black River, as owing its name merely to the black volcanic rocks over which it flows. Of other colour-names, red and yellow belong to rivers turbid with earthy matter; witness the Rio Colorado (*Anglicè* Red River) of the United States of North America, and the Hwang-ho or Yellow River of China. The omniscient school-boy recalls the *flavus Tiberis* of Horace. The names Blue and Green, on the other hand, belong to clear rivers. The former name belongs to the purest waters of all, those which come down from clean rock-regions, as the Blue Nile, for the White Nile is so called because it is turbid with whitish earth. So the name Di-chu, which the Yangtze-Kiang bears towards its source, is rendered Blue River. Green water is tinged with vegetable matter.

Niger and Orange River have only the sound of colour-names. The former represents a native name, *N-eghírrëu*, which means simply *the river*. The latter is the reproduction by the Dutch, in South Africa, of the princely title of the King of the Netherlands.

Taste of Rivers.—All river-water holds some mineral matter in solution; and salt is that kind which the palate most readily detects. There is a Salt River in Western Australia, and more than one Rio Salado in the Argentine Republic. All streams which bring down the washings of the pampas are saline, and the saltness increases with the drought.

The Mouth.—Where exactly the mouth of a river is, cannot be told. In the Nith stake-net case, which was decided at Dumfries, on 30th April 1836, it was vainly endeavoured to settle by scientific evidence where the river ended and the sea began. The stake-nets in question stood far down the estuary; but Lord Moncreiff and his jury, founding chiefly on the wording of a charter of 1395, declared them to be in the river Nith. At every river-mouth, there goes on a deposit, or a distribution, or some combination of the two, of river-borne material. If the deposit form a subaqueous bank at some little distance from the shore, it is called a *bar*. If it rise to the surface in mid-stream, so as to divide the river into branches, and by growing seaward extend the area of the land, it is called a *delta*. Sometimes again, without forming either bar or delta, a river, by distributing sediment to right and left of its channel, embanks itself farther and farther seaward. In this very way, the Shat-el-Arab mouthpiece of the Euphrates and Tigris has added about 100 miles to its course since the dawn of history.

It is a mistake to suppose that deltas belong especially to great rivers.

The tourist, walking along the shore of Loch Katrine when the burns are in *spate*, may notice each little stream heaping up its little delta on the lake-side, and duly embracing it with two little arms. Great rivers with mighty perennial current have no delta; witness the Congo, the Amazon, the St. Lawrence. Great rivers with diminishing flow naturally form large deltas: witness the Nile and Indus. Moreover, the bar of one age may become the delta of another. The Rio de la Plata estuary is at present an assemblage of mud-banks under water; but, should these mud-banks, by continued accumulation of deposit, ever emerge and become dry land, this land may take the form of a delta. It is also a mistake to suppose that deltas are formed only at a sea-side river-mouth. The mouths of tributary rivers are inland; and there also deltas are sometimes formed, as at the confluence of Rio Branco with Rio Negro in South America.

All that has been said of rivers reaching the sea applies to continental rivers, as the Jordan, Volga, and Oxus, which flow into lakes without outlet. Some continental rivers end in a marsh; and thousands of minor ones, in Central Asia especially, reaching neither lake nor marsh, are wasted by absorption and evaporation to a thread, and, being no longer recruited by tributaries, simply disappear in the thirsty ground. The disappearance is all the more rapid if a delta has been formed where the current begins to languish, the divided stream being of course still more subject to absorption and evaporation.

Evaporation from every wet and watery surface forms the clouds, which distil the rains, which again fill the river-beds. Such is the transformation round of water.

EASTERN ROUTE TO CENTRAL AFRICA.

Delivered before the Scottish Geographical Society at Edinburgh, 3d February 1885.

By Frederick L. Maitland Moir.

I have been asked to describe the Eastern Route to Central Africa. It is essentially Livingstone's route. Taking up the work for which he lived and died, the Free Church of Scotland's Mission had a small screw-steamer built, the *Ilala*, and in 1875 their party started for Nyassa, the steamer being transported in sections by the natives to the head of the Murchison Cataracts, where it was put together. The following year, the Established Church sent out the mission now stationed at Blantyre, on the highlands, near the Murchison Cataracts. In order to supply goods and provisions to these and other stations since formed, as well as to check the slave-trade, by developing commerce and encouraging the growing of ordinary agricultural products, some gentlemen in Glasgow

and Edinburgh decided to form a trading company. To commence with, ivory was expected to be the only source of profit, but it was hoped that ere long steam navigation would make transit so easy that grain and other commodities might be profitably exported.

A moment's consideration will show how much more of a civilising influence this latter trade would exert—necessitating as it does steady labour and pacific relations, and reaching also a far wider circle of people—than trade in ivory, which is mostly in the hands of Zanzibar Arabs or chiefs, the ordinary natives having nothing to do with it, and reaping no benefit from it. The work of the Company was taken up by my brother and others, as well as by myself, in the hope that it might serve not only useful ends in connection with commerce, but also other and more permanent purposes which we esteemed more highly. Such, briefly, was the origin of the African Lakes Company. Let me now proceed to describe its route to the interior.

Currie's Castle Line of steamers takes us in six weeks to the Portuguese town of Quilimane. This town is still often described as at the mouth of the Zambesi, but this is incorrect. That river discharges itself into the sea by three principal mouths, the most southerly of which, the Kongoni, is generally considered the best. Quilimane is situated 70 miles north of this mouth, on the Quilimane or Kwakwa River, as it is called at different parts of its course. Delay is here inevitable, to allow goods to be passed through the custom-house, and passports procured for travelling inland. To prevent the town being washed away, a sea-wall was lately built, with a pier at which to load and discharge boats and lighters. This is a great improvement on the old plan of landing passengers; as it can be readily understood that the edge might be taken off the day's enjoyment when a mail passenger, wishing to visit some acquaintance ashore, was, by an unlucky slip of the Negro carrying him pickaback from his boat, shot off his shoulders into six inches of water and eighteen inches of mud. At many points along the Kwakwa the mud is so deep as to be impassable. Even at the ordinary landing-places the natives sink beyond the knees, and often, when a white man is carried ashore, there is a good deal of transference from shoulder to shoulder before *terra firma* is reached.

From Quilimane the start is made inland in shallow-draft boats; ours having wooden houses in the stern for protection against rain and weather. For the first day and a half the time and duration of travelling depend on the tide, which runs up about 70 miles, and is so strong that paddling against it is waste of time and energy. Leaving tidal waters with their mud, we reach Afric's golden sand, of which we have far too much: I refer to the sand, not the gold. Owing to its shifting character, it is the great difficulty in the navigation of African rivers. The banks of a river are washed away by floods, and a broad channel is formed. Over this the sand spreads itself as evenly as possible, so that what should be a respectable river 10 yards broad, aspires in places to a breadth of 50 yards,

and becomes almost unnavigable. Here the men lay aside their paddles and take to poling, in which they are very expert. Both the poling and paddling they often accompany with a wild weird chant or boat-song, very monotonous, often with a touch of music in the cadence, but certainly always with plenty of noise.

The country is one vast plain joining with the delta of the Zambesi. In the blue distance to the north-west you can descry from the bank Morumbala Mountain. There are also some lands above the general level at Mopêa, Shupanga, and Shimwara, but in the distance they do not show.

Near the coast, on the mud-banks, mangroves abound, trees and underwood alike enlivened by monkeys, curlews, divers, and ibises. Crocodiles are plentiful at the junction of fresh and salt water, and also in the lakelets. Farther up, where the banks are higher, villages with cultivated patches stretch on either side, while in the reedy islets in the channel flocks of wild duck and an occasional spur-winged goose rouse alike appetite and sporting instinct in the breast of the traveller. For the last 20 miles of the way, the course of the Kwakwa can easily be traced by the thousands of graceful palmyras that fringe it. Some most picturesque bits occur in this reach of the river, which in its course forms a number of beautiful lakelets. Very lovely they look, as you glide in the the calm daylight over the still water, each palm and creeper reflected in the mirror-like surface ; no sound to break the silence, save the paddles of your own boat or the twitter of the pretty blue and red kingfisher as it flits confidingly from reed to reed, with now and then the screeching of a brown and white fish-eagle overhead. But another kind of charm comes when you are joined by the other boats and canoes with their noisy activity, or when, as night closes in, fifty camp-fires stand out clearly against the dark background of tree and palm, throwing their cheery radiance far over the placid moonlit water, and lighting up the dusky forms that flit about like shadows or lie basking in the blaze.

At Marendinny we leave the Kwakwa for our station at Maruru on the Zambesi. The length of this, the first portage, is about 5 miles. Maruru was purchased by our Company in 1882. There was then a frontage to the river of 150 yards, but the main current of the Zambesi, which was then washing away the bank some miles higher up, was, by the formation of new sand-banks, brought to bear against this part, and 75 out of 150 yards were carried away during the rainy season of 1883. During the next rains the remainder of the frontage and half of the house were washed away. It is thus the Zambesi treats those who confide themselves to her tender mercies. Within the last twenty years the stream has changed its course at least a mile, and it now flows 20 feet deep where, in Livingstone's time, stood a convent and two large groves of cocoa-nut trees. The Zambesi, in the dry season, is there about $1\frac{1}{2}$ miles broad, enclosing very large islands. When one of the great floods comes down, the waters rise from 15 to 20 feet, and the whole country is submerged, a water horizon being visible in several directions. The bars at the mouths are

bad and shifting, but as the Kongoni has lately been buoyed, we hope soon to have direct communication by it with the sea, and so avoid the Kwakwa passage and Maruru portage. At present we are met at Maruru by the paddle-steamer, *Lady Nyassa*, in which we proceed up the Zambesi and Shiré to the Murchison Cataracts. During high floods there is water in most places to float a man-of-war, but the current is very rapid and unsteady, and in the dry season it is difficult enough to navigate, even with this steamer drawing only 2 feet. If we start from Maruru about midday, evening finds us near Shupanga, well known as the resting-place of one who nobly risked her life in that then unknown region, to accompany her husband, David Livingstone, in his civilising work. A huge baobab-tree stands sentinel over the grave.

Fevers in this part of Africa seem to be inevitable, but often pass away as quickly as they come. If, however, complications arise, they prove very dangerous. I remember Shimwara, a few miles up the river, as the place where I most nearly succumbed. Providentially, I had been met a few days previously by a medical missionary, Dr. Laws, who nursed me through days of unconsciousness and months of subsequent weakness; and I recovered.

Two years ago, the lessee of the taxes in Shupanga district, a Portuguese, massacred some Landeens—some say to weaken their power, or, as others assert, to seize some ivory said to have been brought to the villages for sale. He invited across the chief and his men, and made them drunk. At a signal a Negro went up to the chief and blew his brains out with a revolver, and the rest were massacred. Then there was a rush across the river to secure the reported ivory, of which comparatively little was found. The Portuguese Government repudiated the act, and the perpetrator had to leave the country; but what must the natives think of white men who commit such atrocities?

Formerly there were numbers of hippopotami in the Zambesi; now as far as we go there are few, but on every bank lie those loathsome crocodiles, which make one's blood curdle as they slide into the water and disappear with the exception of two shining points—their wicked eyes, watching for prey.

About twenty-four hours' steam from Maruru, we reach the junction of the Shiré. From this point the country becomes higher, till farther up the Zambesi the hills culminate in the mountains, through which flow the Lupata Rapids and Chebrabassa Falls, and on the Shiré the Murchison Cataracts. These waterfalls mark where the great inland plateau descends to the lower level reaching to the coast.

At the Portuguese custom-house, a few miles from the confluence, Morumbala, a noble mountain, towers above the nearer Chingachinga Hills, but the river makes considerable detours ere its base is reached. After the dreary monotony of the plain, the change to this scenery of hill and burn is most refreshing, as is also the clear cold stream water that flows from the heights into the warmer Shiré. Were it not for the tall and

graceful palm-trees standing here and there, the long reeds and too luxuriant vegetation by the water's edge, the traveller could well fancy it a hill in old Scotland. A few miles farther on are the hot springs of Maziopissa. The waters at the source are almost too hot to be pleasant. Whether they have any therapeutic virtue or not I leave to the medical faculty to determine; but, under the belief that they have, the natives, when passing, bathe in them, and a warm bath once or twice in a lifetime cannot at least do them much harm. Hot springs are by no means uncommon in this region: there are several along the shores of Lake Nyassa.

Speaking of washing in a land where sponges and soap are unknown, I may mention that the natives have a good plan. They cut a flat disc of wood 4 inches in diameter and about 2 inches thick, leaving a long handle. They thoroughly char in the fire one side of the disc, and as they bathe they scrub their skins with this charcoal—quite scientifically sanitary!

Passing the mountain, we reach Morumbala Marsh, which during high floods is one vast lake 20 miles broad. When the water subsides large mud islands appear, and these are covered by a rank growth of rushes, sedge, and other plants, except where the natives sow their dry season crops. As the waters rise in the lakelets and shallows higher up the river, great masses of floating vegetation are detached and come down stream. So long as there is a fair current they pass on, but when they reach this great sheet of still water, a very little contrary wind will commence an obstruction. As the waters fall, these floating islands can no longer get over the mud-banks bordering the channel; they consequently collect in great numbers and are forced into one compact mass, extending over the whole breadth of the river. The current passes partly beneath the obstruction, but most of the water still overflows into the marsh beyond. When this overflow water is insufficient to float a light-draft steamer, the river is completely closed except to small boats and canoes. But as yet, during my experience of six years, the block has always disappeared within two months. Probably, as the water subsides further, the overflow stops, and the current being restricted to its own channel, its whole force is brought to bear on the floating mass in its way, which is carried off either to be deposited in some eddy of the lake, or to be floated out to sea.

On leaving the marsh, the hills above Senna, which separate the Shiré from the Zambesi, approach pretty near, and from Morumbala northward stretches a range of mountains (including the peculiar cone-shaped Pindar) which continues till it is lost in the highlands. Mounts Clarendon and Milanji are the most conspicuous. The shores of the river are reedy, and often marshy, and sand-banks again begin to impede the navigation.

It was here, at Chironji, that the Portuguese made their station on the edge of a swamp, and from this district the late rising of the natives against them commenced. Considering themselves unjustly treated by the soldiers and officers quartered among them, they rose, massacred the garrison at Chironji, and took possession of the stores which,

during the disturbances on the river, we had deposited in the stockade; and, united under four chiefs, they commenced marching on the coast stations of the Portuguese. Portuguese traders at Mpassas and Shamo were killed, and their stores carried off; the custom-house was broken into and cleared; the French factory at Shimwara, and Dutch barges in transit, and some of our boats were looted. From this point they retired with their booty, threatening to return. They came back, and, joined by the natives along the route, swept all before them. As they advanced, all the whites retired, and their progress and pillaging were unchecked. Mopêa, an important Portuguese station, with a military guard-house and cannon, was abandoned, the inhabitants fleeing to our Maruru station, to the Kongoni, or to Quilimane. For greater security we removed our goods to the other side of the Zambesi, formed a fortification of bales and cases, and made a camp.

News of the disturbance reached Quilimane, and while the Portuguese were discussing what was to be done, and sending to Portugal, Mozambique, and India for soldiers, the foreign houses (seeing the imminent danger their up-country branches were in, and the certainty that, were the Machinjiri to come any nearer unchecked, the coast natives would rise and join them) formed, with the consent of the Governor, a volunteer relief corps. It consisted of only 15 whites, including representatives from the English, French, Dutch, and German houses. A Scotsman was chosen leader, and in one and a half days they started for the scene of war, with the native crews (ninety men) all armed. The party arrived at Mopêa to find the Opium Company's station, to which the manager and *employés* had in the meantime returned, besieged by 2000 natives. The thirty Portuguese soldiers sent to the rescue were retiring as the volunteers advanced. The best house in the station had been burned down, the iron stores broken into; and the Europeans, consisting of one Scotsman already thrice wounded, two Portuguese (one of them a captain in the army), and fifteen Bombay men, at their last extremity, were still holding the last house. Their ammunition being finished, the natives outside were heaping firewood against the walls to burn a breach. Inside, the Europeans had kegs of powder ready in the middle of the floor to blow themselves up rather than fall into the hands of the besiegers, and another ten minutes must have seen the end, when the sharp crack of our rifles told that a rescue was being attempted. The relieving party, encountering a very brisk fusilade from the hundreds of guns and rifles on either side, and losing some men by the way, eventually cleared with their repeaters a road into the fort, and, once behind the earthworks, were comparatively safe. Now the long range rifles came into use; and several of the enemy falling where they had collected about 900 yards off, the whole multitude fell into panic and fled. But such are the good feelings with which we are regarded, that three weeks later, I, accompanied by only six of our men, passed through their country, and received apologies for what they had done to us aud assurances of friendship in future.

From Chironji it is fully a day to the Ruo, where, on a neck of land formed by the junction of that river and the Shiré, Chipatula, one of Livingstone's trusty followers, had a strong stockaded village. It has since his death passed, with the rest of the country, under the rule of the senior Makololo chief, Kasisi or Ramakukan. Above the village lies the Elephant Marsh, but this is so intersected by crocodile-infested streams and swamps, that during the six years we have been there, we have only shot one elephant in this district. These animals are very shy, and fear the steamer. But there are herds of buffalo and waterbuck on the plains, and after the annual fires have passed over the country, and the young grass crops up here, while the hills are still dry and burned, some good bags of game may be got.

Beyond the marsh the banks are higher, and the country is again more populous; but the river becomes very shallow indeed, and difficult of navigation. This continues up to Katunga's village, where the Shiré Junction Road commences.

The staple product of the country so far is oil-seeds (ground-nuts, and gergeline). These are, however, bulky, and of comparatively little money-value. A small trade in rubber and wax is done; but the natives are too fond of killing the goose to get the eggs. They hack and cut at the rubber vines, till in many districts two or three years are sufficient to destroy all the plants in the neighbourhood. The vines are not distributed so liberally here as on the Zanzibar coast; they are found chiefly in the woody ravines bordering the streams.

The Shiré Junction Road is about sixty miles long, and leads past the series of cataracts, called after Sir Roderick Murchison, which extend some 50 miles up the river. First we cross a level plain 4 miles broad, and commence to ascend. Near the base of this hill is a good deal of middling-sized timber. Conspicuous on the plain, otherwise covered with the usual long African grass and dotted with single trees or bush, is one patch of large trees which has escaped the ruthless axe of the natives. It is the graveyard, where many of the chiefs are buried. The villages, as a rule, are near the river, which meanders through the valley, forming many islands in its course. On these, tall trees sometimes remain, as they are the places of refuge for the chief and his valuables. Across the river there is undulating country, wood and grass intermingled, till the view is shut out by hills to the south and west.

As regards the road, the first ascent is very steep (about 1 in 6) for half a mile; beyond that the gradients are fair, and compare very favourably with many Cape wagon roads. Like them, if used for heavy traffic, especially during the rains, it would cut up very badly. But were it only for the foot-passengers, the advantages of a cleared road are very great. The grass grows 6 and 8 feet high, the dews are very heavy, and as the pleasantest time for walking is the early morning, in a few minutes the traveller on a native path becomes as thoroughly soaked as if he had walked through a river.

Then in the spring months spear-grass is in seed. The seeds are somewhat similar to bearded barley, only longer and thinner. At one end they are sharp as needles, and close to the points commence hairy barbs which work them forward. When ripe, these fall by hundreds on the passer-by, and pierce the clothes; the effect is maddening.

Another vegetable pest is what we call the cobbler's peg. It commences as an innocent flower, somewhat like strawberry blossom, on a tall firm stem, and the seeds are like those of a miniature dandelion, only instead of being soft down, they are strong, and furnished with minute hooks which fasten it to anything suitable it may touch; woollen clothes are its favourite objects of attack, and as it thrives very freely by the road-sides, pedestrians usually come in covered like porcupines with these pegs. Fortunately, unless they are pressed, they do not pierce so much as the spear-grass.

Passing three small villages, at any of which water can be had or a halt made, we reach the Company's head station, Mandala. The situation is central, communication frequent, both towards the coast and inland. It is also healthy, being at an altitude of about 3500 feet. Situated a mile to the north is the flourishing Blantyre Mission.

The majority of packages have still to be carried by porters, as the tsetse-fly abounds on some stretches of the road, and thus bullocks can only be used part of the way.

The tsetse has the shape and appearance of a large house-fly, but with yellow bars across the abdomen. Its sting is painful, and its movements are so quick as to render its capture difficult. But on man no serious results follow. Cattle, when bitten, linger on sometimes for months, but die in an emaciated condition, from causes as yet undiscovered. It is interesting to note that while cattle die, buffaloes thrive in tsetse country; horses die, while zebras and quaggas live; sheep die, and goats survive; dogs die, but jackals and hyenas pass unhurt. It seems to be a fact, that as a country is opened up and cleared, and especially when the buffaloes, which seem to be fly-breeders, are driven off, the tsetse becomes rarer.

Previous to the settlement of the British in the district, wars were constant. The Angoni especially (a Zulu tribe from a district to the south of Lake Nyassa) used to cross the Shiré when the crops were ripe, and carry off all they found—women, children, and grain being chiefly coveted, the men being often killed. Since then, till about two years ago, the country has been little harassed by them; but at that time they crossed the river, and destroyed a few villages. Last July (1884) they made another raid, and overran the whole country, with the exception of the British settlements. With the whites they declared they had no quarrel, and carried out this policy so far as to send back carriers whom they had captured returning from the river, so soon as they learned they were in our employ. A liberal-minded, strong-handed government is much needed to keep these unruly tribes in check and assure to the natives, as well as to the Europeans, the blessing of peace and safety.

Leaving the settlements at Mandala and Blantyre, there is a considerable descent to the lower plain, and a comparatively level road to the river at Matope. This village is some 4 miles above the nearest cataract.

It was in visiting this cataract to photograph it that the late Mr. Stewart and I nearly lost our lives. The hippopotami swarm below this point. We reached the falls safely, but on our return in the dingey, as we were crossing the river to avoid a herd of hippos on ahead, a big bull from another herd on the opposite side made for us. We expected him to rise near, when he would have received the contents of our rifles. But no; the brute seized the bottom of the boat with his teeth, and gave it such a heave that I was shot over Stewart's head and plunged into the water, rifle in hand, revolver, heavy cartridges, and usual hunting accessories in my belt, and wearing coat, heavy walking-boots, etc. The rifle was consigned to the bottom, and I struck out shorewards. The hippo crunched the boat three or four times, till Stewart thought best to abandon it and follow, throwing off coat and encumbrances. The blacks took to the water at once, and, not being troubled with clothes, arrived first. When, after a long swim I reached within six yards of the bank, I sank overweighted; but Stewart was now close behind me, and, taking my hand, guided me ashore as I swam below water. My strength only sufficed to get one knee on the bank, and I fell exhausted. We were all the more thankful for our escape as the river abounds with crocodiles.

Trying to reach Matope, we had twice to wade through deep water. With only one revolver among us, we had to retreat before a herd of buffaloes and camp out without food in a district with plenty of lions and mosquitoes—strange animals to name together; but at the time, though the fear of the lions kept us watchful, the mosquitoes were the more active tormentors.

From Matope we continue our route by water. The screw-steamer *Ilala*, placed on Nyassa by the Free Church Mission, though too light a craft for the weather often met with on the Lake, still keeps communications open. The river above this is deeper than below the cataracts, but there are some reefs of rocks extending under water across the whole breadth, which require to be very well known before it is safe to navigate. The *Ilala*, in gaining her experience, got a hole 4 feet long ripped in her lower plates.

The banks to near Pamalombe are fairly high and defined, but lose themselves in marsh at some places. In this lakelet especially, landing is almost impossible. It is very shallow, in many places being only 4 feet deep. Fortunately the bottom is thin mud, through which the steamer ploughs without damage.

To the east is the chain of mountains bordering the plateau, Zomba, a fine table-mountain, being the most striking landmark.

Passing out of Pamalombe (the exit, by the way, is rather difficult to find) there are some 6 or 8 miles more of river, on which are situated

Mponda's big villages. Mponda is known as one of the great slave-traders. Many Zanzibar Arabs stay with him, and have built comparatively large square houses. Much of the trade from the Bubica country and south-western half of the lake crosses the river here. Slaves in transit have at times been seen, though they are more commonly kept out of sight. They are ferried in large canoes across the river, which is about 200 yards broad. Polygamy is common throughout the country, and Mponda is notorious for the number of his wives. When Young passed eight years ago, he was said to have 300, and since then they have anything but diminished.

Leaving the river, which is sandy at its exit from the lake, we emerge on the broad blue waters of Nyassa stretching 350 miles to the north. The lake at the south end is divided in two by the mountainous promontory which ends in Cape Maclear, so that, on entering, it seems narrow, and only when to the north of that cape can one get a fair idea of its size.

The lake is situated in a remarkable hollow in the great table-land, and is 1520 feet above the level of the sea. Hills are always visible at varying distances from the shore. At some places, notably at the Livingstone Range on the north-east, near Mount Waller, and between it and Bandawe, near Rifu and Cape Maclear, the mountains come down to the shore, leaving only little stretches which can be cultivated. More ordinarily, there is a plain of alluvial soil, varying from 1 to 10 miles in breadth, before the hills are reached. As a rule the east coast is deeper and more rocky, the west shallower and more sandy.

On entering the lake we coast along and double Cape Maclear, when a voyage of 6 miles south-west takes us to the anchorage at Livingstonia.

The site for this mission was chosen chiefly on account of the bay in which the steamer anchors. Rising directly behind the station and continuing to Cape Maclear on the north-east, are high hills which afford shelter from the prevailing southerly gales, while Bird Island, seawards, gives protection from the occasional northerly winds, which are sometimes very severe. Fierce blasts come down from the hills at night, sometimes rendering a berth on board not the most comfortable bed imaginable, but the land is so near that no dangerous waves have room to gather, and the anchorage is safe.

The steamer lies about 150 yards from the shore, so the station is clearly seen. The largest and best houses are the church and school-house, the store, and the manse—all good brick buildings. They are built in line, with broad gravel walks in front. In the same line are about a dozen small square white houses, built and inhabited by the natives who are employed on the station. In the front are grass plots, laid out union-jack pattern, reaching down to the clean gravelly beach, with trees planted in them.

The water of the lake is usually so bright and clear that stones, etc., are visible 15 feet down. Shoals of fishes up to a fair size come swimming round. But behind the station is a plain lying too low to be

properly drained, which renders the place unhealthy. The hills are thinly wooded and rocky. From these rocks, which have baked all day in the sun, and across the marshy plain, a strong warm wind blows every evening, which all who have resided there for some time consider to be one of the chief causes of enervation and fever.

On account of the unhealthiness and the consequent mortality, the principal station of the mission has been moved to Bandawe, half-way up the lake on the west coast; but Cape Maclear, which formerly had been practically uninhabited, now boasts several large villages of natives, who came for the protection a white man's name affords.

On the east coast there is the chief Makanjira, who has many Arabs at his village and does a large trade in ivory and slaves. I once met one of his headmen at the ivory market, six hours out of Quilimane. To the west is Mpemba's, another similar chief.

From Livingstonia a long day's run takes us to Kotakota, where Jumbe's is one of the largest villages on the lake. He owns several dhows, built on the spot, in which he carries his ivory, white and black, to the other side, often to Losewa. When the voyage commences, so does baling out the water, and it does not stop till the dhows are safe on the sand in some creek. But, with their large calico sails, they make a quick run if the wind be favourable. When the *Ilala* first came up, Jumbe was very frightened that it would stop his dhows, but now he makes little or no attempt at concealment, sometimes passing with a load of slaves close to the steamer. He is at war with the Angoni, and has sometimes been pretty hardly pressed; but two years ago he gained a victory, and brought back fifty heads of the fallen enemy to garnish his stockade and strike terror into the hearts of his foes. Since then he seems to have been master of his position.

Another long day brings us as far as Bandawe, the present headquarters of the Livingstonia Mission of the Free Church. It is situated on a small hilly promontory running out into the lake. There is a large population, who have gathered together for mutual defence against the Angoni, who in this part are the scourge of the country. The mission, however, has a station at their headquarters at Mombera's, which does something to restrain them.

The anchorage at Bandawe is bad, the bays being silted up with sand. The steamer therefore lies some considerable distance out from the shore, and in case of a gale coming on, has to run to Nkata, 15 miles north.

About 10 miles to the north of Bandawe is Mankambira's, and on the opposite side Chetesis', both Arab chiefs with followings of Zanzibarees.

On this coast, to the north and south, there are some small villages on the shore. If there be a rocky island it is chosen as a home, if not, some little bay shut out as much as possible from the dreaded Angoni behind.

On the third day from Bandawe, and passing Mount Waller, a noble table-mountain, and Deep Bay, we reach Karongas, whence the land

journey to Tanganyika commences. The lake has narrowed considerably, and the Livingstone Mountains on the other side are distinctly seen, their sharp jagged summits clearly defined against the sky; they plunge abruptly into the lake. Here, on the west, there is a plain of 6 or 8 miles before the first rise is reached. The land north-eastward is flat and surrounded by hills, and a beautiful country it is. The character and habits of the tribes here are different from those farther south, partly, perhaps, because they have not yet been overcome by the slave-hunters. To the south, in most places, everything seems sacrificed for safety. Houses are crammed together on a small island, or huddled in a small stockade. The grain-stores are built on piles 100 yards into the lake, or hidden in caves, or in the tall grass. They may have a few goats, but cattle are things of the past.

Here, and especially a little to the north, there are no stockades, but groves, miles and miles in length, of fine banana trees, and nestling among these are the pretty clean houses of the people, placed for convenience to the cultivation, and not merely with regard to safety. The houses of the headmen are round, and very well and neatly made, the plaster inside and on the lintels being often tastefully corniced. The several houses of a chief are placed in the form of a square or oblong, which is weeded and swept scrupulously clean. Handsome large leafy trees are carefully tended to supply shade. The people are tall, muscular, and lithe, but not overburdened with dress. When we first went among them the men, and even chiefs, were fully clothed with five or six brass whipped cords round the waist, the women wore a strip of fine bark cloth, three inches wide, fastened to a similar belt. When they do get cloth, they, especially the women, almost invariably try to manufacture it into a bonnet—in other words, they tie it round their heads. They have large herds of carefully tended tame cattle; most of these have iron bells round their necks, and in the cool gloaming, "when the kye come hame," though not tended by bonnie lasses, but brought in at the run by little naked herd-boys, the musical clang of the big cow-bells, growing louder as they approach, and slowly dying away again as the patient intelligent creatures turn gently aside on reaching their own homes, one cannot but be struck with the quiet idyllic beauty of the scene, and fervently wish that peace and happiness may long continue.

Many of the fields are hoed up into beds, square and trim as a market-garden at home. The men here do much of the heavy hoeing, the women weeding, sowing, etc.; whereas, farther south, nearly all field-work, hoeing included, falls to the women's share. Cattle-tending and war are considered man's proper occupations. Men usually carry half-a-dozen dangerous-looking barbed spears, and, in time of war, shields. They are said to be treacherous, but I have found them pleasant to deal with, and when our poor friend Captain Berry was, while bathing, carried off by a huge crocodile, one of the biggest chiefs in the country followed, with a dozen men, breast-deep into the water to try and recover the body; this

quite voluntarily on his part, while he refused to let us enter that part of the river with him. The men are warriors, and many of them consider carrying beneath them—the work of slaves, but gradually these prejudices are being overcome, and some now come to us to be employed as required.

To return to the steamer, the whole north end is sadly deficient in harbours. There are rivers, but, though open after a heavy flood, the first storm drives a sandbank right across the mouth. It is no uncommon thing to find a river 100 feet wide and 12 deep within 200 yards of the lake, with a sandbank across its mouth over which you can walk dryshod, the river percolating through the sand. Sometimes sand-pits form themselves conveniently, but of course these are not permanent. Too often the steamer has to anchor out in the lake, and passengers and goods have to land in boats.

A very important section of this East Coast Route is being constructed at the expense of Mr. James Stevenson of Largs, in the form of a road to connect Nyassa and Tanganyika. Its length is more than 250 miles. After traversing the plain westward for about 9 miles, the road has been cut in the side of a hill above the Rukuru River, to avoid crossing it five times, as was done by the native path. In the cutting some interesting fossils were last year discovered by Professor Drummond. Then commences the pull up to the table-land between the lakes ; this part is very hilly and difficult, and the road as far as it is made is a great improvement.

Reaching the plateau, the traveller finds himself among a new set of tribes. For these 40 miles not a village will be found, and though there are some in valleys not far from the road, these are strongly stockaded, and the people again live in fear of their lives. They seem to be part of the Asenga division of the great Bantu race. On the plateau there are different tribes with different languages (we pass the Awiwa, Amanga, Amambwe, and Alungu), yet there is much less difference among them in their customs and manners than between them and the north-end natives we have just left.

Maliwanda or Mwiniwanda is the first village reached on the road. It is about 55 miles from Karongas. At Chirenji, 2 miles from the chief's stockade, there is a Free Church Mission Station. It seems healthy, its elevation being about 4000 feet.

The country is sparsely populated, villages of from fifteen to forty huts being on an average 10 miles apart on the road. The soil seems poor, requiring much fertilising ere crops can be raised. To construct a garden, a spot (say a circle of 30 yards) is chosen in a well-wooded locality. The trees are then stripped of their branches on this space and for 50 yards on every side. The better poles are laid aside to make a fence to protect the crop from wild animals ; the remaining branches are laid breast-high over the garden, and just before the rains are expected the pile is fired. The heat kills the weeds, the ashes fertilise the soil, the ground is scraped up and planted, the fence erected, and then the people

hope for rain. Should there come instead, wind, scattering the ashes, the yield will be poor. The one process serves for the crops of beans, ground-nuts, pumpkins, maize, millet or *maere*. A family will probably cultivate three or four of these in the one garden at different seasons of the year. Africans as a rule, to avoid exciting the cupidity of enemies, rarely sow more than will barely suffice to keep them till the next cereal is due. Should a crop fail through drought, caterpillars, or locusts, the family subsists on fruits and roots till the next is ready. Fortunately there is enough of the uncivilised animal left in the Negro to enable him to starve for a considerable time in the hope of a feed in the future. But picture to yourselves this process of agriculture carried on all over the country, and the wonder is that any trees remain. As it is, there are really few on ground at all available for cultivation that do not show signs of the axe.

What the Angoni are to the dwellers on the lake, the Awemba, a warlike tribe to the south, are to this district. The sites of the villages are therefore chosen for safety, generally on running water, if possible where there are steep banks forming a semicircle. Further, there are strong stockades 10 or 15 feet apart, the space between filled with thorns and underwood; outside this stockade is a deep ditch, the narrow entrance leading through two sets of doors. The inner one is at the end of a narrow passage which projects into the stockade; so that, were the outer gate forced, the besiegers would have to run the gauntlet inside this narrow stockaded passage, exposed to spear thrusts from both sides while they were attempting to force this inner door. But such is the terror in which the Awemba are held, that too often they have only to send a couple of men to demand a present, or to approach in force, and the village becomes deserted. From Maliwanda to the Saisi River, within 45 miles of Tanganyika, not a head of cattle (formerly plentiful) is now found, a few goats being all the people possess. But once the marshy Saisi is reached, two powerful chiefs, Kwikera and Fwambo, have as yet resisted the Awemba, and they again have cattle. Kwikera's village is built on the edge of a deep swampy pool abounding in crocodiles. In case of need, he would take refuge with his cattle among these marshes, where it would require a venturesome enemy to follow.

When we crossed in the dry season, at a ford some 6 miles down this river, we found a dried marshy plain on each side, with a deep stream 10 feet wide flowing through it, spanned by a few small trees and branches. But on my return from Tanganyika, during the rains, the water had risen 4 or 5 feet over the whole country. Kwikera's people were, as usual, very anxious we should stay a few days with them—"Why hurry away after one night's rest?"—and they related to my men a terrible story of a native carried off at the ford by a crocodile the previous day. But as the chief himself, in using many arguments to detain me, had entirely omitted all about the crocodile, which he certainly would not have done had there been any truth in it, I determined to push on. We had first to

cross 200 yards of flooded plain, the water gradually increasing to chest-deep; then to find footing on the primitive rickety bridge, which, difficult enough to cross when dry, was now 4 feet under water. We had to feel our way most carefully, as a false step would have precipitated us into the rushing stream. Then came another 200 yards of comparatively still water, some of it so deep that, walking on tiptoe, it almost reached my lip; men with loads on their heads had to take a long breath and go under, or jump to get a fresh mouthful of air. Small folk who could not swim had to be carried. And this in a still swampy river, which we knew in many places to be infested with crocodiles! It was one of those uncomfortable experiences of African travel which one shudders to think of. As it was, the long exposure, superintending the crossing, gave me fever and dysentery.

From the Saisi and Fwambo to Tanganyika so lately as 1878, there was a fairly well-peopled country, with several important villages. Zombe was described as one of the finest situations one could wish for a station. A strongly stockaded village with plenty of cultivation and friendly people, situated on the high plateau, on a pleasantly undulating slope, and with a beautiful clear cold stream, reminding one of a Highland burn at home, it appeared healthy—the *beau-ideal* of a site. It was arranged that our friends from Tanganyika should meet us at this village. But on our reaching it we found utter desolation; grass ranker in places than on the plains told where cultivation had been, hippopotami and buffaloes had laid waste the banana groves, the doors of the stockade were nearly impassable from thorns and creepers, while within and without, the whitening skulls told of the too common tragedy in Africa, of a fair and smiling country turned at one fell swoop to a grave and a ruin by the grasping avarice of some fiend in human shape. One pitied those who had lost their lives, whose bones lay bleaching there, but what of the helpless women and children torn from their simple happy homes to form part of some slave caravan? Happier, truly, they who were dead and done with it, than they who, ill-fed, overloaded, tied together in droves, at last succumbed on the thousand-mile road to the coast. From Fwambo to the lake, and on till we reached the Lofu Valley, a distance of nearly 90 miles, the villages and gardens were all gone, and it was one vast wilderness—the men and women who had entertained Stewart, Hore, and others at Pambete and Kasakalawa, all butchered, carried off as slaves, or fugitive. We had therefore to pitch our tents on the sandy shores of the lake, and depend entirely on our rifles to supply the wants of our men during the ten days we stayed there.

The table-land surrounding Tanganyika breaks down more abruptly to the lake than at Nyassa. Not three miles from our camp, a great wall, 2500 feet high, rose in places almost perpendicularly. Farther north the hills recede, leaving plains or bays near the lake. At this point, the dead trees within the comparatively recent watermark clearly point to the great rising of the level of the lake some years ago, which has been already

noticed by travellers. The waters have again receded many feet, and are still going back, leaving long tracks of bare rock, gravel, and sand. Three or four months is sufficient to render the sand almost impassable with grass, bush, and rushes.

At Liendwe, near the mouth of the Lofu, there is one of the advance guards of civilisation in the London Missionary Society Station, where the *Habari Ngema* ("Good News") is being built in spite of danger and detention consequent on the serious disturbances lower down the line of communication.

Within twenty miles of this station, while we were on our march from Nyassa to Tanganyika, the fertile valley of the Lofu was the scene of a terrible slave raid. An Arab, Kabunda, who had been settled there for about ten years, having many houses and slaves, determined to go to Zanzibar with his ivory. So he picked a quarrel with Katimbwe, the chief, and took all his cattle; then organised a sudden raid through all the valley, and every man, woman, and child who could be found was seized and tied up. Very few managed to escape him or his keen hunters, and a caravan was made up for the coast; but the smiling valley that had been known as the Garden of Tanganyika from its fertility and the industry of its people, now silent and desolate, was added to that already long stretch of hungry wilderness through which we had passed.

The day after we arrived at the sandy shore at Kasakalawa on Tanganyika, we heard that an Arab caravan had reached the plain, a couple of miles to the south of us. It was Kabunda and his party. We were three, Lieutenant Pulley, Mr. Roxburgh, and I, with about fifteen armed blacks. Some of the armed Arabs came along evidently to inspect our force, so we thought it best to go and visit them. Taking our revolvers and a rifle or two, we walked along the shore to where we saw the crowds camping. The sands were broad and flat, and behind there was a dense thicket of light trees and reeds in which the main part of the camp was hid. We were received in a temporary pavilion in grave sedate Arab fashion. Curdled milk was produced, and handed round; and after some conversation in Swahili we parted. In the afternoon our visit was returned, when we regaled them with coffee and biscuits; later, Kabunda sent us a lamb and a small bag of rice. To deal with so far he was the polished gentleman. He told us he was going on next morning, and would pass our tents; his caravan was about 3000 strong, two detachments had gone by a road to the back of us, as could be seen by the tracks in the grass. Accordingly we were up betimes to see them pass.

First came armed men, dancing, gesticulating, and throwing about their guns, as only Arabs can, to the sound of drums, panpipes, and other less musical instruments. Then followed, slowly and sedately, the great man himself, accompanied by his brother and other headmen, his richly caparisoned donkey walking along near by; and surely no greater contrast could be conceived than that between this courteous white-robed Arab, with his gold-embroidered *joho*, silver sword and daggers, and silken

turban, and the miserable swarm of naked squalid human beings, that he had wantonly dragged from their now ruined homes in order to enrich himself.

Behind the Arab came groups of wives and household servants, laughing and talking as they passed along, carrying the camp utensils and other impedimenta of their masters. After that the main rabble of the caravan, the men armed with guns, spears, and axes. Ominously prominent among the loads were more slave sticks, to be handy if any turned refractory, or if any likely stranger were met. Mingling with and guarded by these, came the wretched overburdened tied-up slaves. The men, who might still have had spirit to try and escape, were driven tied two-and-two in the terrible *goree* or taming-stick, or in gangs of about a dozen, each with an iron collar let into a long iron chain, many, even so soon after the start, staggering under their loads.

And the women! I can hardly trust myself to think or speak of them —they were fastened to chains or thick bark ropes; and very many, in addition to their heavy weight of grain or ivory, carried little brown babies, dear to their hearts as a white man's child is to his. The double burden was almost too much, and still they struggled wearily on, knowing too well that when they showed signs of fatigue, not the slaver's ivory but the living child would be torn from them and thrown aside to die. One poor old woman I could not help noticing. She was carrying a biggish boy who should have been walking but whose thin weak legs had evidently given way; she was tottering already; it was the supreme effort of a mother's love—and all in vain; for the child, easily recognisable, was brought into the camp a couple of hours later by one of my hunters, who had found him on the path. We had him cared for; but his poor mother would never know. Already, during the three days' journey from Liendwe, death had been freeing the captives. It was well for them; still we could not help shuddering, as, in the darkness, we heard the howl of the hyenas along the track, and realised only too fully the reason why. Low as these poor Negroes may be in the moral scale, they have still strong maternal affection, and love of home and country. How long are they to be at the mercy of any armed scoundrel who may care to carry them off? The remedy is to open up these dark and distant places by regular communication and commerce, and for such Associations as the International to step in with strong hand in support and defence of the oppressed. And then such horrid spectacles as we that morning witnessed will be things of the past, and the shores of Nyassa and Tanganyika may once again be peacefully settled by quiet villagers, and mission-work and education prosper among them. That such would be the immediate result is evident, for this Kabunda himself told us that had we but arrived a month earlier, to exchange his ivory for the necessary goods, he would never have left Tanganyika.

To sum up the route in a word, there are 4 days by boat and 5 miles of land journey, then 6 days by steamer and 60 miles of land journey, then

6 days by steamer and 250 miles of land journey. Then the London Missionary Society's *Good News*, or the International Association's small steamer, will carry the explorer nearly 400 miles farther into the "dark continent." And with the exception of the 5 miles of portage, near Maruru, most of the other walking is done on comparatively high land —a vast difference from the broad, too often swampy, plains that have to be crossed by the Zanzibar Ujiji route. And though we, too, have to pass the graves of some noble men who fell pioneering the way, there is no doubt that the path thus opened is the best one into the interior; and it only requires that the means of communication be improved, to enable future searchers in geographical or other scientific fields to make their base of operations, not Zanzibar or some fever-stricken coast port, but a comparatively healthy station, be it of the African Lakes Company or the International Association, somewhere between the great east and west watersheds of Africa, whence they may start on new voyages of discovery, or seek patiently to solve some of the many problems of that continent still so little known.

THE EGYPTIAN SÛDAN.[1]

SOUTHWARD of the first cataract on that mystic equatorial river which the ancient Egyptians worshipped as a god, lies that tract of land towards which so many eyes are now turned. If a nation is not taught geography by its wars, at least many a place acquires thereby a tragic, if transitory, importance which it would not otherwise obtain. Of the physical features of the Sûdan, therefore, a brief description may not here be without interest.

Belad es-Sûdan, or the land of the Blacks, as the Arabs call their country, is divided from Egypt Proper by the natural boundary of the Nubian Desert, which opposes a formidable barrier to the amalgamation of the two peoples and to the extension of so-called civilisation to the heart of Africa. "It was," wrote General Gordon, "this boundary of the desert that kept the warlike and independent tribes of the Sûdan quite apart from the inhabitants of Egypt Proper, and has made the Sûdanese and the Egyptians two distinct peoples, that have not the least sympathy one with the other."

Nubia Proper, or Lower Nubia, might be said to consist, as far as cultivation and civilisation are concerned, of that narrow strip of land watered by the Nile—which river flows through the desert like the life-fluid of the country, reclaiming from it a portion of land on either bank upon which the inhabitants eke out an uncertain livelihood. This cultivation in no place exceeds four miles, and at several points altogether disappears

[1] Compiled from the latest official reports.


GENERAL MAP SHOWING THE
EASTERN ROUTE TO CENTRAL AFRICA
FROM KILIMANE TO LAKE TANGANYIKA.
Illustrating Mr Fred. L. M. Moir's Paper.
Route shown thus
Stations of the African Lakes Company thus
English Miles
Longitude East 33 of Greenwich
LAKE TANGANYIKA
LAKE BANGWEOLO
LAKE NYASSA
LAKE SHIRWA
River Zambezi
INDIAN OCEAN
Kilimane
Livingstonia
Karonga
Bandawe
Tete
Sena
Zumbo

into the desert. After a course of about 3300 miles—the last 1700 without a single affluent or tributary—the Nile discharges the volume of its diminished waters into the Mediterranean through the Rosetta and Damietta mouths. The rise and fall of the river is as regular as the (Egyptian) seasons. It begins to rise at Khartûm towards the end of June; is at its fullest before 1st September; and decreases regularly from 1st October until the next summer solstice.

The Sûdan, which includes the whole of that portion of Central Africa lying between the 10th and 20th degrees of latitude, is the name popularly applied to designate the southern portion of the Egyptian kingdom; but it would be more correct to use the general terms:—"The Egyptian Provinces of the Sûdan," "Equatorial Provinces," and "The Red Sea Provinces," as, at the present day, it extends to Lake Victoria Nyanza and to the south and east of Abyssinia. On the east of the Nile, the desert extends to the Red Sea, where Suâkin is the only practicable port; and on the west we find a continuation of the Libyan wilderness that flanks Egypt Proper and embraces Kordofan and Darfur.

Nubia was originally understood as including all the countries south of Assuan; afterwards Nubia Proper comprised all the country between Assuan and Dongola, south of this point receiving the generic term, Belad es-Sûdan. The name of Nubia was then given, in a more or less restricted sense, to the countries in and around the valley of the Nile as far as the mountains of Abyssinia, and included Belad es-Sûdan. Now the name of "Egyptian Sûdan" is gradually taking the place of all others for the whole of the Egyptian territory below Assuan.

Nubia Proper is by some divided into the Wadi-Kunuz and the Wadi-Nuba; the first extending from Assuan to Lebua, and the second thence to Dongola. The physical aspects of the two districts are almost identical. Granite and sandstone hills line the main valley for the most part, closing in upon it in many places, so that, up to Wadi-Halfa, cultivation is confined to the mere banks of the river. At Wadi-Halfa, the second cataract begins, and extends for 100 miles in a series of rapids through the Dar el-Hajar to Sukkût, where the valley widens and the sterility disappears. Fertile plains stretch out on both sides, and the river is studded by well-cultivated islands. Here the Nile seldom overflows, and artificial irrigation is necessary. Cultivation continues up to the third cataract, but contracts again on passing the island of Argo. At Ordu, or New Dongola, Lower Nubia terminates, and the dreary and monotonous Belad es-Sûdan begins.

The author of *Egypt as it is* speaks of Dongola as one of the finest of the Sûdan provinces. The peninsula formed by the great bend of the Nile—misnamed in many maps the Desert of Bayûda—is, in reality, a fine savannah, peopled by several tribes, who rear goats, camels, and large flocks of sheep, and cultivate considerable tracts of land. In the course of this bend, the country of the Berbers is passed, to the south-east of which lies the province of Taka, one of the most productive

portions of Egyptian territory. At Khartûm, the capital of the Sûdan, the Blue and White Niles (Bahr el-Azrek and Bahr el-Abiad) mix their waters, the former flowing from the Abyssinian Hills, the latter from the Equatorial lakes. Here the frontier of Sennâr begins. This province may be generally described as bounded east and south-east by the Atbara and Abyssinia, west by the White Nile, which separates it from Kordofan, and south by the mountains of Fazokl. It is for the most part an undulating plain, increasing in elevation southwards, and, especially near the rivers, abounding in forests. The soil near Khartûm is sandy, and mixed with Nile mud; but farther south a deep bed of argillaceous marl succeeds, which, though apparently sterile in the dry season, is covered with crops during the autumnal rains. Due west, lies Kordofan, and, separated from it by a narrow strip of desert, Darfur. This province is in reality a huge oasis, or rather clusters of oases. Towards the south it is hilly, the principal elevation being a ridge called Marah, traversing the province longitudinally. Wedged in between Kordofan and Sennâr is the Shillûk country, a slip of territory some 200 miles long by scarcely a dozen broad, the soil of which is fertile. To the west and south of this lie the Darfetit and Donga countries, now comprised in the province of Bahr el-Ghazal; and to the south and east of the latter are the Equatorial Provinces, which are bounded to the south by Lake Albert Nyanza and the Victoria Nile.

It is only possible, within the limits of this paper, to give the barest description of the provinces and districts of the Sûdan. They may, however, be glanced at under the following heads:—

1. *Lower Nubia.* 2. *Upper Nubia*, comprising Halfiyeh, Shendy, Damer, Shaikiyeh, Dongola, Berber, Bogos, Taka, Fazokl, and Sennâr. 3. *Kordofan.* 4. *Darfur.* 5. *Equatorial Provinces*, comprising Mudirieh Lado, Mudirieh Makaraka, Mudirieh Rohl, and Mudirieh Bahr el-Ghazal. 6. *Shillûk District.* 7. *Red Sea Littoral.* 8. *Issa*, *Harrar*, and *Gallas* districts.

1. Lower Nubia.—Nubia proper extends through 6° of latitude from Assuan (24°) to the south limit of Dongola (18°), nearly 600 miles along the river. The first portion of it, Wadi el-Kunûz, reaches up to about 70 miles; then follows Wadi-Nuba, to the second cataract. The average width of this part of the valley does not exceed $\frac{1}{4}$ mile. It is a glaring reddish desert, studded with black rocks, and with narrow strips of green, and a few palm-trees along the river. To this follows Dar Sukkût, where the valley opens and the excessive sterility begins to disappear, the date-palm here attaining perfection. Dar Mahâs succeeds, and the fertile plains of Dongola, where the river forms several large islands, that of Argo being 30 miles in length. Remains of ancient edifices occur throughout the whole extent, but chiefly at Dongola. The whole population of Lower Nubia does not exceed 15,000.

2. Upper Nubia.—After the occupation of Upper Nubia—or, as it

was called, Belad es-Sûdan—by the Egyptians, it was divided into six governments or departments, each department or mudirieh being under a mudir. Khartûm is the seat of the Governor-General of all these provinces. The inhabitants are mostly of Arab extraction; some of the tribes are pure-blooded, whilst others have more or less strains of Negro and other blood. In Southern Nubia the flora exhibits a great and beautiful variety; and here, too, are specially found in great numbers the tree which supplies the gum known as "gum arabic."

Halfiyeh, in which district is Khartûm, extends along the Bahr el-Azrek, or Blue Nile, and the Main Nile, between latitude 14° and 16° north.

Shendy, in which district there is a town of the same name, was once the most important part of the ancient kingdom of Merôe, the reputed residence of the famous Queen of Sheba. Merôe, which many assert was the cradle of all the sciences, is now a vast sandy plain, where some ruined pyramids are the only vestiges of its former greatness.

Damer is to the north of Shendy, and was, up to 1820, a small independent State; but there are now only 500 houses there.

Shaikiyeh is situated on the banks of the Nile north of the so-called Bayûda Desert. The chief town, Korti, will be remembered as the headquarters of the British expeditionary force.

Dongola has already been sufficiently described; and of Berber, Bogos, Taka, and Fazokl there is little to be said.

Sennâr, however, merits a closer scrutiny. This province is bordered on the north by the country known as Dar el-Halfiyeh, and on the south by Dar Fazokl. The popular traditions of Sennâr represent that country as the original seat of the Macrobii, whom Herodotus mentions as the most remote of the Ethiopians; and that twelve queens and ten kings reigned there. The territory is, in general terms, a great level plain, from which masses of rock, chiefly granite, protrude at wide intervals and at no great elevation. Of these bare rocks baboons are the only inhabitants. The plain is covered with a black mould, the result of decomposition; the argillaceous soil is retentive of water, and when refreshed by rain becomes exceedingly fertile, but in the dry season it has an aspect of the most dismal sterility. The population is very mixed, and no traveller has succeeded in determining distinctly the aboriginal race.

3. Kordofan.—The limits of this province are ill-defined. In appearance it is a monotonous rolling steppe country formed of undulating plains. In the north-west there are some compact mountain-masses, and south of the 13th parallel of latitude the country changes to flat, fertile, and thickly-wooded plains, from which the rugged mountains of Takalla and Dar Nuba rise abruptly. The triassic formation extends over the whole province, of which the new red sandstone resting on hypogen rocks is the most important feature. The soil is bad, except when improved by the clay and potash resulting from the detritus of hypogen rocks where they crop up. The steppes of Kordofan are about

1350 to 1850 feet above the level of the sea, the greatest altitude being at El-Obeiyad, where igneous rocks, quartz, gneiss, and granite abound. The total population is about 280,000, including nomads; and nine-tenths are primitive barbarians, the village population around El-Obeiyad, the Madhi's headquarters, being especially heterogeneous. Here it is that the air quivers visibly in the sun, and "moya helwa" (sweet water) is more precious than gold. Kordofan is, in consequence, an arid, unproductive land, with a sparse population, yielding a scanty revenue; the inhabitants are low in the moral scale; murder is very common, and no one travels without arms.

4. Darfur.—Darfur Proper, or the country of the Fors, may be taken as extending between latitudes 10° N. and 14° N., and longitudes 22° E. and 28° E. The geological formation is very varied. In the west the mountains show a volcanic origin; in the north and south granite and sandstone are the prevailing rocks; in the east the soil is sandy, and contains a quantity of iron, which is worked to a small extent; and in the north-east granite predominates, with the exception of a strip between Foga and El-Fasher, where red and white sandstone crop up. The group of Jebel Midubh, which contains both sandstone and granite, has been much distorted by volcanic agency, beds of lava being seen in all directions; the greatest elevation does not exceed 3500 feet; and the plateau between it and Jebel Tagabo is about 1200 feet. The Jebel Marah group is also of volcanic origin; and about Jebel Turah, one of the offshoots of the main group, the height of the plateau is about 4400 feet, whilst the peak itself is about 5500 feet. Stretching from the main group, in a westerly direction for a distance of 30 or 40 miles, is a huge dike of white quartz, with a plateau of sandstone raised some 300 feet above the plain, which is itself about 3200 feet above the sea-level. To the south-west of Jebel Marah the plain is about 4000 feet above the sea, and the main peaks of the group rise to an altitude of about 6000 feet. The inhabitants report a large lake of brackish water, from which salt can be obtained, on the north-eastern part of the mountain. In all the depressions sand rich in iron is met with. In a southerly direction from Jebel Marah, there stretches a broad alluvial plain which is dotted all over with peaks of granite, giving the appearance of a range of mountains buried all but its highest points. This plain falls rapidly towards the north-west and south-east; and the whole country has a constant fall towards the east and south-east. On the road from Darra to Shakka there is a plain of sand about 40 miles long and broad. The road from Shakka to El-Fashar, for three days, passes through a dense wood, where the soil is of sand and clay mixed; it then debouches on a sandy steppe country, which stretches up to El-Fashar. The late General Gordon describes the eastern part of Darfur as "most miserable—a sandy, bush-covered desert—quite useless for any food purpose, with no water for distances of 40 or 50 miles." There are no rivers which flow all the year round, and in the

dry season water is very scarce. The inhabitants consist of the Darfurs, chiefly in the west; the Berti and Tukruri in the east; the Risegat in the south-east; while in the south the Bagarra Arabs and Tukruri are mingled. The population is said to be over a million, at least half of this number being Fors.

5. Equatorial Provinces.—Up to 1877, the Negro countries of Egyptian Africa were under a separate administration to those of the Sûdan, which were inhabited more or less by Arab races; but last year all the provinces from the first cataract on the Nile, southward, were united in one administration under Colonel Gordon. The countries of the Negro tribes were now divided into four administrative districts, or Mudiriehs.

Of these, Mudirieh Lado comprises the countries bordering the upper portion of the White Nile. The northern boundary of the province is the White Nile between the mouth of the Bahr el-Ghazal and Sobât rivers; the western boundary may be taken as the River Rohl as far as it goes (all the Makaraka country on the south has lately been included); the eastern boundary is in no way defined, the province here embracing all territory where it has been found advisable to establish stations garrisoned by Egyptian troops; and the southern boundary is marked by the northern shores of Lake Albert Nyanza, the Victoria Nile, as far as the station Mruli, and the territory of the King of Uganda, which lies to the north of the Victoria Nyanza. The vast basin in which lie the sources of the Nile is formed by a semicircular band of mountainous regions. To the east of the river, this band curves away from the Abyssinian hills and the neighbourhood of the Blue Nile, and has its apex towards the lake regions of the equator. In the valleys, the soil consists of a dark brown iron-holding clay, overlying granite detritus; the slopes of the hills are well wooded with acacias and numerous other kinds of trees. The country for about 30 or 40 miles east of Gondokoro is inhabited by various small clans of the Bari tribe.

The Mudirieh Makaraka lies to the west of the Niambara country, and is crossed by the 5th parallel of latitude N. and the 30th longitude E., the boundaries of which can only be approximately laid down. The extent of the entire territory, however, may be estimated at 70 miles from north to south, and the same from east to west. The province is one of the most populated of Africa, the Makaraka themselves inhabiting but a small portion of the territory. From Laguhm, the country north appears to be an extensive monotonous plain, and from the high plateau the country to the south is seen to be an undulating expanse, bordered to the south-west by high hills.

The Mudirieh Rohl has several outlying stations in the Mombutta country, where ivory is collected from the countries still farther south. Towards the north, the country is principally low and, in some places, wooded; to the east, treeless low-lying lands are visible; and in the west,

a short light-green grass succeeds to the high vegetation of the swamp lands, and covers a large proportion of the province to the north.

The boundaries of the Mudirieh Bahr el-Ghazal are but vaguely defined, but may be described as enclosing the entire district watered by the northern tributaries of the Bahr el-Arab and Bahr el-Ghazal. The character of the country is very varied. The principal tribes are the Denka, Dyûr, Bongo, Dembo, Golo, Kredy, Sehre, Bellanda, and Babukur.

6. Shillûk District.—The Shillûk tribe of Negroes inhabits the entire bank of the White Nile for 200 miles northwards of the mouth of the Bahr el-Ghazal. Their territory, which is not more than 10 miles wide, is more densely populated than any known part of Africa. The soil is very fertile, for, in addition to the rains, it is watered by the rising of the river and artificial irrigation.

7. Red Sea Littoral.—Suâkin is the principal port on the Red Sea for all merchandise from the Nile provinces. Glancing at the Littoral and Arabian Gulf districts, it may be mentioned that the Abyssinian coast from Khor Nowarat to the straits of Bab el-Mandeb is generally low and arid next to the sea, gradually rising for 40 miles inland to the first of the three series of plateaux of which Abyssinia is formed. On this coast no river enters the sea, those that do exist losing themselves in the sand before reaching it. The Danikl Province, consisting of a strip of 40 miles broad, is rich in many products, but the trade is small, Massauah being the only port. The mountains bordering this fertile region are of great height.

8. Issa, Harrar, and Gallas Districts.—On leaving the port of Zeila, *en route* for Harrar, the country of the Somalis is first traversed. In the Issa country, pasturage is not abundant; it is found chiefly in ravines and other moist places, but depends entirely on the amount of rain. Although the land is hilly, the ground can be cultivated with advantage when irrigation is obtainable. The people of Issa are divided into three principal tribes:—Ebgali, of 47,000; Wardek, of 38,000; and Dallul of 45,000.

The country of the Gallas Nolli, which is traversed by the road from Galdessa to Harrar, is difficult and mountainous, but is rich, fertile, and well-watered, and in these respects a great contrast to the Issa country. This region extends about 43 miles from the town of Harrar, the neighbourhood of which is inhabited by the Gallas Ala.

The Gallas tribes dependent on Harrar can be classed under the four groups which surround it to the north, south, east, and west. In going from Harrar to any of these tribes, the routes traverse first a very broken ground, afterwards plains covered with dhûra, coffee, sugar-canes, etc.; and there are streams running in all directions. The country is extremely rich, and the central district is well cultivated by the Kuttu, who supply the towns of Harrar with the necessaries of life.

USE OF CYLINDRICAL PROJECTIONS FOR GEOGRAPHICAL, ASTRONOMICAL, AND SCIENTIFIC PURPOSES.

By the Rev. James Gall, Edinburgh.

The value and importance of cylindrical projections have been somehow overlooked; and although Mercator's is only one of several, each of which has its own peculiarities and advantages, yet, until lately, it was the only one known.

There are three, but only three things, in which a cylindrical projection can be perfect; and these depend upon the way in which the latitudes are drawn.

1. We may obtain *perfect orientation* by rectifying the latitudes throughout, as Mercator has done; and this is especially valuable for navigation. But in order to obtain perfect orientation everything else must be sacrificed.

2. We may obtain *comparative area* with mathematical accuracy by projecting the latitudes orthographically. But in order to obtain comparative area we must sacrifice everything else.

3. We may obtain accurate *polar distance* by projecting the latitudes isographically, that is, at equal distances. But, in order to obtain this, everything else must be sacrificed.

My attention was first drawn to the subject in connection with astronomy. I had published *An Easy Guide to the Constellations*, in which each constellation had a page for itself; and it became necessary for me to publish an *Atlas of the Stars*[1] to show their connection. In planning the atlas, it occurred to me that a magnificent panorama of the stars, including three-fourths of the heavens, might be brought into one map by using a cylindrical projection, with the latitudes drawn stereographically and rectified at the 40th parallel. The result was, that the constellations on the 40th parallel were absolutely perfect in both hemispheres, and although those at the equator were a little contracted and those beyond the 40th degree a little expanded, the errors were so small as not to be observed.

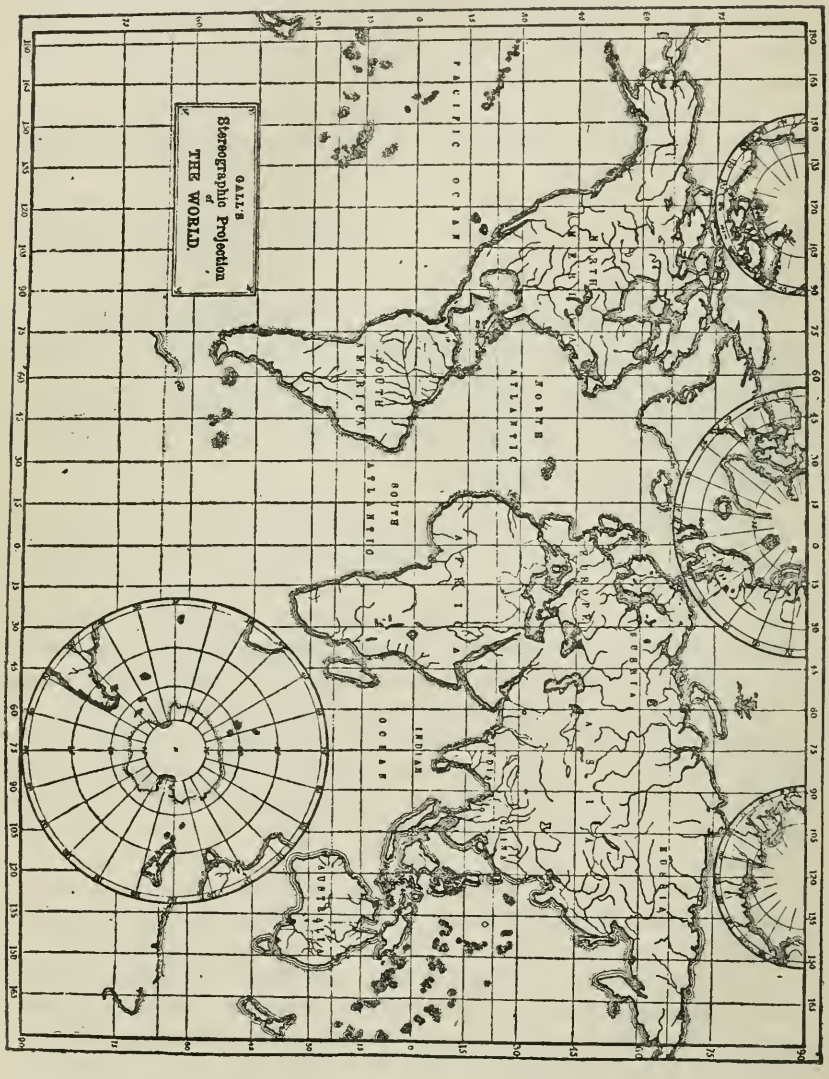
One great advantage which this projection has over every other is, that several astronomical problems can be solved upon it, the same as on a globe.

It then occurred to me that the same, or a similar projection, would give a complete map of the world, which had never been done before; and, on drawing a projection with the latitudes rectified at the 45th parallel, I found that the geographical features and comparative areas were conserved to a degree that was very satisfactory.

[1] In a series of Astronomical Charts which I drew for the Messrs. W. & A. K. Johnston, I adopted the Stereographic Cylindrical Projection for the Equatorial and Sub-Equatorial heavens.

Gall's Stereographic Projection of the World.

For General Purposes.



Having more closely studied the subject, I read a paper before the British Association in 1855, and exhibited the three new projections—the Stereographic, the Isographic, and the Orthographic; but I had not then thought of the supplemental diagrams, which add so much to the value of the Stereographic.

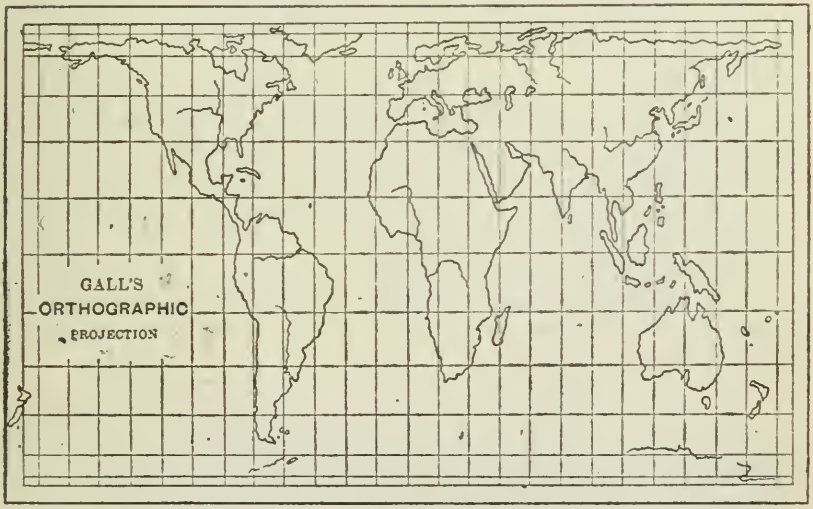
The Stereographic projection has this advantage over all the others, that it leaves room for supplemental diagrams at the top, on the same scale and on the same projection, which take up the extremities of the general map, and show their convergence towards the pole.

The Orthographic projection also is a valuable map for showing the comparative area occupied by different subjects, such as land and water, as well as many other scientific and statistical facts. It is true that the geographical features are more distorted on this than on any of the others, but they are not distorted so as to be unrecognisable; and so long as that is the case, its advantages are not too dearly bought.

GALL'S ORTHOGRAPHIC PROJECTION.

EQUAL AREA. PERFECT.

For Physical Maps, chiefly Statistical.



I have wondered why geographers never thought of using the Isographic projection with the latitudes rectified at the 45th parallel. Even for general purposes it is better than Mercator's, and still more for physical maps, where polar distance and comparative area are all-important. It is very simple, its geographical features are on the whole very good, although not so good as in the Stereographic; and for isothermal and other lines connected with climate, as well as for comparative area, it is greatly superior to Mercator's.

For general purposes, however, the Stereographic is best of all; for though it has none of the perfections of the others, it has fewer faults,

and combines all the advantages of the others in harmonious proportions. It does not give perfect orientation like Mercator, but it gives it better than the other two. It does not give exact polar distance like the Isographic, but it gives it better than the other two; and it does not give comparative area like the Orthographic, but it gives it better than Mercator, though not better than the Isographic. The consequence is, that even without the supplementary diagrams, the geographical features of the earth's surface are better conserved than in any of the others; while, with the supplementary diagrams the polar regions are as accurately and symmetrically represented as the equatorial.

The Stereographic projection, though inferior to Mercator's for navigation, is superior to it in the following particulars:—

1. On Mercator's projection the whole world cannot be represented, because as we approach the poles the difficulty increases; and after passing the 80th degree the map begins to run wild. For that reason, from ten to fifteen degrees of latitude are generally left out. On the Stereographic projection the whole world is represented from pole to pole.

2. In Mercator's projection there is a great waste of room. Nearly one half of the map is occupied with a vain attempt to represent the Arctic and Antarctic regions, while the habitable world is confined to a comparatively narrow stripe in the centre. In the Stereographic there is no waste of room.

3. In Mercator's projection, the comparative areas are grossly misrepresented. For example, Spitzbergen appears to be three or four times larger than Borneo, whereas in reality it is five or six times less. In the Stereographic they appear in their true proportions.

4. In Mercator's projection the polar distance is not only practically but theoretically ignored. The 90th degree is nowhere. This makes it peculiarly unsuitable for physical maps.

5. In Mercator's projection the polar regions have no resemblance to the reality. In the Stereographic they are as accurately represented as the equatorial.

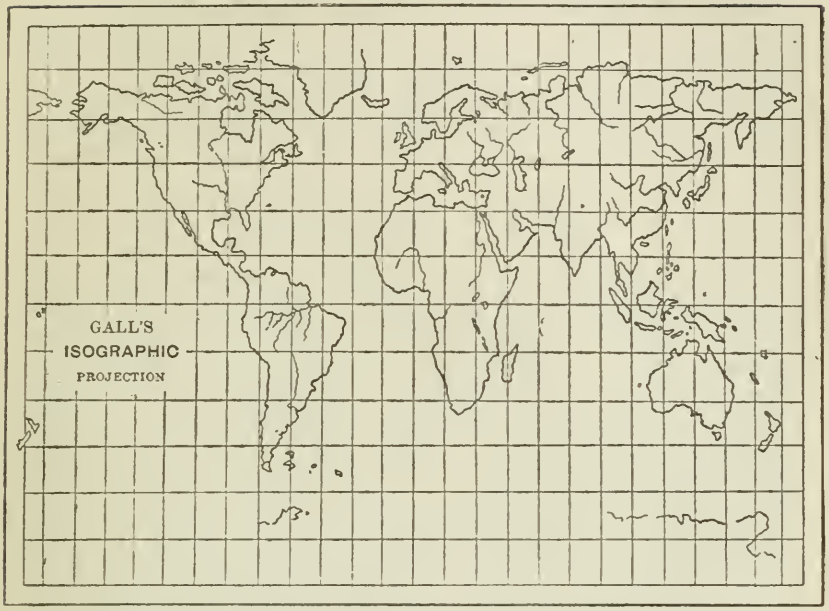
It is always difficult to introduce changes when long established custom has created a rut; and for more than twenty years after I had exhibited the three new projections before the British Association I was the only person that used them. But at that time I had not added the supplementary diagrams which add so much to the value of the Stereographic projection.

The first to adopt it was the late lamented Mr. Keith Johnston, who introduced it into his miniature Atlas, which was, I believe, the first of his publications. The next to adopt it were Messrs. Chambers and Mr. Bartholomew, who has done more than any other to make it known. After them it was adopted by Messrs. Nelson, Messrs. Gall and Inglis, and Mr. Heywood of Manchester. The late Dr. Keith Johnston when he saw it gave his hearty approval, and said that his only surprise was that it had never been thought of before.

GALL'S ISOGRAPHIC PROJECTION.

POLAR DISTANCE. PERFECT.

For Physical Maps, chiefly Meteorological and Hydrographic.



I do not know whether there is any copyright in new projections. I hope there is not. But if there is, I wish it to be known that I make no pretensions to it, and that every person is welcome to use them. All that I would ask is that, when they are used, my name may be associated with them, and that they may be severally distinguished as Gall's Stereographic, Isographic, and Orthographic Projections of the World.

THE SCOTTISH GEOGRAPHICAL SOCIETY.

Meeting of the Aberdeen Branch.

A meeting of the Aberdeen branch of the Scottish Geographical Society was held in the Square Room, Music Hall Buildings, Aberdeen, on March 18th, when Mr. Frederick L. Moir, of the African Lakes Trading Company, delivered a lecture on "The Eastern Route to Central Africa." Mr. David Stewart presided, and there was a large attendance. On the conclusion of the address, the Chairman read a circular that had been received from Mr. Ralph Richardson, the senior Honorary Secretary of the Scottish Geographical Society, with regard to Mr. H. O. Forbes's proposed expedition to New Guinea, in which an appeal for subscriptions was made to members of the Society; and, in urging the appeal, Mr. Stewart said that he had just heard that the Aberdeen Chamber of Commerce had voted £10 towards the cost, an announcement which was received with applause.

Professor Pirie subsequently proposed a vote of thanks to the Chairman, which having been very cordially awarded, the meeting terminated.

MR. FORBES' PROPOSED EXPEDITION TO NEW GUINEA.

Mr. Henry O. Forbes, F.R.G.S., a member of the Scottish Geographical Society, who has spent the past five years in exploring the East Indian Archipelago, is about to undertake an expedition to the interior of New Guinea. To assist him in equipping this expedition, the Royal Geographical Society gave a grant of £250, and the British Association for the Advancement of Science gave £200. These sums did not, of course, suffice; and, after hearing Mr. Forbes deliver an address upon his past work and future expedition, the Scottish Geographical Society gave him a further grant. Being, however, so young a Society, and unable to take much from its funds, the Council authorised a special circular to be issued to several of the members of the Society and others, requesting their subscriptions towards furnishing Mr. Forbes with what he desired very greatly—a properly qualified European assistant. The response to this circular has been most gratifying, an exceedingly liberal subscription having been received from a member of the Society, the Hon. John Abercromby, and various other subscriptions from other members. In this way, upwards of £260 have been raised by the Scottish Geographical Society, which, added to the £250 from the Royal Geographical Society, and £200 from the British Association, amounts to £710. Mr. Forbes himself contributes £300, whilst £120 have been contributed by some of his personal friends, and £25 by the Philosophical Society of Glasgow. In all, a sum of nearly £1200 has thus been raised. No doubt, this is a very small sum for so important an expedition (and the Secretary of the Scottish Geographical Society will gladly receive further subscriptions); but, nothing daunted, Mr. Forbes has resolved to proceed to New Guinea, and will leave this country on his interesting but perilous mission whenever his promised work, *A Naturalist's Wanderings in the Eastern Archipelago*, has been seen by him through the press. We may add that Mr. Forbes proposes to explore a portion of New Guinea recently annexed to the British Empire, and that H.M.'s Government have intimated to him that, though unable to offer him any financial aid, they will instruct their officials in and near New Guinea to give him every assistance in their power. If Mr. Forbes successfully achieve his purpose, he will have explored territory which, although now British, has never yet been visited by a white man.

QUERIES AND REPLIES.

San Brandano.—"X" writes:—In Major Ellis's *West African Islands*, I find it mentioned that the existence of the miraculous "moving island" of San Brandano, in search of which Spanish expeditions were sent out down to so late a date as 1721, is still an article of faith among the credulous peasantry of the

Canaries, the most current belief being that the island was one "on which a Scotch abbot, named St. Brandan, had landed in the sixth century." Can anybody acquainted with our Scottish hagiology say whether the legendary history of the saint, whose fame is still great in the neighbourhood of Kilbrannon Sound, contains anything bearing out this claim of Brandan's to be regarded as the earliest of Scottish explorers?

Who are the Bûrlaki mentioned in connection with the Kama and the Volga? [They are not, as the inquirer seems to suppose, a separate tribe or race, but merely the bargemen (for this is the meaning of the word) of the river.]

GEOGRAPHICAL NOTES.

Scotland and Geographical Work.—Our correspondence bears gratifying testimony to the amount of interest excited by the article on this subject in our first number. The writer did not, of course, profess to exhaust the subject; and, indeed, it is evident that material will soon accumulate for a second article on the same interesting theme. Meantime note may be taken here of a few of the more important additions that will have to be made to the list both of explorers and of geographical authors. First and foremost comes the name of Dr. John Rae, the Arctic explorer and the discoverer, in 1854, of the relics of Franklin. Rae, we are informed, was a native of Orkney, where there is a prevalent belief to this day that two of his aunts were the prototypes of Minna and Brenda Troil in Scott's *Pirate*. Then, among the names of geographical authors or editors, a place must be given to that of Bell, whose *Gazetteer of England* was published in Glasgow in 1832, followed a few years later by his comprehensive *Geography* in six volumes. A prominent place must also be found for that of Dr. Walter Graham Blackie, F.R.G.S., who has been for many years an assiduous worker in the field of geographical knowledge. His *Imperial Gazetteer*, first published in 1850, was at once recognised as an original and important contribution to geographical literature. It was followed by the *Imperial Atlas* in 1855, and the *Comprehensive Atlas and Geography* in 1880. Mention may also be made of the *Edinburgh Gazetteer*, published in 1820; of the *Glasgow Geography*, in five volumes, issued by Blackie, Fullarton & Co., in 1822; and of Fullarton's *General Gazetteer of the World*, in seven volumes, published in 1850. To the list of Scottish encyclopædias which give due recognition to geography must be added *The Popular Encyclopædia or Conversations Lexicon*, first published about 1832, and still before the public in an extended and corrected form. It should have been noted in the article that the *Encyclopædia Metropolitana* was originally a London publication, though subsequently acquired by a Glasgow house, which issued certain sections of it in separate volumes. Lake Tanganyika was inadvertently mentioned among the discoveries of Livingstone. It was of course discovered by Speke and Burton in 1858, but for our earliest knowledge of its extent and character we are indebted

to Livingstone and Stanley, who explored a great part of it in company in 1871. We shall be glad to receive further information regarding Scottish explorers from such of our readers as may be specially interested in the subject.

EUROPE.

The Aberdeen Meeting of the British Association, 1885.—We understand that this meeting will commence on Wednesday, 9th September, under the presidency of the Right Hon. Sir Lyon Playfair, M.P. The Geographical Section will, we believe, be presided over by General Walker, with Professor Donaldson, of Aberdeen, and Dr. John Rae as Vice-Presidents. The Secretaries of this section will be Mr. J. S. O'Halloran and Mr. E. G. Ravenstein. Mr. J. W. Crombie, Dr. Angus Fraser, and Professor G. Pirie are the Local Secretaries for the meeting.

The Danish Scientific Expedition to West Greenland in 1884.—The Danes have naturally the most immediate interest in an exploration of their vast but not very valuable dependency in the northern seas. Their scientific expedition to the western coasts of Greenland last year devoted itself primarily to hydrography and the study of deep-sea temperature, and to the collection of the fauna and flora of the coast and coast-waters. The main head-quarters of the expedition were at Holsteinborg, on Davis' Straits, within half a degree of the Arctic Circle. One notable observation as to the temperature of the sea near Holsteinborg was that for depths not exceeding 200 fathoms the coldest stratum of water was not that at the bottom, but between 30 and 100 fathoms. Thus, on one occasion, when the surface temperature was 37°·04 F., that at 30 fathoms was 33°·62, while beyond that it rose to 39°·56 at the bottom—362 fathoms deep. Another series of temperatures showed 45°·86 F. at the surface, 31°·64 at 50 fathoms, and 35°·78 at the bottom—264 fathoms deep; these last observations were made, however, in the confined waters of Disco Bay, where the surface stratum of water is much warmer, that of the air over it being at the time 50·36° in the shade. Very numerous specimens of phanerogamous plants and higher cryptogams were collected, some of them in places much farther north than they had been known to inhabit. As the expedition arrived at Godthaab in June and did not return till August, there was also opportunity for studying the customs and dispositions of the natives, both Danish colonists and Greenlanders. It appears that on the whole the Danish Government is not popular with the Greenlanders: and indeed, from one tale recorded by a member of the expedition, the relations of the Greenlanders with Denmark might be described as "strained." The trade with Greenland is a strict Government monopoly, but the Americans, who come to fish off the coasts, are reported to do a good deal of smuggling. When a rumour was circulated that a Danish war-vessel was coming to drive the Americans away, the Greenlanders frankly expressed their hope that the war-ship might sink ere it reached Greenland. They show the greatest unwillingness to learn Danish, but are delighted to use whatever English they can pick up from the Americans. They are, like most hunting people, singularly improvident. They have usually plenty of fish and other food supplies in summer: they are happy but heedless, and are usually in straits in winter. They recognise the value of such vegetables as are to be had without trouble, but cannot be persuaded to cultivate them. Reindeer are now very scarce, having been extirpated in large districts for their skins merely. Many of the birds that used to be very plentiful have been driven from their old haunts into well-nigh inaccessible wildernesses. Such fishing as is undertaken is not conducted systematically, but for the needs of the hour. During the expedition, bright,

moderately warm weather was seldom interrupted by rain or snow. Light breezes were frequent, and were valued as serving to banish the midges, which are a torment in still, warm weather. The day temperature usually was about 40° or 50° F., seldom rising to 70° on very still days. (See *Globus*, vol. xlvii., No. 9.)

Present Condition of Finland.—Finland occupies a curious position in the Russian political system. Russia has crushed and incorporated Poland, has absorbed large numbers of Tartars, has exterminated or expelled the Circassians, and has largely Russified Georgians and Armenians; but in Finland it appears that the Russian influence rather decreases. Though a part of the dominion of the Tsar, and bordering on the province of St. Petersburg, Finland has a very full measure of autonomy in regard to internal administration. The Emperor rules not as Autocrat of all the Russias but as Grand-Duke of Finland; the constitution dates from 1772, and recognises parliamentary government. The Established Church is Lutheran, and 98 per cent. of the population belong to it. This contrast to other Russian provinces is due to the fact that Finland belonged to Sweden from about the twelfth century till the Russian conquest in the eighteenth century, and obtained a pledge from the Tsar in 1809 that its religion, laws, and liberties should be maintained. The Finnish race is alien alike to Slavs and Scandinavians, being a branch of the Finno-Tatar or Ural-Altaic family, but Swedish is still the official language of Finland. Of the total population of 2,100,000 nearly 85 per cent. are Finns, the Swedes amounting to some 300,000 in all. In an interesting paper in the *Nineteenth Century*, Prince Kropotkin affirms that the Finns are as anti-Russian as ever, that the Swedish party grows weaker, and that Russians and Germans in Finland become rapidly Finnicised. Finland is making steady and remarkable progress in industrial prosperity, especially in commercial marine. The Finns, he says, hope to constitute an independent State, with its own language, constitution, and laws. Prince Kropotkin has had good opportunity of knowing Finland; but as a Russian political exile, lately convicted in France for promoting anarchism there, he is naturally disposed to take the view most favourable to the revolutionary tendency and least favourable to the existing Russian *régime*.

Future Arctic Work.—The *New York Tribune* publishes an article on this subject by Lieutenant Greely. This famous explorer says that, ever since his attention has been drawn to Arctic work, he has regarded the route *via* Franz Josef Land as the true route to the Pole. The voyage and experience of Leigh Smith in 1880, 1881, and 1882, leave no doubt that at some season of every year Franz Josef Land may be reached by a well-fitted steamer. This route presents unusual chances of success with the minimum of danger; and it is more than probable that an English expedition will enter these waters. Chief Engineer Melville, U.S.N., has in view an expedition by this route, for which two ships, with about sixty men and officers, would be needed. One vessel should winter in Fira Harbour, or some secure point near by, while the second should be pushed forward as far northward as possible, preferably by Austria and Rawlinson's Sounds, but, if that is not possible, along the west coast of Franz Josef Land, beyond Cape Ludlow. The vessels should be provisioned for three years, and the crews should be quartered in temporary houses to be erected on shore. A dépôt of supplies, for use in case of disaster, might be established on the northern coast of Nova Zembla. Lieutenant Greely then proceeds to give his views regarding the most suitable build of vessels and of Arctic navigation, and concludes his interesting article by saying:—"The Magnetic Pole of Boothia Felix Land, located by Ross in 1831, has probably changed its position in the last fifty years. Its relocation would be an important contribution to science. With a home station in Repulse Bay or Wager River,

I believe this work could be done without great expense or serious danger. The benefits to be derived from such an expedition would not be confined to terrestrial magnetism. As regards ethnology, botany, and natural history, the country around King William Land is substantially a blank."

ASIA.

Prejevalsky in Gobi and Northern Tibet.—Colonel Prejevalsky, or, more correctly, Przhevalskii, the leader of the Russian exploring expedition into Tibet, contributes interesting information on the progress of his party, in two letters translated in the *Proceedings of the Royal Geographical Society*, from the *Invalide Russe* of 4th January. The first is dated from the temple of Chob-sen, Province of Kan-su, 33 miles north of Sining,[1] March 10th, 1884, and relates that he started from Urga, about 270 miles south of Lake Baikal, on 8th November 1883, with 21 men, 56 camels, 27 saddle-horses, and a flock of sheep; the men all armed with rifles and revolvers, and under strict discipline. Immediately south of Urga the fertile and well-watered region of Northern Mongolia, abounding with meadows and forests, terminates, and the great desert of Gobi or Sha-mo commences, stretching from west to east, from Panwi to Khingan 2650 miles, and about 700 miles broad. Crossing it about the meridian of 106° east, he found the first portion—200 miles from Urga, or to about Zaire-asu on the route of Mr. Ney Elias—composed of steppes, covered with excellent grass, giving pasture to antelopes and vast herds of cattle belonging to the Mongols. Then begins Central Gobi, consisting of bare flat spaces, covered with pebbles, and cut up at intervals by low barren stratified ridges. Southern Gobi, known by the name of Ala-shan, is almost entirely covered with sand over a substratum of firm clay, and in places of stone, which is blown up into shifting hills 50 to 100 feet high. There is no water, and quicksands are frequent. This vast desert is subject to the utmost extremes of heat and cold, but is inhabited by Mongols whose flocks and herds manage to subsist on its scanty herbage.

The party marched daily from 13 to 17 miles, and bivouacked at wells, or carried ice from the previous night's halting-place. The temperature in the tents at night went down to 15° F. below zero.

In the western part of the Ala-shan, where the range of that name runs like a great wall separating the desert from the cultivated banks of the Hoang-ho, is the town of Din-yuan-in, or in Chinese Fu-ma-fu (38° 55′ N. 106° 42′ E.), the residence of a local ruling prince, whose acquaintance the traveller had made on previous journeys. From this they had 200 miles more of the desert to cross, and when still about 70 miles distant, they could see the advanced spurs of the towering mountain slopes of Tibet, which, under the successive designations of Nan-shan, Altan-tagh, Tugus-daban, and lastly, Kwen-lun, stretch from the upper Hoang-ho, to the Pamîr. The first ridge was not more than 20 miles wide where Prejevalsky crossed it, but behind it lay a new world; he had previously been passing places varying from 3500 to 5000 feet above sea-level; now they suddenly rose to 9000 and 10,000 feet, with numerous streams, a fertile soil, and rich fauna and flora. The party hunted whole days in the forests of Kan-su and enriched their natural history collections.

The second letter is from Eastern Tsaidam, 8th August 1884, and relates that the party left the province of Kan-su in March, for the plateau of Lake Koko Nor, at an altitude of 10,000 feet, among meadow-like steppes, affording excellent pasture for cattle, and on which roamed herds of antelopes, wild asses, and khulans. The ground was often honey-combed with the burrows of the marmot,

[1] Sining is about 70 miles east of Koko Nor, in lat. 36° 37½′ N., long. 101° 49′ E.

which feeds on the roots of grasses, and thus often lays large areas waste. The Koko Nor he found to be 167 miles in circumference, and very beautiful, but was still covered with ice at the end of March. The inhabitants of the neighbourhood are Mongols and Tangutans, and the latter, often in company with robber bands from Tibet, oppress the Mongols most cruelly. Tsaidam or Chaidam, to the west of Koko Nor, is a vast salt marsh (530 miles by 70), which must have been at a comparatively recent epoch the bed of a mighty lake, 9200 feet above sea-level.

Early in May they reached the Burkhan-Buddha[1] Mountains, guarding the table-land of Tibet. Here they left all unnecessary animals and baggage with seven Kosaks, and to the number of fourteen set out for the sources of the Yellow River. The pass in the Burkhan-Buddha Range was 15,700 feet, and took three days' climbing, but the table-land beyond was from 14,000 to 15,000 feet high. Travelling 67 miles beyond these mountains, they came upon the junction of two streamlets from the south and west, at a height of 13,000 feet, which form the Hoang-ho. It is fed by numerous springs of a marshy valley 40 miles long by 13 wide, called Odon-tala, and in Chinese Sing-su-hai or "The Starry Sea." The Yellow River here consists of two or three branches, from 20 to 30 yards broad, and 4 deep at fords and at low water generally. Fourteen miles lower it falls into a wide lake, and from that it pases into a second lake, which it leaves a very considerable stream. These lakes lie at a height of 13,500 feet, are each more than 80 miles in circuit, very beautiful, and have been named by the traveller Russia and Expedition Lakes ;[2] farther on, making a sharp bend round the ridge of Amnê-machin, covered with eternal snow, the river courses violently through the cross strata of the Kwen-lun, and flows toward China.

The climate in Northern Tibet, even in May, was terrible—snow-storms were not unfrequent, and at night the cold went down to 9° F. below zero—while the rain was often incessant in June and July. But even here antelopes, yaks, wild asses, mountain sheep, and bears abound.

From this the traveller went southward towards the source of the Blue River (the Yangtze) or Di-chu, as the local Tangutans call it. The watershed[3] between the two great rivers was 14,500 feet high where the party crossed it. Farther south, in the basin of the Blue River, the country is Alpine in character, with rich and varied herbal flora, and is inhabited by the Kam tribe of Mongols. After travelling about 70 miles through the mountains the river was reached at a height of 12,700 feet. With a width of 100 to 120 yards, hemmed in by mountains, the current is extremely rapid, deep, and muddy.[4] Not able to cross it, the traveller returned towards the lakes of the upper Hoang-ho, and on the way was attacked by a band of Tangut robbers about 300 strong. These were driven off with heavy loss by the Kosaks, with their Berdan rifles, who followed them up as long as they were within range, and then, attacking the Tangut camp, executed summary vengeance. Six days later another attack was made by another tribe, but though they took to cover again and again, their flint locks were no match for the rifle, and in the two affrays 40 men and many horses were killed, while not a man of the expedition was hit.

[1] Burkhan is the Mongol name for Buddha, who gives name to the religion that arose in India 500 B.C. Burkhan-Buddha is thus a biform name, and perhaps not correct.

[2] These lakes have long been marked on our maps under the names of the Charing Nor and the Oring Nor.

[3] On the Bayan-kara Range, the Pe-ling Mountains of older maps.

[4] The sources of the Yang-tze lie in about long. 90° E., far to the west of where Prejevalsky here struck the river. He calls it Di-chu, which is the same as the Pe-chu of our maps, the Kin-cha-kiang or "River of Golden Sand" of the Chinese, formed by the junction of the Namisitu and Murus-ussu in long. 94° 42′ E.

On the way back to Tsaidam, they came upon a party of gold-washers. They went no deeper than one or two feet from the surface, but showed "whole handfuls of gold in lumps as big as peas, and often twice and thrice as big." Colonel Prejevalsky thinks that in the course of time, "Northern Tibet will become a second California, perhaps even richer than the first in precious metals, lying in the soil over the surface of the desert table-land."

Afghanistan and its Northern Boundary.—If even in Europe it is true that boundaries are the *bête noire* of the geographer, what shall we say of Asia, and of the conflicting claims at different times of Turkomans and Jamsheedee Afghans? So long as these advancing and receding waves of nomads and highlanders keep to themselves, the geographer and the politician alike are indifferent to boundaries; but when the time comes for civilisation to arrest the ebb and flow of barbarism, and fix a line, then the trouble begins. Twice we ourselves have fought with Afghanistan nominally for a so-called scientific frontier. Now, representing the Afghan, we are face to face with Russia, as conqueror of the Turkomans. It was the geographer who first raised the question, and it is the geographer who must finally settle it, in the shape of the surveyors and engineer officers on the staff of Sir Peter Lumsden.

Twenty years ago, on 11th July 1865, the remarks of Sir R. Murchison, President of the Royal Geographical Society, on the progress of Russia in Central Asia, led the Foreign Office to address to the Secretary of State for India, then the present Lord Halifax, a despatch on the expediency of entering into diplomatic arrangements with the Russian Government as to boundaries in Central Asia. Step by step Russia rolled south, like a wave, till in 1869, having extorted the Atrek boundary from Persia, it proceeded to claim the Afghan principalities *south* of the Upper Oxus, and so to threaten Balkh. Lord Mayo, having received the Amir, Sher Ali, at Umballa, as Lord Dufferin and Sir C. Aitchison have just met his successor in Rawal Pindi, persuaded Lord Clarendon, then Foreign Secretary, to send the Panjab civilian, now Sir D. Forsyth, to St. Petersburg, to fix amicably the northern boundary of Afghanistan. The confidential maps and correspondence are before us as we write. After agreeing to a boundary, Russia tried to claim Badakshan, but finally, in 1873, it accepted the line which will be found laid down accurately on the 1881 edition of the Turkestan map of General Walker, R.E., F.R.S., which he drew up after a visit to St. Petersburg, and which is based on the surveys made by British and Russian officers up to that year. Starting from the west at Sarakhs, midway between 36° and 37° N. Lat., the line trends towards E.N.E. across the Murghab to the Khwaja Saleh ferry, on the Oxus, somewhat to the north of 37°. Thence it is carried up the course of the Oxus and its principal source, the Panja, to the Victoria Lake, discovered by the Scotsman Wood. This "line of boundary, which has been approved of by the British and the Russian Governments," runs *thirty miles* to the north of Sari-Yazi, and sixty north of Panj-deh. This is the "Clarendon-Granville Agreement" referred to by Mr. Gladstone in the House of Commons on the 13th March. If departed from, because Russia has chosen to annex to the south of the line, in the name of its new Turkoman subjects, then it may be given up on the other side of the Oxus also, and so imperil Balkh as well as Herat. This is the danger in the future. An officer, who is in the midst of the negotiations and activities on both the south and the north frontier of Afghanistan, writes to us as follows:—

"With the Sind Sagar Doab Railway an accomplished fact, and a good military road down the British frontier, we shall be pretty secure. Personally I think a struggle for our Indian Empire not at all improbable; it is not in the nature of

things to be otherwise. But with our communications complete, and a more thorough organisation of our Imperial army, which seems imminent, we can afford to let Russia come on. I believe England to be very strong in India even now, and she has got money. As to Afghanistan, you have no idea how strong the Amîr's Government is, and how searching and firm his authority. His subjects, and especially the officials, turn green with fright if they are told they will be reported unfavourably to Kâbul; one and all are agreed that never has Afghanistan seen such a mighty ruler. Robbery and plunder have been put down, even in the distant countries round Herat. This seems to have been done, too, without much military force. From Girislek to Herat there is only one regiment of regulars. His policy so far seems to have been most successful in keeping the chiefs owing the most nominal subjection in first-rate order, in frightening the officials, and in putting down all disorders and efforts at resistance. The members of the Commission, one and all, have been much impressed with this view of a united Afghanistan. No doubt this unity of control is in a great measure due to the exhaustion consequent on the war, and to a widespread consciousness, which extends to the lowest and most Ishmaelite classes, that the two iron pots are coming uncomfortably close to the earthen pitcher; but, discounting all this, there is a great deal to be thankful for in the present state of the country."

Herat.—The Indo-Persian organ *Shems* has received the following from Herat:—"In pursuance of the Amir's orders, the old high-road from Herat to Peshawar *via* Kâbul, known as the King's Road, will be repaired as speedily as possible, and the wooden bridges on that route will be carefully restored. The Heratis, who are Sunnis, like the Turkomans, but whose nationality and language are Persian, are opposed to both English and Russians. Already trade between Merv and Herat, which but two years ago was flourishing, has been reduced to next to nothing since the Russians have been in possession of the latter town. English engineers are surveying the entire district between Herat and Sarakhs."

The Aborigines of Formosa.—The island of Formosa has acquired some fresh interest of late from being the scene of French naval operations. On its own account, however, it deserves a greater share of attention, both from a geographical and from a commercial point of view, than has yet been bestowed upon it; and a description of it, "compiled from official and other sources" by Mr. L. C. Hopkins, at the request of Sir H. Parkes, late British Minister at Pekin, contains some welcome additions to our somewhat scanty knowledge of this rich and beautiful island. Mr. Hopkins gives the greatest length of the island at 235 miles; its area at 14,000 square miles; and the total population, guessed rather than computed, at from two to three millions, "probably an excessive estimate," he adds. The foreign trade, carried on at the two treaty ports of Tamsuy and Tai-wan, is worth rather less than two millions per annum, the great bulk of it being in British hands. Mount Morrison, the culminating point of the axial range of Formosa, reaches a height of 12,000 feet; the slopes of these forest-covered mountains and the east coast are still in the possession of the wild aboriginal tribes. Mr. Hopkins has interesting notes on the history, the climate, and the productions of Formosa. Its natural resources, he says, "are capable of a development practically limited only by the demand for its products abroad. Apart from its mineral resources, of which coal, sulphur, and petroleum are already known to exist in its very imperfectly explored territory, the island should produce rice, sugar, tea, camphor-wood, hemp, indigo, rattans, hard woods, turmeric, and cassia." Describing the almost incredible violence of the tornadoes that sweep the Formosan seas, he states that "the torrents of rain appear like masses of steam being swept along the ground,

while the surface of the rivers is, or seems to be, lifted bodily in sheets and thrown on the land." But the portion of the report which will be read with most interest is that dealing with the peculiar elements of the Formosan population. These are four in number—the independent savages, the Pepohuans or reclaimed savages, the Hakka immigrants from the mainland, and the non-Hakka Chinese, also immigrants from the mainland. The first of these, he says, are "perhaps of Malay race. They are divided into a large number of clans, and inhabit the whole region of forest-covered mountains of central and eastern Formosa. Their time is passed in hunting, but they do not lead a wandering life, and do not depend entirely on the proceeds of the chase for subsistence. Those of the men who, through age or infirmity, are unable to hunt, till the ground with the women, raising crops of millet and other food for the rest of the tribe. The women also weave cloth of two kinds, known as 'savage cloth' and 'pine-apple cloth,' the first a sort of grass cloth, the latter a fabric made from pine-apple leaf fibre. These people live together in villages, and, in spite of the extreme hostility which they not unnaturally bear to the encroaching Chinese, are by nature civil and polite. In the constant skirmishes between the Chinese borderers and the aborigines, the day is by no means always to the former; indeed, the savages appear sometimes to regain lost ground." The Pepohuans are found scattered throughout nearly the whole length of the island, but occupy chiefly the sterile and hilly lands at the foot of the great mountain-ranges where, as Mr. Hopkins says, "they are neither free from the coveteousness of the Chinese, nor always secure from attack by the untamed aborigines." His information leads him to regard them as "the ancient pre-Chinese inhabitants of the flat lands, from which they have been gradually driven by the Hakka and other Chinese settlers, until they are now being pushed on to the very verge of the savage territory. Large and well-built physically, they are mild and inoffensive in disposition, and seem to have received Christianity and teaching from the Dutch in the seventeenth century." Twenty-five miles south of Kelung, and extending to Suao Bay, is the beautiful valley of Kapsulan, a fertile rice-field hemmed in by mountains, and studded with Pepohuan villages; and concerning it recent reports say that "Christianity is spreading rapidly amongst the population." The Hakka immigrants are a strongly marked and important feature of the Formosan population. "It is they who carry on the barter trade with the savages, whom they supply with guns, powder, and knives, mostly of their own manufacture, receiving in exchange skins, hardwood, camphor, and the native cloth. They are the camphor manufacturers also, and have many thriving villages on these border marches, where they live independent of the Chinese administration. Up to 1874 many of the large Hakka villages would not even allow an official to enter their fortified precincts. These independent village communities carried on the barter trade with the savages, in which no outsiders could participate. Even official communication with the savages in most instances was only carried on through the independent savages and Pepohuans. Some change has taken place since that time, however, and aborigines in small numbers may now be met with at the capital of the island, and at other large places. The fourth and last element is the Fuhkien agricultural colonists, who call for no special remark."

A Journey in Corea.—Corea, the hermit-crab among the nations, has lately been "coming out of its shell," and in a few years we shall probably know as much about it as about the Eastern countries that are its neighbours. The reports of Consul-General Aston, just printed among the Parliamentary blue-books, indicate the wonderful progress that has been made during the last two years in opening up the

country to commerce. The chief events of 1883 were the opening to foreign trade of Chemulpo, the port of Soül, the capital, situated near the highest point on the south branch of the river Han to which sea-going vessels can conveniently ascend; the signature of treaties of commerce with Britain, Germany, and the United States; the establishment of a British trade agency and steam service to the new port, and of a regular system of customs collection. The result was an increase of the total export and import trade of Corea by about a half—from somewhat over two million dollars to rather more than three million dollars. All the gain, however, has been taken by Chemulpo, which, from a squalid village of fifteen huts, with no commerce whatever, has at once taken the position of the principal centre of the import trade, the two old treaty ports, Pusan and Wŏusan, having suffered by its being opened. The "palace revolution" of last year had its origin, it is believed, in the anti-foreign proclivities of the Regent Tai Wŏu-Kun, the king's father, and its effect was to put a temporary check to the rapid progress of foreign trade. In the circumstances, the fact that notwithstanding war alarms and suspension of business the total trade showed no sensible diminution, is strong testimony that the commercial development may be expected to continue. Mr. Aston forwarded to the late Sir H. Parkes some interesting notes on a journey which he made in August last from Soül to Song-do, the former capital of Corea, and described as still "a bustling commercial town of some 40,000 or 50,000 inhabitants." The road traversed passes through Koyang, Phaju, and Changdan, and crosses the river Injingang, at a point where it is a fine deep stream 300 or 400 yards wide, and navigated by small craft engaged in carrying salt, firewood, and agricultural produce between the capital and various places on the river. A solid granite wall fronts the landing-place, and bears the sounding inscription, "Gate for the Tranquillisation of the West;" and the river cliffs, ablaze below with orange lilies and thickly wooded above, formed "decidedly the most picturesque bit of scenery on the whole journey." The distance between Soül and Song-do is 160 li—say, over 50 miles, and the road through the great thoroughfare to the northern provinces and China is extraordinarily unequal in character—now a broad well-kept highway between lines of shady trees, and again "an almost impracticable track, over rocks and along river-beds." Near Koyang a cliff has been hewn into two colossal rudely-sculptured figures, or rather busts, of striking aspect, one representing heaven or the male element, and the other earth or the female element of Chinese philosophy; and the approaches of Song-do are lined with monuments, many of them of handsome appearance, erected "to dutiful sons and faithful wives, or commemorating the wise administration of the governors and other officials of the city." As for religion, however, the account of the Dutch visitors of the seventeenth century still holds good—"the Coresians have scarce any." Local administration is attended with great state and ceremony even in the small villages of Corea. Speaking of Phaju, a place of perhaps 200 straw-thatched mud cabins, Mr. Aston says:—"As usual, the residence of the Mayor and the public offices were buildings of considerable pretension, though in a very neglected condition. We were lodged in what was evidently the Chancery, from the official memoranda of all kinds and dates pasted on the walls, and from the chests of archives standing in rows and secured by padlocks. Some of these were tastefully inlaid with silver. Dozens of well-dressed officials were to be seen, and everything was done with a degree of state and ceremony well calculated to impress the tenants of the cabins without. The chief magistrate's commands were repeated by a crier, whose prolonged notes in a high key, with 'a dying fall,' could be heard at a considerable distance, while the soldiers or servants who received the orders responded in chorus in a lower note, rising at the end into a scream. The ceremony of shutting the gates of the Governor's office for the night

occupied half-an-hour, and comprised a long performance on a drum, a horn, whose notes recalled the bagpipes, and an instrument which produced an interrupted snoring noise, like that made by the wind in the chink of a door or window." The soil is better cultivated than Mr. Aston had looked for, from his experience of other parts of the country. At Song-do there are important manufactures of oil paper, made from the inner bark of the paper mulberry ; but the most valuable product of this part of Corea is the drug known as ginseng, which holds so high a place in the Chinese pharmacopœia. Of the mineral resources of Corea Mr. Aston does not speak in an encouraging tone, but the surveys made furnish as yet a wholly inadequate test.

AFRICA.

The Political Map of Central Africa.—The late Conference at Berlin and the treaties which resulted from its deliberations have materially altered the map of all the region of equatorial Africa situated between the two oceans. Yesterday, all was a matter of political controversy ; to-day, it is all definitely fixed, at least on paper. Portugal has seen part of her historical pretensions admitted and recognised ; France has obtained, south of the basin of the Ogowe, an important accession of territory ; Spain has assured her authority at the mouth of the Muni ; Germany has obtained a footing at Cameroons in the west, and in Usagara in the east ; finally, the International Association, recognised by the civilised world as a sovereign power, has nominally taken possession of that part of central equatorial Africa on the banks of the Congo from its source at Lake Bangweolo to its mouth at Banana. Following from north to south the western shore of the continent, we find :— 1. Great Britain, who has taken possession of the littoral of the Bay of Ambas, west of Cameroons, up to the village of Victoria. 2. Germany has placed under her protectorate, from the 15th July, all the littoral bordering on the estuary of Cameroons, from Bimbia in the west to Great Batanga in the south-west. 3. Spain, who acquires the whole littoral from Benito to Muni, occupying the two banks of this little river at the mouth. 4. France, whose vast colony lies between the shore and the Congo, from the Bay of Corisco down to Massabe, to the north of the Chiloango mouth. 5. Portugal, who possesses the enclosed land of Kabinda, between Massabe and Yabé, at the mouth of the Loungé, and whose Angola colony commences at Shark Point, south of the Congo mouth. 6. The Congo Free State, the limits of whose territories may thus be defined :—On the west, the littoral of the Atlantic Ocean, between Banana and Yabé; the parallel of Yabé to its intersection with the meridan of Ponta-da-Lenha ; this parallel, towards the north, up to Chiloango ; the left bank of this river to its source ; a curved line from this point to the cataracts of Ntombo-Makata on the Congo, leaving on French territory the station of Mboko, and on the territory of the Association those of Mukumbi and Manyanga ; finally, from the end of the Ntombo Cataracts, on the Congo itself, up to its confluence with the Bumba, beyond the station at the equator, whose limit, running in a north-westerly direction, has yet to be determined. On the south, the Congo, from Banana to a short distance up to Nokki, the north bank of the river belonging to the Association, the south bank to Portugal ; then, from Nokki, the parallel of this point, to the Congo ; this river up to a point fixed in the neighbourhood of the 9th parallel, and a broken line running thence to Lake Bangweolo. On the east, the western shores of the Bangweolo, Tanganyika, Muta Nzigé, and Albert Nyanza. On the north, the watershed which separates the hydrographical basin of the Congo, from that of the Nile, Shari, and Binue. 7. Finally, the Sultanate of Zanzibar the sovereignty over which extends over the

littoral, between the Juba mouth, on the north, and Cape Delgado, on the south, where the Portuguese province of Mozambique commences.—*Le Mouvement Géographique*, March 8. [Map illustrating above.]

Dutch Exploration in Africa.—Reports have been received from M. Veth, leader of the Dutch expedition, up to 2d January. Writing from Mossamedes, M. Veth had explored, he said, as far as Humpata and Hulla. He speaks in high terms of the assistance rendered to him by the Portuguese officers. Of the Boers he met he sends very favourable reports, and he does not think they are likely to return to the Transvaal. All the members of the expedition were in good health.

The Togo Territory.—Dr. Hugo Zöller, the correspondent of the *Kölnische Zeitung*, who last December reached the summit of the peak of Great Cameroon and who is still on the West Coast of Africa, has published a series of articles on his discoveries which deserve attention. There are, however, some inaccuracies which should be noted. In regard to the Togo territory, the Avon lagoon is not 60 kilometres long by 40 wide. There is a lagoon by the coast, and parallel to it, which, though comparatively small, forms two lakes, the one at Togo, and the other opposite to Little Povo at Sallivi Avemme. The lagoons near the coast are not always connected with each other, consequently the tides do not occur at the same time. The lagoon of Togo has communication with the sea at Great Povo and Weida, and some artificial outlets at Little Povo. The difference of the water-marks is very great. If the water is low, the lagoon becomes a labyrinth of rivulets, often very shallow, and the banks as well as the islets are then covered with reeds. The lake near Togo is surrounded by undulating land which, farther inland, reaches a height of some 300 feet. Dr. Zöller endeavoured to find some opening to the lagoon, but though he led an expedition to the extreme north he was unable to discover any channel in the undulating land that surrounds it. The supposition that it is supplied by the river Volta is certainly not borne out by the map of the Ewe territory published by the *Bremer Missions Gesellschaft*. It should also be mentioned that the boundaries of the Ashantee and Dahomey kingdoms do not meet to the north of the Togo lagoon, as shown on some maps.

Navigation on the Upper Congo.—The English missionaries of the Livingstone Inland Mission are about to launch on Stanley Pool a steamer called the *Henry Reed*. This will raise to seven the number of small craft at present navigating the Upper Congo—four belonging to the Association, two to the English missions, and one to the French expedition.—*Le Mouvement Géographique*, March 8.

AMERICA.

The Ascent of Mount Roraima.—By his ascent of Roraima, the enterprising young explorer and naturalist, Mr. Im Thurn, has undoubtedly drawn for himself one of the few remaining first prizes of geographical research. Roraima, as most readers may be aware, is a singular pillar-shaped mountain—the most remarkable of a remarkable group—rising from the sandstone plateau of British Guiana, near the point where the border-line of that colony touches towards the south-west the frontiers of Venezuela and Brazil. The limits of these countries are still so indefinite that it cannot be said with any certainty whether this "freak of nature" is within British territory or not. All the scientific attempts to approach or ascend it have, however, been made from the base of our settlements on the Essequibo and Demerara rivers. The first to describe Roraima were the brothers Richard and Robert Schomburgk, who, in 1840, reached its southern side by ascending the Essequibo and its tributary the Rupumuni, and then travelling overland across the

savannah and forest. Their account of the mountain, fully borne out by the statements of more recent explorers, was eminently fitted to stimulate the curiosity of scientists. Roraima is part of a wall-like mountain mass, running in a north-west, south-east direction, and forming the point of junction not only of three political territories, but also of three great river-systems. The general level of the sandstone tract—itself a region of peculiar interest to the botanist and zoologist from the highly specialised plant and animal forms which it contains—is not far short of 5000 feet. The base of the mountain, formed largely of rock *débris* and rich vegetable mould, and thickly covered with forest, slopes up steeply to a height of some 5500 feet above sea-level; and on this pedestal Roraima shoots upward, a vast wall from 1400 to 2000 feet high, "perpendicular as if drawn by a plumbline." From the summit of these cliffs sheets of water plunge down, and flow off in different directions to reinforce the Essequibo, the Orinoco, and the Rio Negro branch of the Amazon. The atmosphere is extraordinarily moist, and the ring of forest girdling the mountain is a perfect paradise for the botanist, so luxuriant is the vegetation and so numerous and beautiful the new forms of plant life. "Every shrub, herb, and tree," says Richard Schomburgk, "was new to me, if not in its family, yet as to its species. I stood on the border of an unknown plant zone full of wondrous forms, which lay as if by magic before me." The fern flora of Roraima shows a marvellous development and variety, and tree ferns are among the most conspicuous features of the vegetation. It has been calculated that at least 200 species of ferns grow on the mountain, and that of these probably one-half are peculiar to it. Palms, cacti, heaths, and pitcher plants are also in great abundance, but perhaps the most rare and lovely of the flowering plants of Roraima are its orchids, many of which are superbly coloured and of fantastic form. The fauna of Roraima is almost as highly specialised and interesting as its flora; and the district is also of peculiar interest to the ethnologist from being the home of the Arecuna Indians, who have not yet fully emerged from the "Stone Age." But the crowning attraction of Roraima to the scientist is attached to the summit of the mountain, a slightly undulating and apparently forest-covered plateau, which hitherto has been deemed unattainable by human foot. The top of Roraima has been a kind of "happy hunting ground" for the imaginative naturalist; the supposition being that, from its absolutely isolated position, inaccessible to any creature not provided with wings, it must be a small primeval world apart, unaffected, or comparatively unaffected, since the date of the first upheaval of the mountain by the laws of the struggle for existence and the survival of the fittest that have operated so powerfully in the great world below. The history of the exploration of Roraima strongly supports the faith of those who hold that the word "impossible" need not be written opposite any task in the field of geography. Richard Schomburgk, from his view of the southern and south-eastern side of the great mural wall, declared it to be inaccessible; the next visitor, the German botanist Appun, who approached it by way of the Mazeruni and the Cako, was of the same opinion, which was held also by Mr. C. B. Brown, who, in carrying out in 1869 the geological survey of the colony, reached Roraima by the same route chosen by the Schomburgks. This latter line of attack was that chosen in 1877 by Messrs. Eddington and Flint, who, like their predecessors, saw only the southern and eastern side of the wall, and, more cautious than they, pronounced it "possibly inaccessible." In the following year, Messrs. M'Turk and Boddam Wetham found their way to Roraima, by the Mazeruni, and for the first time glimpses were caught of its western and northern sides, which, however, seemed to them quite as unsurmountable as the others. In 1881, Mr. David Burke, an enterprising young orchid-hunter, coming by the Mazeruni route, obtained a view of the north-eastern part of the mountain, but did not take it upon him to

say whether it might be ascended or not. Lastly, in 1881 and 1883, Mr. Whitely spent some time in the neighbourhood of Roraima and its twin-mountain, Kukenam, his line of approach being the Mazeruni and its tributary, the Carimang, and in a paper describing the results of his researches published in the *Proceedings of the Royal Geographical Society* for August last, he indicated the opinion that there is at least one point—and probably more than one—where an expert cragsman, furnished with the proper appliances, might make the ascent. The feat which his predecessors had described as impossible or barely possible, Mr. Im Thurn has shown by practical demonstration to be performable by a single European explorer, with very limited resources. His plan of approach and attack differed from that of the other travellers mentioned. His scheme, as explained in his paper read at the late meeting of the British Association at Montreal, was, starting from the mouth of the Essequibo in the course of October, to make his way by canoe up that stream and its tributary, the Potaro, to the celebrated Kaietur Fall, a locality with which Mr. Im Thurn is well acquainted from two previous visits. Having ascended to the sandstone or savannah region above the fall, it was his intention to push on by boat or across country to the foot of Roraima, which he expected to reach "well within a month" of his start from the coast. The difficulties of the march over a practically unknown country full of rugged mountains and dense forests appear to have been greater than he had counted on; but on 6th of December, in a letter to Sir Joseph Hooker, he describes himself as stationed at the Indian village of Teroota, on the south side of Roraima, "in the midst of a very garden of orchids and most beautiful and strange plants," and as having on the previous day climbed up the precipitous mountain-slope to a spot at a height of 5600 feet, where he proposed, on a second visit, to build a hut. From the site of the intended hut a place was seen where an ascent of the cliffs could be made; but should this fail, it was his intention to pass round to the unvisited western side of the mountain, and there make the attempt. On the 7th of February the explorer was able to telegraph to Kew from Demerara the good news, conveyed in a single word, "ascended." The announcement has been supplemented by letters since received from the explorer, from which it appears that he was fortunate enough to discover a ledge running diagonally up the face of the cliff, and by means of this he succeeded with much difficulty in making the ascent on the 18th of December. Owing to the impossibility of carrying up hammocks, provisions, and firewood—for, contrary to what was supposed, there are no trees; the atmosphere is bitterly cold and wet—it was found impossible to examine the summit except in the immediate vicinity of the spot where the ascent was made. Enough was seen to dispel the fanciful idea of a "fossil world in the clouds" existing on the top of Roraima. What was really found, however, was sufficiently strange and wonderful to reward the explorer's labours. The scenery is described as "of the most marvellous description." The plateau is covered with groups of rocks of singular shape, piled up in heaps. The clouds are almost always resting on the mountain top, and everything is dripping with water, which accumulates in little basins, is drained away in streamlets, and spills over the edge of the cliff in the waterfalls which are so marked a feature of the mountain. Between the rocks is a dwarfish and somewhat scanty vegetation of a character distinct from what is found elsewhere in Guiana. Of these plants Mr. Im Thurn has brought away between 300 and 400 species, including some living specimens—"*Heliamphora*, three most exquisite *Utricularias*, two of which are I fancy new, and some other things." The only signs of animal life were a few small butterflies of a common type. It is mentioned in the *Athenæum* that Mr. Siedel, a German botanist, ascended the mountain the day after Mr. Im Thurn had done so, and by the same ledge. All will regret to learn that the latter gallant

young explorer was laid up with a severe attack of fever after his return to Georgetown, and that this has interfered with the preparation of his report. The full story of his ascent, and of his two months of botanising work at the foot of the mountain, will be awaited with a high degree of interest, and with a feeling of gratitude not only to Mr. Im Thurn, but to the Royal and Royal Geographical Societies that furnished him with funds, and Sir Joseph Hooker and the other gentlemen who gave him advice and encouragement in carrying out his adventurous enterprise.

War and Canalisation in Central America.—There is trouble—but when is there not trouble?—in Central and South America. As often happens there, as elsewhere, "the way to war has been paved with peaceful intentions," or at least peaceful professions. News has been received that relations are on the point of being broken off between Brazil and the Republic of Chili, and that in the case of hostilities breaking out, the Argentine Republic is likely to join the former, and in this way endeavour to obtain a settlement of certain territorial questions that have been long in dispute. A rebellion, not unconnected, it is understood, with the progress of the Panama Canal, is making rapid strides towards success in the United States of Colombia. Farther north the Nicaragua Treaty project, rendered abortive for the present by the adverse decision of the Washington Senate, appears to have set all the smaller Central American republics by the ears. With a view, it is stated, of preventing the construction of the Nicaragua Canal, and the carrying out of the other terms of the arrangement between Nicaragua and the United States, President Barrios, of Guatemala, has issued a decree declaring that the time has come for the union of Central America into one republic, and adding that, with the object of realising this aspiration, he has assumed supreme military command. This has been promptly followed by a formal declaration of war between Nicaragua and Guatemala; and later telegrams from Costa Rica indicate that the other republics are likely to join in the strife for "union." From what is stated in the *Panama Star*, geographical questions of frontier have not a little to do with the quarrel. The boundary-line between Nicaragua and Costa Rica, laid down in the preliminary terms of treaty signed by General Zavala and Mr. Freylinghuysen, will begin on the Atlantic at Punta del Castillo, at the mouth of the river San Juan, which river it will follow up on the right bank of the river to a spot situated below the Castillo, and three miles from its fortifications. From that spot a curve will commence, the centre of which will run through the said fortifications and terminate higher up the river, and two miles from its bank. Thence the boundary-line will run parallel to, but two miles distant from the river, following its curves and windings, and along the southern shore of the lake, but always two miles from it, until it reaches the river Sapoa. From a point situated 2 miles distant from the river Sapoa, an astronomical line will be run to the centre of Salinas Bay, in the Pacific, where the dividing line of the two republics will terminate. A glance at the map of Nicaragua, after perusing the so-called Nicaragua Canal Treaty, is (says the *Star*) sufficient to prove the ignorance of the geography of the country displayed by those who drafted it. The right bank of the San Juan, to within three miles of Castillo belongs to Costa Rica, which republic is not consulted in the Zavala treaty. From that point onward, and round the southern edge of Lake Nicaragua, the republic from which the lake derives its name can only exercise jurisdiction two miles from the water-line. Ignorant of this circumstance, General Zavala has signed a protocol conceding two miles and half of Nicaraguan territory to the canal builders, and, in all probability, intentionally opens a question in which time and thought will have much exercise before a final decision can be reached.

The Hudson's Bay Route.—We have received from Winnipeg a copy of the official report of the Select Committee which was appointed by the Manitoba Legislative Assembly to inquire into the practicability of the Hudson's Bay route. It will be remembered that the evidence of a number of witnesses was obtained by the Committee, many of the gentlemen examined having had personal and extended experience of that district as officers of the Hudson's Bay Company at their posts at Hudson's and Ungava Bays. The facts laid before the Committee have convinced them that the ports on the shores of the bay are open on an average from four and a half to five months in each year to ordinary vessels, and that both the bay and the straits appear to be singularly free from obstruction to navigation in shape of shoals or reefs, and during the period of open water, from storms or fogs. Bearing in mind the importance of the subject to the province, the Committee advise that steps be taken to secure the proper representation of Manitoba upon the Dominion expedition to examine into the general question of the navigation of the bay and straits. As to the possibility of constructing a railway from Manitoba to the shores of the bay the Committee, from the evidence furnished to them, have come to the conclusion that no engineering difficulties exist to prevent the building of such a road. On the contrary, they are sanguine enough to entertain no doubt that such an undertaking would prove successful and remunerative, and would do more to stimulate production in the provinces of the North-West generally than any other enterprise.—*Canadian Gazette*, March 5.

Thunder Bay.—The following proclamation has appeared in the *Ontario Gazette*:—"That from and after the fifteenth day of February now next, all that part of the provisional judicial district of Thunder Bay lying west of a line drawn due north and south through the most easterly part of Hunter's Island shall for the purposes (except registry purposes) mentioned in the revised statute respecting the territorial district of Muskoka, Parry Sound, and Thunder Bay, be detached from the said provisional district, and shall form a separate territorial district, by the name of the district of Rainy River."

AUSTRALASIA.

Exploration in Northern Australia.—Messrs. Stockdale and Ricketson, who are exploring the Kimberley district in the Northern Territory of South Australia, have reached the Katherine telegraph station, and report having passed through fine country and found the climate magnificent. A river 4 miles wide, 100 miles inland, was met with, flowing into the Cambridge Gulf.

Conference of the Geographical Society of Australasia.—At the four days' Conference of the Geographical Society of Australasia Sir Edward Strickland was elected President, and Baron F. von Muller Vice-President. The first resolution proposed that the term "Australasia" should be strictly defined; and the proposer suggested that the following definition would suit all purposes:—"Australia is that part of Oceania of which Australia is the geographical, commercial, and political centre. Limits: on the west and part of the north the 100° of longitude; east, to the point of its intersection with the 20° south latitude, thence by a line running in approximate parallelism to the western and northern coast of New Guinea, and round its north-western extremity to the equator; thence on the north by the equator, to its intersection with the 120° of longitude west; and on the east by the 120° to the south pole, including groups of islands on the equatorial line." The question was ultimately referred to a strong committee. The next resolution affirmed the desirability of a scientific exploration of New Guinea under the auspices of the Society. A corollary calling on the Government to define the boundaries of the

British possessions in that island was rejected in favour of one for complete annexation. The formation of Geographical Societies, and their affiliation with the central body, in South Australia, Queensland, Western Australia, New Zealand, and Tasmania was also recommended. The next Conference will meet at Sydney.

MISCELLANEOUS.

An International Geographical Society.—It is stated that the King of the Belgians is conferring with M. Martinie, President of the French Geographical Society, on the subject of the formation of an International Geographical Society. —*Nature.*

Mr. Stanley's New Work.—Mr. Stanley's new book will be called *The Congo, and the Founding of its New State,* and is already in the press. It will be a complete history of the origin and foundation of the new Congo Free State, together with the author's exploration of the Congo Valley, from the lower cataracts up to Stanley Falls, with all its chief tributaries and newly-discovered lakes—in short, a full account of his doings during the last six years since leaving England in 1878 to his return from Africa last summer. The work will contain more than 100 engravings and five very valuable maps. According to *Le Mouvement Géographique*, it is to appear shortly. The French translation, having been intrusted to a member of the staff of that journal, is coming out in Brussels, and great efforts are being made to publish it simultaneously with the German edition (Brockhaus : Leipzig) and the English edition of Messrs. Sampson Low & Co.

NEW BOOKS.

Rambles in the Far North. By R. Menzies Ferguson, M.A. Appendix. Pp. xii. 266. Paisley : Alex. Gardner, 1884. *Price* 3*s.*

A chatty and pleasant book of Orcadian memories, mixed with much antiquarian and topographical lore and notes on the customs and characteristics of the islanders, and in style and matter much superior to the ordinary run of volumes written by that bird of passage, the British tourist. Mr. Ferguson, however, was not an ordinary tourist ; he had access to excellent sources of information respecting the past and present of the Orkney Islands, and he evidently took a vivid interest in all relating to the folk-lore and traditions of the people, and more particularly in the traces that may still be found of the period of Norwegian settlement and occupation. It can be thoroughly recommended to all intending to visit the islands, as well as to the islanders themselves.

Studien und Forschungen veranlasst durch meine Reisen im hohen Norden. Herausgegeben von Freiherrn von Nordenskiöld. Mit über 200 Abbildungen, 8 Tafeln und Karten. Leipzig : F. A. Brockhaus, 1885. Pp. 521. 24 Marks.

The essays collected in this handsome volume were to have appeared in the famous work dealing with the voyage of the *Vega*. Not wishing to abridge them, however, Baron Nordenskiöld wisely determined to publish them in a separate volume. To those interested in the subject dealt with, these papers will afford delightful reading, though they may feel disposed at times to disagree with their contents. The essays include :—The voyage of the brothers Zeno, and the oldest map of the north, being a lecture delivered by A. E. Nordenskiöld in the Academy at Stockholm, April 12, 1882 ; the flora and fauna of the snow and ice, with

appendix, by Veit-Brecher Wittrock ; geological importance of cosmic stuff fallen on the surface of the earth (referring to the theory of Kant-Laplace), by A. E. Nordenskiöld ; contributions of the Polar explorations to the knowledge of the prehistoric geography of plants (Pflanzengeographie), by A. G. Nathorst ; contributions to the art knowledge of uncivilised tribes, by Hans Hildebrand ; insect life in Arctic countries, by Christopher Aurivillius ; and an article by F. R. Kjelman on the life of Arctic plants. There is also a supplement dealing with the voyage of the *Vega*, written in a popular scientific manner, to meet the requirements of the general public.

A Short History of the Naval and Military Operations in Egypt, from 1798-1802. By Lieut.-Colonel Sir John M. Burgoyne, Bart. London : Sampson Low, Marston, Searle, and Rivington. 1885. *Price* 5*s.*

Though possessing no historical importance, this short volume may be read with a certain amount of pleasure on account of the subject treated. The gallant author wields his sword better than his pen ; though there are some spirited passages in the book, it is altogether lacking in proportion and consecutive narration. The most valuable portions are those containing the published despatches, which afford some interesting reading. An appendix gives the list of casualties during the campaign.

Nine Years in Nipon. Sketches of Japanese Life and Manners. By Henry Faulds, L.F.P.S., Surgeon of Tsukiji Hospital, Tokio ; Member of the Royal Asiatic Society. Alexander Gardner, London and Paisley. 1885. Pp. xii. 304. *Price* 7*s.* 6*d.*

Mr. Faulds' book is a welcome addition to the growing mass of literature that is making Japan and Japanese manners, art, and character familiarly known to our countrymen. The direct geographical interest of the volume is of a secondary nature. There is still an immense and most interesting field of work for the explorer in Japan, especially in those northern and western districts which as yet have been barely visited by, or are quite unknown to, Europeans. Mr. Faulds, during his nine years' residence in Japan, made excursions to Fujiyama, to the sacred shrines at Nikko, and other places within comparatively easy access of Tokio ; visited Nagasaki, Osaka, and Kioto, and made a journey along the *Tokaido*, the "east-sea-way," or great highway between the old and new capital. All these are localities or experiences which have been repeatedly described by previous travellers in Japan. But previous travellers have not always such opportunities of becoming acquainted with the inner life of the people which were afforded to Mr. Faulds in the course of his professional practice in Tokio and his semi-medical, semi-evangelical missions into the interior. Of these opportunities he takes full advantage. There are capital chapters on such subjects as the language, the educational system, the amusements, and the homelife of the land of the Mikado ; on the "Japanese Philosophy of Flowers," and "Japanese Art in relation to Nature," and there are exceedingly interesting, if somewhat amateurish, notes on the botanical and zoological spoils that may be gathered in the forests, in the gardens, and by the seaside in Japan. Mr. Faulds, who, it seems, may be claimed as a Scot, does not pretend to high training either as an artist or as a scientist. But he has the artistic instinct and the scientific taste ; he observes closely, and he has a happy turn for description which finds full play in the beautiful land where he has been so long a resident, and of whose future he entertains the most hopeful expectations.

Francis Garnier: Voyage d'Exploration en Indo-Chine effectué par une Commission française présidée par le Capitaine de frégate *Doudart de Lagrée*. Relation empruntée au Journal *Le Tour du Monde*, revue et annotée par Léon Garnier. Contenant 211 gravures sur bois d'après les croquis de M. Delaporte, et accompagnée de 2 cartes. Paris: Hachette et Cie, 1885.

We have transcribed the above title at full length, because we thus sufficiently indicate the character and scope of the work. The narrative of this very remarkable series of explorations is now put before the public in a more convenient form than that afforded by its place in the *Tour du Monde*, or in the *Publication Officielle* of two volumes quarto. M. Jules Garnier has supplemented the narrative with some explanatory notes and references to the *Publication Officielle*, and prefaced it with a natural and well-deserved eulogium on the author. Two maps from the atlas accompanying the large work are also given.

De Paris au Tonkin, par Paul Bourde, Correspondant du *Temps*. Paris: C. Lévy.

Describes a visit to Hanoi, Son-tay, and Bach-ninh, with a graphic account of the difficulties of campaigning in a country which is either submerged or almost impassable from the treacherous mud. The author has also some interesting notes on the people, and on the condition and prospects of their art industries.

Reise der russischen Gesandtschaft in Afghanistan und Buchara, 1878-79. Von Dr. J. L. Jaworskij. Autorisirte Ausgabe, etc., von Dr. Petri. 1 Band. Jena: Hermann Costenoble. 8 Marks.

In view of the political aspect of affairs on the Afghan boundary, this volume may claim an attention which it would not otherwise receive. The author, a physician who in 1878 accompanied the Russian Embassy to Kâbul, gives a description of the journey. He speaks with such freedom of language, especially in regard to affairs in 1876, that it was at one time a debatable question (so we learn from Dr. Petri's preface) whether the book would be allowed to appear at all. Some very interesting passages are to be found, and some of the geographical descriptions are valuable.

Hand-books for Bible Classes. Palestine. By Rev. A. Henderson, M.A. Edinburgh: T. & T. Clark. Maps. 1885. *Price* 2*s.* 6*d.*

The author has contrived to compress into a very small space much valuable information on the geography of Palestine, as well as on the subjects with which the book principally deals. There is a very complete topographical index at the end of the book, which will be welcome to students.

West African Islands. By A. B. Ellis, Major 1st West India Regiment. London: Chapman & Hall, 1885. *Price* 12*s.*

Between the years 1871 and 1882, Major Ellis made fifteen voyages to the principal islands lying off the West Coast of Africa, and his book embodies the notes collected by him in the course of these visits. Major Ellis seems to be at least as keen in his search for fun as in his quest for information. Like Miss Mowcher, he is so volatile, that one does not always know whether he is to be taken as in jest or in earnest. Several of his geographical and ethnographical notes have a good deal the air of jokes—such, for example, as his description of a tribe with bony or horny excrescences growing out of their cheeks; his account, on the authority of a Jesuit priest, of a race on the Gaboon with tails; and his statement, on the authority of another priest, of peoples whose language is helped out so copiously by gestures, that "they cannot understand each other in the dark." One of the races of which this

latter assertion is made is the Aduyahs—the so-called "Boobies"—of Fernando Po, of whom Major Ellis gives a great deal of curious and interesting information. As much can be said of his chapters on the Isles de Los, of the habits and manners of the Canarese, and of French progress on the Upper Gambia, and in the region behind Sierra Leone.

From Home to Home. By ALEXANDER STAVELEY HILL, D.C.L., Q.C., M.P. London: Sampson Low & Co. Maps. 1885. *Price* 21*s.*

This handsome volume describes the author's journey from his old home in England to a new one founded in the Rocky Mountains, and contains matter both grave and gay. Opening with an historical sketch on Canada, the physical geography of the Dominion is given, and then the various events of the writer's journey, with his remarks on the places visited. It is a pity he gives so little attention to the Kootenai Lakes, of which so little is really known, and devotes so much valuable space to places already "done." The book is profusely illustrated, the heliogravures being quite works of art.

Cruise of the "Alert": Four Years in Patagonian, Polynesian, and Mascarene Waters (1878-82). By R. W. COPPINGER, M.D. With Illustrations. Swan Sonnenschein, 1885. *Price* 6*s.*

The author was appointed surgeon to the *Alert* on the understanding that he should devote his spare time to collecting information on the natural history of the regions visited. His observations of the marine zoology are especially copious, and both these and the scattered notices of the habits of birds and other animals are of much value and interest. The same may be said of his remarks on the geological and other agencies which have produced the present features of the country about Magellan Straits. The object of the *Alert's* work in these parts was a detailed survey of the sheltered channels extending southward from the Gulf of Peñas to Port Tamar, with a view of enabling vessels to avoid a certain part of the outer and island-fringed western coast of South America. A small map of this district would have much aided the writer's description of it. The Amirante group of islands (west of the Seychelles) is one of the lesser-known localities visited and described.

NEW MAPS.

EUROPE.

BALKAN HALBINSEL.—Stumme physikalische Wandkarte, by R. KIEPERT. 6 sheets. Scale 1 : 1,000,000. *Berlin: D. Reimer. Price M.*7.50.

BELGIQUE, Atlas de,—à l'usage des écoles. 18 maps. *Bruxelles: Lebègue et Cie. Price Fl.*2.50.

ENGLAND.—Physical School Wall Map. Scale, 8½ miles to an inch. *Edinburgh and London: W. & A. K. Johnston. Price* 12*s.*

NORWAY.—Postkart over de fem sydlige Stiften af Norge. 2 bl. Nordlige Norge, 1 bl. *Christiania: Cammermeyer. Price Kr.*2.60.

RUSSLAND,—Übersichtskarte vom westlichen. By G. O'GRADY. 4 sheets. Scale, 1 : 1,750,000. *Kassel: Th. Fischer. Price M.*12.

SWEDEN.—Reskarta öfver Södra och Mellersta Sverige. By C. F. SÖDEBERG. Scale, 1 : 125,000. *Stockholm: Carlson.*

ASIA.

AFGHANISTAN.—Map to elucidate the Boundary Question. *Edinburgh and London: W. & A. K. Johnston. Price* 1*s.*

ASIEN,—Politische Schulwandkarte von. By H. Kiepert. 9 sheets. Scale, 1 : 8,000,000. *Berlin: D. Reimer. Price M.*12.

ASIE,—Carte murale de l'. By E. Levasseur. Scale, 1:10,000,000. *Paris: Dalagrave. Price Fr.*15.

CHINA,—Atlas von. By F. von Richthofen. (Orographical and Geological Maps illustrating the author's work *(China.)* Scale, 1 : 750,000. 1 Abt. Das Nördliche China. 1 Hälfte: Tafel 1 und 2, West-Shantung; 3 und 4, Ost-Shantung; 5 und 6, Lian-tung; 7 und 8, Mukden; 9 und 10, Tung-ping-fu; 11 und 12, Peking. *Berlin: D. Reimer. Price M.*24.

TONKIN.—Carte physique, politique, et militaire. *Paris: Jouvet. Price, Fr.* 1.

AFRICA.

AFRICA.—By the late Keith Johnston, F.R.G.S. (new edition, 1885). Scale. 133 miles to an inch. Size, 52 × 43 inches. *Edinburgh and London: W. & A. K. Johnston. Price in case,* £1, 1*s.*

L'AFRIQUE CENTRALE.—Carte politique. 1er Mars 1885. Echelle de. 1 : 10,000,000. *Bruxelles: Institut National de Géographie.*

This map appears as a supplement to *Mouvement Géographique*, and shows the result of the Berlin Conference on the political delimitation of Central Africa.

CONGO, Carte du Bassin du.—Dressée par le Dr. Richard Kiepert. Echelle de 1 : 4,000,000. *Berlin: D. Reimer. Price Fr.*2.50.

This is one of the best maps of West Central Africa at present published, and illustrates very fully the political division of the Congo basin.

EGYPT and the Nile basin.—Large School Wall Map. Scale, 52 miles to an inch. *Edinburgh and London: W. & A. K. Johnston. Price* 12*s.*

MOUNT KILIMA-NJARO.—Sketch Map by Mr. H. H. Johnston. Scale, 8½ miles to an inch. Illustrating Mr. Johnston's account of his expedition in *Proceedings of the Royal Geographical Society*, March 1885.

SÛDAN, Bird's eye View of the. *London: Letts, Son, & Co., Lim. Price* 6*d.*

ZULULAND.—Kartenskizze von Zulu Land und den Goldfeldern der Südafrikanischen Republik. Von H. Haevernik. 1 : 1,850,000. *Petermann's Mitteilungen*, Jahrgang 1885, tafel 6. *Gotha: Justus Perthes.*

AMERICA.

BRITISH COLUMBIA, Map of the Province of.—Compiled and drawn by Edward Mohun, C.E., by direction of the Hon. W. Smithe, Chief Commissioner of Lands and Works. *Victoria (Brit. Col.)*, 1884.

NORD AMERIKA.—Übersichtskarte über die Endmoräne der zweiten Glacialepoche Nord Amerikas. Nach T. C. Chamberlin. 1 : 15,000,000. *Petermann's Mitteilungen*, Jahrgang 1885, tafel 5.

UNITED STATES.—New Library and travelling map by John Bartholomew, F.R.G.S. Scale, 57 miles to an inch. Size, 35 × 37 inches. *London and Liverpool: George Philip & Son.*

EASTERN EQUATORIAL AFRICA.

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

BRITISH INTERESTS IN EASTERN EQUATORIAL AFRICA.

More especially in the Kilima-njaro District and on the Victoria Nyanza.

By H. H. Johnston, F.R.G.S.

The impressions made on me by my recent sojourn on Mount Kilima-njaro and in its vicinity are so vivid in their character that I fear, to many whom I am addressing to-night, my descriptions of the country may seem somewhat exuberant; but I speak to you confidently, for I know that, sooner or later, others who follow in my footsteps will substantiate my reports.

Let me first briefly summarise the object of the present paper. It is to bring to your notice a vast and richly-endowed district of Eastern Equatorial Africa, where at present no white man resides; to show you how well worthy it is of opening up to commerce and civilisation; and further, to give you some notion of how this might most profitably be done. I shall also briefly touch on three important ends to be attained by British enterprise in this part of Africa, viz., the discovery of a new and unoccupied field for our commerce, the suppression of the slave-trade, and the bringing civilisation to many tribes who are willing and worthy to receive it.

Firstly, as to the physical geography of this country, which I have broadly described as Eastern Equatorial Africa. For present purposes it may be delimited as follows:—By the river Ruvu or Pangani on the south; thence westwards following the 4th degree of south latitude to the 32nd degree of east longitude, including the basin of the Victoria Nyanza Lake, and round again to the east from the northern border of the lake by Baringo to Kenia, the Pokomo river, and the coast.

The most marked characters of this region are its immense isolated mountain-masses, in most cases volcanic, such as Kenia and Kilima-njaro—the latter the highest known peak in Africa; its spacious level plains, or—more strictly—plateaux; and its freedom from marshy or swampy ground as contrasted with other parts of Africa. The water supply is fairly abundant and equally distributed, though there is but one river, the Dana or Pokomo, which is at all navigable. Besides the huge Victoria Nyanza there are a few very much smaller lakes, one or two of which are salt and the majority fresh. The highlands, up to 10,000 feet, and also the banks of the rivers and streams, are generally clothed with forests of splendid timber; the plateaux are often covered with scattered bush and *short* grass—not the terrible giant grass of 6 to 8 feet high which obstructs so much of African country; while many districts I can only compare to beautiful natural lawns, whereon you meet with springy turf closely cropped by the browsing antelopes, and here and there a group of handsome shady trees, disposed with so much regularity that it would seem as if man and not Nature had planted them. Such is the country that lies between Pare and Usambara, or in the vicinity of Lake Jipe, or again, to the south of Kilima-njaro, and also in many districts to the north, as we hear from Thomson.

These vast regions are very unequally populated. On the coast there is a fringe of slightly civilised races, nominally under the dominion of the Saiyid (or 'Sultân,' as we incorrectly call him—he is only known by his subjects as 'Saiyid' or 'Lord') of Zanzibar. These people belong principally to the Bantu family of Negroes, which includes all the inhabitants of Africa from the Victoria Nyanza to the Cape and Fernando Po to Mombasa, with very few exceptions. There are also Gallas on the north, between the Sabaki and the Dana rivers; a few invading Somalis in the same district; Arabs of pure blood and Arab hybrids of every degree throughout the length of the littoral; and about four thousand Banias and other natives of British India, who come there to trade and sometimes to settle. To add to this medley of races, there are remains here and there of ancient "Persian" and Portuguese colonisation; but, as I have before said, the bulk of the coast population is Bantu-Negro—a stock which seems to absorb or assimilate easily most foreign strains. The lingua franca spoken is the celebrated Swahili language, one of the Bantu tongues, which promises to be the French of Eastern Africa.

On penetrating inland from the coast the country is, for the first hundred miles, as a rule, very thinly inhabited, except on certain mountainous districts or along the course of the Ruvu, the Sabaki, or the Dana rivers, and what people there are belong to the Bantu stock, and speak languages related to Swahili. Whenever you meet with people speaking Bantu languages in this part of Africa, you find they are invariably settled agriculturists, and never nomads. As a contrast to them may now be mentioned the celebrated Masai, a negroid race of splendid physical development, speaking a most interesting language,

which is distantly related, I fancy, to the Galla tongues. The Masai are semi-nomads—that is to say, each tribe has its home country wherein the married men and women settle and move about within a circumscribed radius, while the warriors, who are forced to remain unmarried, range over immense areas for the sake of plunder. These people were once, and are still in a lesser way, the scourge of Eastern Equatorial Africa. They have made previously well-populated prosperous districts, abandoned wildernesses, driving away all the cattle, killing such of the inhabitants as resisted, and leaving the remainder to die of starvation. But of late years they no longer play the same havoc. Between the coast and Kilima-njaro they are rarely to be met with, and in such cases—as when they are encountered away from their homes—the white traveller will not find them very hard to deal with. Commerce is slowly but surely humanising the Masai. Most of them prefer trading to fighting now. Yearly they are visited by many native caravans from the coast, who go to buy ivory with iron wire, cloth, and beads. Certain tribes of the Masai, generally known as Wa-Kwavi by the coast people, have abandoned entirely this roving robber life, and now occupy large districts as quiet thrifty agriculturists. The Masai are all of them great cattle-keepers, and possess not only innumerable herds of splendid kine, but also keep numbers of donkeys as beasts of burden. These asses are very fine animals, resembling exactly the Ethiopian wild ass, from which stock they are certainly derived. The Masai are a people who, in time, will, I am sure, become amenable to civilisation, and commerce will temper their wild ways. They are very different from the mad fanatics we are slaughtering in the Sûdan; and if all Europeans will behave as well to them as your distinguished countryman, Mr Thomson, has done, we shall soon be welcomed as traders or settlers in their midst.

It may be roughly said, then, that between the coast of the Victoria Nyanza the plains or plateaux are inhabited by the Masai and their helot races, and the mountains and mountain-ranges by Bantu people. These latter evidently occupied the land prior to the incursion of the Masai from the north, and existed in former times in greater numbers than at the present day. Of late, however, their fortunes have begun to revive. Forced, during their struggle for existence, to take to the highlands that were difficult of access to an invader, they have become a more hardy, independent race than their relations on the coast, and have also, in their wish to turn their mountain soil to the best advantage, become skilful and laborious agriculturists. Now their relations with the Masai are becoming sensibly improved. The Masai raids have ceased before the rude fortifications of the hill tribes, and both parties are able to trade on equal terms. The inhabitants of the mountains bring their honey and vegetables, their smith's work and dressed skins, and exchange them against the ivory, rhinoceros horns, and native salt, that are collected by the rovers of the plains. These two distinct races, whose contact was formerly so provocative of bloodshed and rapine, are now not only

exchanging peaceably their products, but also their ideas, manners, and customs. The Bantu of Kilima-njaro and Taveita loves to copy the Masai costume and mode of fighting; he incorporates many Masai words and salutations into his own tongue; while the once nomadic and restless Masai are increasingly taking to agriculture in the vicinity of Bantu settlements, and are changing from lawless robbers into quiet and honest tillers of the soil.

Around the Victoria Nyanza Lake the population becomes very dense, and probably the littoral people alone may be estimated at from ten to twelve millions. With one small exception they are Bantu, and speak languages of an archaic form, and more resembling the typical Bantu mother-speech than any other we have yet met with. The exception is a small enclave of Nilotic negroes settled in the country of Kavirondo, on the eastern shore of the lake, who have never yet come into contact with Europeans. We know something of their language from the Swahili traders, and we find it to belong to the same group as the Shilluk of the White Nile.

Besides the races above enumerated, dwarf tribes are reported in the unknown country lying between the Victoria Nyanza and Kilima-njaro, and there are also curious helot tribes dwelling among the Masai as hunters, or smiths, or slaves, who speak languages of their own, and remain at present unclassified in their affinities.

Of all the people I have mentioned in this hasty description, the Bantu offers the greatest hope for civilisation. He is so industrious, so imitative, so inquiring, that he is instinctively attracted toward the white man. He is a born trader, and will travel miles to sell a fowl, while his appreciation of Manchester stuffs and Birmingham beads should insure him the favour of British merchants.

The animal and vegetable products of this vast region are typically African. I might mention, to begin with, that it is a sportsman's Paradise. Such quantities of big game were surely never met with elsewhere. If you want confirmation of my statements on this point, read Mr Thomson's book, *Masai Land*. In some districts you may stand on a hillock, and see the plains at your feet covered with compact herds of antelopes, moving in squadrons, with straggling companies of giraffes, and scattered flocks of ostriches. Buffaloes abound so as to be dangerous. Rhinoceroses are so numerous that their horns are an important item in the trade, for they may be bought in the interior for a few pennies'-worth of cloth, and sold on the coast for three and four rupees each. Hippopotami are abundant in the rivers and lakes. The Vice-Consul at Lamu on the coast, near the Pokomo river, informs me that when properly prepared (which is done by cutting the skin into long thin strips and drying it in the sun) hippopotamus hides will fetch £5 a piece in Natal. But the great wealth of this country lies in its ivory, which is preferred to any other in the Zanzibar market. The elephant abounds in the neighbourhood of Kilima-njaro to the extent of many thousands. He here becomes quite a

mountaineer, and ranges through the magnificent forests that clothe the upper slopes of this giant among African peaks. The natives waylay his forest tracks with artfully-devised pitfalls and traps; preferring this more cowardly way of procuring their ivory to facing the elephant in the chase. Other tribes to the north and west of Kilima-njaro kill the elephant with poisoned arrows or javelins, or sharp swords. But in one way or another they procure ivory to supply the many native caravans, led by Muslim natives from the coast, which annually traverse this country between the Indian Ocean and the Victoria Nyanza Lake. Another item of trade should not be forgotten—namely, the valuable and handsome wild-beast skins, which may either be procured in the chase or very cheaply purchased from the natives. A leopard skin may be bought for about two or three shillings'-worth of goods, and will sell on the coast for eight or nine. Lions' skins are less easy to obtain from the natives, as that animal is rarely killed by them; but European sportsmen might shoot him to any extent, as he is both common and bold. Monkey skins of the handsome variety of white-tailed Colobus, which is alone found in this region, are valuable, and fetch a good price on the coast.

Ostriches are exceedingly numerous in the vicinity of Kilima-njaro. When living at Taveita in the month of August last, I and my men used to largely subsist on their eggs, which were brought us in numbers by the natives, and sold for about a pennyworth of cloth each. Sometimes by searching we would ourselves discover nests. In the month of October, I bought twelve young ostriches from the natives at the rate of an ell of cloth apiece. I could have purchased many more, and started an ostrich farm had I wished; but as I was returning shortly to the coast, I did not feel disposed to commence the undertaking. I tried to bring these young ostriches away with me, but they all died before reaching Zanzibar, as they suffered a great deal from the effects of the land transit, being very young. Of course, to any ornithologist this country is exceedingly interesting, but to those whom I am more immediately addressing to-night, rare or beautiful birds will not serve as a sufficient inducement for opening up a new country; still, I might remark, for economic reasons, that there are abundance of guinea-fowl, francolin, pigeons, and bustards, and all these serve materially to supply the traveller with palatable food.

I cannot say much for the reptiles of this country, as there are few species which would attract the traveller's attention, and none which, as far as I know, would be useful commercially, unless the crocodiles of Lake Jipe might furnish some of the leather which is now so fashionable for dressing-bags; but the very scarcity and unobtrusiveness of the reptiles is a negative advantage. Like most parts of Africa I have ever visited, the snakes here are very few, and infrequent in their appearance. Most species, too, are non-venomous.

In many of the streams, rivers, and lakes, there are fish in great quantities, representing most of the African fresh-water genera. There are few that are not edible, and some species are remarkably good to eat,

and of considerable size and weight. While at Taveita I was often able to feed the entire caravan during a week or more on the fish caught in the small river Lumi; and at Jipe they are so plentiful that a fish-smoking establishment, similar to those on the Upper Congo, might be set agoing to provide food for long journeys. There are few things that Swahili porters like better than a fish diet.

The insects are not likely to offer anything commercially interesting, nor indeed any of the lower invertebrate forms. I might, however, in their case, lay stress on the same favourable fact as with regard to the snakes, viz., the scarcity or absence of noxious forms. Thus there is no tsetse fly, such as but a short distance southward interferes with the introduction of horses and cattle. Mosquitoes only exist in certain districts near rivers or lakes, and are entirely absent from most parts of the country. Fleas and bed-bugs are unknown; nor has the American jigger, which is such a pest on the Congo, been introduced. White ants are not very numerous, and do not exist at all above a moderate elevation. The tænia intestinal worm, so often heard of in other parts of Africa, is never, to my knowledge, met with here. I might mention that a small edible fresh-water crab is found in the rivers.

As to the vegetable productions, they are, apart from those cultivated and introduced by man, certainly valuable. There is particularly fine timber growing in many parts, especially on Kilima-njaro and in the mountainous districts to the northward, and again on the west of the Victoria Nyanza. The forests in Usambara and in Pare, both districts near the coast, are full of magnificent lofty trees, which are much prized at Zanzibar for shipbuilding. On the coast of Zanzibar timber sells for 25 to 50 dollars per 50 cubic feet, according to quality.

Gums are produced in the interior—both copal and a kind called false copal. India-rubber can be produced from at least one creeper, the *Landolphia Florida*, and I think also another, a species of fig. Coffee grows wild, especially in the northern parts of the district, where it is the same species as the Abyssinian plant, which, it is supposed, being first introduced from the kingdom of Kaffa, to the south of Abyssinia, thence derives its name. Coffee-planting would succeed admirably in districts like Usambara, which may be regarded as the natural home of this shrub, which is indeed indigenous to the African continent.

On the trees occurring in the Kilima-njaro and Usambara forests orchilla-weed is found growing in incredible quantities. When delivered half clean—that is to say, mixed with sticks and rubbish—on the coast, it fetches from 3 to $3\frac{1}{2}$ dollars per frasilah of 35 lbs.

As regards minerals, iron ore is found in some abundance, and copper apparently also, since the natives possess rude rings and ornaments of this metal, which have not come from the coast. Nitrate of soda covers vast plains to the south, west, and north of Kilima-njaro. There is good building-stone in many parts of the country. Limestone often appears.

And now, having briefly noted some of the productions with which

this part of Africa is naturally endowed, I may mention others which owe their introduction or development to the agency of man.

Vast herds of cattle are kept, not only by the Masai, whose very *raison d'être*, as it were, consists in cattle-breeding, but also by the agricultural races on the borders of Lake Victoria Nyanza, and in the mountain districts everywhere. When I was residing on Kilima-njaro, I not only purchased excellent beef at about 10s. a bullock, but also procured daily so much milk that I was able to make cream, butter, and cheese in plenty. The oxen are not, as a rule, so large as the Cape breeds, and, indeed, come from quite another stock, being descendants of an Asiatic humped variety—the zebu—introduced into Africa by the ancient Egyptians. The hides are held in such little account by the natives that they may be purchased for the merest trifle. As I have already mentioned, the Masai keep large herds of fine strong asses, which they are always ready to sell cheaply.

Goats and sheep are most abundant. The goats are small, plump, and great milk-givers. The sheep belong to the fat-tailed variety, and offer really excellent, juicy, tender mutton. Those who have visited Usambara will agree with me that the mountain mutton of East Africa rivals in tenderness and shortness that furnished by the Welsh or Highland sheep. Like all African sheep, they are hairy and without wool.

Fowls are not kept by the Masai, but are met with in great quantities on the Victoria Nyanza, and among all of the agricultural Bantu races. On Kilima-njaro they might be purchased at the rate of one ell of cloth each, averaging a cost, when the local value of cloth is estimated, of 2½d. each. In two days, at Mandara's capital, I purchased eighty fowls. Some of them are a very handsome breed—pure white, with very long tail feathers in the male. Another variety is plump and dumpy, with exceedingly short legs. The hens are very good layers.

The vegetable productions of native cultivation are the banana, the sweet potato, the edible arrow-root, the sugar-cane, Indian corn, intama, or red millet, and many unnamed varieties of peas and beans. A little rice is grown in some districts, namely, at Taveita and on the river Dana. Tobacco is everywhere abundant and exceedingly cheap. I might mention my own almost incredible experience with the cultivation of European vegetables on Kilima-njaro. Immediately after my arrival I planted the eyes of a few potatoes, onion bulbs, and the seeds of mustard, cress, radishes, turnips, carrots, peas, beans, spinach, borage, sage, tomatoes, cucumbers and melons. Everything came up, and flourished amazingly. In three months' time I had a dozen fine cucumbers from one plant, and so many potatoes that I was able to give them away to my men, as well as supply my own table. I had everything else in abundance in a short space of time. Before leaving, I had planted my land at Taveita with wheat and coffee, limes, oranges, mangoes, and cocoa-nuts. I also distributed numbers of useful seeds among the natives.

I should have mentioned in its proper place, before the vegetables, that there is a great quantity of delicious honey produced throughout this

district. The wax is of very good quality, but the natives have no use for it, and merely throw it away.

I might now, perhaps, briefly summarise the principal trade products, and in some cases give their cost in the interior and on the coast.

At present, no doubt, the most paying thing is ivory. This may be bought in the Masai countries between the Victoria Nyanza and the coast, at the rate of from 1s. to 2s. a pound, according to quality. When I refer to money in the interior, I mean money's worth in cloth, or other trade goods. On the coast, ivory sells at from 6s. to 10s. a pound, sometimes reaching a higher price.

Hides may be almost got for nothing in the interior, and merely cost the expense of transit. On the coast they are sold, when dry, at about 1 dollar for 7 lbs. Rhinoceros horns I have already alluded to. They find a ready sale on the coast, fetching on an average 5s. apiece.

Live stock of all kinds may be purchased cheaply in the interior, and find a ready market on the coast.

There is even another source of profit, in which, although many people laugh when I suggest it, *I* see nothing ridiculous, viz., the capture and sale of wild animals. If it can pay Hamburg and Austrian firms to hunt and employ hunters on the confines of Abyssinia, for the purpose of supplying the zoological gardens of the world with wild animals, why should not the same thing be done here, where animal life is present to a degree which puts Abyssinia and the Eastern Sûdan to shame? If you can get from £100 to £200 for a young rhinoceros, elephant, hippopotamus, or giraffe, with lesser sums in proportion for large antelopes, zebras, buffaloes, ostriches, lions, leopards, snakes, and crocodiles, surely it is worth while to capture them in districts like these, that are actually nearer the sea than the hunting-grounds of the German firms, and where the natives are already familiar with such a trade, and with the mode of capturing wild animals alive. When I was in Kilima-njaro and Taveita, the natives were always bringing me live creatures for sale, and I have already mentioned how cheaply I bought young ostriches.

Another important trade product would be orchilla-weed, which may be gathered for nothing from the vast forests of Kilima-njaro. I have already mentioned its selling-price on the coast.

Iron, copper, and nitrate of soda might pay a profit on their transport, when communications between the coast and interior are facilitated. Nevertheless, it is to be admitted that the special wealth of this country lies in its agricultural future. There are districts that might become the granaries of the world, possessing over large areas a European climate. There are other regions peculiarly adapted by their elevation for the culture of quinine. Sugar-cane already grows half-wild, and its cultivation might be increased to any extent. Coffee, tea, cocoa, vanilla would thrive in countries and districts remarkably suitable for their favourable growth. Above all, the question arises,—If it can pay people to open up and trade with other parts of Africa, why should these magnificent

fertile lands remain untouched, when they possess a climate superior in its salubrity to any other part of the continent? In the neighbourhood, and near the east of Kilima-njaro, the greatest heat registered was 81°; in the warmest part of the interior, 91°. The average night temperature in hilly districts is 60°; in the plains 68°. Except on the loftiest mountains, and on the Victoria Nyanza Lake, where it rains a few days in every month, the seasons in eastern Equatorial Africa are regular in their divisions of wet and dry. From June to the end of October there is almost no rain, and from November to May there is an abundant rainfall during certain months. On Kilima-njaro the climate up to 8000 feet is that of a Devonshire summer. Above that elevation you may have it as cold as you like the higher you go.

I hope I have now said sufficient to show you that if Africa is worth opening up at all, the region which lies between the coast and the Victoria Nyanza is eminently so. There is no doubt that Africa is the New World of the nineteenth century. What America was to Europe in the sixteenth and seventeenth centuries, that Africa is now. Within the last two years England, France, Germany, Portugal, Spain, and Italy have taken decided steps towards founding African colonies and even empires. Consequently, I argue from this that if land in Africa is worth having, how much more profitable would it be in a fine country with a healthy climate lying between a great lake and the Indian Ocean!

Having explained to you that, from my point of view, this region is worth possessing, I now wish to indicate to you as briefly as possible the best way of opening it up to trade and civilisation. Selecting some good port on the coast—and there are three or four to choose from, within a limit of a hundred miles of coast-line—the expedition should establish themselves firstly in the healthy and beautiful country of Usambara. The road to the interior runs either to the north or south of this little Switzerland, and joins to the west of it. In Usambara the first stations should be established, as the country is very healthy. Here, too, the land might be sown or planted with all kinds of crops, for the proximity to the sea would render exportation easy and cheap. From Usambara you should cross the rich and fertile valley of the Mkomazi river, and enter the hill country of Pare, the trade route continuing along the level plain at the foot of the hills. The scenery of Pare I can only call enchanting. There are wooded crags, waterfalls, secluded Alpine valleys, and splendid views. The people are pleasant to deal with, and food is plentiful. From Pare you might proceed to Ugwéno, over against Lake Jipe, the road still following the plains, and the stations being established in the hills. From Ugwéno it is a short distance to Kilima-njaro, which offers splendid sites for large settlements, and has also no scarcity of food. From Kilima-njaro there are two routes to be opened up. One, and the most important, leads past Mount Mêru, another pleasant site for a trading station, straight to Speke Gulf, on the Victoria Nyanza. The other is more or less Thomson's track, leading to Lake Baringo and the north-west. This is the

richest country for ivory. Hither every year come the Swahili caravans, who trade nearly to the borders of Abyssinia and the Nile. In all important districts stations might be founded, after Stanley's style along the Congo, and these would in time become centres of civilisation, cultivation, and trade. Although there is no doubt that a railway, under British auspices, made to connect the Victoria Nyanza with the coast, would give all the trade of Eastern Central Africa into our hands; yet it seems to me that that is a matter altogether for after consideration. The first thing is to develop trade and create agriculture. Along many of the native tracks, as they at present exist, there is no obstacle, for stout wagons at any rate, so far into the interior as the precincts of Mêru and Kilima-njaro, that is to say, half-way to the Victoria Nyanza. Mules in plenty may be purchased in Zanzibar, and will do well in the country, or asses might be bought from the Masai. Oxen, doubtless, might also be trained to draw the wagons, as on the coast. As I have before remarked, there is no tsetse-fly in the country, so that even horse-breeding might be attempted in time. Human labour is plentiful on the coast, and fairly cheap; you may hire good stout carriers at the rate of 5 dollars a month, and the cost of their food is about 2d. a day. Many of these men make very decent soldiers and guards, as Stanley has found on the Congo. As a rule, the Zanzibari porters are faithful, trustworthy men. I have always found them so, and have even discovered very fine qualities in their nature too. At any rate, if they fall out with a white man, it is generally his fault; and a very little discipline, together with a kind and quiet manner, will always keep them in order. Many of them can read and write their own language in the Arabic character, so that if you wish to communicate with them at a distance, you can do so by letter. The cost of keeping these men in the country would very much lessen after the first year or two, as you might soon grow sufficient food on your plantations to support the entire expedition. These Zanzibaris are very easily satisfied. They will subsist tranquilly on a few handfuls of maize a day, or a little rice and dried fish, or simply bananas; while if you manage to bring down some zebra or antelope with your rifle, they are overjoyed. In two days ten men will construct you a spacious dwelling, with a grass-thatched rain-tight roof; and in a much shorter time will build their own simpler habitations. They are singularly handy, and can plant gardens, make roads, trap animals, cure skins, construct bird-cages, wash clothes, mend them, make them, cook a dinner, and arrange a nosegay with equal facility. They are much more ingenious than English navvies, much more enduring of hardships, and much more courteous in behaviour. Without doubt, they are the means, the force by which Eastern Africa will be opened up.

The white men who should form the pioneers of any commercial enterprise in Central Africa must be young, vigorous, and active; not, as they are so often, *usé*, battered men, who have failed in other careers, and try Africa as a last chance. They should possess sufficient education to be

inspired with an intelligent interest in the wonderful nature that will surround them. There is no more miserable person in Africa than your utterly uncultured man; he pines and sickens for want of sympathy with his surroundings, while he who is so far alive to natural history as to be moved by the interesting fauna and flora of Equatorial Africa will never be lonely or have time to be ill. If any of them have a taste for sport, he will be never unhappy, for this country surely offers—without exception—the most splendid hunting-ground in the world. Nor, in such a case, will his sport be mere useless butchery of beautiful animals. He will be able to supply his caravan with fresh meat at no expense, and may secure many valuable skins or hides. In the case of elephants, a sportsman is a positive acquisition to the party, as he can procure ivory for nothing. I have personally known men in South-Western Africa who have made their fortunes over ivory and ostrich feathers.

Any enterprise that has the intention of opening up this part of Africa should begin modestly, without a large staff of white *employés* or ambitious plans loudly proclaimed to a carping world. With care, most, if not all, of the preliminary expenses might be paid with trade profits; and in time, I have no doubt, a handsome surplus might be laid aside. I reckon that an expedition of the kind I would suggest might penetrate some distance inland, create stations, buy ground from the local chiefs, and sink about a thousand pounds in trade goods for about £7500 the first year, £5000 the second, and £4000 the third; while, after that time, it should be self-supporting, and be putting aside money to repay the original outlay. This would include the employment, and all expenses connected with the employment of four white men, and about 200 Swahili porters, labourers, and guards.

In my prefatory remarks, I spoke of opening a new field for British commerce in this region. This, I am convinced, we should do. Wherever I went in this country, the natives were anxious to trade—more anxious to trade than to fight, always. Constantly they have said to me, "Why won't you come here and set up a shop" (for "shop" they employ the Arab word *duk*, which the Wa-Swahili have taught them), "and let us exchange our goods for yours?" At places nearly two hundred miles from the coast I have found people, who had never seen a white man before, in possession of Maria Theresa dollars and Indian rupees, with which they came to buy cloth from me. They had, of course, received this currency from the coast traders; but it only shows they are beginning to understand the value of money—nay more, Mandara, an influential chief on Kilimanjaro, wanted me to open a banking account for him at Zanzibar, and he had a distinct, through crude, idea of drawing cheques. Even the fiercest people here have wants for extraneous things that must be satisfied. Then again, if you introduce commerce and a ready market, you suppress the slave-trade. Chiefs now sell their people into slavery because the Arabs care to buy nothing else; but once convince them—and Africans are much more practical than you may think—that more money is to be

gained by employing their serfs to cultivate the soil at home, and produce food stuffs, and other products for sale, and I am sure the expatriation of these wretched people will cease. Again, at the present moment, one chief makes war against another to procure prisoners and sell them as slaves; but the commercial instinct will introduce peace by turning the sword into a reaping-hook and covering the devastated fields with fair and marketable harvests. These people are well worthy of civilisation. Yes, even the fierce and roving Masai, who are already being softened wherever they impinge on the rendezvous of coast trade.

I would suggest that, in any undertaking to open up Eastern Equatorial Africa, Kilima-njaro should be made the centre of operations, both by reason of its fine climate and the placability of its inhabitants. I would also mention that the intervening country between Kilima-njaro and the coast is quite safe for travelling.

I have no doubt many here present to-night have heard some of my statements with amused incredulity, and are prepared to hotly contest them. Let me disarm their criticism by assuring them that I have merely related what has come under my personal experience, and that, however much my information may conflict with previous information, I hope they will give me the benefit of the doubt until some traveller following in my footsteps (as I followed in Thomson's), is able to dispute what I say. I would also like to remark that my interest in this country is purely disinterested. I am not an African trader, nor do I intend to be. Scientific pursuits have led me to this richly-endowed region, and I have thought it well to let my countrymen know what advantages it possesses; so that, when some day it comes into the hands of Germany or some other European Power, and British merchants and philanthropists are bewailing the loss of the great African sanitarium, they cannot at least plead ignorance of its existence or advantages. Having said this much, I leave my poor remarks to the kind consideration of all interested in the "Dark Continent" whom I have sought to serve. I would only ask for one privilege in return for any information I may have been able to impart. Should ever some powerful trading or political association be formed to develop the resources of Eastern Equatorial Africa with Kilima-njaro as their basis, I hope they will accept one fanciful suggestion from me. They will want a distinctive flag to fly from their stations, and to precede their trading caravans: let its colours be green, white, and blue—white for the snow, blue for the heavens, and green for the forests of this splendid land.

SKETCH OF SOUTH-WESTERN TURKOMANIA.[1]

By M. PAUL M. LESSAR.

Translated from the Russian by H. A. Webster.[2]

This district has no general name, either among the Turkomans who occupy its frontiers, or among the neighbouring inhabitants. In recent times, some English geographers have begun to call it Badkhyz, as a proof of its belonging to Afghanistan ;[3] but that this is erroneous can easily be shown, even from English sources. Badkhyz is the mountain district between the rivers Kushk and Kash.[4] The district between the Murg-ab and Heri-rud is most correctly designated after its ethnographical characteristics—Land of the Saryks and Salors, or, in more general terms, South-western Turkomania. As I have previously mentioned, little was known about this country up till 1881. The English travellers, Shakespeare and Abbot, in 1840 and 1841, advanced by the great caravan route from Herat to Merv ; General Grodekoff crossed the Paropamisus Mountains to the east of the river Kushk; N. G. Petrusevich, exploring North-east Khorassan, proceeded along the Heri-rud ; but not a single European explorer visited the district between the rivers, and among the inhabitants of the surrounding country none knew the roads except the sirdars at the head of robber bands. For the exploration of South-west Turkomania, I undertook two journeys in 1882, and one in the beginning of the next year, immediately after the capture of Merv by our forces. Besides, commencing with the autumn of 1882, the following persons arrived there. According to the statement of the Persian Khan in Serakhs, after my first journey, in April 1882, Colonel Stewart, on the conclusion of his labours in Seistan, advanced to Mosyn-abad, and from thence went to Pesh-robat, Gurlen, and Islim-chishme (the latter syllable is sometimes given as *chasma*), returning by the same route. An account of his journey, however, has not yet been printed. Also, in the autumn of 1882, the same road was traversed by two Russian explorers—Captain Gladysheff, who determined astronomical positions, and Lieutenant Khabaloff, who carried out a survey of the route. According to information communicated by Khabaloff, the explorers advanced from Mosyn-abad to Bengi-keriz, and crossed by a difficult route over the Borkhut Mountains, near the source of the Yaki-Tut (to the west of the Pass Khombou and

[1] *Yugo-Zapadnaya Turkmeniya : Zemli Sarykoff i Saloroff* in *Izvyestiya Imp. Russk. Geogr. Obshchestva.* Tom. xxi., 1885. Read before the Imperial Geographical Society 7th (19th) December 1884.

[2] The best thanks of the Editors are due to M. Lessar, who has most obligingly corrected the proof of the translation.

[3] *Vide* Sir H. Rawlinson's map, attached to M. Lessar's second journey in the Turkoman country, *Proceedings of the Royal Geographical Society*, January 1883.

[4] Compare the map *Turkestan*, by Walker, fifth edition.

Karuan-ashan); they next proceeded to Kizil-bulak (named by their guide, Tulan-chishme), and thence towards Ak-robat; but the guide did not know how to find this place, and led them across Adam-elan to Serakhs, in the district between Murg-ab and Heri-rud; one point, Melek-heiran-chishme, was determined astronomically. Finally, in April next year, Charykoff, a diplomatic agent under the General-Governor of Turkestan, proceeded along the Heri-rud. From Serakhs, to a point of 10 versts (6½ miles) south of Zulfagar-Derbend (Zulfikar), he travelled along the river, and then by Keriz-Iliyas and Soutli Pass, he crossed into Khorassan, near the junction of the Jam into the Heri-rud.

Boundaries.—The boundaries of South-west Turkomania are :—(1) on the north, the Merv oasis ; (2) on the east, the Murg-ab, the land of the Jemshidis, the river Kushk to the south from Chil-dukhter,[1] and the hills bordering this river on the east ; (3) on the south, the Borkhut Mountains ; and (4) on the west, the river Heri-rud, separating Turkomania from Persia. The whole region measures 250 versts (165 miles) from north to south, and on an average about 100 versts in the transverse direction.

Character of the District.—The Borkhut Mountains are a prolongation of the Sefid-Kukh (Safid-Kuh), separated from the main chain by a considerable depression (between the Ardevan and Karuan-ashan Passes), in which there are, properly speaking, no mountains, but only two ranges of hills, with soft soil, across which are roads having even at present gradients not steeper than 0·02 (1 in 50). Such a pass is Karuan-ashan.

Further west, the ridge increases in height as it approaches the river. Its altitude is from 3000 to 4000 feet; it is composed of hard sandstones ; and its slopes are steeper, but still there are, in very many places, passes accessible, with few exceptions, for wheeled traffic. In a deep ravine in the Borkhut Mountains, which continue into Persia, flows the Heri-rud ; the mountains again sink towards Meshed (Mesh-hed) ; and their continuation further west forms the Alla-dagh chain.

The Borkhut Mountains are the principal branch of the Paropamisus, going on to unite with Elburs ; the more southern branches, near the Heri-rud, marked on some maps as the principal range, in reality are only a series of hills of very little importance on the route from Karuan-ashan to Shebesh, and on the road to Kusan, a tract of quite level ground.

Near 36° N. lat., the clay *bairs* (hills) of Elbirin-kyr divide South-west Turkomania into two portions, very different in character, vegetation, and climate. Those hills, as is indicated by the very name *kyr*, consist of clayey elevations rising 2000 feet above the sea-level. Beginning with bluffs on the banks of the Heri-rud, they run almost in a straight line from west to east ; curve round Lake Er-oilan ; and, after that, change into lines of separate hills (*kyrs*) scattered in disorder over the rest of the

[1] Other spellings of the first part are *Chihl* and *Chahil*.

country up to the Kushk. To the east of Er-oilan, these elevations are almost parallel, and rise 50 or more sazhen (350 feet) above the surrounding country.

In this portion there is no definite slope observable in any direction; on the other hand, the triangle, having as its base the Borkhut Mountains from Khombou to Ardevan, and its apex at Chemen-i-bid, clearly forms part of the river Kushk basin. Two affluents of this river, each about 100 versts in length, previously unknown, were examined by me. One begins near Khombou, and the other near Gurlen; and they unite under the name of the Egry-gyok, and fall into the Kushk near Chemen-i-bid. The whole triangle consists of valleys beginning in the slope of the Borkhut Mountains, and drained by those leading streamlets; the spaces between the valleys form a slightly hilly region, gradually descending from the Borkhut to the north. The western portion of the southern half has a slope to the Heri-rud; some of the deep ravines stretch for 10 to 15 versts (6 to 10 miles) from the river inwards. The water-parting of the basins of the Heri-rud and the Murg-ab is formed, not by the steep bluffs near the banks of the former stream, but by the low hills behind them, which extend from the end of the Borkhut Mountains, near Keriz-Iliyas, by Kungryu-eli Adam-elan to the ruin of the bridge of Pul-i-Khatun. In general, the whole southern half is an undulating district, a series of heights and hollows; the soil is everywhere a sandy clay, overgrown with thorns and steppe-grass; sand occurs only in certain places and in very limited quantity, clearly produced by the disintegration of the *kyrs*.

The northern slope of the Elbirin-kyr has at first the same appearance as the southern. Deep ravines run from the summit of the heights, in general northwards; then follow rows of separate heights, which become always lower and lower; towards the well Koyun-Kui, but only at intervals, are separate *kyrs*; the mixture of sand becomes always greater and greater, and finally the country passes into a sandy desert like that of Kara-Kum (boundaries shown on the accompanying map). On the south it is bounded by a line curving from *bairs* at Doulet-abad to Kalei-Mor on the Kushk; on the west the sands extend to the road from Serakhs to Merv, and cut across it in a few places, and, passing to the roads for Karry-Bend and Mamur, unite with the Kara-Kum; on the north their convex frontier line advances almost to the Merv oasis; on the east they keep in great part about 400 to 1000 sazhen (2800 to 7000 feet) from the banks of the rivers Murg-ab and Kushk; and in some places they advance in the form of separate capes right up to the water.

Badkhyz has the same character, as also the country between the Borkhut Mountains and the Elbirin-kyr. From Pende, the oasis of the Saryks, the district gradually and very gently rises to the mountains Sefid-Kukh. Its irregularities are unimportant—hills between the Kushk and the Kash, 20 to 40 sazhen (140 to 280 feet) in height, in some places cut by shallow valleys drained by both affluents of the Murg-ab. The mountainous part of the district begins with the range of the Sefid-Kukh;

there the ascent is very steep, and, according to Abbot and Grodekoff, the passes present considerable obstacles to traffic.

Rivers.—Two great rivers with their affluents drain the whole country of South-west Turkomania. These are the Heri-rud and Murg-ab.

The Heri-rud takes its rise 350 versts (232 miles) east of Herat, at the point where the Sefid-Kukh and the Siya-Kukh unite. Its head stream bears the name of Jengel-ab, and only after its junction with the Tingal-ab does it begin to be called the Heri-rud, and enters on a broad valley everywhere suitable for tillage.

The great dam, situated a little above Herat, diverts a considerable part of the water of the rivers into canals for the irrigation of the Herat Valley, without dispute the richest in all Central Asia, to the south of the Amu-Darya (the ancient Oxus). At the present time the leading products are assafœtida, saffron, pistachio nuts, fruits of all kinds, grapes of various sorts, wheat, barley, clover. The silk-worm is reared to a considerable extent in the valley. Wood, or even bushes, however, exist only in places within the immediate neighbourhood of the Heri-rud; the slopes of the mountains are completely naked. Every settlement has rich orchards, but the only fuel is brushwood, brought from very distant parts. On the banks are luxuriant meadows, in which horses are pastured in great numbers—according to the Afghans, upwards of 40,000. They form one of the principal exports of the Herat province to Persia: they are small, and of ordinary breed, but strong and hardy. There is also a considerable quantity of other cattle kept by the natives.

About 10 versts (6½ miles) lower down, before we reach Tir-pul, the valley contracts, and the Heri-rud advances very close to the heights of the south bank, and the road, both to Kafyr-Kala and to Gurian, continues in narrow defiles, sometimes on rather steep declivities.

At Tir-pul is a bridge built by Yar Mahomet Khan, forty sazhen (280 feet) long. The abutments and the arches are of brick; only the starlings are faced with strong stones, as in severe winters the ice is thick enough to support a horseman, and the "ice-gang" is generally of great force. When the water is high, the road from Herat to Meshed goes not *via* Kusan, but *via* Tir-pul, and thence along the south bank to Kafyr-Kala.

Near Kusan—the last Afghan settlement on the Heri-rud—the river turns almost directly to the north, and flows between low and cultivable banks as far as Pesh-robat. Thence it continues for about 20 versts (13 miles) through the defile which separates the Borkhut Mountains from the Kargala Mountains (the latter are the continuation of the former on Persian territory). After this the left bank is in great part only slightly hilly as far as Mount Peskemar, which approaches the river between Zur-abad and Pul-i-Khatun. The heights of the right bank up to Zulfagar-Derbend are in some parts 2 or 3 versts distant from the river, and further north, at Gyarm-ab-Derbend, approach close to it with very steep

bluffs; there the valleys capable of irrigation are very rare, and are of quite limited extent. On the left bank the traces of unimportant sowings are visible only near Zur-abad, on the right bank about Zulfagar and Gyarm-ab-Derbend.

North from Pul-i-Khatun the left bank is bounded by the low and very gentle underfalls of the Khesar-Mesjid, on which are many places to which water for irrigation can be brought. The small hills of the right bank are a little higher; only for short distances about Shir-tepe, and Nouruz-abad there is a series of fields between the overflow of the river and the foot of the hills; about Kassab-Kale the hills give place to level ground suitable for tillage.

The Heri-rud from Kusan to Pul-i-Khatun flows in great part in one channel from 15 to 20 sazhen (105 to 140 feet) broad. The water is usually high from the beginning of January to the end of March; at that time the fords are very dangerous owing to the swiftness of the current, but as early as April one can cross in many places with a depth of not more than 4 feet. In the summer the water in the river rapidly diminishes, and in June and July crossing is possible everywhere, except where the steepness of the banks prevents it. In September, at the crossing from Kusan to Kafyr-Kale, MacGregor observed hardly any current with a depth of about 3 feet.

Further to the north, by August there is no current in the bed of the river: only here and there is preserved a reach of water, sometimes almost fresh, sometimes so brackish that horses drink it with reluctance. The bed everywhere consists of coarse pebbles, and the natives assert that when high water arrives the course of the river is continued, but only underground, and is then to be seen only in the deep parts of the bed; in any case an underground current exists, otherwise it is not possible to explain the short reaches of water which do not dry up all autumn. Water of such a depth, even on clayey soil, would dry up in two or three days. The current ceases, as already stated, somewhat to the north of Kafyr-Kale, and below that it begins again only from Pul-i-Khatun, where the Kara-su falls into the Heri-rud, and receives a great increase from two abundant springs in the neighbourhood of Nouruz-abad: there there is so much water that it is everywhere conveyed by canals to the settlements of the Salors at Old Serakhs, and the supply is uninterrupted all the year round. Water appears again through the whole course of the river in November or December.

South of Pul-i-Khatun there are springs everywhere on the banks of the channel. The reaches in which the water is preserved in summer are so numerous that the traveller by the road along the Heri-rud may count on a good supply of water at any time of the year; but here and there the advance along the river is prevented by the mountains, which reach down close to the stream. In autumn it is everywhere possible to travel in the channel itself; when the water is high this is not the case. From Serakhs to Pul-i-Khatun the road is good on both banks. From this last point

southward it is necessary to go by the west bank across Mount Peskemar to Zur-abad by a very difficult road, but on the Turkoman side travelling is practicable on level ground to the east of Mount Kelet-Koya, which extends its bluffs to the very bank of the river from Gyarm-ab-Derbend to the Zulfagar ravine. After that both banks again become fit for traffic. Where on the second occasion the mountains advance to the river, about 20 versts (13 miles) northward from the river Jam, a passage along the banks is quite impossible. In Serakhs people assert that in former times there was more water in the Heri-rud. There is no reason to believe that. Burnes, travelling through Serakhs in September 1832, found the bed of the stream completely dry, and so unimportant that he took it for the bed of a separate streamlet, Tajen, as if it took its rise in the neighbouring hills, and denied its connection with the river of Herat. The water of the Heri-rud, though turbid, is pleasant and wholesome.

At Pul-i-Khatun are the ruins of a bridge: about the date of its construction the Tekkes know nothing; tradition only asserts that the bridge was built by a woman. Four of its arches exist at the present time. The fifth, and central, was destroyed by Medemii Khan, at the time of his expedition against Merv. The whole distance between the extremities of its outer arches is $28\frac{1}{2}$ sazhen ($199\frac{1}{2}$ feet). Four buttresses of unequal thickness take up $9\frac{1}{2}$ sazhen ($66\frac{1}{2}$ feet), and for the passage of the water there are five openings, taking the remaining 19 sazhen (133 feet). The first, from the Turkoman bank, measures 4 sazhen (28 feet); next are two of five sazhen each; and lastly, on the Persian side, two of $2\frac{1}{2}$ sazhen each. The breadth of the bridge is a little more than 2 sazhen (14 feet). It is in good preservation; cracks are nowhere visible in the arches; and the restoration of the central arch would render it fit for the passage of beasts of burden across it. The buttresses are nowhere undermined; in some places their surface has been worn away by the current up to the level of high water. Repairs could be generally accomplished without difficulty, as from the end of July to December the bridge is almost on dry ground: only under one or two arches are there two or three vershoks (each 1·75 of an inch) of water.

The continuation of the Heri-rud to the north and north-west from Serakhs is known by the name of Tejen. There is a current in this part of the river only during full water, when the stream is very deep, and in many places crossing is impossible. O'Donovan, in February 1881, crossed a little to the north of Kangaly-Guzer by swimming. On a previous occasion, in the middle of the same month, the Tejen at the Karry-bend dam had a breadth of about 12 sazhen (84 feet), and a depth of $5\frac{1}{2}$ feet. Frequently the water there was deeper, and then for a month or a month and a half, the road passes through Alaman-Junguli, to which place the Tejen does not reach, but only the separate canals derived from it. Overflowings of the river, and inundations of those districts, take place only when the dam at Herat happens to burst. In the beginning of 1884 the dam at Karry-bend and canals for irrigation of the surrounding country were restored.

In summer the current in the Tejen ceases; in places it dries up completely, but in great part it consists of long lakes, fed, according to the opinion of the local inhabitants, by wells, but possibly also by underground prolongations of the streams Chacha, Meana, and Dushak, which end in marshes 15 to 20 versts from the Tejen. This opinion is based on the fact that the water in those lakes is cool and does not dry up in the course of the hottest summer, which could hardly be the case if they were only accumulations of the spring-tide water in the deep hollows of the bed of the Tejen.

The river Murg-ab, rising in the north slope of the Sefid-Kukh, traverses a mountain district occupied by Khazare tribes, and about Bala-Murg-ab descends into the plains of Southern Turkomania. From this bridge the right bank of the river consists of hills running near the watershed. Of ground suitable for tillage there is very little, and on the right bank the only fields are in the oasis of Pende. The slopes of the hills are for the most part gentle, and the road passing over them along the Murg-ab is of great service for traffic; only opposite Sary-yazi the hills descend almost vertically into the river by the bluffs of Kushle-Koya. Here, when the water is high, it is impossible to pass, and the road has to make a detour by the summit of the hills.

At Cape Kele-burun the clayey hills come to an end, and give place to sandy hills, which continue along the river to Iol-otan at the distance of one or two versts ($\frac{1}{2}$ to $1\frac{1}{4}$ miles) from the water; further north the sands surround the ruins of ancient towns near Merv, and advance on the road from this oasis to Bukhara.

The left bank from Bala-Murg-ab to Meruchak is bounded by hills in a fairly straight line; then the valley widens, and in front of the junction of the Murg-ab and the Kushk lies a remarkably level triangle occupied by settlements of Saryks, and known by the name of Pende.

Northward to Iol-otan the left bank is bounded by sandy hills. Then the river flows in one or in several extraordinarily tortuous channels, with a total breadth of 10 to 20 sazhen; the banks are steep, often precipitous, with a height of 4 or more sazhen (28 feet). This first valley lies in a second of greater breadth only in certain places overflowed at high flood; it extends from 300 sazhen to 5 or more versts (2100 feet to 3 miles). The sands which bound this second valley on the west at times advance to the river in the form of capes, at times retire from it and form lake-like depressions, called by the natives *keff;* these areas are all adapted for tillage, and on many of them there are still traces of former irrigation in more peaceful times. Exceptionally good crops are furnished by the keffs when overflowed by the spring inundations.

The sands come nearest to the river between the Yungenly ford and Sary-yazi, and there, for a distance of about 10 versts, the road passes along the summit of the sand-hills. The Murg-ab flows in great part over a very easily disintegrated clayey bed; in consequence of the considerable descent of the country, the stream has a remarkably sinuous course, and undermines the left or lower bank. In many places the road

making a great detour round some newly-formed bend, shows on what an extensive scale and how rapidly the undermining goes on. Such detours are especially frequent from Yungenly to Dash-Kepri, where great fissures are in many places visible in the cliffs along the banks; along the Kushk the canals nearest to its bank frequently fall in, and are removed further to the west.

The depth of the river at low water is 3 to 4 feet; in high water as much as 14 feet or more. High water occurs in spring, in the beginning of summer, and for brief periods after continued heavy rains in the mountains, during which the water rises very rapidly; in the spring of 1884, at the ford near Kurjukli after heavy rain, the water rose $1\frac{1}{2}$ feet in less than three hours. At low water in the whole river there are a great number of fords; on the other hand, as long as high water lasts, there is no crossing by ford, and communication between the two banks is maintained almost exclusively by kayuks (large boats).

Except at Merv, where, up to the time of our capture of it, there were two very wretched bridges, there is only one bridge on the Murg-ab, at Iol-otan. It also is a very wretched construction; its opening is about 6 sazhen or 42 feet out of the 30 sazhen which at this place constitute the breadth of the river, the remaining portion is filled up with dams of earth and fascines. The opening is not large enough, and every year the high water carries off a part of the dams; the beams covering the two spans, 3 sazhen each, are removed to the bank at the approach of high water. In March of the present year I travelled by this bridge; by May it was carried away; it will be restored only in autumn. The depth of the river in the neighbourhood of the bridge is about 2 sazhen. A toll (badj) is charged for crossing by the bridge.

Kayuks (boats) are kept at Iol-otan and at Pende (Panj-deh). At this last point (where the breadth is 14 to 15 sazhen) the boats are guided by ropes stretched across the stream. The kayuks are made of short pieces of torrangi (willow) or pistachio wood fastened with wooden nails, and thoroughly caulked with rags of dressing-gowns; length of the kayuk is 2 sazhen, width 1 sazhen, depth about 1 arshin; it can convey at one time 4 horses or 20 men.

Both the Murg-ab and the Heri-rud contain great quantities of fish, but the Turkomans do not use them for food, owing to the belief that they cause fevers.

The Murg-ab furnishes better opportunities for settlement than the Heri-rud, and if at the present time the districts along the river are occupied by nomadic Turkomans only at three points, and the rest is complete desert, this arises from the disorder reigning in the steppes; along the whole bank, ruins of forts and caravanserais show that at one time it was thickly inhabited, and was the scene of busy traffic.

Of the affluents of the Murg-ab, the Kushk, the Kash, and the Kaisor are of importance for the life of the Turkomans.

The Kushk takes its rise on the northern slopes of the Sefid-Kukh,

and begins to flow through mountainous regions unsuited for tillage. Below Chil-dukhter the valley widens, and throughout almost all its course, till it reaches the Murg-ab; at Dash-kepri the Saryks derive canals from the stream, and devote themselves to agriculture; the width of the cultivable belt is rarely more than 300 to 400 sazhen, and only reaches 6 versts at Kalei-mor.

The bottom of the Kushk below Kalei-mor is swampy and slimy, and consequently, although the depth of the water is for the most part not more than 1 arshin (28 inches), crossing by ford is possible only at a few definite points. Above Kalei-mor the bottom is gravelly, and crossing can be accomplished anywhere.

The water in the Kushk is fresh, but after long-continued droughts slightly salt; and on some occasions it dries up altogether. When this happens in early summer, it causes the destruction of the crops sown by the Turkomans. On the banks of the Kushk there are fresh springs, so that when the river dries up in its bed, there still remain certain reaches of slightly brackish water, sufficient for the supply of passing caravans.

Both tributaries of the Kushk (Gurlen-su and Khombou-su) have almost in their whole extent very salt water, unfit for irrigation; fresh springs occurring on the banks afford sufficient water for passing caravans. The Gurlen-su besides has, at the first, fresh water, and near the river of the same name, there are traces of somewhat extensive tillage. The Kash is in the same condition as the Kushk; when its stream dries up in the early part of the year, the same disasters follow. On the river Kaisor the ruins of Kalei-vali have quite recently been occupied by the Saryks.

Springs and Wells.—The district to the south of Elbirin-kyr is better supplied with water, both in quantity and in quality, than the northern parts. The eastern slope, bordering the Heri-rud, is remarkably rich in springs; there springs of sweet water are frequent, though at present only sufficient for the supply of caravans; traces of tillage occur in rare instances (Keriz-Iliyas). It is very probable that the quantity of water in those localities may be considerably increased by exploration of the springs and the construction of *kerizes* (underground aqueducts). Eastward stretches a series of wells, in great part of fresh water, or with a very inconsiderable element of salt. The Borkhut Mountains and their slopes also abound with springs and wells. The springs are almost all fresh, but the soil is visibly impregnated with salt, and the streams issuing from the springs in a very short distance become completely salt and unfit for drinking.

As regards the supply of water, the northern part of the district, between the rivers, is very similar to the Kara-Kum. It possesses few wells, situated sometimes 80 versts (50 miles) apart; the water in them also has a certain quantity of salt, and for the classification of wells into fresh and salt the same rule is applied as in the desert, that is—those are called

fresh from which the Turkomans provide themselves with water while travelling or nomadising, and those salt which are of no use to man for drinking purposes. Besides, it must be mentioned that there are no wells with bitter water, and that all those in the sands are available for cattle: sheep, camels, and even horses drink quite willingly of the salt water. All the sands of South-west Turkomania lie on a more or less permeable bottom; *takirs* proper do not occur at all, and consequently there are no *kak* or rainpools, even after the heaviest rains.

Climate.—However comparatively unimportant the *bairs* of Elbirin-kyr may be, this line of heights is sufficient to divide South-west Turkomania in its climatic aspect into two very dissimilar portions. The northern portion is in climate quite like the Kara-Kum; with the ascent to the Borkhut Mountains, immediately after passing the Elbirin-kyr, constant and violent southern winds begin. As far as it is possible to judge by the periods which I have spent in those districts (one week in April and one week in August), the assertion of the Tekkes, that there is no good weather there, is quite credible. While on the plain it was perfectly quiet, near the Borkhut Mountains a strong gale was blowing. Clouds frequently came upon us, and on the northern slopes, on both journeys, we had rain—very small rain it is true, and scarcely wetting the road. On the southern slopes the winds moderated as we got away from the mountains, and half-way to Kusan they died away altogether. In Persia it was explained to me that the very name of Badkhyz, the district next to this portion of South-west Turkomania, and identical with it in climate, is derived from this condition of the atmosphere: *bad* means wind, and *khosten* (root *khyz*), to rise or get up. According to the Turkomans this weather lasts there the whole year; and those local winds, though not quite so strong, make life in Pende very irksome.

Vegetation.—Vegetation in the main depends on the quality of the soil, and the abundance of water. Along the banks both of the Heri-rud and the Murg-ab (at the places overflowed by spring inundations), great quantities of poplars, mulberry trees, willows (torrangi), and bushes of various kinds occur, so dense that in many places it is not only impossible to approach the river on horseback, but even to make one's way on foot. Fodder for horses is everywhere in abundance, and of good quality. The trees growing there reach no inconsiderable dimensions, and this fact will explain the opinion of some travellers that timber existed on the banks of those rivers (H. Alikhanoff reported the existence of timber-trees even on the road from Merv to Khiva). Though all the kinds that grow there are used, it is true, for roofing small places, for making small bridges across aryks, etc., they do not at all agree with the notion of timber which prevails in Russia. The wood of the willow and poplar are of no use for large erections or for furniture; for important works timber has to be brought from the Volga or from the Caspian; in the Trans-Caspian country there is none anywhere.

In the district between the rivers, on the sandy clayey soil, mulberry trees occur only near the springs, and pistachio trees are scattered on all the hill slopes, for the most part singly, with considerable intervals between.

Both bushes and herbage grow badly on the *kyrs*, and thus, in comparison with the northern, the southern portion is very poorly supplied with them : only near the rivers can the pasture be considered really good ; bushes are in general scarce. The northern part is quite different ; the series of *kyrs* gives place to a soil with a preponderance of sand ; very luxuriant herbage, which is known only to the Turkomans, covers the district. This part was the source of the wealth of the Saryks, the cause of the excellent quality of their herds. The Turkomans call it Misir : that means Egypt, and is employed in the same sense as we use the Land of Promise. There is not in this district such a burning up of the vegetation as occurs in the Kara-Kum ; even the herbage dried by the summer is all excellent fodder for cattle. The Koyun-Kui wells are considered the centre of the best pastures.

Bushes are everywhere in abundance ; growing ever closer and higher as we advance from the central steppes to the river Murg-ab, and near the river itself almost turning into woods. They are cut down only about the wells, and in settled places. Thus, in the whole oasis of Pende, and along the entire march to the north and south, there is neither bush nor tree. Fuel is conveyed thither out of the sands, and from Chemen-i-bid.

Mineral Wealth.—Of the existence of any kind of mineral wealth in the Borkhut Mountains the Turkomans know nothing.

The Salt Lake, called Er-oilan or Duz, enjoys great repute in the surrounding countries. *Duz* means simply salt ; but Er-oilan subsidence of the ground. There is a tradition that there was at one time a castle there which sank and gave place to two salt lakes. The hollow is 130 sazhen (910 feet) deep ; the shores, consisting of red clay, are partly vertical precipices, and partly flat expanses. The two lakes are separated by the high ground 70 sazhen (210 feet) above the bottom on which the road runs from Koyun-Kui to Ak-robat. On the south side of the lake are some *kyrs* standing apart, and visible from far. In the lakes above the salt, lies about ½ arshin (14 inches) of water ; pieces like millstones are raised from the bottom by levers. In the following year the portion grubbed up is filled again with salt, which the Turkomans assert is of undiminished quantity. The quality of the salt is excellent.

These lakes are utilised by all the Turkoman tribes inhabiting the surrounding districts ; the people of Merv and Iol-otan use the western lake, the Saryks from Pende the eastern. The great road by which the Mervian salt caravans travel passes through Kele-burun and Koyun-Kui ; but it is so dangerous that the caravans must be large, and have strong escorts to protect them from the attacks of the Saryks or Persians. Besides this main route to Duz from Merv the sirdars know many smaller

tracks by which they conduct small caravans. Last winter, after the arrival at Serakhs of the energetic Persian governor, Ali Merdan Khan, who took vengeance on the people of Merv for their brigandage by the pillage of a Tekke caravan near Koyun-Kui, traffic between Merv and Iol-otan and the lake ceased altogether, and the Mervians began to purchase salt from Pende by means of the people of Iol-otan. On the capture of Merv, and the consequent pacification of the district, the previous traffic was resumed. The Saryks of Pende also have paths known to themselves, and besides this two great roads; the first by the Kushk and onwards by Ak-robat—the longest, but with plenty of water; and the other without water, but the shortest, direct from Dash-Kepri to Duz.

Other tribes also supply themselves with salt from Er-oilan, but they do not venture thither themselves, and purchase it generally from the inhabitants of Pende. The Jemshidis procure it, not only for themselves, but also for sale in Herat, where it fetches a high price, as the salt obtained near this town in Afghanistan is of inferior quality. The inhabitants of Maimene also buy salt at Pende.

Communication.—Since the Tekkes settled in Merv, and disorder took possession of the steppes, traffic in South-west Turkomania has been almost given up; even between Iol-otan and Pende, communication has been feebly maintained. The road from Pende to Herat by the Kushk, formerly a great caravan route, is now a scarcely visible foot-track. Within the district travel only well-armed caravans to the Er-oilan lakes, or brigands from Merv and Pende marching to pillage each other, or most frequently the Persians and Afghans. Trading caravans there are none. But these statements refer only to the most recent times; and I question if Rawlinson is right when he says that there never was a high-road there.[1] The ruins of robats in Kungrueli and near the Khombou point to one of its directions, another was formed by the road through Ak-robat; in Gurlen, and near the pass of Karuan-ashan, still exist remains of fortifications and traces of cultivation.

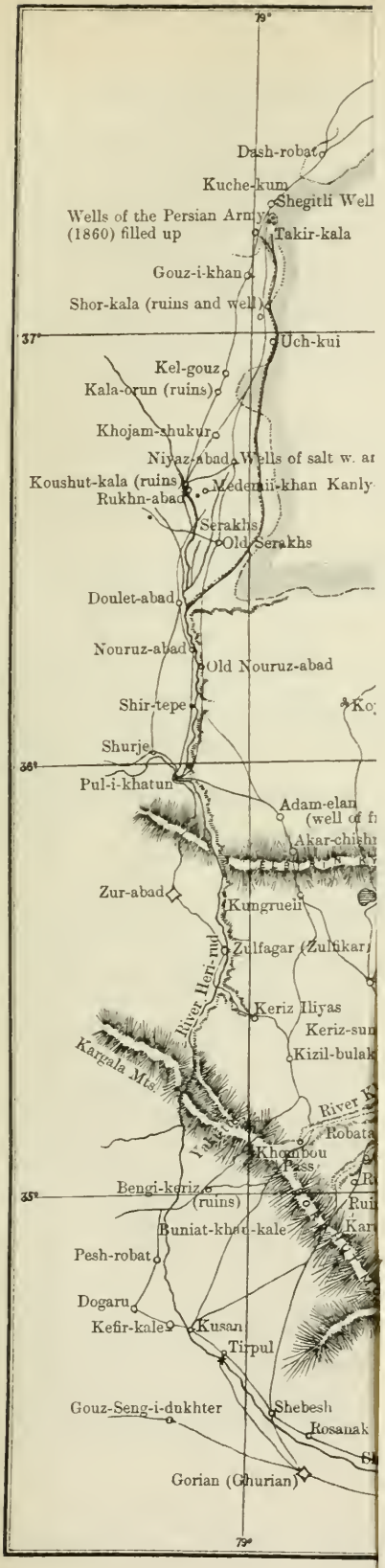
The roads in their present condition are certainly mere sumpter tracks, but the general character of the district is in the highest degree favourable to the construction of good carriage roads or of a railway.

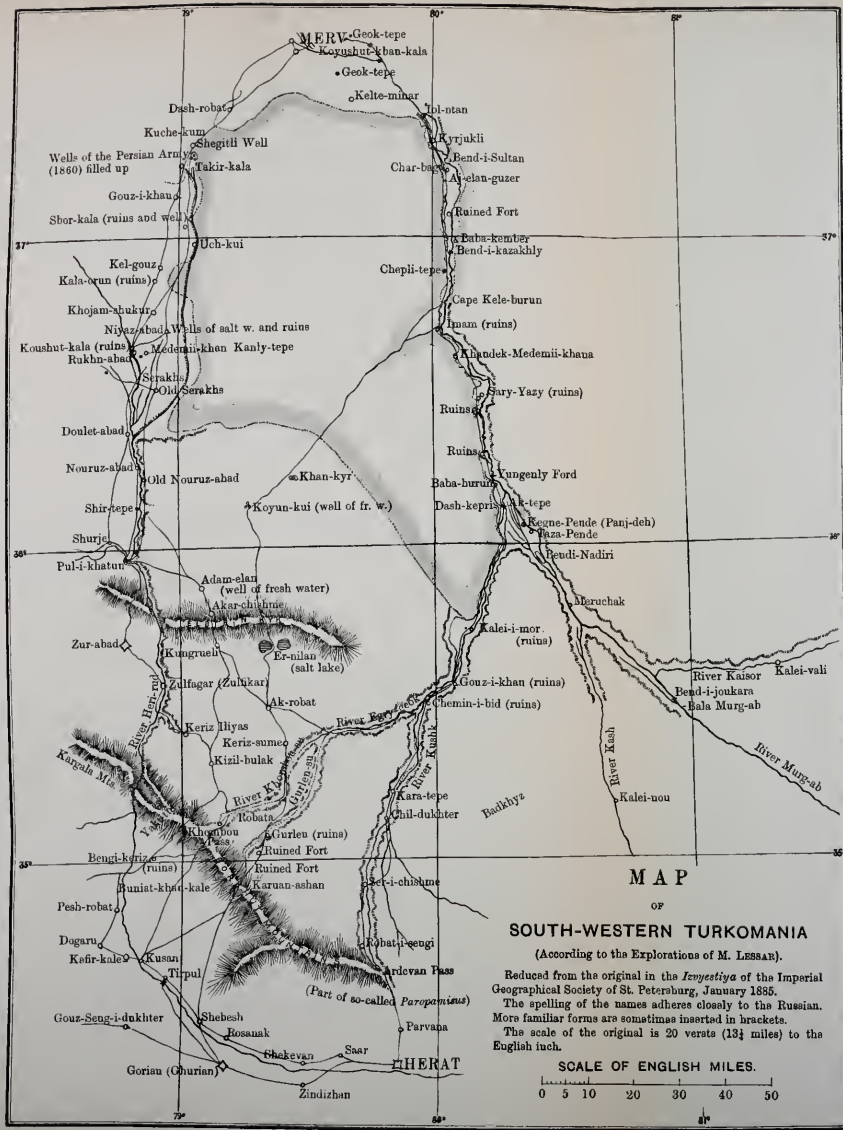
(To be completed in our next Number.)

THE DISTURBANCES IN THE CANADIAN NORTH-WEST.

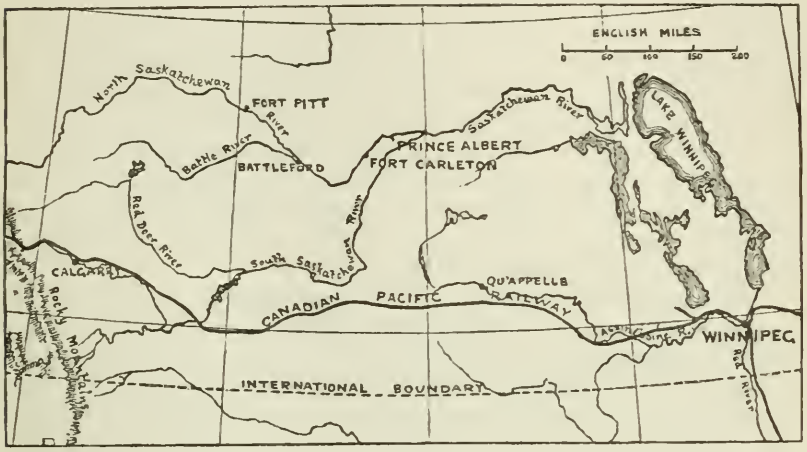
The following Memorandum, relating to the recent disturbances in the Canadian North-west, has been sent to us for publication by Sir Charles Tupper, C.B., High Commissioner for Canada :—

[1] *Proceedings of the Royal Geographical Society*, January 1883, page 16: "I have stated that there never was a high-road through Badgheis, along the line of the Heri-rud."


79°
Dash-robat
Kuche-kum
Shegitli Well
Wells of the Persian Army
(1860) filled up
Takir-kala
Gouz-i-khan
Shor-kala (ruins and well)
37°
Uch-kui
Kel-gouz
Kala-orun (ruins)
Khojam-shukur
Niyaz-abad
Wells of salt w. ar
Koushut-kala (ruins)
Medemli-khan Kanly
Rukhn-abad
Serakhs
Old Serakhs
Doulet-abad
Nouruz-abad
Old Nouruz-abad
Shir-tepe
Shurje
36°
Pul-i-khatun
Adam-elan
(well of f
Akar-chikh
Zur-abad
Kungrueli
Zulfagar (Zulfikar)
River Heri-rud
Keriz Iliyas
Keriz-sun
Kizil-bulak
Kargala Mts.
River K
Robata
Khombou
Pass
Bengi-keriz
(ruins)
35°
Buniat-khan-kale
Pesh-robat
Dogaru
Kefir-kale
Kusan
Tirpul
Gouz-Seng-i-dukhter
Shebesh
Rosanak
Gorian (Ghurian)
79°


MERV
Geok-tepe
Koryshut-khan-kala
Geok-tepe
Kelte-minar
Dash-robat
Ital-ntan
Kuche-kum
Shegitli Well
Kyrjukli
Wells of the Persian Army (1860) filled up
Takir-kala
Bend-i-Sultan
Char-bagh
Ak-elan-guzer
Gouz-i-khan
Ruined Fort
Sbor-kala (ruins and well)
Baba-kember
Uch-kui
Bend-i-kazakhly
Kel-gouz
Kala-orun (ruins)
Chepli-tepe
Cape Kele-burun
Khojam-abukur
Imam (ruins)
Niyaz-abad
Wells of salt w. and ruins
Koushut-kala (ruins)
Medemii-khan Kanly-tepe
Khandek-Medemii-khana
Rukhn-abad
Serakhs
Old Serakhs
Sary-Yazy (ruins)
Ruins
Doulet-abad
Ruins
Nouruz-abad
Old Nouruz-abad
Khan-kyr
Yungenly Ford
Baba-buruny
Shir-tepe
Koyun-kui (well of fr. w.)
Dash-kepri
Ak-tepe
Kegne-Pende (Panj-deh)
Yaza-Pende
Shurje
Bendi-Nadiri
Pul-i-khatun
Adam-elan (well of fresh water)
Akar-chishme
Karuchak
Kalei-i-mor (ruins)
Zur-abad
Kumgruel
Er-nilan (salt lake)
River Kaisor
Kalei-vali
Zulfagar (Zulfikar)
Gouz-i-khan (ruins)
Bend-i-joukara
Ak-robat
Chemin-i-bid (ruins)
Bala Murg-ab
River Herirud
River Kushk
Keriz Iliyas
Keriz-sumee
Kizil-bulak
River Murgab
River Kushk
Kara-tepe
Chil-dukhter
Badkhyz
Kalei-nou
Robata
Khoumbou Pass
Gurleu (ruins)
Ruined Fort
Bengi-keriz (ruins)
Ruined Fort
Buniat-khan-kale
Karuan-ashan
Sei-i-chishme
Pesh-robat
Dogaru
Robat-i-sengi
Kafir-kale
Kusan
Tipul
Ardevan Pass
(Part of so-called Paropamisus)
Gouz-Seng-i-dukhter
Shebesh
Parvana
Rosanak
Shekevan
Saar
HERAT
Goriau (Ghurian)
Zindizhan
MAP
OF
SOUTH-WESTERN TURKOMANIA
(According to the Explorations of M. Lessar).
Reduced from the original in the Izvyestiya of the Imperial Geographical Society of St. Petersburg, January 1885.
The spelling of the names adheres closely to the Russian. More familiar forms are sometimes inserted in brackets.
The scale of the original is 20 versts (13¼ miles) to the English inch.
SCALE OF ENGLISH MILES.
0 5 10 20 30 40 50

"No definite information has yet been received throwing any light upon the causes of the disturbances among the Half-breeds in the Canadian North-west, which have formed the subject of recent telegrams in the newspapers. The statements made in the Canadian House of Commons by the Government, summaries only of which have come to hand, seem to indicate that the rising has been stirred up by Louis Riel, who was at the head of the Red River rebellion in 1870, and who recently returned to Canada after the expiry of the period for which he was banished. There do not appear to have been any grievances of so serious a nature,



so far as at present known, as to warrant the course adopted by the Half-breeds, and this is confirmed by the fact that the outbreak was unexpected, and even doubted when the first reports arrived. Claims have been made from time to time in regard to lands, some of which were well founded, and some were not. The larger proportion of them have been dealt with, and the others are receiving the consideration of the Government, who have always had the reputation of dealing fairly and honourably with the Half-breeds. At the time of the outbreak a Commission was engaged in dealing with the matter. No agitation was heard of, and perfect tranquillity prevailed until the advent of Riel. The Government, however, have taken very energetic measures, and a large force of men, under the command of Major-General Middleton, C.B., is now on the way from Qu'Appelle to Fort Carleton. It is expected that the arrival of the troops in the disaffected district will cause the collapse of the outbreak, and that confidence will soon be restored. Riel's supporters are not numerous, but some anxiety has been felt concerning the Indians. So far, although a few acts of violence have been reported, no general rising has taken place among the Indians, and is not anticipated. Indeed, the Government have received special assurances of loyalty from some of

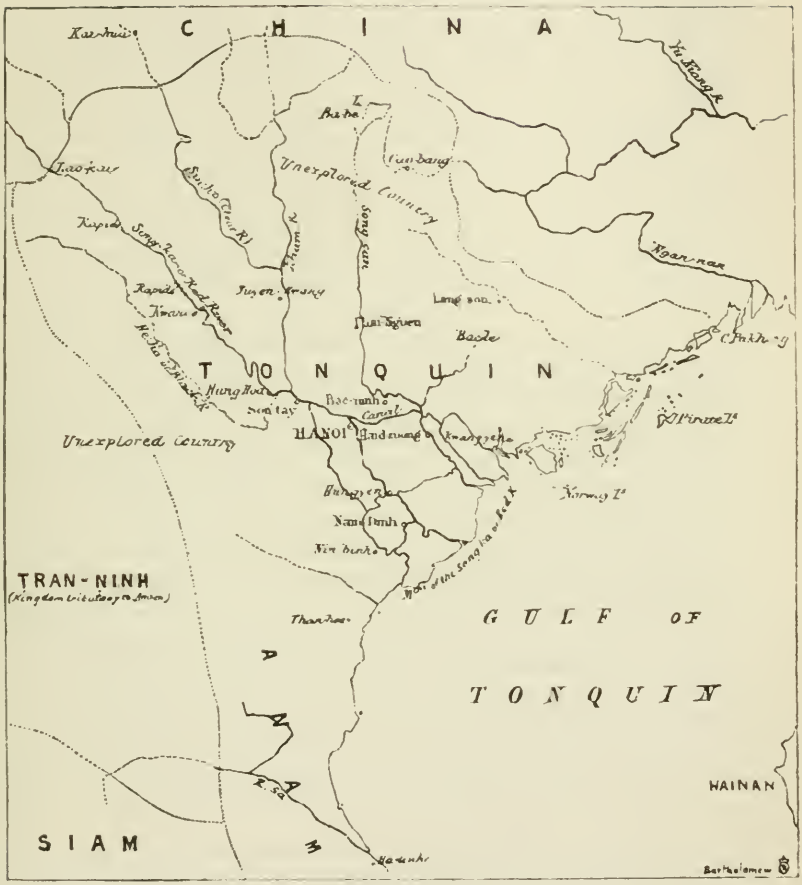
the principal bands, and the presence of so large a military force must exercise a considerable influence among them. The treatment of the Canadian Indians has always evoked much satisfaction. The treaties made with them are respected, their allowances both in food and money promptly given; farm-instructors, implements, and stock have been placed at their disposal on the different reserves, and schools have been provided. In fact, the efforts so far made to induce them to settle down to work upon the land have been attended with considerable success, and, as a general rule, they are on good terms with the white settlers. Riel is believed to be between Carleton and Prince Albert, on the North Saskatchewan River. This part of the country is very sparsely settled, and for the benefit of friends of settlers in the North-West, it may be stated that Carleton is 500 miles from Winnipeg, and 200 miles from the nearest station on the Canadian Pacific Railway, and therefore a long way from the populous portion of that part of the Dominion. Many of the alarming rumours that have appeared were much exaggerated and not based on accurate information. Those who are acquainted with the country, and with the Half-breeds, are sanguine that the outbreak is not of serious importance, and that it will collapse shortly after the appearance of General Middleton upon the scene."

The Half-breeds, or *Metis*, are the descendants of the early settlers in the North-west, by intermarriage with Indian women, and, though generally uneducated, they differ very little from the ordinary small-farmer class. It should be borne in mind that this outbreak is some 300 miles beyond the confines of Manitoba, and will in no way affect that province, or even the more settled portion of the North-west itself. The scene of the disturbances lies between the two branches of the Saskatchewan River, near Carleton, and Prince Albert, a very old Half-breed settlement.

THE FRENCH IN TONQUIN.

Tonquin history, according to Chinese authorities, goes back to the year 2879 B.C. Tonquin geography, according to Western reckoning, may be said to begin with M. Dupuis' expedition in the year 1872 A.D. True, some vague notions of the general character of the country and some knowledge of a more definite kind respecting certain points on the seaboard and in the delta of the great stream of Tonquin, the Song-ka or Red River, were in possession of Western geographers before the latter of the above dates. Marco Polo had something to tell about the kingdom of Chiampa and the parts adjoining. His information was not of a kind to encourage subsequent travellers and traders. Sundry Portuguese and Dutch adventurers in the sixteenth and seventeenth centuries visited the coasts of the Gulf of Tonquin with a view to plunder and possible settlement, and

SKETCH MAP OF TONQUIN.



found, on the whole, the native buccaneers a match for them. Early in the seventeenth century Roman Catholic missionary enterprise, which has since met with remarkable but intermittent success in this region, first became active in Tonquin; and in 1650 a Jesuit father, De Rhodes, published a map of the country. Not long after, the attention of France seems to have been called to it as a field of colonisation. A scheme of the kind appears to have been entertained at one time by Louis XIV.; but it was not till a century later, in 1787, that an opportunity came for realising it. A successful rebellion had driven the reigning King of Annam into exile; the head of the French Jesuit mission at Bangkok, Bishop Pigneaux de Behaine, took up the cause of the exile; and, with the aid of French troops, Gia-long reconquered more than "his own" again, and assumed the title of "Emperor of Annam." French engineers constructed the fortifications at Hanoi and other strategic points, and Christian missionaries established themselves in many places in the interior. But the Great Revolution upset all the plans of colonisation and conquest, and for seventy years Tonquin and Annam were left much to their own devices, the old round of civil war, insurrection, and invasion being only varied by an occasional massacre of native Christians.

In 1858, the French had obtained a footing in Cochin-China, the extreme southern part of the Annamese dominions, and ten years later their attention began to be called to the depredations of the pirates inhabiting the Gow-tow and other islands off the Tonquin coast; and Francis Garnier, that "bright particular star" among Indo-Chinese explorers, had, in his narrative of the Mekong Expedition, contended that the Red River would be found to be the true outlet for the trade of south-western China. But, as has been said, it was not until the years 1871-2 that, through the enterprise of the merchant-adventurer, M. Dupuis, notice was seriously drawn to Tonquin. In 1871, M. Dupuis had followed what is usually regarded as the main stream of the Song-ka, from near its source in the neighbourhood of Yunnan-fu to Laokai on the Tonquinese frontier. Next year, armed with Chinese permits and contracts, he ascended the river with a flotilla of steam launches, in the teeth of Mandarin opposition, transferred his goods at Hanoi to river boats, and at Kwan-ee, below the "Rapids," to flat-bottomed boats, and eventually reached Yunnan-fu in safety.

M. Dupuis' exploits were regarded in France and elsewhere as having practically solved the question of the navigability of the Song-ka, and of the feasibility of "tapping," by means of it, the rich mineral and other resources of Yunnan. The idea has been to a large extent dispelled by subsequent experience, more especially by the journey made by Mr. A. R. Colquhoun across the southern Chinese border-lands in 1882, which has gone to show that the upper course of the river is interrupted by numerous rapids, ledges, and sand-banks, and in the dry season, from November to April, is quite unnavigable even by the flat-bottomed native craft; and that the part of Yunnan to which it affords access is

one of the most barren, sparsely populated, and disturbed districts of south-western China. The effects of M. Dupuis' information was, however, soon made manifest in the extraordinary escapade of Garnier, who, with a handful of men, captured Hanoi and other strong places on the delta in the closing months of 1873. Almost immediately, misadventure and death befel the gallant naval Lieutenant, as happened eight or nine years later, in the spring of 1882, to Commandant Rivière, after he had performed over again the exploits of Garnier.

These seemingly rash enterprises have undoubtedly committed France to the permanent occupation of Tonquin, and have brought her into conflict, first with the Annamese and the "Black Flags"—the sweepings of the Tai-ping rebellion, and other predatory bands that during a long period of anarchy have gathered head and strength on and within the Tonquin frontier—and afterwards with the military forces of China. Of neither the political nor military aspect of France's interference in Tonquin have we anything to say, beyond this, that, whether the enterprise results in gain or loss to our neighbours beyond the Channel, it is pretty certain to bring great eventual gain to the cause of civilisation and commerce in this hitherto anarchic and almost unknown region of the East. But the French troops during the last few years have been "making geography" almost as industriously as they have "made history."

To the operations of Garnier and Rivière, and later of Millot, Négrier, and Brière de L'Isle, we owe it that the delta of the Red River, with its maze of channels, creeks, and canals, wandering over the fat and steaming alluvial plain, can now be laid down with a close approximation to accuracy on our maps.

In the accompanying chart, the main features of the Song-ka river system, with the positions of the principal strategical positions and seats of population in the delta—Hanoi, Bacninh, Sontay, Nam-dinh, and Haid-zuong—are delineated. It will be seen that it might be more correctly described as not one, but two delta systems, corresponding in some way to the interlacing channels of the Ganges and Brahmaputra, on the other side of the Indo-Chinese peninsula; the Song-cau, flowing down from the direction of the Kwang-si frontier, past Thai-Nguen, forming in this case the complement of the Song-ka basin, to which, indeed, through the Gia-cam channel, and the port of Hai-phong, it supplies the chief commercial outlet.

If the delta lands of the Song-ka and Song-cau, with their teeming rice crops and swarming population, form the "flesh" of this oyster—this heretofore tightly closed little Eastern world—which the French are intent on opening, it must be admitted that it is enclosed in an exceedingly rough and impervious shell of mountains. The coast-line, from Cape Vung-chua to Cape Pak-lung, may be described as a crescent-shaped bight of the Gulf of Tonquin, fringed with tidal lagoons, marshes, creeks, and river channels, and in the north by an archipelago of large and small islands, which have, from time immemorial, been the haunt of sea

and river pirates. Orographically considered, the low and cultivated region of Tonquin may be regarded as a deeper bight or recess between two diverging branches of the great mountain system of South-Eastern Asia, which sends down its spurs like the outstretched fingers of a hand into the Indo-Chinese countries. In the south, and also it would appear in the north, the mountains come down close to the sea, and give birth to streams with short courses, like the Song-sa and the Song-tam. All between drains down into the alluvial flat of the Song-ka delta, where the waters, during the long rainy season, often rise high above the level of the adjoining paddy-fields, and where the land, through the deposition of the thick sediment which gives its colour to the waters and its name to the river, is continually encroaching on the sea. Back of the delta are plateaux rising on the north to a height of 3000 feet above sea-level, and behind these the forest and mountain region, the features of which are still practically unknown.

Most of the rivers in these parts cut their way in deep gorges through a limestone formation, over beds so steep and boulder-strewn as to be practically useless for purposes of navigation. Allusion has already been made to what is usually regarded as the main stream of the Song-ka, through which M. Dupuis' countrymen fondly hope that a road of access will be found to south-western China. It is probable that a still larger body of water is contributed by the He-ho, or "Black River," which joins the Song-ka proper from the right, about half-way between Sontay and Hong-hoa. It also is believed to have its source a considerable distance within the Yunnan frontier, but it is rendered utterly useless for commercial purposes by a cataract on its lower course. Besides this, the country which it drains is, according to latest information, of a most unpromising kind—a dense mass of forest-covered mountains, swarming with "Black Flags," river pirates, and independent Muong tribesmen, who promise to afford hard work to the French if they attempt, as has been suggested, to open a road of communication by this line with the Upper Mekong, the Shan countries, and Burmah. Very different in many respects is the chief tributary of the Song-ka on the left bank—the Sin-ho or "Clear River"—represented as rising in Yunnan, a little way north of the town of Kai-hua, and flowing past the provincial capital of Tuyen-Kwang. It is said to give access to a country of great mineral resources but its course, also, is much interrupted by rapids and cataracts, and, according to Chinese reports, it is even in some places subterranean.

The Song-cau is in most maps delineated as draining the northern province, of which Cao-bang—one of the frontier fortresses, which by the new treaty with China will be occupied by the French—is the chief town. The singular lake Ba-be, which, in the dry season, forms three bodies of water that are united and surround a central island, is also shown to be connected with it. Doubt is thrown on this, as on other prepossessions and representations respecting the physical geography of the scene of hostilities in Northern Tonquin, by recent information

from the front. Mr. J. G. Scott—a Scot, we gather, by birth as well as name—in his excellent book, just published by T. Fisher Unwin, recording a special correspondent's experiences in Tonquin, states that the fluvial as well as the political connection of the province of Cao-bang is with the Chinese province of Kwangsi, and, we may assume, with the Yu-Kiang branch of the great Si-Kiang—the River of Canton ascended by Mr. Colquhoun. We learn, indeed, that the limits of the Song-ka River system, and therefore the "geographical frontier" of Northern Tonquin, must be drawn throughout much further south than is usually supposed. Lang-son, made so notorious by recent military and political events, is neither on the Loch-nam tributary of Song-cau, nor on the Song-tam, which finds its way by an independent course to the Gulf of Tonquin and the "Pirate Archipelago," but on the Song-ki-cung, which, says Mr. Scott, "goes on into China through the Prefecture of Lung-chan." This stream forms, he says, part of the Lang-moon river-basin—perhaps the stream marked on the map as the Ngan-nan; and he confounds all preconceived ideas of the geography of this district by stating that this stream forms a delta, with one arm stretching so far to the east as to be within four hours' march of the Chinese treaty port of Pakhoi, and with another forming at its mouth the boundary of China and Tonquin; while, according to M. Romanet du Caillaud, the Song-tam is but another branch, and by creeks, still further to the southward. "The Annamese assert that one can go from Kwang-yen—the rival to Hai-phong as the eventual port of Tonquin—to the province of Lang-son without leaving the rivers and canals, and without going out to sea." Our only comfort is that of Mr. Scott—"in another year we shall doubtless know more about it." Let us hope also that some order will by that time be evolved out of the chaos of Chinese, Tonquinese, and Annamese nomenclature, and some authoritative clew afforded to the spelling which at present helps materially to make the confusion of Tonquin geography worse confounded.

JOHN GEDDIE.

PERSIAN TRADE.

It was in 1855 that Dr. Petermann began to issue those "Communications from the Geographical Establishment of Justus Perthes," which, appearing monthly, constitute an invaluable work of reference for geographers throughout the world; and in the case of such dissertations as seemed too copious and lengthy for admission as articles into these *Mitteilungen*, the editor, in 1860, adopted the plan of publishing them as separate *Ergänzungshefte*, or supplements—usually four or five in the course of the year. Since the death of Dr. Petermann, in 1879, the *Mitteilungen* and *Ergänzungshefte* continue to appear much on the old lines, the present editor being Dr. Supan. Of these supplemental numbers, the seventy-seventh, now before us, deals with the present state of trade in Persia, the condition

under which it is carried on, its prospects, the facts as to exports, imports, roads, telegraphs, tolls, taxes, weights, measures, rate of interest, and many other matters of consequence to mercantile folk. It comprises 86 closely printed quarto pages, with a map, and is actually equal in extent of printed matter to an ordinary octavo of about 400 pages. The information given is copious, detailed, precise where precision is at all attainable, and highly-varied; and the authors, Drs. Stolze and Andreas, are entitled to speak with authority. Resident in Persia for seven years (from 1874 till 1881) and holding official appointments, they had occasion to visit the most out-of-the-way places, and came into contact with all classes of the inhabitants; and they not unreasonably claim that they were in a better position for obtaining and giving full information on Persia at large, than travellers, or even the consuls, whose duties mainly confine them to particular parts or great cities. It is here manifestly impossible to do more than glance at one or two of the multitude of matters that invite the attention of readers of this treatise.

In these days of swift telegraphic communication, it has become to many difficult to realise that news from the further side of the great desert of Turkestan may actually require more than three or four days to reach us. But unless other people managed their telegraphs on very different principles from the Persians, the wonder would be that at any given time any message could be forwarded at all. One of the Persian lines connects Teheran with Meshhed in the corner of Persia, next to that debatable land in which of late Russian armies and English military commissioners have been studying geographical and ethnographical problems with so much zeal. But, unlike the great Indo-European line, which passes right through Persia and is under English or European management, this line to Meshhed and all the other fifteen lines in Persia, are wholly under native administration. They have all only a single wire, which is carried on unsatisfactory wooden posts, with imperfect insulators, and the inspection and supervision is so perfunctory that after an accident, "often for weeks on end, and over long distances, the wire is left lying on the ground, and works only during the dry weather in the good season of the year." Consequently, one cannot form a very reliable guess as to the length of time that may be needed for receiving a despatch from any part of Persia not traversed by the very carefully-managed Indo-European line; and may be thankful if the message, once despatched, ultimately finds its way to the person or place for which it is intended.

The letter post was re-organised in 1877 under European auspices; and Persia was supposed to have become a member of the great family of the Universal Postal Union. But as the punctual and safe conveyance of letters at a regular tariff was contrary to the interest of the numerous functionaries who formerly forwarded letters (after, it may be, studying their contents and abstracting enclosures) at such rates as suited themselves, intrigues were persistently and successfully organised to oust the European innovators, and a partial return has been made to the good old system.

The lack of roads is one serious difficulty in the way of developing Persian trade. A great part of Persia consists of long and fertile valleys, separated by continuous and lofty mountain ridges, running parallel to one another, mostly in the direction from south-east to north-west. Within any one valley, transit is comparatively easy, even when the road or track is not expressly made for wheeled vehicles. But whenever it is necessary to pass from one valley to that next beyond it, the difficulties of conveying goods become very great. The circuit needed for going round the end of the ridges is generally too great to be contemplated. The passes are often very high, and the track practicable only for the excellent Persian horses and mules, bearing their loads on their backs. The cost of conveying heavy goods from the ports of the Persian Gulf, across several mountain ranges and intervening valleys into the interior, may easily be imagined. It is, therefore, of the utmost consequence that the existing roads should be improved, so as to admit of wheeled vehicles on all the main lines. The authors of the treatise regard the improvement of the roads as vastly more practicable than the making of railways. The magnificent concessions made in 1872 to Baron Reuter for making railways came to nothing; subsequent concessions have been sought and obtained, but propose only short railways, to connect Persia with the Russian railway system, or the Caspian ports.

For trading purposes, as for many others, Persia falls into two zones, the northern and the southern. The former is approached from the Black Sea, from the Caucasus, and the Caspian, and has fallen more and more exclusively into the hands of the Russians. The southern provinces are got at from the Persian Gulf, and have been mainly worked by English houses, though of late the Germans, Austrians, and French, are competing for Persian favour. Meantime, the only chance of extending European commerce in Persia is by working from the south; for the Russians, while making railways that ought to facilitate access to Persia, have effectively prohibited other nations from using this channel of communication. Formerly the only practicable northern route from Western Europe into Persia was by the Black Sea, and overland by the tedious road from Trebizond to Tabriz through Armenia. The Russian railway, from Batum and Poti by Tiflis to Baku on the Caspian, *should* bring goods very easily to the numerous Persian ports on the Caspian. But the Russian Government, in the interest of their own traders, introduced, in 1877, monstrously prohibitive measures against transit goods passing through the Caucasian territory; demanding that a sum, equal in value to the goods in question, should be deposited with the Russian authorities, to be returned only when it was ascertained by official report that the goods had again crossed the frontier intact. As the slightest injury to a seal or address of the packages involved the risk of the goods being detained, and the deposit forfeited, traders preferred either to pay the high Russian import duty, as though the goods had been intended for Russia, or resumed the old tedious overland route from Trebizond. From a French official report

it appears that, while the carriage of a piano from Marseilles to Teheran costs £120, the greater part of this sum belongs to the comparatively short journey after its arrival at the Russian frontier. A photographic apparatus cost 13 francs from Marseilles to Poti, and from Poti to Teheran 180 francs. In this quarter, England, Germany, and all other countries are equally at the mercy of Russian diplomacy, and can hardly count on more favourable conditions; for though the decree of 1877 was for a while modified, the prohibitive measures have been again resumed. But the German authors see nothing to hinder a great extension of German trade with Persia by way of the southern ports; they rely on the commercial treaty between Persia and Germany ratified in 1873, and the recent establishment of a German Legation, at Teheran. Formerly, Germans and Swiss, as well as Armenians, had to place their interests under the protection of the British Consular and diplomatic authorities. Now, Drs. Stolze and Andreas look for a favourable turn in German prospects, and give some (to them) cheerful proofs that, in East Persia and Central Asia, English goods, till of late the only foreign manufactures known, are being largely superseded by German and other products.

The system of internal taxation within Persia itself is also highly complicated and embarrassing. For foreign traders the import duty is nominally 5 per cent. *ad valorem*. But the collection of these dues is let by the Central Government to a large number of farmers and under-farmers of customs. The farmers agree to pay the Government a certain fixed sum; to secure a large overplus, it is thus their interest to attract as much trade as they can to their respective districts. They accordingly endeavour to underbid the collectors in the adjoining districts, and in other ports; and, by agreeing to pass goods at much less than the official customs tariff, to get traders to desert other trade routes for those passing their way. Thus they often find it prudent to exact no more than 2 per cent. This naturally calls for considerable calculation on the part of the traders, and brings about frequent changes in the routes to be preferred. Another consequence is the extreme difficulty of getting accurate returns of imports and exports, as it is hardly convenient for the farmers of the customs to let it be known precisely what value of goods has been taxed by them in any given period. Drs. Stolze and Andreas, who base many of their statements on the returns of the English Consuls and other agents, point out frequent inconsistencies and defects in the English Blue Books, from year to year, on this subject.

The Persian valleys are many of them extremely fertile, and with extended irrigation might produce vastly more; so that if roads were made and more rational administrative methods employed, the produce of Persia might be very greatly extended. In that case its demand for foreign goods would grow in like proportion; for the Persians as a rule are luxurious, and like to buy such things as they fancy, even when they can ill afford it. For a loan of ready money they cheerfully pay interest at the rate of 2 per cent. per month, settled monthly; that is, nearly 29 per cent. per annum.

A notable fact in the recent history of Persian trade is the rapid increase of the opium exports. Since the silk-worm disease rendered silk culture less profitable, opium has been largely grown in the silk districts. In 1871-72, some 870 chests were exported, worth 696,000 rupees; in 1877-78, the figures were 4730 chests, worth 4,730,000 rupees; in 1880-81, 7700 chests, worth 8,740,000 rupees. As large quantities of opium are used in Germany for the manufacture of morphia, it is pointed out in this treatise that it would be highly advantageous to German trade that the opium should be shipped direct to Germany from Persia or elsewhere, and not pass as at present through London. Since 1865 the silk crop has been very fluctuating.

The boxwood of Persia is a very valuable possession, but has been extirpated in large districts. Now some attempts are being made to regulate the cutting of the trees. Gums, drugs, and dyes, are largely exported, but might be much more extensively produced. Persia is an admirable land for wine culture. Vines in great variety grow to high perfection in numerous districts; and some really good wine is made. With more careful methods of manufacture, excellent wine of Shiraz could, even in spite of the deplorable roads, be shipped at Bushire at about sixpence a litre. Enormous quantities of raisins are exported to Russia. Comment is made not merely on all the important articles of export and of import, but the special kinds of manufactured articles required by Persians are carefully described, and hints given as to ways in which the imports might be increased by German traders.

DONATIONS TO THE SCOTTISH GEOGRAPHICAL SOCIETY.

From the United States Government.

The best acknowledgments of the Scottish Geographical Society are due to the United States Government for presenting to the Society's library a series of the admirable official volumes, dealing with subjects of commercial, administrative, scientific, and general interest, issued from the Secretary of State's Department at Washington. In the preparation of these works, as well as in the cosmopolitan spirit in which they are distributed, our American friends display a liberality which other Governments might do well to copy; it can only be hoped that the favours they so freely bestow on the learned Societies of other countries, as well as their own, will come back to them with interest after not many days. In the set bestowed on the Society's library are included twenty-six volumes of the *Reports on the Foreign and Commercial Relations of the United States*, from 1870 to 1883, inclusive; *Reports* of the Secretary of the Interior for 1881-83; also *Reports* on the Survey of the Boundary between the Republic and the British Possessions in North America; and on the Public Domain of the United States for 1883. The value and varied

interest of the contents of the volumes, and the special importance which many of them possess for geographers hardly need to be pointed out. Other volumes, embodying the Land Laws of the United States, deserve, for obvious reasons, the attention of those Scotsmen who contemplate emigration to America, or already possess a stake in the soil of the Republic. The series of Census Reports are perhaps still more entitled to notice. In the vast amount of labour bestowed, in amplitude of detail, in elaboration of analysis, and in richness of illustration, no statistical work has yet approached the Reports of the Tenth Census of the United States (1880). Great credit is due to Mr. Francis A. Walker, on whom the bulk of the work of census superintendence, at least in the early stages, fell; and to those who assisted him, and have since carried his labours to completion. The excellent and carefully prepared series of maps, diagrams, and illustrations, which accompany the reports may be studied with advantage by such as desire to see at a glance the process of growth, the westward movement, the aggregation according to colour and foreign or native birth, and the arrangement in respect to lines of temperature, rainfall, and hygrometric conditions of the population of the United States; and to study the condition of that population in its commercial, agricultural, manufacturing, or other aspects. By the solidity of the scientific results attained, and by the beauty and wealth of their illustration, the volumes of the Geographical and Geological Survey of the United States Territories have obtained world-wide notice. These are continued and their reputation sustained and enhanced, in the *Reports* of the new Department of the Geological Survey, under the directorship of Mr. J. W. Powell, the three first volumes of which—those for 1881-3—have been forwarded by favour of the Secretary of the Interior, along with a valuable set of charts and atlases, including Professor Hayden's *Geological and Geographical Atlas of Colorado*, and a *Statististic Atlas of America*. Besides this donation—amounting to nearly sixty volumes—the Bureau of Navigation, Navy Department, Washington, has forwarded a roll of charts, and the United States Geological Survey has sent the whole of the publications of the Survey so far distributed.

From the Italian Government.

To the liberality of the Italian Government, acting through the learned chief of its Statistical Department, Professor Luigi Bodio, the Society is indebted for a valuable series of volumes, one of which, the *Annuario Statistico* for 1884, was already noticed at p. 72 *ante*. Of the rest the most important is an elaborate monograph on *Rome and the Campagna*, published in two handsome quartos, with separate appendixes and a large atlas. From the bibliography (120 closely-printed pages) one gathers a good idea of the enormous part Rome has played in the world's history. The *Archivio di Statistica* and the *Annali di Statistica* take a high rank among publications of their class, and are characterised more particularly by a broad cosmopolitanism of treatment. While Italian subjects naturally preponderate,

they are generally brought into contact with a large body of illustrative material derived from foreign sources. Such a paper, for instance, as that on the Comparative Statistics of some Italian and Foreign Cities (in vol. ix. (of 1884) of the *Annali*), supplies such details of social interest in regard to London, Paris, Lyons, Copenhagen, Hamburg, Berlin, etc., etc., as the price per square metre of ground in the dearest part of the city, the ratio of population to area, that of local taxation to population, etc., etc. As of strictly geographical note, may be mentioned Marinelli's paper (1883) on the Area of Italy.

From the Danish Government.

The Danish Government has forwarded, through the Minister of Marine, a very valuable series of Charts of the Baltic, founded on the Danish Survey, and of the Danish Colonies, including the Faroe Islands, Iceland, Greenland, and the Danish West Indies. These Charts, amounting to over sixty in number, are well known to seamen for their excellence and accuracy; intricate passages and entrances to harbours are so clearly marked that, in many cases, the aid of pilots can be dispensed with. Those of Iceland and Greenland are especially interesting, the contour of the land being also shown. When, in 1883, Mr. W. H. Smith visited the Baltic, in his steam-yacht *Pandora*, he procured a set of Danish charts, which he used in preference to the Admiralty charts he had on board.

From the Swedish Government.

A roll of forty-two charts has been received from the Swedish Government, through the Minister of Marine. They comprise a complete series of the Swedish coast-line, the Skagerrack, the Cattegat, the Baltic, the Sound, the Belts, and the Stockholm Archipelago, with the lakes Mälar, Wenern, and Wettern. The same praise may be extended to them as was given to the Danish charts, which they even surpass in the excellent finish of the engraving.

PROCEEDINGS OF THE SCOTTISH GEOGRAPHICAL SOCIETY.

The April meeting of the Society was held in the Masonic Hall on April 2nd—Lord Balfour of Burleigh, Vice-President, in the chair. The Chairman, in opening the proceedings, stated that the Secretary had heard only in the forenoon that Mr. H. H. Johnston, who was to have read the paper that evening, had been prevented from attending in consequence of a severe attack of ague. Mr. Johnston had, however, forwarded his paper from London, and his Lordship then called upon Dr. George Smith to read it. The paper, which forms our leading article, was then read by Dr. George Smith; and on its conclusion the Rev. Dr. Laws and Mr. Frederick Maitland Moir made a few remarks in reference to it. Lord Balfour moved that a cordial vote of thanks be awarded to Mr. Johnston for his interesting paper, and to Dr. George Smith for reading it, which was warmly accorded. His Lordship next moved, and Dr. Burgess seconded the motion, "That, in terms of the laws of the Society, the following members be appointed trustees to hold the

property of the Society, namely :—Mr. Adam Black, publisher, Edinburgh, Mr. Robert Cox of Gorgie, Midlothian ; Mr. James Currie, shipowner, Leith ; and the Honorary Treasurers of the Society, Messrs. Alexander Bruce, Edinburgh, and Robert Gourlay, Glasgow, *ex officio*," which was unanimously carried. Mr. Ralph Richardson, the senior Honorary Secretary, stated that a sum of nearly £400 had been subscribed by members of the Society towards Mr. H. O. Forbes' expedition to New Guinea, an announcement which was received with applause. A vote of thanks to the Chairman, moved by Mr. Cox of Gorgie, terminated the proceedings.—On the following evening a meeting of the Glasgow Branch of the Society was held in the Hall of the Philosophical Society of Glasgow. Mr. Michael Connal, in the absence of Mr. James Stevenson, of Largs, occupied the chair, and intimated that owing to ill-health Mr. Johnston had been unable to leave London, and that his paper would therefore be read by the Secretary of the Scottish Geographical Society. Dr. Turner, Secretary of the Geographical Section of the Glasgow Philosophical Society, read a communication from Mr. James Stevenson, directing special attention to Mr. Johnston's paper and pointing out that the construction of the Suakin-Berber railway would enable British traders to reach the districts within and around the junction of the Blue and White Niles, which offered a favourable field for commercial enterprise. The paper having been read, Dr. Christie, Mr. Ewing, and Mr. James Thomson delivered short addresses. Mr. Ralph Richardson referred to the subscription towards Mr. Forbes' expedition, and both he and Mr. Silva White expressed, on behalf of the Society, gratification at the first joint meeting of the Geographical Section of the Glasgow Philosophical Society and the Scottish Geographical Society having been so successfully carried out. A vote of thanks was awarded to the Chairman for presiding.

QUERIES AND REPLIES.

St. Brandan (*ante*, p. 124).—On the terrestrial globe of Martin Behem, made at Nuremburg in 1492, a large island is laid down between 40° and 47° W. long. from Ferro, and extending from the equator to about 9° N. lat., and it is stated that "in the year 565 St. Brandan came in his ship to this island." It was also laid down on many maps of the 15th century by the name of St. Brandan or St. Borondon. St. Brendan or Brandan is well known in early legend (see, *e.g.* Fordun's *Chronicle*, ed. 1872, vol. ii. p. 24), and his life and acts exist in several editions. He was one of the twelve disciples of Finnian of Clonard, and soon after his ordination by Bishop Erc he is said to have sailed with fourteen monks in quest of the land of promise of the saints, and spent seven years in the search. The monkish narrative of this long voyage to different unknown islands* was one of the most popular tales of the middle ages, and had its influence on the mind of Columbus in determining him to seek for new lands in the far west. On Brendan's return, he went to visit St. Gildas, and then to the Western Isles, where he founded a church and village in Tiree and a monastery, perhaps on the Eilean-na-Naoimh in the Firth of Lorn, the next island to which is Culbrandon or Brandan's retreat, and not far to the north of it, on the island of Seil, the church is dedicated to Brendan. We have also Kilbrandan or

* Yule, in his *Marco Polo*, vol. ii. p. 294, quotes the following curious lines from Bauduin de Sebourg (i. 123) :

> " Li est de Saint Brandon le matère furnie,
> Qui fut si près d'enfer, à nef et à galie,
> Que diable d'enfer isserent, par maistrie,
> Getans brandons de feu, pour lui faire hasquie." . . .

Kilbrennan Sound, and the natives of Bute are called "the Brendanes" (Skene's *Celtic Scotland*, vol. ii. p. 77). In 559 A.D. the saint founded his principal monastery at Clonfert in Ireland, so that the date given on Behem's globe is probably twenty years in error, his voyage having been made in his earlier life. J. B.

Another correspondent supplies the following:—

St. Brandan's Isle and the "Terrestrial Eden."—In view of some recent speculations connected with the subject, and as bearing on a claim to carry Scottish geographical research back to a remote period, the inquiry of a correspondent in last number in regard to "St. Brandan's Island" seems to merit some attention. The answer to "X.'s" question as to the form of the saintly legend of the voyage of the Scoto-Irish "eremite" may perhaps be most conveniently found in the following quotation from the curious work just published by Dr. W. F. Warren, of Boston, entitled *Paradise Found; or the Cradle of the Human Race at the North Pole* (London: Sampson Low & Co.):—

"According to the story an angel brought to the good abbot, St. Brandan, son of Finlogho, who died A.D. 576 or 577, a book from heaven, in which such marvellous things were narrated concerning the then unknown portions of the world that the honest father charged both angel and book with falsehood, and in his righteous indignation burned the latter. As a punishment for his unbelief, God sentenced him to recover the book. He must search through earth and hell and sea until he finds the heavenly gift. The token given him by the angel is that when he sees two twin fires flame up, he shall know that they are the two eyes of a certain ox, and on the tongue of that ox he shall find the book. For seven long years he sails the Western and the Northern Ocean. He here encounters more marvels than were recorded in the original incredible book, and is even permitted to visit the Earthly Paradise. The beauty of the soil, of the fountain with four streams, of the magnificent castle lighted with self-luminous stones and adorned with all manner of precious jewels, surpassed description. The stay of the party seems, however, to have been short, and unfortunately just where the island was located the commander forgets to mention."

There is a strong family likeness, possibly also a common origin, in the St. Brandan legend and the stories of the Fortunate Islands and Garden of the Hesperides; the Keltic terrestrial paradise, Avalon, the home of Morgan la Fee, visited by King Arthur, Holger Danske, and other heroes of chivalry, and many more ocean myths that have floated before the imaginations of saintly and secular romancers of the old world. A favourite theory of mediæval theologians and travellers was that the "Earthly Eden" was to be found in an unapproachable island of the Indian Ocean, sometimes identified with Ceylon; and in this connection allusion may be made to the fact (which seems to have escaped the notice of Dr Warren) that the late General Gordon latterly occupied his mind much with a hypothesis that the true site of the "Paradise" of Genesis is the Seychelles Islands, and that he even believed that he had discovered, in the *coco de mer*, the "forbidden fruit." General Gordon's conclusions are understood to have rested largely on the existing and prehistoric conditions of the bed of the Indian Ocean, which he considered pointed to the convergence on the Seychelles of the "four great rivers" now represented by areas of oceanic depression. How is it, by the way, that no ingenious speculator in the dim region of ancient cosmology and mythical geography, has not fixed upon Roraima, ascended the other day by Mr. Im Thurn, as the true site of the "Terrestrial Eden"? It fulfils better than most others the required conditions of the "Golden Summit of the World," and of the "quadrifurcate rivers." Columbus, while struggling on his third voyage with the great volume of fresh water from the

Oronoko, which rushes through the narrows of the Gulf of Paria, was "hot" on the long-sought-for site. He was convinced that the water must flow from the Mountain of the World, on which, according to the theologians whom he cites, is placed the Earthly Paradise, "whither no one can go but by God's permission;" and, he adds, "if the water of which I speak does not proceed from the Earthly Paradise, it seems to be a still greater wonder, for I do not believe that there is any river in the world so large and deep." The veracious Sir John de Mandeville, who gives his description on the authority of "wise men," as he repents that he did not visit the spot himself, supplies us with particulars regarding the primitive Eden, which, it must be admitted, agree singularly well on some points with the account of the mysterious mountain of Guiana. "It is so high that the flood of Noah might not come to it, that would have covered all the earth of the world all about and above and beneath, except Paradise. And this Paradise is enclosed all about with a wall, and men know not whereof it is, for the wall is covered all over with moss, as it seems; and it seems not that the wall is natural stone. And in the highest place of Paradise, secretly in the middle, is a well that casts forth four streams, which run by divers lands." Thus far old-world assertion and new-world speculation, on a point which does not seem, in spite of Dr. Warren's ingenious and eloquent plea for the North Pole as the "primitive centre of distribution of the race," to admit of scientific determination; while the fate of St. Brandan is a warning against rash scepticism on any point of geography. In conclusion, however, a reference may be permitted at this moment to the proposed identification of the Helmund with the Phrath of the Mosaic record, and to the imposing array of authority, to the effect that the "Cradle of the Human Race" is to be sought, not at the North Pole, nor at the sources of Euphrates, Nile, or Oronoko, nor in some unsubmerged fragment of "Lemuria" or "Atlantis," but in the neighbourhood of the "debatable land" of North-western Afghanistan, over which Russia and Great Britain have been on the point of quarrelling. J. G.

No. 6.—F. W. inquires, Where is Arkinholm, vaguely mentioned in Burton's *History of Scotland* and elsewhere as the spot where the Douglases met in conflict? [Arkinholm was situated on the river Esk, in Annandale, opposite Wauchope Kirk (Tytler), and the town of Langholm now occupies the site (Armstrong's *Liddesdale*, vol. i. p. 157). It is curious to observe that while the name of the town has changed, Arkinholm remains in the district. Slater's *Directory* for Langholm contains such entries as Alexander Stevenson, Esq., J.P., of Arkenholm, Arkingholm Terrace, and Erkingholme Terrace.]

GEOGRAPHICAL NOTES.

EUROPE.

Blantyre, Lanarkshire.—No name combines more harmoniously the ideas of Scottish topography of world-wide research than that of Blantyre, the Clydesdale parish which was the birthplace of Dr. Livingstone, and the nameplace of that other Blantyre on the Shiré uplands, which is the fitting memorial of the Church of Scotland to the heroic zeal of the great traveller and missionary. The Rev. Stewart Wright, the minister of the parish, in his *Annals of Blantyre*, just published (Wilson and M'Cormick, Glasgow), rightly interprets Blantyre's most honourable distinction; for the frontispiece of his book is a view of the humble building where, "in a little room up a spiral stair, David Livingstone first saw the light;" and there is an interesting notice of his early days in "the sweet and pretty village" by the Clyde, and his later geologising rambles in a neighbourhood then

quiet and rural, but now a busy seat of the coal and iron industries. Blantyre, however, has other claims to mention, some of them not unconnected with geography. A young Blantyre blacksmith, named William Pollock, emigrated to Virginia towards the end of last century, and became the owner of valuable plantations in that State. The family changed its name to Polk, and the blacksmith's grandson was James Knox Polk, under whose Presidentship the United States underwent an enormous territorial development by the annexation of Texas, California, and other Mexican possessions to the Union. Here is another fact picked from Mr. Wright's little volume, which has some topographical interest, especially for Glasgow. In 1770, Mr. John Finnie, the veteran librarian of Glasgow University, was presented to the church and parish of Blantyre, and thus became the occasion of a "disputed settlement," which was suddenly terminated by the death of the aged presentee. While a tutor in the family of Mr. Orr, of Stobcross, Mr. Finnie suggested to that gentleman the advantages of laying out a village adjoining Anderston. The plan was acted upon, and thus the "rejected presentee" of Blantyre has become the name-father of the populous and busy suburb of "Finnieston."

Arctic Exploration.—Lieutenant Hovgaard, leader of the *Dijmphna* Expedition, corresponding member of the Scottish Geographical Society, writes to us from Copenhagen, on April 4th, as follows:—"Though it is my opinion that the only route left to penetrate into the unknown regions round the North Pole is that route proposed by me in 1882, it is impossible to raise such an expedition here in Denmark. Everybody here, who takes an interest in Arctic exploration, dreams about Greenland, and everywhere I get the answer: 'Go to Greenland; the other route must be explored by the great nations.' For some years, therefore, I shall be forced to abandon my favourite exploring ground; and it is my intention to proceed to the east coast of Greenland with the *Dijmphna*, which M. Gamel has offered me for another expedition. Still, I don't think I shall be able to leave Denmark before 1886; and I then intend to enter the pack ice at about 65° lat., take up my winter quarters in the neighbourhood of Cape Dan, and from thence, by sledge, explore the unknown coast up to Scoresby Sound, paying, of course, special attention in regard to the ancient colonies."

A Message from the North Cape.—Signor Sommier, author of *Un Estate in Siberia*, noticed in the *Scottish Geographical Magazine*, p. 53, left Florence in January last with the intention of proceeding to the North Cape, and afterwards making a winter tour in Lapland. He writes from Skarsvaag, Mageröe, on the 16th February, to a member of the Scottish Geographical Society:—"My friend and I have been imprisoned here for eleven days. We have been to the North Cape, and that is why we are here; we are the first who have trodden the famous Cape in the winter season. When, by the help of wind and tide, we get back to Hammerfest, we shall go on to Alten, and from thence either to Archangel or to Haparanda and Stockholm. The journey from here to the North Cape is tiring, except in very good weather; in bad weather it is impossible, and might even be dangerous, as there are snow-storms almost daily. I have myself had part of my nose frozen. The lowest temperature I experienced in southern Norway was −30° Centigrade (−22° Fahr.) of cold, but up here it is never below −14° (+6°·8 Fahr.)."

ASIA.

Port Hamilton and Quelpart.—The last public service rendered to his country by Sir Harry Parkes was the arrangement by which England acquires a coaling station

at Port Hamilton. This port was at first described in the newspapers as in the island of Quelpart, and thus both places have come up for inquiry. The following as to Port Hamilton is taken from the *China Pilot* (fourth edition, 1864):—"The Nan-how or Nagn-hau group, lying about N.N.E. ½ E., 38 miles from the north-east end of Quelpart, consists of two large islands, deeply indented, the northern points of which nearly meet, and which, with a third and smaller island, Observatory Island, situated between their south-eastern points, form a spacious and well-sheltered harbour named Port Hamilton, the main entrance to which is at the south-east part of the group. These islands may be readily distinguished from the numerous clumps of islets and rocks in the neighbourhood by their greater size and massive, bold appearance, as well as their peculiar position. Except at a great distance from the south-eastward, they invariably make as one island. Within Observatory Island a vessel may be safely hove down for repairs. Wood is scarce; fresh water is plentiful and good, and easily embarked. Fish may be caught with the seine. The largest village is in the north-west part of the harbour, and in 1859 it contained 250 inhabitants. The Port Hamilton group, so far as the examination of the surveying vessel *Saracen* went in 1856, is clear of danger on all sides, but is best approached from the south-east. There is also no difficulty in entering the port at night if the weather be not very thick." The name was given by Belcher in 1845 in compliment to the Secretary of the Admiralty.

The island of Quelpart, which lies 60 miles distant from the southern coast of Corea, and commands the straits between that peninsula and Kiu-shiu, the southern island of Japan, has been not inappropriately termed the "Sicily of the Italy of the East." In length it is about 40 miles, and in breadth, at the widest point, about 17. "It may be said," remarks Mr. Griffis (p. 200), "to be an oval rock-bound island, covered with innumerable conical mountains, tipped in many instances by extinct volcanic craters, and all bowing down before one vast and towering giant, whose foot is planted in the centre, and whose head is lost in the clouds." This culminating peak—Mount Auckland, or as the natives call it Aula, or Han-ra-san, has a height of 6500 feet, and its white rocks wear the appearance of being covered with perpetual snow. On the top are three extinct craters, each with its own lake of pure water; and, according to Corean folk-lore, in those lakes the three first-created men in the world still reside. The scenery provided by the dense woods and lofty peaks throughout the island is very beautiful. Pines and a species of red wood, resembling mahogany, are the prevailing trees. The rich volcanic soil is under careful cultivation, and produces wheat, barley, maize, Russian radishes, turnips, etc. There are large herds of cattle, and numerous ponies, which are in great demand on the mainland. The islanders also follow the pursuit of fishermen, and a flourishing industry is provided by the manufacture of straw-plaited hats, which are in general use throughout Corea. Three walled cities and a number of towns are said to exist in the island. The capital is Moggun (Mon-gan), or Tse-tsiu, about the middle of the north coast, described by Belcher as standing in a broad valley, with a conspicuous flat eminence on its eastern side, and a small river or copious stream on the west. The city wall on the face exposed to the sea occupies a line of about 500 yards, containing seven bastions." It is 25 feet in height, and apparently of European design. Quelpart has been known from ancient times, when it formed the separate kingdom of Tam-na. It was in 1653 the scene of the shipwreck of Dutch vessels, to which we owe Hamel's account of Corea (see Pinkerton, vol. i.). For further information see Belcher, *Voyage of H.M.S. Samarang*, 1848; *Nautical Magazine*, 1879; Opperts' *A Forbidden Land*, 1880; Griffis' *Corea, the Hermit Nation*, 1882; *Nature*, 1885, p. 541. The writer in *Nature* says the best account is one (published in an English journal printed in

China) from the pen of a gentleman who visited the place with the French Consul in Shanghai, at the time of the reported wreck of the *Narwhal*, in 1851.

The Afghan Frontier.—General Walker, C.B., late Surveyor-General of India, read a paper on February 27th last before the *Royal United Service Institution*, on the Afghan Frontier. By means of a large wall-map, the lecturer proceeded to give the geography of the whole region, pointing out the boundaries of the various races, and describing the physical features of the country generally, interspersing his descriptions with dissertations upon the ethnical differences of the peoples. The Afghans were the most numerous and important of the dwellers in the kingdom, which had a mixed population of about 5,000,000 ; and the lecturer gave a succinct history of the race over several centuries. He proceeded to say that the people residing in the immediate vicinity and on both sides of the Russo-Afghan frontier might be most conveniently studied by dividing the line into three sections ; the first, extending from the sources of the Oxus in the Pamir highlands to the point where the river debouches into the plains ; the second, from that point to Khwaja Saleh ; the third, from Khwaja Saleh to Sarakhs. In the first were the petty States of Wâkhân, Shaghnân, Rhoshân, and Dârwâz, each with lands on both banks of the river, and the larger states of Badakshân, wholly to the south, and Kârâtegin, wholly to the north of the river. The people of these States were regarded by ethnologists as all of one fundamental stock, the Galcha ; those to the north of the river had been assigned to Bukhâra, and those to the south to Afghanistan, by agreement between the Russian and British Governments ; but, as a matter of fact, the riverain boundary was not recognised by the people of the country, and at the present moment the Amîr of Bukhâra tried to govern the whole of Dârwâz, and the Amîr of Afghanistan tried to govern the whole of Wâkhân, Roshân, and Shaghnân, each pushing his authority as far as he could across the river. In the second section, the population on both banks was mostly composed of Tajiks and Uzbegs, with a very sensible Afghan element on the south bank ; but here the river was accepted as an appropriate natural boundary-line. In the third section was an air-line boundary, to the north of which all the population was Turkomân, while to the south it was Turkomân, Tajik, Uzbeg, and Afghan. In the opinion of the lecturer, Herat was but the gateway to one of the half-dozen passes over the Hindû Khûsh Range, leading to various routes through Afghanistan, and Khelat had far more claim to be called the "Key of India."

Panj-deh.—Professor Arminius Vambéry, Corresponding Member of the Scottish Geographical Society, writing from Budapest University, March 1, to the *Times*, says :—"From various reports in the papers I see that the Russians claim Sari-Yazi (*i.e.* the Yellow Plain) as their own, declaring this station on the road to Panj-deh, as well as the last-named place, to be an integral part of the Turkoman district of Merv. In order to find a legal basis for this assertion they pretend that Panj-deh, as well as the whole tract of country extending from Maruchak to the oasis of Merv, was formerly incorporated by the Khân of Khiva into the Turkoman country, and that consequently the Russians, as the actual possessors of Merv, have the right to look upon Panj-deh as their own property.

"Such an assumption is utterly false, and might easily lead to great misunderstandings. The fact is simply this. In the time of the Khivan ruler Allah-Kuli Khân (1826-1841) the Uzbegs of Khiva had succeeded in extending their forays from the Turkoman country to the Upper Murghâb, and had forced a large portion of the Jemshidis, then subjects of Afghanistan, to migrate to Kokcheg, in the Khanate of Khiva. On that occasion the Uzbegs had penetrated even beyond Panj-deh, as far as Bala Murghâb, but they returned at once to Merv without

retaining any of the said places. The same happened in the time of Muhammad Emir Khân (1843-1855); and, since forays or temporary inroads in a country cannot be taken for a permanent conquest, the Upper Murghâb—neither Panj-deh nor even Sari-Yazi—cannot be looked on as belonging to the Turkoman country, *i.e.* to Merv; and the Russians are again drifting into one of those dilemmas which are based upon the principle, 'My will is my right.' As far as I know, the boundary of the Merv oasis towards the south never extended beyond Baba-Gömbez and Yolöten, and this may be proved by the Persian saying current among the Jemshidis, '*Guzesht er Yolöten*'—viz., 'He is gone beyond Yolöten'—*i.e.* he is fallen into the captivity of the Turkomans."

Panj-deh and its Vicinity.—Major Holdich, R.E., chief of the Geographical Section of Sir Peter Lumsden's Commission, in the latest notes sent home by him, describes the country which is now the scene of operations. He says:—"Five miles south of Pul-i-Khisti, the hills on the right bank of the Kushk river cease trending away round to the left of the Murghâb river, and leaving a well-defined delta to fill in the fork between two rivers. This delta is a kind of steppe, for the rivers run in narrow valleys some hundred feet below it, and out of this valley rises Ak Tapa. The top of Ak Tapa is on a level with the steppe. Ak Tapa is distinctly the strongest and most strategical position in the country. It dominates all the roads to Herat, which diverge from the head of the Kushk and Murghâb rivers, and it bars the way to the entrance of the two finest and most fertile valleys north of the Paropamisus. The Murghâb is a deep and impassable river near Ak Tapa, between 50 and 70 feet wide. The ruins of the old Panj-deh fort are some five miles north of Ak Tapa on the left bank of the Murghâb, and the new fort is a mile further north. The latter is not remarkable in any way." Dash-Kepri, mentioned by General Komaroff, is in the vicinity of Band-i-Nadur, where there is a dam across the Murghâb. Concerning Maruchak, on which place the Afghans fell back when driven from Panj-deh, Major Holdich says it is the only place of importance between Panj-deh and Bala Murghâb. There is the largest fort there that he has ever seen, and the remains of a brick bridge that could be reconstructed. Bala Murghâb is some distance south, 41 miles from Panj-deh. It has a fort in a very good state of preservation, which is occupied by the Amîr's troops. Concerning Herat, Major Holdich says it could be invested without much difficulty. The villages, affording capital cover for an enemy, cluster round it right up to the foot of the mud walls.

The Lena Expedition.—The *Globus*, No. 15, gives the following, on the authority of the *Novoe Vryema*:—"Nikolai Jurgens, the leader of the Lena Expedition, arrived towards the end of last December in St. Petersburg. The Lena is one of those expeditions sent in the year 1882 for the purpose of taking magnetic and meteorological observations, and pursuing other investigations, in various regions of the far north. Russia fitted and sent out two expeditions, one to the west coast of Nova Zembla, and the other to the mouth of the Lena. The tasks of the Lena Expedition were of a more difficult nature, both for climatic reasons and on account of its remote destination and the difficulties of travel. The members of the expedition successfully carried out for a whole year the work with which they were intrusted, and even wished to remain for another ten months. They were unable to remain to the close of the second year, as it would have been quite impossible to transport their instruments and other equipment from the mouth of the Lena to Yakutsk, for which purpose it was necessary to take advantage of the short summer in order to reach the waterway to Yakutsk. On the 26th of June 1884, therefore, they left their position at the mouth of the Lena. All the members of the expedition enjoyed good health,

and there were no deaths. The first part of their work, whilst engaged in erecting their huts and instruments, was especially difficult. The expedition did not experience the extreme cold that was anticipated, viz., −50° Celsius (−58° Fahr.). In calm weather, a lower temperature than that experienced would have been bearable enough, but there were continuous winds, which made the cold more trying. The long Polar nights were also very tedious ; and the damp cold summers were by no means agreeable, for the sun scarcely ever shone, and the temperature only on one occasion rose to +12° Celsius (+53°·6 Fahr.). Under such conditions the vegetation of this region could not be otherwise than very scanty—indeed, scarcely anything but moss is to be found. In the neighbourhood of the island of Sagastyr, there are no regularly inhabited places, only Yakuts occasionally visit there for the fishing. When they took up their quarters on Sagastyr for the purpose of taking observations, they believed that this was the northernmost part of the Lena delta, but later explorations discovered the existence of an island called Dunay, which was still more northerly, being in 74° of north latitude. The geographical explorations carried out will add much to the cartographical information of that district. One member of the expedition, Dr. Bunge, remained behind in Siberia to explore during the current year the territory of the river Jana ; and next year he will give his attention to the Siberian islands."

Bridge over the Jordan.—In February of this year, the first bridge built over the Jordan in modern times was opened for traffic in presence of the Governor of Jerusalem, the military and civil authorities of the neighbourhood, the heads of various religious communities in Jerusalem, and numerous Bedouin sheikhs. The bridge crosses the river near the ruins of Jericho ; it is solidly built of wood, and is 140 feet long by 16 wide. From the reports of early Christian pilgrims, there would seem to have been a bridge there in the seventh century, but it has long vanished without leaving a trace.—*Das Echo*, 13th March.

The Proposed Railway between Burmah and Siam.—Mr. Holt Hallett, C.E., F.R.G.S., has arrived in London from his journey of exploration through Indo-China and the Shan States. Mr. Hallett has laid the results of the expedition and the scheme of Mr. Archibald Colquhoun's proposed railway to connect Burmah and Siam before the King of Siam and Lord Dufferin, pointing out the material advantages to trade which would follow the construction of the line, and the important political effects likely to be produced. The Siamese authorities are willing to make their section to our frontier, and the surplus paid by British Burmah into the Indian Treasury in one year would, according to the *Times*, suffice for the construction of the remaining section of this great work, while the expenditure would be most remunerative. On April 13th, Mr. Hallett delivered an address on "Railway Extension to South-West China and Siam," before the London Chamber of Commerce, at a special general meeting held in the Cannon Street Hotel, London. Mr. Hallett said the reasons for instituting the exploration were :—(1) The existence of an important field for commerce in Indo-China and the Chinese South-West Provinces ; (2) The desire to test the feasibility of opening out this field by means of a main line of railway to connect Bangkok, the capital of Siam, with the Siamese Shan States, and ultimately with South-West China, and the practicability of connecting this main line at some point with one or more of our seaports in British Burmah ; (3) The favourable opinions said to be entertained by Siam towards opening up the country by means of a railway, and its connection with British Burmah ; (4) To collect information about Siam and its Shan States, regarding which great ignorance existed, practically nothing having been learned since the journeys of Macleod and Richardson, on their Government missions in

1836-37. Proceeding to portray the physical features of the country and the reasons which had weighed with him in the selection of the route he proposed for the projected railway, Mr. Hallett observed that the rivers of Indo-China in their upper courses resembled in their character the rivers of China. The Saluen, the Thoungyin, the Mainglungyi, the Meh-nam, and their branches, all passed through gorges at certain portions of their course, and it was to escape these gorges, or the necessity of crossing ranges of hills to escape them, as well as for certain other reasons, that they had been led to choose the railway system which they had submitted to the King of Siam. The great mass of the population in Siam resided on the banks of the deltaic branches of the Meh-nam River. No fewer than 288 villages were passed between Raheng and Bangkok, and for many miles the villages and towns were conterminous. In the Siamese Shan States of Zimmé, Lakhon, Peh, Nan, and Luang Prabang the population was not only distributed along the streams, but villages were scattered in great numbers over the plains. Missionaries who had resided in Zimmé (Cheang-mei) for many years put the population of the Siamese Shan States alone at between two and three millions. The gross population of Siam, including the tributary Shan States, might be approximately taken at seven and a half million souls. One of the most remarkable features of the Shan States was the great size of the fertile and well-watered plains, running generally in a north and south direction. The Kiang Hsen plain could be traversed in a straight line for a twelve days' journey, and must be about 150 miles in length. Since in 1881 a frontier was agreed upon, passing a few miles above Kiang Hsen, north of which the Kiang Tung Shans might settle peaceably, and south of which the country should belong to the Siamese Shans, the plain was being rapidly populated, chiefly by the descendants of its former inhabitants, who, by order of the King of Siam, had been allowed to leave their chiefs and return to the home of their ancestors. Kiang Hsen was situated on the Meh-khong or Cambodia River, about 190 miles from the Chinese frontier. This was the point at present proposed for the terminus of the main line of railway towards China ; the whole of the distance through which it would pass was in the Siamese dominions, and the branch line to connect it with British Burmah would only pass through Siamese and British territory. There could therefore be no political difficulty in the way of its construction. Mr. Hallett then proceeded to describe the railway scheme, and, on the conclusion of his address, Mr. Herbert Tritton, the chairman, moved the following resolution :—"That this meeting request the Council of the London Chamber of Commerce to urge upon Her Majesty's Government the great importance, from a mercantile point of view, of furthering in every way the establishment of railway communication from British Burmah towards the south-western frontier of China." The resolution was carried unanimously, and the meeting terminated.

China.—Much light has lately been thrown on the Celestial Empire, both by travellers and by students of the oldest Chinese literature, and doubts have been thrown on many long-established beliefs. Not long since it was usual to state the population of the Chinese Empire at a figure above 430,000,000, of which 405,000,000 were assumed to belong to China proper. Now some of the best authorities affirm that China itself has not more than 250,000,000 inhabitants, and the usual works of reference now do not give more than 350,000,000 for the middle kingdom, and 372,000,000 for the empire in its widest extent. Formerly, the Chinese people were assumed to be a homogeneous race, though ruled over by a Mantchu tribe. Now, it is recognised that the country was thickly peopled by various races ere the Chinese came thither, that the Chinese have mixed largely with one tribe in one district, with another in another, and that they are, accordingly, far from being a

pure race. Many of the hill peoples of China at the present day are not Chinese at all. M. Terrien de la Couperie identifies some of them with the Laos of Burmah. The Chinese civilisation and culture is not purely of native growth ; its elements were brought from Western Asia—perhaps from the neighbourhood of the Aral—by the Chinese ere they set out for China. Professor Douglas is even disposed to admit the arguments for connecting early Chinese culture with that of the Akkadians of Babylonia. The Muhammadans of China may still amount to 30,000,000.

Formosa.—M. René Allain, in a paper read at a recent meeting of the French Geographical Society, took occasion to make some remarks on the subject of the period at which the Chinese first became acquainted with this island, and their subsequent colonisation of it. He disputed the correctness of Mr. Wells Williams' statement in his work *The Middle Kingdom*, that "Formosa was unknown to the Chinese prior to the year 1403 of our era, that is, at the commencement of the Ming dynasty." In support of his statement, M. Allain cited the testimony of Hervey de St. Denys, as also that of Rosny, and of the geographical scholar Ma-to-nan-lin, author of a geography a copy of which exists in the *Bibliothèque Nationale* of Paris. Shortly before the Christian era and the conquest of China by the Mongols, under the Han dynasty (202 B.C. to 226 A.D.), Formosa was already mentioned—with contempt, it was true—as the country of the Southern Barbarians, which Klaproth incorrectly believed to be the generic name of the Formosans. The Chinese first visited the island in 605 A.D., and an expedition was sent there in the following year, during the Sui dynasty. Ma-to-nan-lin gives to the island at this period the name of Liu-kiu, which explains the pamphlet published by the Marquis d'Hervey de St. Denys, of the Institute. At the time of the invasion of China by the Mongols, in the fourteenth century, several colonies were established in Formosa, which was still called Great Liu-kiu ; in the sixteenth century it was named Tai-wan (high peaks), by which it is still known to the Chinese. At about the middle of the seventeenth century, on the occasion of the Manchu invasion of China, the colonists were recalled, when a Chinese adventurer, known to Europeans chiefly under the name of Koxinga, took possession of the island on his own account in 1661, and retained it until 1683. Afterwards, a regular colonisation was undertaken by the Chinese from the provinces of Fo-kien and Quang-tung.—*La Gazette Géographique.*

The Frequency of Earthquakes.—In the latest volume of the *Transactions of the Seismological Society of Japan*, there is a paper by Mr. John Milne, recording the results of an elaborate series of observations on the earthquakes that occurred in North Japan between October 1881 and October 1883. For about half the empire of Japan, in two years—the first being a year in which earthquakes were frequent, and the other one in which earthquakes were few—387 shocks were registered without the aid of instruments. Had instruments been employed—to judge from the results obtained from the Tokio district—this number would have been considerably increased. For the whole of Japan, therefore, Mr. Milne thinks it may be safely asserted that on the average there is at least one earthquake a day—there may possibly be two or three. This is an estimate which some seismologists have given for the whole world, the deduction being based on earthquake calendars published annually in Europe. "If the records contained in these calendars," says Mr. Milne, "are as imperfect for other parts of the world as they are for Japan, we might conclude that in the world generally there are at least twenty earthquakes per day, or perhaps fifty." Other results obtained by Mr. Milne go in a striking manner to support certain previously observed

laws of seismic action. For instance, he finds that 84 per cent. of the North Japan earthquakes originated beneath the ocean, or on the seaboard; that earthquakes in summer were in the proportion of 278 to 109, and the winter intensity was nearly three and a half times as great as the summer intensity; that there is a close general coincidence between the maximum of earthquakes and the minimum of temperatures, the sinuses of the temperature curves, however, being usually a little in advance of the crests of earthquake waves. These and other facts are illustrated in the *Transactions* by numerous diagrams and figures, and 123 maps.

Mount Fujiyama.—T. C. Mendenhall (Columbus, Ohio) has determined the value of gravity upon the summit of Fujiyama in Japan, using a Kater's pendulum, from which one of the knife-edges, the "tail pieces," and all the unnecessary parts were removed, and an adjustable slide-piece fixed on the piece projecting above the knife-edge. A Negus break-circuit chronometer, a chronograph, and a portable transit instrument were also used. After the necessary corrections, the value of gravity on the summit of the mountain was found to be 9·7886. In Tokio it had been previously determined as 9·7984. From these values, taken in connection with certain data concerning the mountain, Mendenhall has sought to calculate the mean density of the earth. The result obtained, assuming the density of the mountain to be 2·12, gives 5·77 for the earth's density. As this is slightly above Baily's value, 5·67, the author reverses his calculation, and assuming this value, he calculates the density of the mountain, and finds it to be only 2·08; thus suggesting a deficiency in its attraction.—*Amer. Jour. Sci.* vol. xxi. p. 99.

The Malay Peninsula.—The most important paper read before the Paris Society of Commercial Geography, at its meeting on 17th March, was one by M. Delonell, the explorer of the northern part of the Malay Peninsula. He described his discovery of a large lake, during his survey of the isthmus of Krao, called Tabé-Sab, which is bordered by fertile plains, where elephants and buffaloes abound. The people inhabiting this region have hitherto been unknown; they appear to be mestizos, half Siamese, who call themselves Samsams.

AFRICA.

Official Announcement.—The Berlin *Official Gazette* publishes the following statement:—"The German and British Governments have agreed to submit to a mixed Commission, to assemble at Cape Town, the claims to private property and usufructuary rights which British subjects maintain they have acquired in the territory now under German protection between the mouth of the Orange River and Cape Frio, exclusive of Walfisch Bay, and the analogous claims of German subjects with respect to Walfisch Bay and the islands adjacent to Angra Pequena, British territory. The German member of the Commission will be Herr Bieber, the Imperial Consul-General."

French Administration in Algeria.—Consul-General Playfair's report on the commerce and agriculture of Algeria for the year 1884 contains, as usual, many items of geographical as well as of general interest. It opens ill-omenedly with the announcement that during the year Algeria had suffered "from troubles of various kinds—cholera, quarantine, commercial depression, and a harvest below the average." The colony had shared in the misfortunes arising from the embarrassed condition of the French budget, and found it necessary not only to reduce expenditure, but to raise at least eight million francs of increased revenue, and with this object an effort had been made to assimilate the customs duties to the protective tariff of France. As to the effect of this measure, the Governor-General, in his address to the *Conseil-*

Général, remarks, "foreign commerce alone will suffer, and it is not to it that our solicitude is due." Much attention is being given to projects of colonisation. "Everything foreign," says Colonel Playfair, "is in disfavour with the present administration; it is greatly concerned at the idea that the French element in the European population only exceeds the numbers of foreigners, and as there is little hope of the former being increased to any appreciable extent by immigration, every effort is being made to induce the latter to accept French naturalisation." This privilege, however, is not one highly esteemed by the Maltese, who form the bulk of the British subjects. They are devotedly attached to their own island, and not by any means anxious for military service in France, from which their British nationality exempts them. Gigantic irrigation works are being carried out, but the British Consul-General doubts whether the returns will ever compensate the cost. As to the political changes in progress, on the 1st of January 1885 nearly the whole of the remaining territory of Algeria came under the *régime* of civil law—a population of 90,000 ceased to be administered by the time-honoured Bureau Arabi, French officials being substituted for the great native chiefs. In the south of Oran, however, this is still impracticable, the construction of a railway to Machnia and Ain Sefra, through an immense region of desert and almost uninhabitable country, having had little influence beyond its immediate vicinity. The Government are endeavouring to tempt the important Saharan tribe, like the Waled Sidi Chirk, who had been in open rebellion for more than 20 years, to settle quietly down on Algerian territory. About 3600 tents have lately entered from Morocco, and these, it is hoped, may become the nucleus of a peaceful and pastoral people. Artesian wells and water-works are being everywhere extended in the extreme south, and communication along the desert routes thus rendered comparatively easy. The geological survey of Algeria, long suspended, has been resumed, and it is hoped that a new and revised edition of the map will be ready in 1887. One, on an exceptionally large scale, of the environs of Algiers is in course of execution, based on the map prepared by the Military Engineer, on the scale of 1 : 20,000.

Expedition to the Upper Congo.—A Committee of the Geographical Society of Vienna has been appointed to carry out the business arrangements of Professor Lenz's proposed expedition to Central Africa. It is reckoned that 25,000 florins will be wanted for the expedition. At first, it was thought that Dr. Oscar Lenz might go out as the representative of the united Geographical Societies of Vienna, Berlin, and Munich; but the Society of Berlin has decided to send out an explorer of its own, Dr. Fischer, who will start next month. Dr. Fischer will go for the same purpose as Dr. Lenz—that is, to explore the watershed of the Upper Congo, and to find traces of the four missing Europeans, Emin Bey, Dr. Junker, Captain Cassati, and Mr. Lupton; but instead of starting from the West Coast, as Dr. Lenz proposes to do, he will proceed from the East Coast, going from Zanzibar to Uganda. Dr. Lenz will leave Vienna in May.

The Exploration of the Kasaï.—It is beyond doubt that the Kasaï is the most considerable of the great tributaries of the Congo. It has its sources in about 12° of S. lat., not far from the sources of the Kuanza, the Kuango, and the Leeba, an affluent of the Zambesi. The upper part of its course is already known, thanks to the explorations of Livingstone, Magyar, Buchner, Schutt, Wissman, and Dr. Pogge. The last-named explorer has touched the most northern point of its course, near 5° of S. latitude, at the confluence of the Lulua, one of the great affluents on the right. With respect to the lower part of the river, it has all to be explored: we do not even know under what name or at what particular point it enters the Congo. At the time of his first journey in 1877, Stanley thought it might be

identified with the Ikelemba, which flows into the Congo a little north of the equator. Afterwards, however, he gave preference to the Lulemgu, which debouches more to the north. Lieutenant Van Gèle inclines to think it the Ruki, another great affluent which joins the river at the distance of some kilometres from the station at the equator. If one or the other of these theories is verified, as is likely, the Kasaï would have a total length of about 1200 miles. A letter lately received in Brussels announces that the expedition of Lieutenant Wissman, in the service of the International Association of the Congo, had arrived in safety at Molemba, on the Chikapa, on the 12th of October last, and that the expedition was expected to reach the Kasaï five days afterwards. Lieutenant Wissman left Europe in November 1883, followed the month after by his colleagues, the two Lieutenants Meyer and Dr. Wolff. The object of his expedition was the exploration of the lower course of the Kasaï, and the unknown territory which the river traverses. In the following February, the members of the expedition met at Malangé, a small Portuguese station on the Upper Kuanza, not far from the colony of Angola. Here the elder of the Meyers, shortly after his arrival, died from dysentery. Just then Dr. Pogge arrived at Malangé, on his return from his great journey across the kingdom of the Muata-Yamvo. On his way back he had made an excursion to where the Lulua falls into the Kasaï, and in his report he says, "The whole way is composed of almost impenetrable virgin forests. I have also learned that, for a great distance down, the banks of the Kasaï are fringed with similar forests of great density." The unexpected return of the caravan of Dr. Pogge was very opportune, as it enabled Lieutenant Wissman to organise his own under favourable conditions, because each carrier returned with a small fortune in gum and ivory. Without delay they were all re-engaged, and, what was more important, the two interpreters on the previous journey decided to take service again. The expedition was organised in the beginning of July 1884. Four hundred carriers were engaged, and carpenters and mechanics completed the staff of white men, among them being the carpenter Busihlah, who, in 1880, descended the Kuango with Major Méchow. The expedition carried a canoe made of steel, capable of holding from ten to twelve men. The departure from Malangé took place on the 17th July. From Kuango to Kasaï, the route followed by Lieutenant Wissman was very much the same as taken in their return journeys by Buchner, Schutt, and Pogge. He went by Kabembo and Kabocco on the river Luchiko. Arrived there, Lieutenant Meyer with a dozen men descended the river in the direction of Kumbana, and the rest of the expedition, instead of proceeding towards Kaungula, in the east, took a north-easterly course, striking the old route at Muene-Tombé, on the river Chikapa. It is from this spot that Lieutenant Wissman writes, under date the 12th October. On his arrival at the Kasaï, Lieutenant Wissman will follow the course of the river to its confluence with the Lulua, where he will establish a base of operations. He will effect a treaty with Lukengo, king of the Bakuba, erect a station on the banks of the river, which he will leave under the protection of three white men and a certain number of soldiers, and, by means of a small flotilla of canoes, which will be constructed by the carpenters of the expedition, he will follow the whole course of the Kasaï to its confluence with the Congo. Lieutenant Wissman writes that he expects to reach that point towards the beginning of April. —*Le Mouvement Géographique*, April 5.

The Stevenson Road between Lakes Nyassa and Tanganyika.—This road of 220 miles was begun by the late James Stewart, C.E., the devoted missionary and scientist, who fell a victim to the fever of the lower lands, and lies under a baobab tree, not far from the head of Lake Nyassa. He was succeeded by Mr. W. O.

M'Ewan, C.E., another zealous Scotsman, to whom the Royal Geographical Society awarded the Cuthbert Peek grant for 1884, "in testimony of the zeal and ability he has shown in qualifying himself, under the Society's instructor, as a geographer and astronomical observer." From letters written at the end of 1884, from the plateau between the lakes, at the Free Church of Scotland's furthest mission station of Mwiniwanda's, we make this extract :—"This has been a bad year on the Shiré, and my great curiosity is to know how all these circumstances affect the minds of the folks at home. A lot of property has been lost in the war, and 'the road' has come in for its share of trouble. . . . From the beginning to the end of the season the Atonga have worked and behaved splendidly, and we will give them a good character. Before paying the men, we asked for volunteers to go with us to Tanganyika next month, and we were much surprised and more delighted when the whole nineteen gave in their names, most of them good solid men. The workers were divided into certain messes, according to the villages from which they came, and we had a representative for nearly every mess. All the Man-ganja (from Livingstonia and the river Shiré) are going with us, so you see we are on very good terms with our men. Our experiment of bringing up the Atonga, and thus making ourselves independent of local labour, is, I think, a success. We have constructed over 16 miles of road, through ground heavier than the average, in eleven weeks, at a total expenditure (including wages, food, steamer passages, etc.), of under £70, exclusive, of course, of all expenses in connection with white labour. Besides that, we have maintained and repaired four miles, at a cost of £5. Our plans for the season's work will depend much on the result of the Tanganyika reconnaissance."

News of Serpa Pinto.—The Portuguese Minister of Marine has received two telegrams from this enterprising traveller. In the first he states that he has arrived at Ibo, without any loss of his men, after having traversed more than 240 miles of very difficult country, in which he has accomplished important work, and that he would forward his report and maps by the next mail ; in the second despatch he announced his departure on 10th March with 350 porters for Lake Nyassa.—*La Gazette Géographique*, 19th March.

Cameroons.—With reference to the ascent of Great Cameroon by Dr. Zöller, described in the *Scottish Geographical Magazine*, in which the latter stated that he had not discovered the *solfatara* mentioned by Burton, the *Athenæum* publishes the following letter from Captain Burton :—"As regards the *soufrière*, I carefully described it in my volume (p. 206), and forwarded a canister full of the burning sand and sulphur to the Geological Museum, Jermyn Street. For the evidences of recent volcanic activity, see page 208. On May 22, 1867, Mr. Frank Wilson, who is now in London, wrote to me :—'You will be interested to hear that on the 15th of May, and three following nights, Cameroons was observed to be in eruption. A stream of lava was distinctly seen running down for a considerable distance from a point somewhere lower than the peak on the Fernando Po side. Flames issued from the same source as the lava, and appeared as if shot out horizontally, "like the flame from a blowpipe," as one of the Spanish officers described it to me.' It would seem that these last visitors belong to Gibbon's extensive family of 'blind travellers ;' they certainly contrast sharply with their only too wide-awake countrymen."

New Port in Liberia.—In consequence of a decision of the Legislature, the President of Liberia has ordered the creation of a new port situated to the south-west of the river Cavally, in the county of Maryland, which will be open to inland and foreign commerce, subject to the laws and regulations which govern the other ports of the republic.—*La Gazette Géographique*, 19th March.

AMERICA.

Prehistoric Researches in Indiana.—Material of high interest to the geographer as well as the palæontologist and archæologist will be found in the State Report on the Geology and Natural History of Indiana for the year 1884, as a few gleanings from it will abundantly show. In the report on the Topographical Survey of Hamilton County, an account is given of the early settlement of this part of the State, originally the home and headquarters of the Delaware tribe of Indians, and also of a race of an antiquity which goes much higher than the days of the Delawares—the "the mound-builders," who have left numerous traces of their arts and dwellings in the vicinity of the anomalous mound and circular embankment at Strawtown. It is remarked that "it is possible that the circle dates back to the period of the mound-builders, and that the Delawares took advantage of it to build their stockade on, and made a ditch to strengthen their palisades." The ditch has been filled, and the embankment reduced much by recent cultivation. In the adjoining Madison County is a spot with a piece of history attached to it of more than local interest—Pendleton, where, in 1824, the sentence of the first regularly constituted court of these parts was carried out on three white men who were guilty of an atrocious massacre of peaceable Seneca Indians. "So far as my reading informs me," says Dr. R. T. Brown, the author of the *Survey*, "it is the only instance since the formation of the United States Government where white men were hanged for killing Indians." Madison County also contains remarkable relics of the Stone Age, perhaps the best-preserved works of the mound-builders in the United States being found here. That the extensive remains at "Old Fort," and elsewhere, belonged to a race which used no metal tools is "inferred from the numerous stone implements collected in the vicinity, and the absence of anything metallic, even copper ornaments." In spite of the investigations that have been carried out, the object and purpose, as well as the age, of these singular clay banks and mounds continue to be problems almost as insoluble as ever, though there are indications that "suggest the idea of sacrifice, and tend to confirm the suspicion of a religious use. Whatever may have been their use," continues Dr. Brown, "these works were not constructed by sparsely scattered savages who lived by the chase, nor by nomadic tribes that lived a pastoral life. The country must have been densely populated by a race inured to labour and skilled in the art of design." On behalf of Science, he makes an earnest appeal to the public to secure these memorials of a forgotten past from the destruction which may come on them any day while they remain the property of private individuals. A letter from Mr. John P. Reasoner describes a partial examination which he made in November 1884 of the "University Cave," in the lower carboniferous limestone at Greencastle, Putnam County, the earth-covered floor of which it is proposed to search for the remains of extinct and recent vertebrate animals and relics of man. Referring to the Wyandotte Cave, in Crawford County, Indiana, which he says is more extensive and beautiful than the more familiarly-known "Mammoth Cave" of Kentucky, Mr. Collette remarks:—"The Wyandotte is estimated by recent explorers to contain 53 miles of travel, going and returning. The magnitude of its rooms, with their step-like 'domes,' has no counterparts in the rooms of other caves. The gorgeous calcic decorations of its halls and galleries, for brilliancy and effective imagery, are unequalled by the grottoes of the fabled genii. Had America been inhabited by a race of Troglodytes, they could have formed houses in the cavernous limestone of Indiana, and become a populous race, but, like the *Amblyopsis* and other denizens of the caves, become non-seeing." Admirable papers on the glacial drift deposits and the postpliocene vertebrate remains in the State are furnished by Dr. J. S. Newberry, and Professors E. D.

Cope and J. L. Wortman. From the materials of their research, Messrs. Cope and Wortman attempt an imaginative reconstruction of a landscape on the banks of the Ohio, "in the misty twilight of long ago," with a grouping of the more prominent animals:—"Huge mammoths and mastodons would have been seen loitering near the water's edge, or lazily browsing on the neighbouring trees; herds of horses, giant bisons, and elk grazing upon the adjoining hills, while numerous smaller species of ruminants would be seen in their appropriate places; the tapir, peccary, and peccary-like platygonus would have been found in the dense growths of the swamps and marshes; the mighty sloths and castoroides would also contribute to the scene; while, lurking in the background, the stealthy lion and wary wolf ready to pounce upon their victims. Whether this scene was ever beheld by human eyes is a matter which yet lives in the shadows of uncertainty, but it is possible that man was there in all the nakedness of his primitive barbarity."

"**Cicero Creek,**" **Indiana.**—Here is a curious "place-name" note on Cicero Creek, which drains 150 square miles of the north-western part of Hamilton county, Indiana, contained in the Geological and Topographical Survey of the district for 1884, by Mr. Rylant T. Brown:—"The naming of the smaller streams was the duty of the surveyor of public lands. In the year 1820, Dr. William B. Laughlin was employed in the lineal survey of Township 19, Range 4, the lines of which frequently crossed the creek. Now, Dr. Laughlin was an educated Scotsman—a literary and medical graduate of Edinburgh University, and almost insanely fond of the classics; but, like many other scholars, he was not a notable success in his profession, and was now in the employ of the Government as a surveyor. His eldest son, whose name was Cicero, was attached to his company of surveyors. A heavy rain had swollen the streams, and made it difficult to cross them. The backwoods expedient for making a foot-bridge, by felling a tree across the creek, was resorted to, and Cicero Laughlin, in crossing, missed his footing, and fell in. He was with difficulty rescued in a nearly-drowned condition. From this incident Dr. Laughlin called the stream Cicero's Creek; but in process of time the sign of the possessive, or, as the Doctor would have said, the genitive, was dropped, and the stream is now known as Cicero Creek."

Key West.—A Special Correspondent, W. R. L., has been contributing a series of very interesting letters to *The Courant*, descriptive of various places in the United States. From the letter printed April 24th we extract the following:—"Key West is a quaint, dirty, dusty, but withal flourishing little town. It has given up wrecking, and lives on cigars, of which it has no fewer than eighty factories. They employ four or five thousand hands, nearly all Cubans. It was the American tariff which brought them over. While the raw tobacco has to pay only 50 per cent. duty on its value, the manufactured article is taxed about 100 per cent. on cost of production. The Cuban manufacturers saw their opportunity, and migrated to Key West, the nearest point of American territory. There they import the tobacco leaf and convert it into cigars, the reputation of which has grown rapidly of late years. Key West brands are now running the real Havanas very close, not only in the North, but in Europe. The New York makers have found it necessary for the protection of their trade to open branch establishments here, where they have the advantage of superior labour, and also of a Key West brand. But if the pending treaty of commerce with Cuba should be confirmed by the American Senate, it will strike a hard blow at Key West, as the discriminating duty in favour of raw tobacco will be abolished, and the Cuban makers hope to recover their lost superiority. But Key West is one of the sensible towns which do not rush to meet trouble half-way. It grows and prospers, and 'sufficient to the day is the evil

thereof.' Should the Cuban treaty pass, Key West will have to put on a little more steam, or to cut a small slice off its ample profits. Cigar-making affords a broad margin for contingencies. The most expert workman can earn from thirty to fifty dollars a week, and his children from four to five dollars a week, as soon as they are fit to go into the factories. They have various aristocratic peculiarities, one of them being that they do no work after dinner. They start early in the morning, but at the stroke of 4 P.M. every cigar factory is emptied."

Argentine Expedition up the Pilcomayo.—At a meeting of the Geographical Society of Paris on March 20, a letter was read from the French Consul at Asunçion, in Paraguay, giving details of the expedition sent by the Argentine Government to explore the Pilcomayo, and to ascend to the Bolivian frontier, if possible. It has been found that, owing to impassable rapids, the river cannot be utilised as a route between Paraguay and Bolivia. The only practicable route is that by land—the possibility of which was recognised in 1883 by M. Thouar's expedition.

Tierra del Fuego.—The members of a scientific expedition to Cape Horn from the French Geographical Society were so deeply impressed with the good work done, in reclaiming Tierra del Fuego from barbarism, by the English Protestant Mission, that on leaving the island they handed over to the latter the large range of huts which they had erected for their lodgings, and their meteorological and magnetic observations. This was done with the cordial consent of the French Government.

Winnipeg.—The word has undergone many changes in the spelling. I give the word as printed in works from 1734 to 1833, since which last-named date there has been no change. Ouinipigon, Verendrye, 1734 ; Ouinipiduc, Dobbs, 1742 ; Vnipignon, Galissonière, 1750 ; Ouinipeg, Bougainville, 1757 ; Ouinipigon, Jeffreys, 1760 ; Ouinipique, French map, 1776 ; Winnepeck, Carver, 1768 ; Winnepegon, Henry, 1775 ; Winipic, Mackenzie, 1789 ; Winipick, Harmon, 1800 ; Winipic Pike, 1805 ; Winipic, Lord Selkirk, Winepic, Ross Cox, 1817 ; Winnipic, Schoolcraft, 1820 ; Winnepeek, Keating, 1823 ; Winipeg, Beltrami, 1823 ; Winnipeg, Capt. Back, 1833. The name is derived from the Cree words *Win*, dirty, and *Nepe*, water.—C. N. Bell, *Canadian Gazette*.

AUSTRALASIA.

New Hebrides.—The Rev. J. G. Paton has received letters direct from the New Hebrides informing him that France appears to have practically annexed the group. The commander of a French man-of-war, by the order of the Governor of New Caledonia, called on and commanded our British missionaries working on the group not to write to Australia or Britain again pleading for British annexation. The French flag has been hoisted and is kept flying on many points in the centre of the group. Our New Hebrideans have sent twelve petitions—the last on behalf of eighty-six chiefs—pleading for British annexation.

MISCELLANEOUS.

Emigration and Immigration.—A Parliamentary paper has been published dealing with emigration from and immigration into the United Kingdom during 1884. The paper consists, firstly, of a general report on the whole subject, by Mr. R. Giffen, the Assistant-Secretary of the Board of Trade ; and, secondly, of the usual tables, which show in detail the number, age, sex, nationality, and occupation of the emigrants, the ports for which they started, the amount of remittances sent from the other side of the Atlantic to their friends at home, and other matters. The main fact, which Mr. Giffen dwells upon in his report, is the great decline in emi-

gration which took place in 1884. There is a general and large decline, and this has been accompanied by an increase in immigration. The total number of emigrants for the last four years will prove this. In 1881 the total number of emigrants of all nationalities from the United Kingdom was 392,514 ; in 1882, which showed a larger total than any year before or since, the number was 413,288 ; in 1883, it was 397,157 ; and in 1884 it fell to 303,901. This is a decline of nearly twenty-four per cent. This decline in the total number of emigrants is emphasized by the increase of immigrants, which rose from 100,503 in 1883 to 123,466 last year. Thus, while the excess of emigrants over immigrants was 180,435 in 1884, it was 296,654 in 1883, and 330,484 in 1882. Indeed, last year shows a smaller excess than any since 1879. Several interesting facts relative to these 303,901 emigrants may be gleaned by examining the various tables. Thus, 203,519 of them went to the United States, 45,944 to Australasia, 37,040 to British North America, 4699 to the Cape of Good Hope, and 12,696 to other places. If we regard the sex of the emigrants, we find that there were 181,555 males to 122,346 females. This is very nearly sixty per cent. of males. That emigrants from this country are fairly prosperous in their new homes may be inferred from the fact that from 1848 to 1884 it has been ascertained that no less a sum than £29,776,977 was remitted by them from the other side of the Atlantic to their friends at home. This does not include sums sent from Australasia and other places ; and, of course, large sums must have been sent without official knowledge. In 70 years—from 1815 to 1884—the total number of persons who have left this country for the purpose of settling abroad is 10,748,893, though the conclusion can hardly be called trustworthy, as in the earlier years the science of statistics was in its infancy, and no such elaborate calculations were made as those whereby Mr. Giffen at once instructs and delights his readers every year.

A New Gaudeamus.—The *Kreuzzeitung* paper published, in honour of Prince Bismarck's seventieth birthday, a new and spirited version of the well-known dog-Latin student's song *Gaudeamus*. The praises of the *Cancellarius* having been sung, the new colonial policy is touched on, and, invoking blessings on the Chancellor's views in this respect, the chant proceeds to names and "things unattempted yet in Latin rhyme," and with a piquant geographical flavour :—

Prosperent Imperii
Nunc intratae viae ;
Valeat tellus amoena,
Camerun, Angra-Pequena ;
Vivant Coloniae !

NEW BOOKS.

Forschungen zur Deutschen Landes- und Volkskunde, etc. Herausgegeben von Dr. Richard Lehmann, 1, 2 : Die Oberrheinische Tiefebene und ihre Randgebirge von Dr. G. R. Lepsius. Stuttgart : J. Engelhorn, 1885. Pp. 92, and Map.

On the occasion of the "Geographentag" at Halle in 1882, a Commission was appointed to prepare a "Wissenschaftliche Landeskunde von Deutschland." It was stated, at the time, that in Germany foreign and distant parts of the globe were better known than the Fatherland, but that it was both a scientific and national duty to pay greater attention to one's own country, and especially to one's immediate surroundings. Many papers and essays were written, it was true, but they were

shelved among the innumerable publications of different societies, and thus lost to the majority of readers. The chief task of the Commission was to collect these papers, and those interested in promoting the aims of the Commission were invited to send in the titles of any which answered the purpose, but more especially those written during the present century. Their sphere of work was not limited to Germany alone, but embraced those countries in which German was the national language, or so generally spoken as to have a place in their literatures. In a comparatively short time, sub-committees were formed in various parts of Germany, which assisted the Commission in compiling a bibliography; and, shortly afterwards, the publication of scientific monographs was undertaken. *Forschungen zur Deutschen Landes- und Volkskunde, etc.*, is one of them, and it is also proposed to publish *Kleine Einzelforschungen zur Deutschen Landeskunde*. It may not be uninteresting to give a few particulars in regard to these monographs. They will have reference both to the geography and ethnography of the country. It is intended to publish essays on the structure and formation of the soil; the fossil treasures, and how to obtain them; on climate and hydrography, plants and animals; on all anthropological and ethnographical questions; on surveys, cartography, and the history of geography—in short, on all subjects which in Germany are considered to come within the province of geography. Such a vast undertaking may raise fears of a mere chaotic collection of essays, but the Commission promise due regard to proportion and connection in the material thus gathered. To instance an example—we quote from their programme—the geological structure of a landscape will not be treated without explaining at the same time the configuration of the relief and the composition of the soil, and without, at least, hinting at the consequences resulting from these two component parts in as far as they affect the organic world in the district under discussion, especially in regard to sociology. In like manner, essays on nationality, and the distribution and migration of the peoples, will have for their object the discovery of the intrinsic connection between these subjects and the nature of the country, as well as of ethnography and history. Though written by different hands, and therefore from different standpoints, these essays will form parts in the final structure raised by scientific investigation, a monument of the native country and of the individual character of its inhabitants. From this it may be inferred that the papers will not be such as are only interesting to specialists, but will appeal to a far wider circle of readers, though, at the same time, all references to authorities will be given for the benefit of those who desire to institute a closer inquiry. This programme is admirable in regard to its comprehensiveness, but for this very reason, if for no other, it is very questionable whether it can be fully realised. It would, however, be difficult to judge of the work as a whole from the single specimen under review, and we therefore reserve our criticism until others appear.

Report on the Egyptian Provinces of the Sûdan, Red Sea, and Equator. Compiled in the Intelligence Branch, Quartermaster-General's Department, Horse Guards, War Office. Revised up to July 1884. London: W. Clowes & Sons, and other Booksellers, 1884. Pp. 275. Map. *Price* 3*s.* 6*d.*

This valuable report, owing to its official source, is a welcome addition to the mass of literature now being published on the subject. In arrangement, there is, of necessity, some little repetition of the matter, but the form chosen is perhaps the best. It commences with an historical sketch of the events in the Sûdan, omitting, for high politic reasons, the enumeration of recent events. As stated in the introductory remarks, the geographical, geological, and topogra-

phical characteristics have been treated in Chapter II. with special reference to tribal distinctions, general resources, food and water-supply, products, and climatic considerations. Chapter III. is a report on towns, only those of primary importance being included. Chapter IV. deals with the navigability and general adaptability as a waterway of the Nile, with its tributaries. Statistical and general information follows; and, finally, in considering the question of communications, Khartûm is regarded as the objective, and the various routes from Lower Egypt and the Red Sea are grouped under four different heads. The map (scale, 1 : 2,253,080 or 35·56 miles to 1 inch) represents the Egyptian Sûdan.

Reiseeindrücke und Skizzen aus Russland. Von Th. von Bayer. Mit 6 Illustrationen und 2 Karten, 1885. Stuttgart: J. G. Cotta. 8 *Marks.*

As this work is dedicated to the "Königen Mutter, Marie von Bayern, in dankbarer Liebe und Verehrung," the public will not be surprised to learn that its author is a Princess of Bavaria. Though it cannot be compared to the volumes on the same subject by Leroy Beaulieu and Mackenzie Wallace, the book possesses very considerable merit and deserves attention. The author, who seems scarcely to have digested the works from which she makes such numerous quotations, nevertheless gives us in a series of essays some very pleasing and interesting matter, which is not devoid of scientific value. It certainly is the best of recent German publications on the same subject, and is far superior to the ordinary geographical works so largely advertised.

On the Track of the Crescent. By Major E. C. Johnson, M.A.I., etc. Hurst & Blackett, 1885. With Map and Illustrations.

After visiting Athens and Constantinople, the author travelled from Varna through Roumania to Pesth, and thence into Transylvania. Except in the last part of the journey, he does not leave the railway or Danube line, but he is an observant traveller, and the personal narrative is amusing.

Si-yu-ki: Buddhist Records of the Western World. Translated from the Chinese of Hwen Thsiang (A.D. 629). By Samuel Beal, B.A., Professor of Chinese, University College, London, Rector of Wark, etc. In two volumes. London: Trübner & Co., 1884. 24*s.*

Since 1858, when M. Stanislas Julien published his French version of the *Si-yu-ki*, Orientalists have been familiar with this work of the famous Chinese pilgrim, who in the year 629 A.D., at the age of thirty, set out from the province of Ho-nan, and, undeterred by all difficulties and hardships, made his way through Central Asia by Tâshkand and Bâmiyân to Peshâwar and into India, in order to question the sages of the Buddhist faith on points that troubled his mind. There he spent about fourteen years studying the sacred Sanskrit language and learning from the great teachers of Buddhism. During this period he wandered over nearly the whole country from Kashmîr and Nepâl to Kanchipur, south of Madras, and from Asâm and the Brahmaputra to Gujarat and the Indus. In his *Records* he gives an account of 138 provinces or states into which the country was divided, of which he visited all except about twenty, with descriptions of them and of all the localities particularly sacred in Buddhist legend. On his return from India, in 645 A.D., he crossed the Pâmîr and through Kâshgar and Khotan, bearing with him sacred relics, images, and a great collection of books carried on twenty-two horses. The remaining nineteen years of his life were spent in the translation of his literary acquisitions, of which no less than seventy-five are still included in the great Chinese collection.

The *Si-yu-ki* is a work of special interest: to the student of the Buddhist religion it is of immense importance, illustrating, as no other known book does, the condition of that religion in India in the seventh century; but to the geographer and historian it is of quite equal value, from the data it affords for the map of India and the chronology of its dynasties and its literature at the same epoch, and it has given rise to not a few elaborate treatises devoted to the illustration of his itinerary. The translator—an accomplished Chinese scholar—has conferred a boon on the English reading public at home and abroad by his fresh rendering of this work direct from the original, and by the abundant commentary he has added in the shape of foot-notes—philological, historical, geographical, etc., etc., many of them bristling with references to all that has been written on the points under notice.

To this version Mr. Beal has also affixed a new translation of the *Fo-kwö-ki*, or travels of Fa-hian, who in the beginning of the fifth century had made a similar pilgrimage to India, and of the mission of Sung-Yun, who was sent in 518 A.D. by the Empress of the Northern Wei, and went as far as Peshâwar. The narratives of both these earlier travellers are short, occupying, with a few brief footnotes, only 86 pages of the Introduction. A sketch map, unfortunately on rather a small scale, illustrates the geography, and an Index of 43 pages in double columns, by Dr. J. Burgess, forms an indispensable accompaniment to such a work.

Madagascar and France, with some Account of the Island, its People, its Resources, and Development. By George Shaw, F.Z.S., London Mission, Tamatave. With many Illustrations from Original Sketches, and a Map. The Religious Tract Society, 1885. *Price* 6*s*.

To the general reader, perhaps, Madagascar is less known than any other island of even much less size on the globe; yet this great island, 970 miles in length by 300 in breadth, having an area of 225,000 square miles, with its great central plateau 3000 to 4000 feet high crowned by mountain ridges and peaks 8000 and, in one instance, 8950 feet high, is well deserving attention. We have no such work in English as Grandidier's voluminous *Histoire Physique, Naturelle, et Politique de Madagascar* to stir up our interest in it, and therefore such small but instructive volumes as Mr. Sibree's *Great African Island*, and this of Mr. Shaw's, should have the readier acceptance with us. This latter is an unvarnished statement of facts and experiences, told rapidly, without any attempt at fine or imaginative picture-painting, but perhaps on that very account all the more fascinating and instructive. The general description of the geographical features of the island is told briefly but clearly, and leaves a more distinct impression on the mind than a more laboured attempt would perhaps have done. The civilisation and manufactures are equally rapidly and succinctly disposed of; the chapter on the origin of the Malagasy is cautious but scientific; that on the present civil and religious state of the people is most interesting, as are those on the fauna, flora, and meteorology of the island. In one of these the question is raised—What interest has England in Madagascar? By the Treaty of Paris, May 30, 1814, Madagascar was retained as a dependency of Mauritius by the British, and, though M. Lozier afterwards protested that it was not specifically named, Sir R. Farquhar, our first Governor of Mauritius, held by it, and finally, in October 1817, all our possessions or claims upon it were handed over to Radama I. But Mr. Shaw answers his own question thus:—"Commercially Madagascar is of great importance to Englishmen. Not only is the demand for English iron and cotton goods, glass and crockery, becoming each year greater and more remunerative, but, as has been shown, the island can produce very many products in great and constant demand in this country. There is in Madagascar an unknown wealth of mineral productions, which is but waiting the establishment of

confidence with Europeans on the part of the native Government, so that mining operations might be undertaken, and a fair outlay of English capital more than fully repay the capitalist" (p. 209). "The English trade is about five times the value of that of the French, who are surpassed considerably by the Germans, although the latter are represented by but one or two firms;" and "the proportion of British to French settled there is said to be as five to one" (p. 210). "Apart from present disturbances with the French, there is no reason why coffee, rice, vanilla, spice, sago, and fibre planting should not be carried out on a large and highly profitable scale; while the vast extent of prairie and pasture land presents a tempting prospect for the formation of cattle ranches in a country where fat oxen can be purchased for three dollars and upwards, according to the district" (p. 118). The great evil in Madagascar has been the import from Mauritius and Bourbon of vile rum manufactured from molasses and the refuse from the sugar mills, and so crude that it can be retailed at from 4d. to 6d. a quart at Tamatave. In the last commercial treaty with America our cousins have shown themselves the most noble with whom the Malagasy have had to deal. They stipulate that with regard to these alcoholic liquors the Malagasy Government "may regulate the importation according to its pleasure, or prohibit the importation altogether, . . . or make it a misdemeanour to sell or give such liquors to certain classes of its subjects." Contrast this with the selfish, ungenerous, rum treaty with Britain, which stipulates that "spirits of all kinds may be imported and sold in Madagascar by British subjects on payment of the same duty as that levied by the Malagasy excise laws upon spirits manufactured in Madagascar;" and this again hedged and protected by provisions in favour of the British importer of what the native Government would give anything to keep out of their country as the baneful demoraliser of its subjects.

Some chapters are naturally devoted to the recent French claims—too like those of Russia on Afghanistan—and their pitiable results, in which the author was a serious sufferer. These events are told in a plain, unvarnished, straightforward way, worthy of a brave sensible Englishman, which enchains the reader's attention, and reveals the characters of such Frenchmen as MM. Baudais, Le Tembre, Raffray, and Admiral Pierre: one can only hope, for the honour of humanity as well as of France, that there are few more such men in the official service of any nation calling itself civilised. It is the "utterly barbarous" Malagasy that seem to have shown the only traits of true dignity, humanity, justice, and nobility in the transactions of 1882.

The naturalist will find much to interest him in the descriptions of the various lemurs, the Aye-aye, and the notice of the enormous Æpyornis—now extinct, but which was probably the *rukh* of Marco Polo.

Das Wissen der Gegenwart. Band. xxxvi. und xxxvii. Das Kaiserreich Brazilien. Von H. W. Sellin, ehmaligen Koloniedirecktor in Brasilien. Mit Illustrationen und Karten. 1885. *Preis per Band, gebunden*, 1 *Mark.*

These volumes are a valuable addition to the geographical works being issued by Herren G. Freytag and F. Tempsky at Leipzig and Prague respectively, who are publishing a series of works dealing with all branches of science. The author, from his official position, has had exceptional facilities for procuring statistical information, and for that reason, if for no other, his work should be reliable.

Bilder aus Brasilien. Von C. von Koseritz. Mit einem Vorwort von A. W. Sellin. 19 Illustrationen. Leipzig und Berlin: W. Friedrich, 1885. Pp. xvi, 379. 9 *Marks.*

It was not the intention of the author, it appears, to write a geographical work,

but having been in the country for thirty-three years he has endeavoured to give a real picture of the land and its inhabitants, and in this he has succeeded far better than the ordinary run of "globe-trotters," who describe a country from their own individual standpoint, and are much influenced by the state of their livers. Herr von Koseritz is not always impartial, which may be excused and allowed for on account of his official position as "superintendent" of a colony and a member of the Government, but his descriptions are always life-like and true in the main. The book lacks proportion, and would gain much in value by a little systematic arrangement; many important questions are interspersed between occurrences of daily life.

Work and Adventure in New Guinea. By JAMES CHALMERS and W. WYATT GILL. The Religious Tract Society, 1885.

Mr. Chalmers' long acquaintance with Eastern New Guinea, his familiarity with the languages, and the intimate relations he has established with the natives, give an insight into the character of the people, and the significance of various strange habits and customs, such as we derive from no previous writer. The geographical result of his explorations is also by no means unimportant. A coast-line of some 500 miles—*i.e.* from the eastern extremity of the island to the head of the Gulf of Papua—was examined, and its character described, and numerous excursions made inland from various points. About Port Moresby, the probable future headquarters of our rule, the coast region is exceptionally barren. A low range of hills fringes the coast, with a plain behind, where the drainage from the interior appears to lodge, forming a sort of *terai*, which in the hot season is flooded and very unhealthy. Inland thence, as far as the lofty central range, extends a very broken and difficult hill country—the hills furthest inland being very precipitous. But there are endless streams, with occasional open and fertile valleys at a considerable elevation. These, and where practicable the hillsides, are well and carefully cultivated. Near Yule Island, the barrier reef, after fringing the coast for 140 miles, ceases, the greater number and volume of the rivers interfering with the coral-builders. Here the natives were found wearing ornaments brought from the north coast, and at various places in the peninsula it was reported that a route across the peninsula lay in this direction. The country here is extraordinarily fertile, and the rivers accessible to canoes for several days' journey inland. The people here are reported to be cannibals, but indeed cannibalism prevails here and there throughout the peninsula, though not at Port Moresby. The races are evidently much mixed, dark people with frizzled hair, and fair people with straight hair, being frequently found in juxtaposition. Thus the view commonly held that the coasts are peopled by a fair race with Polynesian affinities, who have driven the darker aboriginal race into the interior, must for the present be taken with considerable qualifications. Some slight corrections of the chart of the coast-line are recorded, and an important passage one and a half mile wide, through the barrier reef between Thursday Island and Port Moresby, was discovered by Captain Liljeblad, of the mission steamer *Ellangowan*.

Mr. Wyatt Gill's addition to the volume is interesting as containing the testimony of an experienced Polynesian authority to the remarkable progress of peace and order, due to the influence of his fellow-workers, within the last ten years.

The Russians at the Gates of Herat. By CHARLES MARVIN. London: Warne & Co. *Price* 1*s.*

This is a most opportune publication, produced in a handy form, and should be read by every Englishman who wishes to understand the exact position of the

Russians in Central Asia at the present juncture, and how they have advanced since 1878. The whole position is sketched with graphic power and distinctness by one who has made himself a recognised authority on Central Asia. The great geographical point that Mr. Marvin emphasises is that the supposed bar to the Russian advance to Herat, and consequently to Afghanistan proper—the Paropamisus range, which till quite lately was supposed by most people to be a mountain range 15,000 feet high—is but a ridge of hills with passes barely 900 feet above the surrounding locality. A coach-and-four could in fact be driven from the Caspian Sea to Herat, and thence to the Indo-Afghan frontier.

The former advance of Russia by Tashkend and Samarcand towards Afghanistan and India is effectively barred by the lofty range of the Hindû Khûsh, but this new advance of Russia from the Caspian *via* Askabad and the Persian frontier, which has been made feasible by the seizure of Merv and the subjugation of the Tekke Turkomans, presents no geographical difficulty to a Russian advance on Herat, nor is there any further physical barrier between Herat and the south-western Indo-Afghan frontier. The supposed mighty natural defence of difficult mountain passes garrisoned by warlike mountaineers has vanished : Russia and England are now face to face.

NEW MAPS.

EUROPE.

ALPEN, Wandkarte der—. Nach dem Entwurfe und unter der Leitung des Vinzenz v. Haardt. 6 sheets. Scale, 1 : 600,000. *Wien : Eduard Hölzel. Price* 1s.

As a physical school-wall map, this is one of the nearest approaches to perfection we have yet seen : it gives a picture of the country at once geographically correct and pictorially effective. The work is beautifully executed, and evidences great care and taste.

BUXTON.—Plan of Buxton and Neighbourhood, by John Bartholomew, F.R.G.S. Scale, 6 inches to a mile. *London : W. H. Smith & Son. Price, mounted in case,* 1s.

BUXTON AND MATLOCK, Environs of—. By John Bartholomew, F.R.G.S. Scale, 1 inch a mile. *London : W. H. Smith & Son. Price, mounted in case,* 1s.

The above two maps are most valuable additions to Messrs. Smith & Sons' Tourist's series; they show all the information given on the Ordnance Survey, with the additional advantage of being more clearly engraved, and coloured to give prominence to the special wants of the tourist.

EDINBURGH.—Plan of the City, coloured to show New Parliamentary Divisions and Municipal Wards according to the Boundary Commissioners' Report, 1885. Scale, 6 inches to a mile. *Edinburgh : John Bartholomew. Price, in case,* 3s.

NORWAY.—Jernbanekart over Norge af N. S. Krum. Scale, 20 miles to an inch. *Kristiania : N. S. Krum's Forlag. Price,* 25 *Öre.*

An interesting feature in this map are the sections along the roads, showing the altitudes.

OUTER HEBRIDES, Lewis and Harris.—By JOHN BARTHOLOMEW, F.R.G.S. Scale, 2 miles to an inch. *Edinburgh: Adam & Charles Black. Price, in case, 2s. 6d.*

This is another sheet of Messrs. A. & C. Black's Reduced Ordnance Map of Scotland, and ought to be welcomed by tourists to the Western Isles. It is coloured to show the parishes.

SCOTLAND, Orographical Map of—. By JOHN BARTHOLOMEW, F.R.G.S., showing elevation and physical relief of land by contours of altitude, and graduated tints. Scale, 10 miles to an inch. *Edinburgh: Adam & Charles Black. Price, in case, 2s. 6d.*

This is really the first reliable physical map of Scotland published. It shows most effectively by colours the minute contour work of the whole Ordnance Survey of Scotland reduced into one sheet, giving pictorially a much more correct idea of the elevation of the country than can be shown by hill-shading. The map will no doubt prove most valuable, and interesting for scientific and general uses.

ASIA.

AFGHANISTAN, Bartholomew's War Map of—. With large general Map, showing the connection between England, Russia, and India. *Edinburgh: John Menzies and Co. Price 6d.*

AFGHANISTAN.—Bird's-Eye Map of Afghanistan and surrounding countries. *Edinburgh: W. & A. K. Johnston. Price 1s.*

AFGHANISTAN, Special Map of—. With inset maps of Europe, Asia, South-western Asia, and India. *Edinburgh: T. Ruddiman Johnston. Price 1s.*

FORMOSE, Carte du Nord de.—D'après les travaux les plus récentes et les reconnaissances des Officiers du Corps Expeditionnair français. *Paris: Société de Géographie, Bulletin No. 4.*

PERSIEN, Übersichtskarte der Verkehrs-verhältnisse von. Scale, 1 : 7,500,000. *Petermann's Mitteilungen*, Ergänzungsheft, No. 77. *Gotha: Justus Perthes.*

This map illustrates the special supplement to *Petermann's Mitteilungen*, on *Persian Trade*, which is specially noticed in a preceding part of this number.

PHILIPPINE ISLANDS.—Topographische Skizze des Bezirks Escalante auf Isla de Negros, aufgenommen von DON E. DE ELMONTE. Scala, 1 : 500,000. *Petermann's Mitteilungen*, Jahrgang 1885, Tafel 7. *Gotha: Justus Perthes.*

AFRICA.

AFRIKA.—Politische Übersichtskarte, März, 1885. Scale, 1 : 25,000,000. *Petermann's Mitteilungen*, Jahrgang 1885, Tafel 8. *Gotha: Justus Perthes.*

This is a carefully prepared map, showing clearly the ever-changing political divisions of Africa at the present time.

BANGOUÉOLO ET MOÉRO.—Itinéraire de Dar es Salam aux lacs. Par VICTOR GIRAUD, Enseigne de Vaisseau, 1882-84. Echelle, 1 : 3,000,000. *Paris: Société de Géographie, Bulletin, Nos. 7 et 8.*

M. Victor Giraud has so altered the shape of Lake Bangweolo, that to those familiar with Dr. Livingstone's lake it is scarcely recognisable. Moero has also

undergone a transformation ; from this it would appear that the size of these lakes, surrounded with extensive marsh lands, must vary to a very great extent at different seasons of the year.

CONGO FREE STATE—Sketch Map of—and adjoining French and Portuguese Territories. *Proceedings of the Royal Geographical Society, April* 1885. *London : E. Stanford.*

AMERICA.

CALIFORNIA, Map of the State of—, compiled expressly for the Immigration Association. Scale, 30 miles to an inch. *San Francisco Immigration Association.*

FLORIDA, Rand, M'Nally, & Co.'s New Sectional Map of—. Scale, 1 : 633,600. *Chicago : Rand, M'Nally & Co.*

INDIANA, Railway and County Map of—. Scale, 14 miles to an inch. *Chicago : George F. Cram.*

OCEANIA.

AARU INSELN.—Scale, 1 : 1000,000. *Verhandlungen der Gesellschaft für Erdkunde, Band XII. No.* 3. *Berlin : Dietrich Reimer.*

This map accompanies Herr J. G. Riedel's most interesting paper on the Aaru Archipelago and its inhabitants ; it discloses some rather wonderful hydrographical features in the coral formation of the group,—the long main island being divided into six islands by narrow parallel channels running across it.

NEW ZEALAND.—Map of the King Country and Neighbouring Districts ; from Explorations made by J. H. Kerry-Nicholls, April-May 1883. Scale, 11 miles to an inch. *Proceedings of the Royal Geographical Society, April* 1885. *London : E. Stanford.*

This is the same map which appears in Mr. Kerry-Nicholls' book on the *King Country.*

COMPARATIVE TABLES OF THE MOST IMPORTANT MEASURES OF LENGTH.

(From Behm's *Geographisches Jahrbuch*, Band I.)

French Mètre.	French Toise.	Paris Foot.	English or Russian Foot.	American Foot.	Swedish Foot.	Norwegian Foot.	Prussian or Danish Foot.	Prussian Dec. Foot.	Austrian or Viennese Klafter.	Austrian or Vienna Foot.	Spanish Vara.	Spanish Foot.	Portuguese Foot.
1	0·5130741	3·078444	3·280899	3·280709	3·368126	3·187116	3·186200	2·655167	0·5272915	3·163749	1·196308	3·588925	3·030303
0	9·7101801	0·4883313	0·5159929	0·5159677	0·5273883	0·5033979	0·5032730	0·4240918	9·7220507	0·5002020	0·0778431	0·5549644	0·4814861
1·949036	1	6·000000	6·394592	6·394220	6·564599	6·211805	6·210019	5·175016	1·027710	6·166261	2·331648	6·994945	5·906171
0·2898199	0	0·7781513	0·8058128	0·8057876	0·8172082	0·7932178	0·7930929	0·7139117	0·0118707	0·7900219	0·3676630	0·8447843	0·7713060
0·3248394	0·1666667	1	1·065765	1·065703	1·094100	1·035301	1·035003	0·8625027	0·1712850	1·027710	0·3886080	1·165824	0·9843617
9·5116687	9·2218487	0	0·0276615	0·0276363	0·0390570	0·0150666	0·0149417	9·9357604	9·2337194	0·0118707	9·5895117	0·0666330	9·9931547
0·3047945	0·1563822	0·9382930	1	0·9999420	1·026586	0·9714155	0·9711362	0·8092802	0·1607155	0·9642932	0·3646282	1·093885	0·9236198
9·4840071	9·1941872	9·9723385	0	9·9999748	0·0113954	9·9874050	9·9872801	9·9080989	9·2060579	9·9842091	9·5618502	0·0389715	9·9654932
0·3048122	0·1563912	0·9383474	1·000058	1	1·026646	0·9714718	0·9711926	0·8093272	0·1607249	0·9643492	0·3646493	1·093948	0·9236734
9·4840323	9·1942124	9·9723637	0·0000252	0	0·0114206	9·9874302	9·9873053	9·9081241	9·2060831	9·9842343	9·5618754	0·0389967	9·9655184
0·2969010	0·1523322	0·9139933	0·9741024	0·9740457	1	0·9462580	0·9459860	0·7883217	0·1565534	0·9393202	0·3551851	1·065555	0·8997001
9·4726117	9·1827918	9·9609430	9·9886046	9·9885794	0	9·9760096	9·9758847	9·8967035	9·1946624	9·9728137	9·5504548	0·0275761	9·9540978
0·3137633	0·1609838	0·9659028	1·029426	1·029366	1·056794	1	0·9997125	0·8330938	0·1654447	0·9926682	0·3753576	1·126073	0·9507978
9·4966021	9·2067822	9·9849334	0·0125950	0·0125698	0·0239904	0	9·9998751	9·9206939	9·2186528	9·9968041	9·5744452	0·0515665	9·9780882
0·3138535	0·1610301	0·9661806	1·029722	1·029662	1·057098	1·000288	1	0·8333333	0·1654923	0·9929536	0·3754655	1·126397	0·9510712
9·4967270	9·2069071	9·9850583	0·0127199	0·0126947	0·0241153	0·0001249	0	9·9208187	9·2187777	9·9969290	9·5745701	0·0516913	9·9782131
0·3766242	0·1932361	1·159417	1·235666	1·235594	1·268518	1·200345	1·200000	1	0·1985907	1·191544	0·4505587	1·351676	1·141286
9·5759082	9·2860883	0·0642396	0·0919011	0·0918759	0·1032965	0·0793061	0·0791813	0	9·2979590	0·0761102	9·6537513	0·1308726	0·0573943
1·896484	0·9730370	5·838222	6·222173	6·221813	6·387598	6·044316	6·042579	5·035482	1	6·000000	2·268780	6·806339	5·746923
0·2779493	9·9881293	0·7662806	0·7939421	0·7939169	0·8053376	0·7813472	0·7812223	0·7020410	0	0·7781513	0·3557923	0·8329136	0·7594353
0·3160807	0·1621728	0·9730370	1·037029	1·036969	1·064600	1·007386	1·007096	0·8392470	0·1666667	1	0·3781300	1·134390	0·9578204
9·4997980	9·2099781	9·9881293	0·0157909	0·0157657	0·0271863	0·0031959	0·0030710	9·9238898	9·2218487	0	9·5776411	0·0547624	9·9812841
0·8359050	0·4288812	2·573287	2·742520	2·742361	2·815433	2·664126	2·663360	2·219467	0·4407656	2·644593	1	3·000000	2·533046
9·9221569	9·6323370	0·4104883	0·4381498	0·4381246	0·4495452	0·4255548	0·4254299	0·3462487	9·6442077	0·4223589	0	0·4771213	0·4036430
0·2786350	0·1429604	0·8577623	0·9141732	0·9141202	0·9384777	0·8880421	0·8877868	0·7398222	0·1469219	0·8815311	0·3333333	1	0·8443485
9·4450356	9·1552157	9·9333670	9·9610285	9·9610033	9·9724239	9·9484335	9·9483087	9·8691274	9·1670864	9·9452376	9·5228787	0	9·9265217
0·3300000	0·1693144	1·015887	1·082697	1·082634	1·111481	1·051748	1·051446	0·8762050	0·1740062	1·044037	0·3947817	1·184345	1
9·5185139	9·2286940	0·0068453	0·0345068	0·0344816	0·0459022	0·0219118	0·0217869	9·9426057	9·2405647	0·0187159	9·5963570	0·0734783	0

Kilometre.	League (25 = 1°).	League (20 = 1°).	English Statute Mile.	Sea Mile (all nations) 60 = 1°.	American Mile.	Russian Verst.	Swedish Mile.	Norwegian Mile.	Prussian or Danish Mile.	Dutch or Geog. Mile (15 = 1°).	Austrian Mile.	Spanish League (New).	Portuguese League (New).
1	0·2246049	0·1796839	0·6213824	0·5390517	0·6213464	0·9373998	0·0935590	0·0885310	0·1327583	0·1347629	0·1318229	0·1495385	0·2000000
0	9·3514192	9·2545091	9·7933590	9·7316305	9·7933338	9·9719248	8·9710858	8·9470954	9·1230618	9·1295705	9·1199908	9·1747531	9·3010300
4·452263	1	0·8000000	2·766558	2·400000	2·766397	4·173550	0·4165495	0·3941634	0·5910749	0·600000	0·5869101	0·6657848	0·8904527
0·6485808	0	9·9030900	0·4419398	0·3802113	0·4419146	0·6205056	9·6196666	9·5956762	9·7716426	9·7781513	9·7685716	9·8233339	9·9496108
5·565329	1·250000	1	3·458198	3·000000	3·457997	5·216939	0·5206870	0·4927042	0·7388438	0·7500000	0·7336377	0·8322311	1·113066
0·7454909	0·0969100	0	0·5388499	0·4771213	0·5388247	0·7174157	9·7165767	9·6925863	9·8685526	9·8750613	9·8654816	9·9202440	0·0465209
1·609315	0·3614600	0·2891680	1	0·8675039	0·9999420	1·508571	0·1505660	0·1424743	0·2136499	0·2168760	0·2121445	0·2406546	0·3218630
0·2066410	9·5580602	9·4611501	0	9·9382715	9·9999748	0·1785658	9·1777268	9·1537364	9·3297028	9·3362115	9·3266318	9·3813941	9·5076710
1·855110	0·4166667	0·3333333	1·152732	1	1·152666	1·738979	0·1735623	0·1642347	0·2462812	0·2500000	0·2445459	0·2774103	0·3710219
0·2683695	9·6197887	9·5228787	0·0617285	0	0·0617033	0·2402944	9·2394554	9·2154650	9·3914313	9·3979400	9·3883603	9·4431226	9·5693995
1·609408	0·3614809	0·2891847	1·000058	0·8675543	1	1·508659	0·1505747	0·1424825	0·2136623	0·2168886	0·2121568	0·2406685	0·3218816
0·2066662	9·5580854	9·4611753	0·0000252	9·9382967	0	0·1785910	9·1777520	9·1537616	9·3297280	9·3362367	9·3266570	9·3814193	9·5076962
1·066781	0·2396042	0·1916833	0·6628788	0·5750500	0·6628404	1	0·0998070	0·0944432	0·1416240	0·1437625	0·1406261	0·1595248	0·2133562
0·0280752	9·3794944	9·2825843	9·8214342	9·7597056	9·8214090	0	8·9991610	8·9751706	9·1511369	9·1576456	9·1480659	9·2028283	9·3291052
10·68844	2·400681	1·920540	6·641607	5·761621	6·641221	10·01934	1	0·9462581	0·1418979	0·1440405	1·408980	1·598333	2·137687
1·02891418	0·3803334	0·2834233	0·8222732	0·7605446	0·8222480	1·0008390	0	9·9760096	0·1519759	0·1584846	0·1489050	0·2036673	0·3299492
11·29548	2·537019	2·029615	7·018811	6·088847	7·018404	10·58838	1·056794	1	0·1499569	1·522212	1·489002	1·689109	2·253900
1·0529046	0·4043238	0·3074137	0·8462636	0·7845350	0·8462384	1·0248294	0·0239904	0	0·1759663	0·1824750	0·1728954	0·2276577	0·3539346
7·532484	1·691833	1·353466	4·680554	4·060399	4·680282	7·060949	0·7047321	0·6668584	1	1·015100	0·9929537	1·126397	1·506497
0·8769382	0·2283574	0·1314474	0·6702972	0·6085687	0·6702720	0·8488631	9·8480241	9·8240337	0	0·0065087	9·9969290	0·0516913	0·1779682
7·420438	1·666667	1·333333	4·610930	4·000000	4·610663	6·955917	0·6942491	0·6569389	0·9851250	1	0·9781835	1·109641	1·484088
0·8704295	0·2218487	0·1249387	0·6637885	0·6020600	0·6637633	0·8423544	9·8415154	9·8175250	9·9934913	0	9·9904203	0·0451826	0·1714595
7·585937	1·703839	1·363071	4·713768	4·089212	4·713495	7·111055	0·7097330	0·6715907	1·007096	1·022303	1	1·134390	1·517187
0·8800092	0·2314284	0·1345184	0·6733682	0·6116397	0·6733430	0·8519341	9·8510950	9·8271046	0·0030710	0·0095797	0	0·0547623	0·1810392
6·687240	1·501987	1·201589	4·155334	3·604768	4·155092	6·268617	0·6256519	0·5920281	0·8877868	0·9011920	0·8815312	1	1·337448
0·8252469	0·1766661	0·0797560	0·6186059	0·5568774	0·6185807	0·7971717	9·7963327	9·7723423	9·9483087	9·9548174	9·9452377	0	0·1262769
5·000000	1·123024	0·8984195	3·106912	2·695259	3·106732	4·686998	0·4677953	0·4426550	0·6637916	0·6738146	0·6591144	0·7476926	1
0·6989700	0·0503892	9·9534791	0·4923290	0·4306005	0·4923038	0·6708948	9·6700558	9·6460654	9·8220318	9·8285405	9·8189608	9·8737231	0

Yours very truly

A. Vambéry

[*From a Photograph by the London Stereoscopic Company.*]

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

HERAT AND ITS ENVIRONS.

Being an Address delivered before the Glasgow Branch of the Scottish Geographical Society on 8th May, 1885.

By Professor Arminius Vambéry.

Ladies and Gentlemen,—I must begin by stating that I have been invited here by the Scottish Geographical Society for the purpose of delivering a Geographical Address on the countries on which the present political question bears. In coming to the industrial centre of Scotland, I must, at the outset, say that I regard Scotland as the cradle of many noble ideas, of many heroic deeds; and that I put particular emphasis upon Scotland as the country which has given birth to many intrepid explorers of Asia. Amongst others, I will mention one who must be looked upon as the man who has really opened Central Asia to us—I mean the late Sir Alexander Burnes. It was he who gave the first impulse to my travels in Central Asia. I was a young boy when I saw his book, which contained an engraving of the author in Central Asian dress. In those times, Central Asia was an entirely sealed book to us Europeans, and in order to go there, one had not only to change his nationality, but also his exterior person, by adopting the dress of the country, as a safeguard against his detection. Seeing the courageous Scotchman in that dress, I said to myself, "Why should not I, too, adopt such a disguise, and go to that country which is not permitted to be seen by Europeans?" It was not only the desire to undertake a journey to Central Asia, but also the disguise that I learned from your late countryman, who has done so much to open to us the interior of Central Asia. I need scarcely say that there are many other Scotchmen of high distinction and reputation who have done a great deal to give us precise and

accurate information about the countries now forming the burning question of the day, so that, really, if in any part of the United Kingdom, it is particularly in Scotland that I should speak with the greatest zeal for, and admiration of my predecessors in Asia. But my time, ladies and gentlemen, is rather too short to give you a sketch of the explorers of that region; I would rather begin with an outline of what I would call Russian Conquests in Central Asia, in order that you may form an idea of the present result of these conquests.

Russia entered the path of Conquest in Asia long before Britain. She entered because she herself was an Asiatic Power; the very origin of the Russian Empire is not ethnical, but rather political; the nucleus of the Russian nation has grown into that formidable state it is to-day only by continual conquest and by continual amalgamation with the neighbouring nations. Russia, after conquering the Tartar Khanates, had reached, at the beginning of the seventeenth century, the frontiers of the present Central Asia. Peter the Great, we are told, was the first to cast his eyes on Turkestan. He heard of the extraordinary wealth of the country, and, particularly, of the rich gold mines there. Therefore, he sent his agents to reconnoitre. From Central Asia, these agents went even as far as India; and we are told that Peter the Great was the first who conceived the idea of conquering India, thus enlarging his dominions from Siberia to the banks of the Ganges and the Indus. This we are told by historians, but, from a practical point of view, we do not accept things altogether as they are told us by historical theorists. The real conquests of Central Asia began only after the Russians had come down upon the Kirghiz, the inhabitants of a large desert north of the Aral Sea. It was hard work to subdue these Kirghiz, because roaming people could not be got at so readily; when Russia had subdued one portion of them, it was necessary to run after another portion until they got them all. But these conquests were made not by force of arms, but rather by political trickery, by inciting one tribe against the other and by bribing the chiefs: and thus in a very short time Russia got possession—of course only nominal possession—of the whole Kirghiz territory, which contained something like three million nomads. But after having subdued these steppes, Russia began to turn her attention towards the Khanates, or the three Turkestan countries, Khokand, Bukhara, and Khiva. Khiva was first assailed. At that time, though very near to India, you had not extended your power beyond the Sutlej. The Panjab belonged to the famous Sikh princes, and the Afghans were entirely independent. But it was apprehended in your country that Russia might possibly conquer these countries, and, crossing into Central Asia, attack you in India. These ideas sprang up at the time of Napoleon the Great; because Napoleon, in order to injure you, had already matured a plan of marching across Persia to India, and attacking you there. It was only a plan, of course, which could never have been realised, because the country was not then sufficiently known. In spite of the venturesome schemes which the

great Napoleon used to foster, this scheme could never have succeeded, but the apprehension remained always that, some day or other, France, not Russia, would undertake it.

This brings us to the year 1860. In this country we had some vague notions of the approach of Russia across the desert; and when I returned home in 1864, I was able to state that Russia was really approaching. I did not see any soldiers at the time, but I heard from the natives that Russia had already reached the right bank of the Jaxartes, and that she was nearing Tashkend. It seems very strange to state that the invasion of Russia across the desert commenced at Khokand, and was so concealed and so utterly unknown in Europe that what I related came as a complete surprise. The public, indeed, accused me of exaggeration; they said it was probably a bazaar rumour. I remember well, Lord Palmerston said to me, "You Hungarians have got hot brains, and a man with hot brains will see more than other men." But my report was verified shortly afterwards. Russia took Tashkend (1865), and when she took Tashkend she issued that famous diplomatic circular in which she stated that she did not like to go to Tashkend, but that she was compelled to do so. You see Russia is continually compelled to make conquests. We continually hear of the clamorous demands of peoples to be subdued by the Russians, and an extraordinary desire to come under the shadow of the Black Eagle. There were those among us who believed these things; others said, certainly it was not the fact. But Prince Gortchakoff had already led us to believe that Russia really intended to move further than Tashkend. The pretext with which the Russian Government came forward at that time was simply that, in order to have a hold upon the Kirghiz, they must have a firm footing in a comparatively fertile country. The pretext was admissible under certain circumstances, but we had full right to believe that Russia would not remain there, that she would go on further to the south; and, as a matter of fact, such was the case.

From Tashkend the Russians moved along the Jaxartes to Khojend, and from Khojend on to Samarcand. From Samarcand they could have gone very easily to Bukhara, but it was unnecessary to go thither, because the Emir, having lost all his power, submitted voluntarily. He paid a large war indemnity and became a vassal of Russia. Russia could have conquered the country, but it was too costly; because Central Asia never pays expenses; it is not rich enough. It is inhabited only on the banks of the rivers, and the further you go from them the less is the ground cultivated. Therefore Russia did not annex Bukhara, but satisfied herself with a nominal supremacy over the country.

Now, if you ask me whether it was an extraordinary feat of arms or of courage to conquer these countries, I simply reply "No." Russia, indeed, conquered not only the deserts, but even the inhabited, settled country, though not by force of arms. Altogether, I should say not more than two thousand soldiers first entered the country. Afterwards, this force was

increased, but not by large numbers; and it is easily understood that it was not necessary to have large armies in order to conquer the Tartars. The Tartars have the reputation of being formidable opponents; but, as a matter of fact, any Asiatic is inferior to a European. He is inferior from several points of view; but, above all, native liberty is entirely wanting with them, and they have not got what we call courage. Then comes into consideration the superiority of our arms: Europeans have got the best weapons, but Asiatics have those only of antiquated make.

To give you an idea of the arms of the Central Asian, I will describe the gun in use in my time, and even now. It is a rusty old musket, which can only be fired by a man who rides on horseback. Alighting from his horse, he first looks for a level piece of ground; having discovered that, he fixes into it a pair of wooden forks, and upon these he puts his musket. Taking out his powder—of a very coarse quality—he pours it upon the pan; and then he takes the tinder and lights it with a flint. After many efforts, perhaps he may succeed in getting the tinder to catch; and, having blown it into a flame, he begins to tap with the tinder upon the powder. He may possibly tap for several minutes; and then at last, by the assistance of Providence, the gun goes off. Then the machinery falls to the ground, and the ball goes heavens know where! Imagine such an enemy in the face of a good soldier who has a breech-loading gun, and who is able to fire five or ten times in a minute! I give you these details, not to amuse you simply, but to show you that the Russian soldier in Asia is not such a formidable man as in Europe he is rumoured to be. He is, however, a good soldier; he has got extraordinary powers of endurance; but in Asia he does not show the same signs of valorous conduct which your soldiers have shown in fights against Sikhs, against Rajputs, and in every part of India where they have made really formidable resistance, and where the conquest of the country was made by extraordinary deeds of courage.

But this is outside the question we are speaking of. Russia conquered Central Asia in these parts, and reached the Oxus. The Oxus is a river which rises in the high plateaux called the Thian Pamir, and ultimately flows into the Aral Sea. Even before the Christian era, the Oxus, which is a very large river, formed the boundary between the two chief ethnical elements of Asia. On the south, or left bank, were the Aryan race; on the north, or right bank, the Turanian race. One might imagine that Russia, having got to the river Oxus, would consider her position and say: "Now that we have subdued all the Turks in the north, beginning at the Ural, down to the Oxus, we shall be satisfied, and shall not mix any further with the population to the south of this river."

Such was our assumption; but we were mistaken; and I am sorry to say that the mistake was a misfortune not only to this country, but to Europe in general. But diplomatic agencies or States, particularly despotic States, are not governed by any limits of frontier whatever. Russia, as soon as she reached Bukhara, crossed the river and went to

conquer Khiva. This happened in 1873. Khiva was subdued by the same means, I may say, as the rest; it was very easy work, comparatively. I remember well the Khan of Khiva, when he was vanquished by the Russians, taking flight and going among the Turkomans. Poor fellow! he fancied—looking at the Asiatic manner of waging war—that as soon as the Russians entered the country, he himself would be put to death. But Russia gave him back his country, because to govern Khiva would have been too expensive; so they left him the shadow of rule, and retired. In 1876 they conquered Khokand, and the whole of Central Asia was in their power. They then began to extend their conquests to the Turkoman country, which extends in the northern portion of Persia from the Caspian Sea to the Paropamisus mountains. The Turkomans, until the Russians came to the country, were looked upon as the real barrier of Central Asia, because, hitherto, nobody had succeeded in wholly conquering them. They are a hardy race, no doubt; very good horsemen and good soldiers (of the militia or irregular sort), but not soldiers in our sense of the word. Against Asiatics they were always victorious.

I remember, in 1860, the King of Persia sent a large army against Merv to conquer it. The King of Persia had a high opinion of his army, and he sent a photographer with it to take views of the great victories which his army was sure to make. The photographer was a good Frenchman—one M. de Blocqueville—a man who came from Paris, and was attached to the court of Napoleon the Third, from which place he was obliged to retire. He then went to Persia, and became photographer to the king, who really exulted in those wonderful pictures which he anticipated from the victories of his army. Strange to say, things turned out quite differently. Two thousand Turkomans utterly routed 20,000 Persians, and so complete was the defeat, that not only all the Persian generals, but the poor photographer, himself, were made prisoners by the Turkomans.

The Turkomans also defeated the Bukharans, the Khivans, and the rest of the Central Asians. But against the Russians they could gain no victories at all. Russia vanquished them easily enough—though not by force of arms. It was by force of iron—not iron shot, but iron rails. In order to reach the Turkoman country, Russia was obliged to build a railway from the Caspian Sea to the interior. That railway has now reached half-way between Kizil Arvat and Askhabad. We read in many papers that the Russian railway has already extended from Kizil Arvat to Askhabad, but that is not the fact; it must be only half-way. I suppose that even this little portion, from the Caspian Sea to Kizil Arvat, was quite sufficient to assist Russia in her conquest of the Turkomans. Water was carried along that way and provisions for the army when Russia built that railway. Few people here in England or on the Continent imagined that it could be for any other purpose than to conquer the Turkomans; but others, again, who knew Russian schemes and Russian plans of aggression, always said that this railway might be extended a little further. Russia denied any such intention; and, when pressed to say what the railway meant, she said it

was simply mercantile interests which engaged her attention there. The Russians maintained that, in former times—about 2000 years ago—the whole trade of India and China really went along the northern portion of Persia: it went to Herat, which was an important commercial centre at that time, and along the northern border of Persia, across the Caspian Sea and the Caucasus, and thus to the west. We, who knew the country, laughed at these assertions. We said her commercial interests were too small; they would never pay the expense of a railway in those countries; nor were we mistaken. Russia had other objects in view; she intended to approach the Paropamisus. The western offshoots of that range extend from the Hindû Khûsh towards the west. The Greeks gave the name of Paropamisus to the whole range, but we, in modern times, mean by the name only the western offshoots. From the very beginning, Russia always had a good idea as to how to choose the best places for her future conquests. She attacked the Turkoman country, and you will remember the deadly fight at Geok Tépé, which I will not touch on. From that place Russia went on to Merv.

Merv was then only a heap of ruins. A long, long time ago, Merv was a noble city; and it was still a place of great strategical importance, because if Russia intended to go south of Merv to the Paropamisus, she could not leave that place in the north in the hands of the Turkomans. Therefore she was obliged to take Merv. She did not take it by force of arms; but by the usual means—namely, cunning and astuteness. She despatched thither a Tartar envoy, Ali Khan, who annexed the Russian "off," and thus became the Alikhanoff of whom we hear now a great deal in the papers. I should be sorry if you imagined him to be a diplomatist. He is scarcely able to read or write any European language; he is a downright Tartar; but was quite fit for the task given him. He came to Merv, and was clever enough to begin with the ladies. He brought presents of various jewels, and dresses, and convinced the ladies of the necessity of becoming Russian subjects. The ladies being gained over, easily persuaded their husbands; and so it came to pass that Merv, without a shot being fired, was made Russian. From Merv, Russia began to extend her conquests to the south, to Sarakhs; from Sarakhs and from Merv again to the east, towards the outlying districts of Herat, which are known by the name of Panjdeh —a place about which you are very frequently hearing just now, and of which I will give you a short description.

Panjdeh is not the name of a town. "Panj" means "five," and "Deh" means "village," so that the word Panjdeh means "five villages." But not a single village is there. In olden times there were five towns; but since the Mongolians have devastated the country, these five towns have ceased to exist. The place, however, is important from a strategical point of view, for at Panjdeh the fertile country ends, and the dreary sands begin. From Panjdeh we enter the Murghab valley, which is the easiest way to reach Herat, and therefore the Russians were clever

enough to claim this place, which it had no right to claim, because it never belonged to Russia. We have Oriental writings; we have historical records written in the Persian language, in which it is proved that Panjdeh, from time immemorial, belonged to Herat. Now, Russia discovered that it did not belong to Herat, but to them; and I do not know whether you will agree with her or not. It is not my task, however, to speak of political subjects; my task is, as a geographer and as a traveller, to give you a description of the country. Panjdeh is of great importance because it is the key and the highway to Herat. But Russia, not satisfied, went down to Sarakhs, another place of great importance, because from Sarakhs another way leads to Herat.

When the Russians annexed those parts, your statesmen, and public opinion in Britain, were naturally alive to the issue; and an exchange of diplomatic notes ensued between London and St. Petersburg. This exchange went on for about two years, and the public at large did not know anything about it, until it was made known that the Frontier Delimitation Commission was to be sent out, in order to put down—of course upon paper, or in the air, perhaps—the frontier between Russia and Afghanistan. In 1873, the British Foreign Minister entered into negotiations with Prince Gortchakoff in regard to Afghanistan, and the Russians pretended, at the time, that they had not the least intention of going beyond the Oxus, and that Afghanistan was quite out of the sphere of their politics. Well, the British Government was quite contented with these assurances, and it then became known that Afghanistan would become the so-called buffer between Russia and India. We all laughed at the buffer, because we knew it had got neither sufficient elasticity nor endurance. Again, statesmen did not care much about us travellers. They have got their own way of thinking; and the buffer became the curtain behind which Russia went on in her usual way, stealthily, slowly, and with astuteness, to build up all that power with which she intended to threaten you afterwards. As I have explained, she reached from Sarakhs to Merv; and it was quite necessary, of course, to ask what her intentions were in the future. For that purpose, the Frontier Delimitation Commission was sent out. The Commission consisted, as you are aware, of two different sections. One, Sir Peter Lumsden's, went from England across Turkey and Persia to Herat, and consisted of a staff of officers, chiefly political, but a few military. The bulk of the Commission, however, went under Colonel Ridgeway from India, across Afghanistan to Herat. But at that time, Afghanistan was not accessible to the English. Abdurrahman Khan, Amir of Afghanistan, said, "I cannot vouch for the safety of the mission; it is better that you should make a detour." And thus they went from a town in the north of Belûchistan, across the desert, to the river Helmund. It was a difficult way, and not without danger. To insure the safety of the Commission, it was quite prudent in your Government to provide an escort consisting of 452 men. This escort was a real thorn in the eyes of Russia. She said, "The British Commission is coming with a

large army to conquer Turkestan, and then to penetrate across Turkestan to conquer St. Petersburg." We all knew that was a pretext. Your mission arrived at the spot, and was surprised not to find their Russian colleagues. Instead of Russian colleagues they found there a Russian Cossak outpost, at a place where they did not expect it, at least, at Puli-Khatun, where the Heri-rud river joins the Kashef-rud, which comes from Persia. It is a highly important place. There they met the Russians.

Now, again, the question became serious. Your Government asked explanations from St. Petersburg, but instead of explanations, the Russians went further south and reached the Zulfikar Pass. On their arrival there, the question became rather acute between the two capitals; but it was settled that, unless some unforeseen evil arose, it should not disturb their mutual understanding, and that the Frontier Delimitation Commission should still go on. It was, really, in the hands of Russia to keep peace, but instead her of doing so we were all startled by the news, I should not say of a battle with, but of a butchery of the Afghans. I was surprised at the forbearance shown by the British Government in the subsequent negotiations,—but I desire to avoid politics. I will only state that I fully agree with the importance attached by you to Herat as the key of India—nay, the gate of India.

Herat is a town in which I lived several weeks in a very unenviable position. I lived there as a beggar—a mendicant dervish. When I reached Herat, I had not a farthing; all the trinkets which I had carried across Central Asia were gone; and there remained only two means by which I could gain my livelihood. One was the blessing which I bestowed on the people. Strange to say, the Afghans, in spite of being so fanatic, did not much like my articles, for everybody refused the blessing I offered; or, if they accepted it, they never paid a farthing. I remained in Herat in a caravanserai—a cold and dilapidated place. I was shivering with cold and half-dead with hunger; and, though I went round among the people, the stingy Afghans never gave me a morsel of bread. I quote this in order to show you that I had plenty of time to study the country and its inhabitants, and the result of my study is that I maintain what has been said a long time before me, and what I said in 1869, in a pamphlet entitled *Herat and Central Asia*, that Herat really is the key to India, and the gate of India. And to you here, in the centre of the industrial work of Scotland, it will be particularly interesting if I relate to you how Herat could be made really the centre of the whole of the Central Asian trade. Beginning from the north, from Siberia down to India, there is no spot so fertile as Herat. It is the place where all the roads unite from the north to the south, and from the west to the east; and, in olden times, Herat was always the emporium of Central Asian trade. Even in my time, indigo and tea were staple articles of trade; and not only Persian, but even Central Asian and English goods, which are sent to Central Asia, were all imported into Herat, and sold or exchanged for other articles. If a European Power gets possession of Herat you will

see—and you will remember what I say—that, in the course of ten or fifteen years, Herat will be connected by railway with the Caspian Sea, and will become the greatest trading-place in Central Asia. It is on this account that I should like to see this place in the hands of Great Britain, being fully convinced that with your commerce, and with the goods imported from this country, you would also import the era of a better civilisation. For, according to my views, there are only two good mediums in the world capable of bringing a better life into the dark recesses of barbarism: one is the missionary, and the other is the bale of goods.

It is extraordinary to witness the wonder which such a bale of goods can create among Asiatics. I remember in the desert I saw a woman, one day, who had a handkerchief which was made either here or in Yorkshire. She held it before her; looked at every thread of it, and said to me, "Look how thin this thread is; it must have been a spirit who could have spun it so thin as that!" Again she looked at the colours, and said: "How wonderful are the colours! it must have been a real *jin* who could have done this!"

I can assure you, nothing is more able to turn the minds of Asiatics than the productions of your industry, therefore it is no mere compliment I pay you. Your country, by carrying her merchandise far into the East, has done more, I dare say, to promote civilisation than many hundreds of books could have done. I do not deny that, besides the bale of goods, there are other missionaries who can do good in Asia; and I speak but the truth when I say that your missionaries in the East have imported there the conciliatory spirit of our Western life. Their houses are the hospitals, their houses are the schools; and they show an example of disinterestedness and unselfishness to the natives; therefore, I agree with you, and particularly with the people of Scotland, in this matter: you spend a good deal of money upon the missionaries, and rightly, for they do much good in Asia. Thus, we have seen that bales of goods and the missionaries really are the best civilisers in Asia.

To return to the topic which I selected for my lecture, and to give you an idea of how Russia succeeded in making her conquests in these parts, I may say that it is due to the great indulgence and forbearance shown her, not only by you, but by the whole of Europe. But as things now stand the question becomes acute. We must ask ourselves who is to become, not only mistress of Afghanistan but mistress also of Asia. If the Continental press and Continental public opinion assert Panjdeh to be merely a box of sand, they make an egregious blunder. It is not a box of sand; it is a case of precious jewels which you defend there. By precious jewels I mean principles, by which you say to Russia, "Thus far, but no farther!" If you allow Russia to take Panjdeh, she will take it, and afterwards Herat. From Herat she will go to Kandahar, and from Kandahar she will go to India. She is already in advance of you. You have behind you the sea, and Russia has already behind her a good line of communications. Russia can now reach

Batûm from Odessa in one day. Then, at Batûm begins the railway which crosses to the Caspian,—and a very costly railway it was. It was said to have been built for mercantile purposes; but it turns out now that some other object was in view. From Batûm, by railway, the land can easily be crossed in one day to Baku, on the Caspian Sea; and across to Mikhailovsk again in one day. From Mikhailovsk begins the railway, which will be extended very soon to the neighbourhood of Herat; and Russia will thus be able in a very short time to reach from her military depôts in the interior to the country which she has annexed. As I before said, you have only got the sea behind India; and however forward you may be in India, your depôts are only at Quetta; and from Quetta to Herat even the most rapid march could not be made under from six to eight weeks. Therefore, Russia is already in advance of you—there is no doubt about it. And for this reason I say your statesmen are quite right not to precipitate war.

I am not here in this country in the interests of party politics: I have nothing to do with party politics. It would not only be immodest, but impudent if I mixed in the internal politics of this country: I have nothing to do with them. I come as a Hungarian, as an Eastern traveller, and as a man who bears the interest of Asia at heart; and as such, I come to say that it is my earnest desire to see England spreading Western culture throughout Asia.

You may ask why I come to this conclusion? Well, I lived too long in Asia not to see which of the civilising agencies is the superior. Russia, undoubtedly, approaches the Asiatic character more than you do, because the Russian himself is half an Asiatic. His manners of life, his mode of thinking, and his customs are much nearer the Asiatic than are yours. There is no doubt about it. But we do not see any great results from his civilisation. Look at the Tartar Cossack. He has been now nearly 300 years under Russian rule, but he does not in the least approach our Western civilisation: he is as much a Tartar as ever, he has not been raised to any level of culture, he remains as behindhand as before. But now look at India. I dare say the most bitter enemy of Great Britain would confess that a hundred years of your rule have been beneficial to India. Old superstitions have disappeared, and with them the differences of caste and of political and social standing. Now, the humblest man as well as the Rajah can ask for justice before the British tribunal. There are many instances on record in which not only natives have sought and obtained redress from British justice, but the British Government itself has sometimes lost lawsuits against natives.

But why should I relate to you things which you must know better than I? It is only short-sightedness and envy that make people say that Russia is a better civilising agent than you are: I cannot believe that a thinking man could ever assert such a thing; and this being impossible, I do not see how it can be said that Russia ought to extend her conquests towards India, and damage your interest there. There may be people who support

such an argument, and it has been the habit on the Continent, particularly of late, to abuse everything British. I can assure you it is due only to envy, and to nothing else. No traveller who has been in India, whether he be French, German, Italian, Hungarian, or even Russian, would fail to be astonished at the extraordinary change which has taken place there. And now I ask you whether, this being the case, one can become indifferent to your doings in India or to your future in India? I dare say "No." No foreigner can become indifferent to them, if he really has the interests of humanity at heart. While I am going through your country giving explanations of the present situation, it is by no means with any desire to fan the flame of war against Russia. War is an abominable thing: I hate war. But if it be necessary, if it be the last means, then we must grasp the sword in order to defend the right, in order to defend the sacred cause of humanity; and to such a position you may come in your future struggle with Russia.

I shall now add only a few concluding words for the purpose of showing you that you are not in such great danger as some would have you suppose. Let us begin with the surrounding elements, and, before all, let us begin with India.

In former times, people used to say, India is the powder-mill of England; India is full of discontented elements, and those elements may show themselves in the moment of danger. Well, I do not say that all the inhabitants of India are in love with British rule—I do not say that; but I can state from what I have seen, and from what I have learned, that the majority of the Indians are with you. The feudatory States are, without exception, with you; and we have witnessed lately that not only princes but princesses have brought their jewels and offered them to the Viceroy in order to assist in defraying the expenses of the war which was imminent against Russia. I am an attentive reader of the Indian newspapers, and I have really scarcely noticed any opinion expressed in India in favour of Russia during the present crisis. Looking beyond India you have Afghanistan. You have heard the Afghans very often spoken of; they are a people whom I cannot say that I have fallen in love with. They are greedy, avaricious, rude, barbarous, and, I must say, the worst of the Mohammedans I have ever met with. But, in spite of all this, we must make a distinction. The Afghans are divided into two sections. One of these, namely, the Eastern Afghans, is really more hostile than the Western. Excepting, perhaps, a little bit of country extending from Belûchistan to Kandahar, the western portion of Afghanistan is entirely in favour of the British. Beyond Kandahar, the Afghan element ceases and the Persian element begins. The Persian element is decidedly in favour of English rule, although I do not even know whether that rule will be extended there. I wish only to state that they would not be averse to it: they would never fight against you if they were shown the slightest sympathy. You must remember that this part of Afghanistan has already been under British influence. In 1841 and 1842, when Sir

Eldred Pottinger—a very valiant, wise, and clever soldier—was Governor there; and when Major Todd also held that post, they had only a few British officers, but they were quite sufficient to make your influence felt and the name of the British people beloved. Sir Henry Rawlinson, in Kandahar, was really beloved by the inhabitants. The Afghans, in spite of being a wild people, are not so unmanageable in that district as in the other. But, to turn from Afghanistan to Persia, the Persians are, I should say, always accessible to the highest bidder; but, in such a case, Russia could never outbid you because she has not the means to do it; and in the event of war between you and the Russians—which I should greatly deplore—I am sure Persia would side with you.

The third element is the Turk. The Turk in Constantinople may be classed under two sections—one consisting of the Effendis and the other of the people. The Effendis are not an honest set of men: I do not like them at all; they are neither patriotic nor honest. The Turkish people, however, are more honest and patriotic. I have lived among them, and I can assure you that they really deserve the praise that is so frequently bestowed upon them. They are very good soldiers indeed; I do not exaggerate when I say that they are the best soldiers in the world. Well, those Turks are really greatly in favour of the English. I remember, when I went to Turkey, after the Crimean war, they used to call the British soldier "Johnny," and they said that "Johnny" was half a Turk. They said that he was half a Mohammedan, that he had no idols in his church, that he sang hymns of praise as devoutly as the Mohammedan himself, and they really could not understand why the English should be called unbelievers; they should be accounted as downright believers as the Mohammedans. Such were the views held in my time.

I now come to another question which is not known in this country. I remember seeing an old Turkish watch—it was like a big case. It was handed down from father to child, and was called an "English" watch. Swiss and German watches were shown to the people, but they would have none of them; they would only have English watches—there were none like them. I do not know whether these watches ever saw England, but such was their reputation. The same with arms and everything which came from England—they are all liked by the Turks; and, really, the name of your nation is a favourite household word among all the Mohammedans throughout the world, and I should be sorry if that good name were destroyed. It is by your good standing that you have acquired that reputation in the Mohammedan world, and it is by your good standing you will best preserve your rule in India. If you press forward, without hesitation, I hope it may be long before you have to fight for India; and I am sure you will only be able to fight by retaining the sympathy and the effective help of these same Mohammedans.

And now to conclude—I have come to this country, and have everywhere met with an undeserved reception, owing, perhaps, to my books and not to my personal qualities. Having had this kind and undeserved

reception, I can scarcely find words to thank you for your share in it; and I must conclude, as everywhere I conclude, with the best hope that the present crisis will not lead to a war but to something better, namely, that the British nation will be roused from her stupor and be fully awakened to her interest in the East. A great service has been done to you by Russia; she is, in fact, scarcely aware of the great services she has rendered you. I have gone through your country, and have mixed in all classes of society, and they are all animated with the desire of maintaining your Indian Empire. On the Continent, people are commencing already to divide the spoil. Some of them say that half of the British trade will come to them and the rest go into other hands. They say that Great Britain is abdicating, and that she will become like the Dutch or Portuguese. But I will never believe this. Great Britain will never abdicate her position! You will always be alive to the great interests you have in the East. I come to you, not as a Hungarian speaking against Russia, but as an Eastern traveller, to say to you that you have done hitherto great work and charitable work in Asia; and my earnest hope is that you will continue to uphold the integrity of your Indian Empire.

THE EGYPTIAN SÛDAN.

Delivered before the Scottish Geographical Society at Edinburgh, 20th May, 1885.

By Dr. Robert W. Felkin, F.R.S.E., F.R.G.S.

The subject of my paper to-night has been chosen for me; I should much have preferred to read a paper I had written for this evening on Uganda, but, at your Committee's repeated request, I have consented to speak upon a theme which, though very near to my heart, is at the same time intensely painful. In doing so I shall avoid, as far as I conscientiously can, entering into the realm of British foreign politics.

Notwithstanding the thrilling events which have occurred in the Sûdan during the past two years, I think it must be admitted that little real knowledge is possessed by the people of the United Kingdom as to what the Sûdan was, is, and may be.

In order to lay before you in the short space of time at my disposal, as distinctly and succinctly as possible, an outline of a subject which a large volume only could exhaust, I will first speak of the geographical position and extent of the country, next of its inhabitants, and then of its physical features and powers of production; I will also give a rapid sketch of the Sûdan as it was at the end of 1880; point out some of the

causes of the Mahdi's rebellion; and, in conclusion, indicate what may even now be its future.

According to the nearest estimate I can make, the whole of the Egyptian Sûdan extends over 2,500,000 square miles, as compared with 116,841 square miles, the extent of the United Kingdom. It stretches north and south across nearly 24 degrees of latitude, from Egypt to the south end of the Albert Lake, some 1600 miles; and east and west it is from 1200 to 1400 miles broad. It is difficult to give its exact boundaries, but I will point them out as nearly as possible on the map. The population of this country is roughly estimated at 15,000,000, of which about three-quarters are Negroes.

It will be readily understood that a land of such extent, and stretching as it does through so many degrees of latitude, must present varied physical features. The generally accepted idea that the whole of the Egyptian Sûdan is a dreary, howling wilderness, is totally false. True, in the provinces where our gallant soldiers have been endeavouring to conquer an equally gallant foe, deserts exist, water is scarce, the land is either rocky or sandy, and cultivation extremely difficult, if not impossible; but these deserts comprise only a small portion of the Sûdan, and their gigantic rocks and dreary sands form but nature's barrier to a mine of wealth beyond. Before going into details, I would ask you to follow me for one moment while I sketch out on the map the route I took during my two years' wanderings in the Sûdan. You will then see that I do not give you hearsay evidence, but that I tell you of lands that I have myself visited. The conflicting reports as to the value of the Sûdan are, I think, due to the fact that various travellers have only seen parts of the country. It has been my good fortune to travel through nearly the whole of its extent, so that I think I may be permitted to estimate the wealth and capabilities of those regions which lie beyond the belt of silence and of death, that separates them from civilisation and the sea.

In studying the population of the Sûdan, we must divide the country into districts, for the inhabitants vary considerably as to race and degree of civilisation.

First, then, we will divide it by the ninth parallel of north latitude into two great divisions. The population of the northern division is composed of various Arab and Nubian tribes, all professionally Mohammedan. This large division must be subdivided into four districts; first, one commencing at 24° N. latitude, and extending south to Khartûm, bounded on the east by the Red Sea, and on the west by the 28th parallel of east longitude; second, Sennâr; third, Kordofan; and fourth, Darfur. The boundaries of these divisions I will trace out on the map.

The principal tribes which inhabit these districts are the Abadde between Assuan and the Red Sea, and extending as far south as Berber; next to them, to the east, in the mountains along the Red Sea, and in the deserts between Suâkin and Berber, we find the Bishari, who are in all probability direct descendants of the Ethiopians; they remind one forcibly

of the Abyssinians, though they are rather taller and of a darker colour. They are well formed, and have beautiful classical features. South of this tribe live the Hadendoa, and further to the east, the Beni Amer, the two tribes being divided by the river Baraka. The Kassala district is inhabited mostly by the Melikab, Segolloa, and Hallenga. The great Shukuri tribe inhabits the extensive country between the Atbara and the Blue Nile, as far south as the 14th parallel of north latitude. In Gadaref we find the Dabaina; between the Dender and the Blue Nile the Hamadabs, and in southern Sennâr the Abu Roofs. The inhabitants of Sennâr are the descendants of the Fung, while the Berta tribe is found south of Fazokl, as far as the 10th degree N. latitude. Between Dongola and Metemmeh, on the west of the Nile, we find the Sheigeihs; further south, from the sixth Nile cataract to the 14th degree of N. latitude the Hassanieh, and to the south of this, the great Bagarra tribe. The people of Kordofan are a strange mixture of the old inhabitants and the descendants of slaves and soldiers. The population is about 300,000.

I now pass on to Darfur. The meaning of the word Darfur is the land of the Fors; but several tribes are found within its boundaries. There are the Homr Arabs in the north, the Bertis Tukruri in the east; in the south-east the Risegat, while in the south the Bagarra Arabs and Tukruri are mingled, and the real natives, the Fors, now live chiefly in the west part of the province. The Arabs have not intermingled much with the other tribes, who are more or less Negroes, and it is not difficult to distinguish one from the other, the regular features and lighter colour at once proclaiming the Arab. The total population is over a million, about half that number being Fors. The dress of the natives is very simple, their garments being generally made of their homespun damoor cloth. The men wear merely a long shirt with long sleeves, and open, while the women's attire is a kind of large sheet, which is bound round the waist, one corner being thrown over the left shoulder, leaving the right arm and breast exposed. Their arms and necks are decorated with iron and brass ornaments, which are also of home manufacture. The people are very hospitable, but they only give travellers a certain amount of water, as, having so little, they are unwilling to part with it. They are clean and industrious, and great hunters, often crossing the Bahr el-Arab in search of game. The children are employed in cleaning and spinning cotton, the men in weaving it; the women cultivate the fields, weave mats, and attend to their household duties. It was a real pleasure on arriving at a village to see all the people thus employed in useful occupations.

All these tribes are more or less nomads, but their pastures lie in the well-defined limits I have just mentioned. They possess numbers of camels, cattle, horses, and goats; and their women cultivate just enough grain to supply their barest wants. The men are warriors, and consider that hunting, slave-raiding, and war are alone worthy of their prowess. They are armed with spears, swords, and small round shields; and many

wear chain-armour, which must have belonged to the Crusaders, and have found its way into the country from Syria.

Passing to the second great division, namely that south of 9° N. latitude, we find an immense number of pure Negro tribes in various states of semi-civilisation down to the Niam-Niam cannibals. During my travels I passed through very many of these tribes, and I only wish that I had time to give you a detailed description of each. Their physical development, intellectual powers, manners and customs, are very varied. The Shillûks, the Baris, the Madis, Makarakas and Niam-Niams are well-built, warlike people: the men spend their time in hunting, building huts, and fishing; the women, for the most part, cultivate the land. Intellectually, the Madis and the Fors are decidedly superior to the surrounding tribes; the Shulis and the Bongos are the most friendly, whilst the Dinkas, the Jûrs, and the Nueirs are of the lowest type. A short description of one or two tribes must suffice. The Shulis are tall, powerfully built, of a dark chocolate colour; their heads are much ornamented with feathers and beads; the men's dress is either a leopard or goat skin, which partly covers the body, and the women's a girdle made of a piece of soft leather, cut behind in much the same shape as the tails of a dress coat; the married women wearing an exceedingly narrow fringe of string in front, while the unmarried wear nothing but bead ornaments. It is a universal practice among the Shulis to smear themselves all over with red paint, made of oxide of iron and the oil obtained from the semsem seed. One curious custom which distinguishes them from other tribes is that of boring a hole through the under lip and inserting in it a piece of crystal three or four inches long, which sways about as they speak. The four lower incisor teeth are also extracted, and these two customs combined make their pronunciation very imperfect.

The Baris are a fine muscular race, though not so tall as the Shulis. The men are far better-looking than the women; they are always naked, as they think it womanish to dress. The women's dress I show you, and you will notice its tail. There is very little doubt that it was this article of dress which led to the fabulous reports that some tribes in the Soudan had tails. Iron, copper, and brass rings are worn on the arms and legs; iron chains are sometimes worn round the waist, and usually a string of charms is suspended round the neck, while dogs' teeth necklaces are very common. An ivory ring is sometimes seen on a man's arm, but this may only be worn after killing a man or an elephant single-handed. The men wear a tuft of hair on their heads, but the women are always entirely shaven. The Baris do not wear so many beads as the Shulis or the Madis, but tattoo themselves extensively. The men are armed with light lances, and bows and arrows of superior manufacture, and they are very expert in their use.

The tribes from which nearly all General Gordon's Negro soldiers were drafted were mainly the Makaraka and Madi tribes. They make splendid soldiers, and are very faithful.

In order to give a clear idea of the physical features and productive powers of the various provinces which form the Sûdan, I will briefly describe them *seriatim.*

To begin with Dongola, on the north. This province is the only one I have not myself visited, so that I am unable to give you a description of it from my own observation. On either side of the Nile, which is enclosed by granite and sandstone hills, fertile plains stretch out, the crops are fine, and if the land were well cultivated they might be very abundant. Cotton and corn are grown to a great extent, and goats, sheep, and camels are reared in large numbers. Irrigation has to be employed, as the Nile does not here overflow its banks. Notwithstanding this, one author describes Dongola as one of the finest provinces of the Sûdan. It is, however, destitute of forest trees, and has no large streams.

Coming next to Nubia, the country between the Red Sea and Khartûm, we find dreary sandy deserts and rocky hills; little or no cultivation exists, but goats, sheep, and camels are reared in considerable numbers.

The whole district of Sennâr, however, on account of its position between the Blue and White Niles, and the districts on the east of the Blue Nile, are capable of great development. The fertility of these provinces depends wholly on the amount of the rains, which begin in May and continue till the middle of September. None of the rivers overflow their beds, which, deeply cut in the alluvial soil, contribute their contents towards the formation of the Nile delta. The districts watered by the Setit and the Atbara, as far as Gos Regeb (16° N. latitude), contain magnificent soil. The quality of the soil and the climate are favourable to the cultivation of every tropical plant, as for example, sugar, cocoa, spices, coffee, and especially cotton, which can be produced in the greatest abundance. The whole of Kassala, together with the district between the Blue Nile, the Atbara, and the White Nile, the strip of land along the Rahad and the Dender, as also Sennâr, might be converted into a large cotton plantation, if the inhabitants could rely on an orderly and just government, and if railway communication were established with Suâkin for the transport of their produce. No land in the world is more favourable to the cultivation of cotton than are the countries just mentioned, where a rainfall from May till September insures the growth of the plants, and a perfectly dry harvest-time allows the cotton being gathered in in the best possible condition. It would also be possible to grow corn here to almost any extent; it is now chiefly produced on the Blue Nile, south of Khartûm, and also in the districts of Gadaref, which are famous for their enormous produce of dhûra. The Blue Nile, and its tributaries the Rahad and the Dender, as also the Atbara, which have all very swift currents during the rains, can be controlled by floodgates and dams, and Merôe could be traversed by a network of canals as in Lower Egypt. The importance of an extensive cultivation of grain is seen from the fact that no less than 18,000 tons of corn are imported from the Persian Gulf into Suâkin annually. If the above-mentioned land were

properly cultivated, it would very soon cut out all foreign producers who at present supply the Suâkin market, nor is there any reason why Suâkin should not become a great grain-exporting port and the English market be supplied by farmers round Khartûm.

The province of Kordofan, regarded as a whole, may be said to be one vast plain, sloping from south to north; at the highest part—that is to say, the southern extremity—it is some 2000 feet above sea-level. There are no mountain ranges, and indeed but few hills, and these are not more than 400 feet above the level of the surrounding country. No rivers or streams are to be found, but there are some shallow khors which contain a little water during the rains; I do not think that there is any drainage from this dreary area into the Nile. Here and there one comes across a well, but water is very scarce, and has to be procured from a considerable depth, sometimes even 150 feet. There are also three small lakes, El-Birket, El-Rahad, and Shirkelè. The triassic formation obtains over the whole province; the most important feature is the new red sandstone, which rests on hypogen rocks. Over the sandstone the ground is firm and gravelly, and contains much oxide of iron. It makes bad soil, and as a result the country is very barren, stunted acacias and low thorn-bushes forming the entire vegetation. Where the hypogen rocks crop up, the soil which covers them is far richer; it is composed of the detritus of these rocks, and as it contains a good deal of clay and a little potash, the soil resulting from their decomposition is better in quality, and upon it grass and large trees will grow, while dokn is much cultivated in these parts. Near Obeiyad (1655 feet above sea-level), igneous rocks, quartz, gneiss, and granite abound. At Obeiyad and at Barra there are deep wells with an unlimited supply of water, and the gardens which used to surround these towns were very celebrated. In some parts of Kordofan there are large atmoors, or deserts, through which the traveller may wander for days without seeing a single sign of vegetation. All over, the scenery, excepting during the Harif, is dreary and desolate in the extreme. For a few weeks then the landscape is pretty, the plains being covered with grass and the trees bright with fresh green, but the beauty soon vanishes, and from October to June the country becomes a parched desert. Notwithstanding this the trade with Kordofan was considerable. In 1880 the exports of gum, feathers, etc., amounted to £120,000, and the imports to £50,000, about four-fifths of the latter being cotton goods.

We next pass on to the province of Darfur. The geological formation is very varied; in the west many mountains are found 5000 feet high, having beds of lava and every indication of volcanic origin. In the north and south granite and sandstone are the prevailing rocks; while to the east much sandy soil is found, and a great quantity of iron is obtained, which is largely used for manufacturing purposes. I was informed that near Jebel Marah there is a large salt-water lake, from which considerable quantities of salt are obtained by evaporation. This forms a valuable article of barter. Gold is also found, and I show you

some articles made from it which I obtained in Darra. The goldsmiths there and at El-Fasher are very skilful workmen. When I passed through this province it was in the dry season, and as there are no rivers which flow all the year round, I had great difficulty in obtaining water. Good wells are few and far between; the greater part of the water I found *en route* was taken from the Adansonia reservoirs; and during the dry season the people have to rely chiefly on the water-melon, which is very largely cultivated for drinking, washing, and cooking purposes.

I now pass on to the second great division of the Sûdan, that south of latitude 9°. The population is here pure Negro; and, for the purpose of description, I must subdivide it into three parts. First, the Bahr el-Ghazal and Rohl provinces, or, as they are now, one province, governed by Lupton Bey, an Englishman. It is bounded on the north by latitude 9°, on the east by the Nile, on the west by the twenty-fourth degree east longitude, and on the south by the fifth degree north latitude. This province was the scene of the great slave war of 1878 to 1879, and it had been the chief slave-hunting ground for many years. When I was there, at the end of 1879, order had again been established, and the people were rapidly settling down to their ordinary occupations. The climate here is good, and, in the southern parts, the highlands, 4000 feet above the level of the sea, form an undeniably good field for future colonisation. Fatal fevers are here unknown, and I have no hesitation in saying that Europeans could exist in the southern part of this province, as also in the Niam-Niam country and Makaraka, under conditions of comfort and prosperity. I show you here sections of the country drawn from observations which I made when there; the first is a section of the country from Lake No to Uganda, the other from Lado to Darra, in Darfur.

The whole of the Bahr el-Ghazal district is splendidly watered; numberless rivers, rising in the south, pour an immense volume of water into the Bahr el-Ghazal, and between the streams forests of mighty trees or fertile undulating plains abound. Here tropical luxuriance is seen to perfection; the winding forest-paths lead through charming sylvan scenery; one is completely surrounded by trees, whose mighty branches interlace so thickly that it is impossible to see their crowns, which in many instances tower to a height of more than 100 feet. The dense foliage completely shuts out the rays of the sun, and even at midday one marches along in a dim mysterious twilight. Bright-coloured creepers droop in graceful festoons from the trees, forming bowers of ever-varying beauty; here and there one catches glimpses of shady avenues, through which dart the startled denizens of the forest. Now and then birds of lovely plumage fly overhead, startling one by their shrill piercing cries; rainbow-hued butterflies flutter hither and thither, while the hum of myriads of insects makes the silence more intense. At times one passes through colonnades, formed by the interlacing mighty branches, the soft green sward underneath being a pleasant contrast to the tangled underwood through which one often has to force a passage. At times the path is obstructed by a

gigantic tree, which, unable to resist the force of some fierce blast, has fallen, but, though fallen, is still beautiful, with its soft covering of velvety moss. High overhead the wind sighs among the branches, and the rustling of innumerable leaves sounds like the murmur of the ocean upon a sandy shore. The atmosphere, heavy with the overpowering scent of tropical vegetation, produces a feeling of oppression, and, though wondering and rejoicing at the marvellous beauty so lavishly displayed around, one is glad when a welcome break in the forest permits one to breathe a purer, cooler air.

Up to the time of the slave war in 1878, the whole of the Bahr el-Ghazal district was practically in the hands of the slave-dealers. Dotted over this immense district were their zeribas, strongly fortified posts, garrisoned by Dongolawis and Besingers, and from these forts the slave raids were made. In some districts the effect has been a practical extermination of the native tribes. Where former travellers have seen fertile lands, and happy contented inhabitants, I found only dreary uncultivated wastes; and the once teeming population was reduced to a few wretched creatures, who had been so downtrodden and crushed, that their existence seemed lower than that of the wild beasts that lurk in the surrounding forests.

In all ages, slavery has existed in some countries, but years ago the fiat of the Christian world went forth that it must cease. In the new world, and on the western shores of Africa, its abolition has been accomplished; not so in Eastern and Central Africa. And why? Has the edict been revoked? Have the hearts of Christian nations turned to stone? How is it that a deaf ear seems to be still turned to the cry of those who are bound fast in misery and iron? Thousands upon thousands of Negroes are wistfully looking forward to the time, long since promised, when this oppression shall cease, and an end be put to the cruel tyranny under which they have so long groaned. If their hopes are to be disappointed, why have permitted the slave war, why have allowed the slaughter of thousands, the sack of villages, the devastation of the land, and all the atrocities which attend a war of that description, unless some definite result is to ensue? Far better to have spared them this indescribable misery, and never to have given them a taste of freedom, only to snatch it ruthlessly and cruelly away.

You see it is not only the deserts between the Red Sea and Khartûm that have to be considered in the question of the evacuation of the Sûdan. Much more is involved. If it be evacuated, the old slave-trade must inevitably revive, and the Anti-Slavery Society, although miserably supported, is perfectly justified—nay, morally bound—to use all possible endeavours to prevent the blackest crime being committed which I think will ever have sullied Britain's fair fame.

To make my meaning clear, Egypt, rightly or wrongly, annexed these provinces. England brought the utmost pressure to bear upon her to stop the slave-trade, which flourished in her new possessions; and as a result, wars were undertaken against the slave-dealers. At first, the White

Nile was closed to slave caravans, and the Dongolawies were compelled to undertake the desert routes in order to evade the rigour of the law. Thus the sufferings of the slaves were much enhanced, and hundreds and thousands perished on the road. But the slave-dealers were then followed to their hunting-grounds in the Bahr el-Ghazal district, and the above sanguinary war took place, in which they were overthrown, and order and prosperity were once more introduced into this long-suffering region. Now, however, the British Government advises or rather compels the evacuation of the Sûdan, the only possible result of which will be the re-establishment of the slave-dealer's reign. If you had marched with me along a thousand miles of desert slave route, and seen for yourselves the way lined with the grinning skeletons of fallen or murdered slaves, you would understand why I feel so deeply on the subject.

I come next to the Equatorial Province proper. Its boundaries are somewhat complicated, but approximately they are these:—On the north, the 9th degree N. latitude; on the west, the Nile as far as Lado, and then a line pushed 150 miles west, and continued in a curve to the south end of the Albert Lake. The southern boundary is the Albert Lake, the Victoria Nile, and a line drawn from Foweira to 35° E. longitude, which same parallel forms the eastern boundary line. In this province Sir Samuel Baker struck the first blow at slavery; Gordon Pasha took up the work, introduced order, built stations, made the people respect his authority, and completely abolished slavery. The present Governor, Dr. Emin Bey, rules over this large province with ease, requiring only 1500 Negro troops, divided into small companies at different stations, to keep order. Crime is unknown, slavery does not exist, the people live at peace with each other, and on the most friendly terms with the Government, and they pay their taxes in cattle and grain without any demur.

Emin Bey is devoted to the welfare of his people. His great object in life is to make them contented and happy, and to do as much as possible to raise and educate them. This province presents a picture of the good that can be done by a firm and just hand. Dr. Emin was able to write me in March 1883, that his province "yielded a revenue of £8000 into the Government treasury in 1882, after the deduction of all costs for Government transport, etc., and this notwithstanding the total want of articles for barter, which if we possessed we should be in a position to double this amount, without any fresh development of the resources of the country. I can say, perhaps with some pride, that my province, the youngest in the Egyptian dominions, has remained quite quiet, and we are living here as peaceably as if Egypt, Khartûm, and the Mahdi were not in existence. You know that the Negroes keep true to me, and I am therefore in a position to control them easily, and the soldiers are also devoted to me." "What an enormous market there would be here for calico and other articles of European manufacture! All our people are longing to get them, and if we had only something to give them as payment, they would gladly work to supply their needs. It is not to be expected that Negroes will

work for nothing, but the seductive spirit of barter has already taken possession of the native mind."

Last, there is the district south of the Bahr el-Ghazal, and west of the Equatorial province. Its borders are undefined, but roughly speaking they are, in the south, the 2° of N. lat., and the 23° of longitude on the east. In this province we find numerous tribes, including the Monbuttus and Niam-Niams. The chiefs are mostly independent, but they pay a tribute in cattle, grain, ivory, wax, and feathers. The country is extremely fertile, and the inhabitants are well fitted to make rapid progress towards civilisation, under proper government.

I will not dwell upon the province of Harrar, which lies to the south of Abyssinia, as I quite agree with the opinion that it should be given up. It has always been a great drain on the treasury, and has indeed been one of the chief causes of the financial failure of the Sûdan.

From what has been said, it will at once be seen that the deserts between Suâkin and Berber, Kordofan and the northern part of Darfur, are practically useless for purposes of cultivation, their only value being the production of herds of camels, sheep, and goats. It is, however, important that the inhabitants should be well disposed and live at peace, on account of their position between Egypt, the sea, and the fertile Equatorial provinces.

As I have before indicated, Sennâr, the Equatorial, and Bahr el-Ghazal districts are extremely fertile, and I have no doubt at all that they could be developed rapidly and to a surprising extent. To make this clear to you, I must give you a short account of the state of these provinces up to the end of 1883, as looked at from a commercial point of view. It must, however, be remembered that the Bahr el-Ghazal province had been for years a prey to the slave-dealers, and that the Equatorial province had received no help from Khartûm for five years. There, cotton, indigo, sugar-cane, rice, etc., are all being cultivated. Ostrich farms have been started, roads made, oxen trained to the yoke; and the net profit of the province for 1882 was £8000 sterling. This was the amount realised after the interest of the debt of the province had been paid. In the last letter I had from Emin Bey, the Governor (in 1883), he told me that if he could only have one or two Europeans to help him, and a small allowance from Khartûm for a year or two, to enable him to buy seeds and agricultural implements, he had no doubt that in four or five years he would be making a clear profit of over £20,000 a year, and all this not including ivory, which was a Government monopoly, and is of course becoming more scarce year by year. It is a well-known fact that Africans will trade if they can, and that when once they have felt the influence of barter, they will use every effort to practise it. That trade can spring up rapidly is shown by many facts, one or two of which I will adduce to prove my statements.

Within a year from the time that the late Gessi Pasha had conquered the slave-dealers in the Bahr el-Ghazal province, he was able to write,

"Many looms are at work making damoor cloth, all worked by young Negroes, who have been taught by people from Darfur. The cotton here is superior in fineness, softness, and length of staple to that of America and Lower Egypt." This I can myself confirm, as I have examined it, and seen how luxuriantly the shrubs grow, and how well they bear. Gessi had also taught the people to collect caoutchouc, and a large quantity had already been sent to Khartûm. Speaking of the Meschera-er-Rek district, he said, "It would be easy to produce 10,000 cantars of caoutchouc yearly, worth about £75,000; whilst the expense would not exceed from £3200 to £4000." If such results could be obtained in one district, how much might not be drawn from the Monbuttu and Niam-Niam lands? There is no doubt that cotton and caoutchouc would alone pay for the administration of these districts, and copal, palm-oil, arrowroot, incense, gum-arabic, honey, and wax are procurable in large quantities; also any amount of nut oil, which would be of use for the steamers, though not of commercial value at present in Europe, on account of the cost of transport. In the highlands of the Bahr el-Ghazal province, the tea-plant, cinchona, coffee, and eucalyptus, could easily be cultivated. Throughout the whole of these districts the natives manufacture very good pottery. Iron is also abundant, and they display considerable ingenuity in smelting and working it. Their knives, spears, arrow-heads, and bracelets are made in an admirable style, although the primitive stone hammer and anvil are employed. They evince great aptitude in copying European iron ware, and would adapt any European instruction, and turn it to advantage in the construction of their own implements. It is not to be expected that an immense trade would immediately spring up with these people; but were they free, and at liberty to indulge in peaceful occupations, it is reasonable to expect that a large, permanent, and steady trade would be created. Indeed, Lupton Bey, the Governor, reports that he had made a clear profit in 1882 of £60,000.

I am very desirous of making the cause and commencement of the Mahdi's insurrection clear to you. But in order to do so, it will be necessary for me, with your permission, to give you a rapid sketch of a chain of events which began with the conquest of Darfur in 1874, and culminated with the fall of Khartûm. In 1874 the Egyptian troops were enabled, with the help of the troops under Sebehr Rahama, to conquer Darfur. Now Sebehr Pasha was the great slave-dealing ruler who lived in Dem Sebehr. For an account of his power and the number of slaves he exported, I will refer you to Schweinfurth's *Heart of Africa*. He possessed great riches, thousands of slaves, and many troops. For the aid which he had given the Egyptian Government he was created a Pasha, but not being satisfied with this reward he asked to be appointed Governor of Darfur. He well knew that since the slave-trade by the White Nile route had been stopped by Gordon Pasha, Darfur was the key to the slave-hunting ground; also that the revenue he could extract from the caravans passing through the province, as well as the facilities he would possess as Governor for transporting his own slaves at Government cost, would be a source of

immense profit. The Government refused his request, and their refusal led to several disturbances, so that at last, with the object of removing Sebehr from the Sûdan, he was requested to proceed to Cairo to explain his wishes to the Khedive in person. He saw through this subterfuge, but knowing the wonders which baksheesh will work in Egypt, he gathered together many valuable presents and a large sum of money, variously estimated, but probably not under £100,000, and called a meeting of his fifty captains. He explained to them the object of his journey, told them that he believed he would be retained in Cairo, and bound them by a solemn oath on the Koran to obey his son Suleiman. He also said that at any time he might write and tell them to fulfil the oath made under the tree, when they should immediately commence a revolt against the Egyptian Government. In due time he arrived in Cairo, and although his presents had the effect of winning him many and influential friends, yet he was not successful in obtaining the main object of his ambition. He therefore planned the first revolt of the slave-dealers in 1877. This revolt was soon crushed by Gordon Pasha, who pardoned the ringleaders, but this treatment unfortunately only stimulated them to fresh efforts.

Sebehr Pasha did not fail to support them by all possible efforts in Cairo, and he was enabled by means of immense bribes to forward to his son, from the Cairo arsenal, cannon, Remingtons, and large stores of ammunition. These arms, by-the-by, I saw myself at Dem Sebehr; they were all marked by the Government stamp. Towards the end of 1878 Suleiman again received an order from his father to revolt. Gessi Pasha was sent against him, and the most sanguinary campaign took place. It ended towards the end of 1879, when Suleiman was taken prisoner by Gessi and shot. The power of the rebels was completely broken; 47 out of the 50 captains were killed in battle, and with them over 15,000 of their soldiers fell. Some people have attempted to exonerate Sebehr Pasha from all blame in this revolt. I cannot do so, as I saw the letter he wrote to his son, ordering it. This letter was sent to Cairo, but baksheesh again won the day, and he was pardoned, and remained in Cairo, the friend of the Khedive, with a pension of £100 a month.

Notwithstanding the failure of these two rebellions, Sebehr did not lose heart, but his fertile brain conceived and organised a movement in the Sûdan which was strong enough to break down Egyptian rule and even to bid successful defiance to our own arms.

From the time when Mahomet Ali conquered Khartûm the Sûdanese tribes have been constantly engaged in tribal wars up till 1877, when Gordon Pasha managed to pacify them. As I have before mentioned, they are all Mohammedans, and this explains why it was that the former revolts instituted by Sebehr Pasha failed, because he at that time introduced no religious element into the struggles, and although he managed to incite first one tribe and then another to rebel, it was comparatively easy for Gordon Pasha to re-establish order, as there was no cohesion between the tribes, no bond of union to form a common inspiration. But

when the Madhi, inspired by his friend and protector, Sebehr, introduced a religious motive for revolt, the state of matters changed, and instead of single action a combined movement was the result. Numerous factors combined to bring about the rebellion. I will endeavour to make them clear in a few words.

When the European powers deposed the Khedive Ismail, and Gordon, in consequence, lost the unreserved support from Cairo which Ismail had given him, he felt thoroughly disappointed, and, despairing of the success of his mission, he resigned his post. He had filled it with such unselfishness that the Sudanese looked on with astonishment; but his successor soon made the poor people feel his loss, by a re-establishment of the old system of cruelty, corruption, and heavy taxation. During the time that Gordon was in power there was for once before the people an example of a just and righteous ruler, who feared God and disregarded man. His life and actions were a manifest proof that all government is not necessarily cruel, corrupt, and tyrannical. While he was in the Sûdan the burdens of downtrodden thousands were lightened. Stern and unrelenting in repressing evil and cruelty wherever he found them, his heart was tender, and he was ready to assist the oppressed, the sad, and the suffering. He was looked up to as the Father of his people, feeding the hungry, clothing the naked, and setting the prisoner free. The pitiful requests made to me at many places on my journey to send him back, prove that his work there was not in vain, but that he came as an angel of God, bringing help and deliverance; and his memory is enshrined in many hearts as the one bright oasis in their otherwise sad existence.

But, although not in vain, it was but of short duration. Look at the Sûdan as it was in 1880, when I left it; peace and contentment reigned over its whole extent, taxation was equal and just, most of the corrupt officials had been removed, and the Equatorial and Bahr el-Ghazal provinces, which had been a drain on the Sûdan exchequer, were beginning to pay their way. In 1882 their surplus was nearly £70,000.

But a few short months were sufficient to bring chaos out of order. For Raouf Pasha was appointed as Gordon's immediate successor; taxation returned with heavy pressure, but it was called the introduction of economy in finance. By June 1881 he had filled the treasury to overflowing, by the help of the kûrbatch and Bashibazuks. The beginning of the end had come. All the old grievances returned, but with redoubled force, for had not the people tasted liberty and equal-handed justice? Throughout the length and breadth of the Arab and Nubian portion of the Sûdan acts of cruel and bitter oppression were laying the fires of discontent, which needed but the kindling match to make them blaze into the fury of rebellion. Raouf Pasha was busily engaged in feathering his own nest, when the appearance of the Madhi upset his rapacious schemes. In July, 1881, Mohammed Achmed, the so-called Madhi, applied the match, by appealing to the religious fanaticism of the people; and the insurrectionary spirit which had gradually spread among them broke out into open resistance.

The beginnings of the rebellion, however, were so small that, at the time, they were allowed to pass unnoticed, and even in Khartûm itself they were thought to be of little consequence. And, indeed, they might have been, if only they had been met promptly, and the causes of the discontent removed.

It is not my intention to give any account of the Mahdi's rebellion, as I take it for granted that you are all more or less acquainted with the events that have occupied so much of the public interest during the last two years. But I feel compelled to tell you that the Governments of England and Egypt, from the first, knew perfectly well what was occurring in the Sûdan, and therefore have themselves to blame that the revolt was not nipped in the bud. The warning letters of the Austrian and French Consuls at Khartûm, from Emin Bey, from Schweinfurth, from Sir Samuel Baker, and from myself, were all alike unheeded. If an English Consul had been at Khartûm, perhaps he would have been believed, and all the bloodshed and misery and the terrible war avoided. But the Consul was appointed too late, and, after being delayed several months in London by the Foreign Office, he reached Egypt only to find the road to Khartûm closed against him.

From the very first, the English Government has separated in its deliberations the Sûdan from Egypt. How they could conscientiously do that, I do not profess to understand, for, however much Egypt may be to blame for having annexed the Sûdan, the fact remains that it was annexed, that it was garrisoned by Egyptian troops, that it had a large and steadily growing trade, and that, mainly through England's instrumentality, Sir Samuel Baker and General Gordon had been governing it for years, and been successful in checking the horrible tribal wars, and in curbing to a great extent the slave-trade. After Tel el-Kebir, when England had gained a paramount influence in Egypt, the friends of the Sûdan rejoiced, for they thought that now the hopes of civilisation, and the abolition of the slave-trade, which a generation ago it was the pride of our fathers to accomplish, would at last be realised; but how bitter was the disappointment, how keen the sense of injustice, when we heard the declaration of the British Government that the Sûdan was "beyond the sphere of her intervention," and "outside her interests." Was that true? I think not. Indeed, in December 1882, Colonel Stewart had told all the notables in Khartûm that England had determined, with Egypt and Turkey, to re-introduce order into the Sûdan, and that if the 10,000 soldiers already on the road were not sufficient, 50,000 more would be sent, and that the people were to remain true to the Egyptian Government.

But England has not been true to this promise: what more cruel and thoughtless action could have been taken than to enforce the advice that the Khedive must abandon the Sûdan, and to publish abroad its intended evacuation?

This declaration practically abandoned the garrisons to certain massacre, and enhanced the prestige and the power of the Mahdi to a very

large extent. If it was necessary and right for Egypt to evacuate the Sûdan,—which I for one do not believe,—could they not have withheld their intention from the world, and have given the garrisons private instructions to evacuate the country by degrees?

The result of their ill-judged action is patent to all the world. It is sickening to think of the bloodshed and the loss of life it has entailed, culminating in the fall of Khartûm—a catastrophe which must bring a blush of shame to every honest man's face. My feelings on this subject are almost too deep for words, and indeed it is at the present time needless for me to point out how all this might easily have been prevented, as it is too late to undo the irretrievable blunders of the past.

From what I have said you will see that I consider the Sûdan should be retained, not only on moral grounds, but also because I am convinced that its capabilities have been under-estimated, and that it only requires an outlet to the sea to enable its vast resources to be utilised by the civilised world. Now how is this to be accomplished? By a railway.

I first advocated a railway between Suâkin and Berber or Shendy in 1880, and I am convinced that every one who knows the Sûdan will agree as to its importance. If the proper route be taken there are hardly any engineering difficulties in the way of its construction. In the summer of 1882 a syndicate was formed in London for its construction. The money was provided, plans were made, and, but for the refusal of the Government to allow of its being made, it would have been completed in a very short time. It is well known what action the Government have recently taken in the matter. Permit me to read a letter of General Gordon's on the subject:—

"United Service Club,
17*th December* 1882.

"My dear Mr. Wylde,—You ask me my opinion on the subject of a railway between Suâkin—Berber.

"Speaking from long experience in the Soudan, I feel convinced that until such a communication is made no real progress can be reckoned on in those countries. Their being so near Egypt proper, and yet so backward as they are, is simply owing to the great difficulty existing in getting to and from them to the Red Sea; a belt of arid sand of 280 miles separates them from civilisation, and till this is spanned no real progress can be made.

"The Khedive, Ismail Pasha, fully recognised this great point, for, as His Highness often told me, he wished the Railway made up the Nile simply for the facilities he would then have of supervising the Government of the Soudan, and though the line up the Nile is wrongly chosen, yet he was right as to the importance of a regular communication from Egypt to the Soudan. There can be not the least doubt but that the route, Suâkin to Berber, is the true natural route to be opened.

"Had this route been opened when I was in the Soudan it would have been infinitely more simple to have governed those countries. The hidden

misery of peoples in the dark places of the Soudan exists because no light is thrown on those lands, which light this Railway would give; and it is certain, when it is known that the railway is completed, an entire change will take place in the whole of this country.

"As long as the present state of affairs (with no communications) exists, there will be revolts and misery, and this will entail many thousands per annum on the exchequer of Egypt, for it is certain that Egypt cannot throw off the Soudan and allow other countries to take it.

"Had I time I could say much more on the subject. I conclude in saying that the Railway is a *sine quâ non* for the well-being of the Soudan.—Yours sincerely,

"C. G. GORDON.

"To Mr. A. B. Wylde,
"Westfield, Putney."

Lord Dufferin, in his report on Egypt—"The Reorganisation of Egypt"—strongly advocated this railway. He says, "The first step necessary is the construction of a railway from Suâkin to Berber, or what, perhaps, would be still more advisable, to Shendy on the Nile. It would bring Cairo within six days and a half of Khartûm, the time required to run from Suâkin to Berber on the Nile being only sixteen hours; and the cost would be under a million and a half. The completion of this enterprise will at once change all the elements of the problem. Instead of being a burden on the Egyptian exchequer these Equatorial provinces ought to become, with anything like good management, a source of wealth to the Government. What has hitherto prevented their development has been the difficulty of getting machinery into the country, and of conveying its cotton, sugar, and other natural products to the sea." Later on he says, in speaking of the abolition of the slave-trade: "If a railway were made from Suâkin to Berber, it would do more to stop the slave-trade than any other measure." The Austrian Consul at Khartûm, Herr Hansal, who lived twenty-five years in the Sûdan, writing from Khartûm, in January 1883, said: "If only England will give her sympathies to the Sûdan, and will care a little for its prosperity, let her take care that a railway is begun without further delay to connect Khartûm with the Red Sea." But he recommended the route to be taken from Akik on the Red Sea to Khartûm, because the harbour of Khor Nowarat is the finest bay in the Red Sea. It is $4\frac{1}{2}$ miles broad, and about the same long. The outer part of this bay is bordered by low sand and coral islands, which act as a breakwater, and there are no engineering difficulties between Akik and Khartûm.

Colonel Stewart, who was sent by the English Government to report on the condition of the Sûdan in 1882, also strongly recommended the construction of a railway.

There is no doubt that such a railway, by reducing the cost of transport, and the length of time in transit, would soon increase the commercial importance of the Sûdan immensely. It would bring Lado within

thirty days of the Red Sea, the Bahr el-Ghazal within twenty days, and from both these points trade could be carried on by oxen in every direction. In fact, to my mind, this is the most feasible way of opening up Central Africa.

It puts Zanzibar quite out of the question (not a small advantage, as the Germans have annexed the whole of the fertile country between Zanzibar and Tanganyika, and will probably possess Zanzibar itself before long; the heir to the present Sultan of Zanzibar is an officer in the Prussian army). The Suâkin route would probably be a great rival to the Congo, though both the Red Sea and the Congo routes will pay, there being room and capabilities for both.

I will explain here what extent of river is navigable by steamer from Khartûm. At all seasons of the year they can pass up to Fazokl on the Blue Nile, a distance of 350 miles. On the White Nile they can ply as far as Bedden (4° 35′ 48″ N. latitude, 31° 36′ 6″ E. longitude), a distance of 1050 miles from Khartûm, where there is a rapid for about half a mile, which, however, a little dynamite would make passable. The river is then navigable as far as Kerrie (4° 18′ 10″ N. lat., 31° 40′ 28″ E. long.), from which point to Dufli (30° 34′ 35″ N. lat., 31° 40′ 28″ E. long.), a distance of about 50 miles, no steam navigation by river will ever be possible; however, a pretty good road already exists, but from Dufli to the south end of the Albert Lake, some 250 miles, the river is navigable all the year round, and two steamers are now at work on that lake. The river Sobat is navigable for steamers for about 300 miles during most of the year. From Lake No, the Bahr el-Ghazal and the river Jûr are navigable for more than half the year to a point 5° 10′ north, 28° east, about 400 miles, and the Bahr el-Arab, which flows into the Bahr el-Ghazal, may be navigated as far as 24° 10′ east, 9° 50′ north, near to the copper mines of Hofrath en-Nahass, a distance of about 500 miles, for seven months out of the twelve, whilst the Boru, the Sabu, the Chell, and the Pango, according to the information of Lupton Bey, can each be navigated for fifty miles during five months of the year. From these data will be seen the immense extent of country which would be brought within steam communication were the Suâkin-Berber railway made. Nearly 1700 miles of waterway are navigable during the whole year and 1500 for six months out of the twelve. There is no doubt, also, that the caravans for the great kingdoms of Bornu and Wadai would be diverted to this route, so as to avoid the long and tedious journey through the Sahara from the Mediterranean, the route taken at the present time by countless caravans.

Wood for steamers can be procured almost anywhere except near Khartûm, and even should it fail there is an unlimited supply of coarse grass, which, when properly prepared, makes admirable fuel.

Permit me to make a few concluding remarks. Many people are of opinion that the Sûdan should be entirely relinquished, because they think that it is an encumbrance to Egypt, and they consider that its

development is impossible. I think I have already said enough to show how mistaken these ideas are, but I should like to add a few words with regard to the state of the Sûdan finances in 1881. The debt was then £330,000; this was caused by the initial cost of the annexation of the country, providing steamers, etc., and the amount of money which the Sûdan had to pay on account of the proposed Cairo-Khartûm railway. The yearly deficit was about £72,000, caused by the expense of Harrar, the corruption of the officials, and amounts debited to the Sûdan account by officials in Cairo in order to cook their own balance-sheets. I have before mentioned that, in 1882, the Equatorial provinces yielded a revenue of £8000, and the Bahr el-Ghazal provinces a clear profit of something like £60,000, reducing the deficit for 1882 to £4000, and at that time only a few urgent reforms were needed for the Sûdan to have become a source of profit to Egypt, although it was then in a condition of terrible mismanagement.

The result of its relinquishment will be very disastrous. In the first place, an artificial frontier will have to be constructed at great cost, and this frontier must be protected by a large army, which will entail far more expense than the cost of ruling the Sûdan. The effect will also be very disastrous in Egypt itself, and will necessitate our occupation of the country for a far longer period than would otherwise be needful, if indeed worse evils do not result.

Secondly, it is impossible to leave the Sûdan in the state it was before the Egyptians annexed it; its evacuation will cause it to relapse into a state of civil war worse than it has ever known, and Khartûm will once more become the centre of a thriving slave-trade. The people are well worthy of something better than this, and have surely suffered enough of tyranny and misery in the past.

The vacillating policy of England has much increased the difficulty of arriving at a solution of this great problem, but a definite, firm declaration of a decided policy might yet be made to the Sudanese, which would quiet their fears and dissipate the spirit of revolt, thus making it once more possible to relieve them from the cruel oppression of the past, and to raise them to the splendid possession to which they are entitled, —namely, a just and righteous government.

SKETCH OF SOUTH-WESTERN TURKOMANIA.[1]

By M. PAUL M. LESSAR.

Translated from the Russian by H. A. Webster.[2]

(*Continued from page* 169.)

Population of South-western Turkomania.—In the interior parts of South-western Turkomania there are few places adapted for tillage, and the country is of importance only for cattle-breeding. Settlements of Saryks and Salors, whose "chorva" take advantage of the district between the rivers for their herds, are scattered along the Murg-ab and the Heri-rud.

The Saryks division into Clans.—The tribe of the Saryk-Turkomans occupying the oasis of Iol-otan and Pende, is divided into the following clans:—Bairadj, Suktis, Alasha, Khorasalli, and Herzekis. To the question how many clans they have, the Saryks themselves, however, always answer not five but six, because in their arrangements for the distribution of land and water, the election of chiefs, etc., the Herzekis are reckoned as two clans.

The method of Government in the oasis was the same as in Merv; real authority there was none; every one did as he pleased, and only when it happened to be absolutely necessary to take some decision affecting the whole oasis was the affair settled by the aksakals (elders). As in Merv, the power of the khans was *nil*; thus in Iol-otan Sary-Khan was a simple executor of the regulations of the aksakals; he possessed no independent authority. Now, all is changed in Iol-otan; Sary-Khan is at present a Russian functionary, and his orders are obeyed as those of a Russian authority, not as those of a Turkoman chief.

The Numerical Strength of the Tribes.—The Saryks themselves estimate their numerical strength at 20,000 tents. But in order to appear stronger than they are, the Turkomans always exaggerate the real figure of the population, and more confidence may be placed in Petrusevich's estimate of 12,000 tents, although it is very likely that, when put to the test, even this will be found greatly above the mark. Of these 12,000 tents a third, or about 4000, are settled at Iol-otan, the remainder in Pende and on the Kushk, Kash, and Kaisor. Among the Saryks live a small number of Jews, the larger part immigrants from Herat, a town to whose college the Jews are still accustomed to send their children to be educated. The Saryks do not persecute Judaism, but they oppress its followers and extract money from them when they are wealthy.

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[1] *Yugo-Zapadnaya Turkmeniya: Zemli Sarykoff i Saloroff* in *Izvyestiya Imp. Russk. Geogr. Obshchestva.* Tom. xxi., 1885. Read before the Imperial Geographical Society 7th (19th) December 1884.

[2] The best thanks of the Editors are due to M. Lessar, who has most obligingly corrected the proof of the translation.

Manners and Customs.—In their manners, customs, occupations, and method of life the Saryks differ little from the Tekkes. The inhabitants of Pende are perhaps the most nomadic tribe of all the Turkomans; the Mervians already begin to root themselves to the ground, if only with clay huts for their guests and the walls of their *kale* and *shekhr*. The Saryk even yet prides himself on this, that he regards his saddle and his gun as his castle. In the triangle between the Murg-ab and the Kushk, the fortifications of Taza and Kegne-Pende were in ruins before the arrival of the Saryks. They were not restored, and in the whole oasis there is not a single fortification, nor for that matter a single building of the simplest description; all the inhabitants live in settlements of 20, 30, or at times as many as 100 tents, standing on completely open and unenclosed ground. The mud erections in Iol-otan are only a sort of warehouse.

In consequence of the development among them of cattle-breeding, the Saryks live in abundance; the more wealthy are masters of several tents. The felt cloth is covered on both sides with white linen, which gives the tents a trim and clean appearance, distinguishing them very favourably from those of the other tribes. The value of a tent is from 300 to 800 *tenge*. Within them is great store of carpets and other goods, and even the outside of many tents is adorned with stripes and very costly carpets. Though reed-built cottages covered over with clay are numerous in Merv for the poorer classes, in Pende they do not occur at all.

Language.—According to the Turkomans, it is possible to distinguish by their speech the Saryks from the Salors or the Tekkes, not to mention the remoter Iomuds, Yersaris, etc. This is very probable. The individuality of each tribe, arising from their continual hostility with each other, has certainly led each of them in different degrees to borrow from its neighbours, as well as to produce forms of expression peculiar to itself. For example, the Saryks call a canal *nou-khana* and not *aryk*, *jar*, *jui*, or *yab* like the other Turkomans. The proper names especially are different; the great fort in Merv bears among the Saryks the name of Khan-hechen, which is completely unknown to the Tekkes, who call it Koushut-khan-kala or Mary-shigar (Merv town). On that spot, in the time of the Saryks, there was a small fort and patch of tilled ground. Medemii Khan for a period of twelve years carried on war with the Turkomans, and destroyed the place, and it consequently received the name Khan-hechen, "the Khan has passed." The fort known to the Tekkes under the name Porsu-kala was erected by the Saryks at the time of the wars with the people of Khiva for the protection of the dam Jenaali-bend (now Koushut-khan-bend), and with the Saryks it still bears the name Jenaali-bend-kala.

Raiment.—The dress of the men differs very slightly from that of the other Turkoman tribes. Only the place of boots is often taken by soft leather socks, above which they wear galoshes from Bukhara, with

copper heel-pieces. In the house many wear, instead of the Turkoman sheepskin cap, woollen cloth flat caps (tyubeteiki) from Bukhara, trimmed with a narrow band of fur.

The women's dress differs somewhat more from that of the Tekkes. The chemise and pantaloons are the same as with the Tekkes, except that they are almost exclusively blue, while with the latter tribe red is the prevailing colour. The head-dress is altogether peculiar, and consists of a tall felt cap, surrounded half-way up with a thin turban of coloured stuff, which then descends behind in a broad veil to the girdle, but is gathered up in front to cover the chin.

Occupation.—The chief occupation of the Saryks is cattle-breeding and tillage: trade and industries are but slightly developed; brigandage is completely discontinued from the direction of Iol-otan, and greatly kept in check from the direction of Pende.

As with the other Turkomans, the cattle-breeders are called *chorwa*, and the husbandmen *chomur*.

Cattle-breeding is more largely developed among the Saryks than among any other Turkoman tribe, in spite of the fact that the disturbed state of the district has hitherto prevented them using the best pasture around Koyun-kui, and obliged them to content themselves with the tracts nearest the oasis. The inhabitants of Pende—the wealthiest cattle-breeders—feed their flocks on the hills on both banks of the Kushk, and even in the interior of Badkhyz, for which they pay to the Afghan Governor a tribute of about 6 tenge per 100 sheep.

To the north of Dash-kepri they did not drive their herds further than the ford of Yungenli, because of the difficulty of protecting them from the Mervian raiders. No use was made of all the pasture-grounds up to Kurjukli. That place was the most dangerous in all the steppe: there the brigands of all the surrounding tribes roamed. Iol-otan has very few inhabitants—only those poor people who have migrated from Pende, because they had no cattle, and there was not enough of good ground at the junction of the Murg-ab and Kushk. Such small herds as they possess, the people of Iol-otan pasture in the neighbourhood of their own *auls*. To defend each herd or flock by special hired servants would not pay, and so another system of protection is adopted: at suitable points they secretly station scouts, whose duty it is to follow the movements of the robbers. In case of an attack these hasten to communicate with the oasis, where the people prepare a pursuing party corresponding to the strength of the alaman. It is impossible to drive the cattle quickly, and, consequently, a successful "lifting" is seldom accomplished; generally the affair is confined to the carrying off of horses, arms, and stragglers. The Saryks' sheep are of a very good breed; pasture is excellent throughout the steppe; and thus, in spite of troublous times, the Saryks are the wealthiest of the Turkoman tribes: some have as many as 1000 sheep, the most opulent—*bai*—as many as 2000 sheep and 60 to 70 camels.

Now that the country has been fully pacified, a great part of the flocks will feed on the northern slopes of the Elbiryn-kyr. The scarcity of wells does not form an obstacle: for a part of the time the flocks drink from the river, until the herbage in its vicinity is consumed; then they are removed to the wells: even in summer the sheep need only be watered once every four or five days; in the interval the moisture in the grass is sufficient.

Husbandry is in a worse state among the Saryks than sheep-breeding. As in other low-lying parts of Central Asia, the ground produces nothing without irrigation; and in Pende this presents great difficulties. Almost everywhere the valleys of the Murg-ab and its affluents are lacking in breadth: and the hills that confine them, though comparatively low, prevent all canal-works, except at the cost of extensive erections; and consequently, since the expulsion of the Salors, the Saryks have occupied all the valleys.

The principal canals for the irrigation of Pende are drawn from the Murg-ab: but the banks at that place are not suitable for the construction of a dam, and the Saryks content themselves with small canals supplied by the natural current of the river; only when the water is very low they raise its level by constructing, at the outflow of the western canals, a little below Meruchak, temporary barriers of stone and brushwood, which are carried off by the floods in spring. The first part of this canal is separated from the bed of the river by a dam called Bend-i-Nadiri, formerly erected by the Chorshangy-Yersaris, who lived there before the Salors.

Besides the obstacles presented by the local physical conditions, there are other reasons why the Saryks do nothing more satisfactory for the irrigation of Pende—the indefiniteness of their position, the fear of attacks by the Afghans, who can compel the Saryks to move off northward, and more especially the absence of all settled order in the tribe itself.

Under such circumstances only the very lowest part of the valley, to a breadth of 200 to 300 sazhen (1400 to 2100 feet) is irrigated; elevated areas of 3 sazhen (21 feet) are beyond the reach of the water. The canals of the right bank of the Murg-ab are used by the Bairadj and Alasha clans, those of the left bank by the Suktis, the Khorassalis, and the Herzekis.

Formerly the Saryks used the water taken from the Murg-ab, near the fort Bala-Murg-ab, when every year they formed the temporary embankment of Band-i-joukara; quite recently the Afghans drove the Saryks out of Bala-Murg-ab, and their tilled ground is now occupied by Jemshidis and Khazare (Hazara). At the time of General Grodekoff's journey through Kalei-Vali, that fort was unoccupied and lay in ruins; at present Saryk-Khorassali are in possession of it. From the River Kash also small canals are derived by the Herzeki clan. As was mentioned above, the Kash sometimes dries up in summer, and consequently the utilising of it is exposed to risks; and even in favourable circumstances it does not yield much water.

In spite of a similar danger from desiccation, the river Kushk is of more importance for the oasis, having abundance of water in spring, and after rain has fallen in the mountains, canals are drawn off by the Suktis and Khorassali from Chil-Dukhter along its whole valley as far as the oasis of Pende, about 20 versts (13 miles) to the south of Dash-kepri. The Saryks do not live all the year round near these cultivable districts; only the dekhkany (husbandmen), who have their families in Pende, repair thither for sowing their seed and reaping the harvest. Small strongholds have been built by them at certain points in the valley.

To the north of the Herzekis the Suktis draw off a few canals, the most important of which goes along the left bank of the river by the Dash-kepri aqueduct, and irrigates the cultivated lands up to Yungenli ford.

But all the country described above was insufficient for the Saryks; they say plainly that in Pende the irrigated ground is too little; there only wealthy sheep-breeders and raiders could live. The restoration of the former irrigation works between Yungenli and Iol-otan was rendered impossible by the disturbed state of the steppe, and consequently ten years after the capture of Pende, the poorest part of the population, having no flocks, and consequently risking little, determined, by agreement with the people of Merv, to take possession of the ruins of Iol-otan, a fortress abandoned by the Salors. Forty-five versts (30 miles) above this point they built the dam of Bend-i-Kazakhly, from which a canal branches off to water the oasis of Iol-otan; opposite Char-bag this canal splits into two parallel arms, which are carried almost all the way to Merv. The smaller subdivisions are not constant, and in them the water is only admitted according to the requirements of the ground actually sown. The width of the large canals is 3 sazhen (21 feet), of the single canal running to Char-bag, 4 sazhen (28 feet); the depth is from 1 to $1\frac{1}{2}$ arshins (2 to $3\frac{1}{2}$ feet). The whole oasis of Iol-otan consists of a narrow belt, rarely more than 2 versts broad, stretching from Kazakhly almost to Merv, that is, for a distance of well-nigh 60 versts (40 miles). On the right it is bounded by the river, on the left by the sands, which alternately run down to the river in spurs, or retire from it in bays. The canals pass along the edge of the sands, or even at times strike across them. The cultivated portion of the Iol-otan oasis begins only at Char-bag, and continues to the ruins of Tal-khatan-baba, where it marches directly with the arable land of Merv.

Besides the main canal, there are in the inundation area near Iol-otan small cultivated areas, the water for which is raised from the level of the river by water-wheels (chigirs), of the same structure as those employed in Khiva.

There is no doubt but that after the complete pacification of the district, an important part of the inhabitants of Pende will migrate to the north, and take possession of all the unoccupied country on the Murg-ab, especially near Iol-otan, where the soil is very good, and excellent pasture is found near at hand.

In the oases of Pende and Iol-otan the principal crops are wheat, jugar

(sorghum), barley (a very small quantity), rice (of excellent quality), sesamum, yurunja (lucern), cotton (very little). Of kitchen-gardening there is not much. In Iol-otan and Pende there are absolutely no gardens.

Though the whole success of the husbandry depends on irrigation, it is among the Saryks, as among the other Turkomans, in the very lowest stage of development. Among the other nations of Central Asia there is an absence only of theoretical knowledge in this department; among the Turkomans there is very little evidence of practical skill either in the making or the maintenance of canals. The constructors of irrigation works, called *pyanjvars*, are in general extremely inexpert.

A place for the erection of a dam, or the mouth of a canal, is chosen at a bend of the river, in order to take advantage of the direction of the current; then the canal is laid down by turning to account the remains of previously existing and now abandoned works, of which there are many almost everywhere. If there happen to be no such old works, the direction of the canal is left to guessing and trying. Having no knowledge of levelling, the Turkomans are never sure that the water will go where they wish; consequently they dig the canals, beginning at the river, in small sections, into which they immediately admit the water. They have no idea how to give a slope corresponding to the nature of the ground; this the water itself does in the long run, by undermining the banks, and increasing the length of the canal by sinuosities. And they even neglect to keep the banks and dams of the canal in repair; a considerable portion of the water escapes, and forms extensive pools, especially in the Merv oasis; by this means, besides the waste of water, good land is ruined, if not for ever, at least for a very long time; the salt left behind on the evaporation of the water turns the soil into a salt marsh, of no use for tillage.

The outlets for the water are almost never sufficient; when the level rises the water does not pass through them, and the dam is destroyed. If the dam is too solid, so that the water cannot make its way through it, it turns the flank of the works, which is seldom a matter of difficulty, since the banks are not strengthened in the neighbourhood of the dams. When the water rises, the guard at the dam makes the fact known in the settlement; several hundred, or it may even be two or three thousand, men make their appearance, and begin a contest with the water; everything is done utterly at random, and there is hardly a dam which does not burst every five or six years.

It is evident with how little economy the water is distributed, how defective the system of irrigation is as a whole, and how in great part the results are small, in spite of the great expenditure of labour.

The works for irrigation are of the most primitive construction. As already stated, in the oasis of Pende there are no dams in order to raise the level of the water and direct it into the canals. When the stream is low, they make, both at Bend-i-joukara and on the Kushk, temporary barriers of stones and brushwood, which require to be restored every year.

The aqueduct of Dash-kepri was built at the time when the Arabs were masters of the district. It consists of nine pointed arches, and has the following dimensions:—Each span is 1·8 sazhen (12½ feet), the thickness of the pillars, 1·15 sazhen (8 feet), the whole length of the aqueduct, 30 sazhen (210 feet), the height from the water level to the top of the parapet, 2·45 sazhen (17 feet). The canal which passes overhead is 5 arshin broad and 1½ arshin deep. In appearance the aqueduct is clumsy and low-set; owing to its small elevation, the pointed arches begin almost in the bed of the river, and are very ugly. The mortar was made with sarytch, a kind of cement mixture, in which they put ashes, salt, and even eggs, to increase its hydraulic properties; but it has not preserved the aqueduct from ruin. Several of the arches have fallen; the whole is preserved only by additions, of massive dimensions, to all parts of the structure.

The Saryks tried to turn the aqueduct into a dam, but as there was no outlet, the water rose and threatened to surround it or carry it off, and so the obstruction was removed.

The dam of Bend-i-Kazakhly, supplying water to the canals of Iol-otan and Kyrjukli, is built of earth and brushwood; the sluice for the passage of the flood-water, which does not enter the canal, is of stones and fascines, and thus requires continual inspection and repair. During the time of the Saryks, *i.e.* in the last seventeen years, the dam has three times been carried off by floods; and on one occasion the people of Merv burned the fascines.

The canal from Kazakhly to Char-bag was made by the Salors; at that time the river at this place flowed in another channel, which was also crossed by a dam diverting the water into the canal; the floods turned the flank of the dam, and hollowed out a new channel, which joined the old one at Baba-kember: the Saryk dam was placed in this new channel. The water flows at first in the old channel up to the embankment situated on the site of the Salor dam, and thence along the old canal; the declivity of the bed is very considerable, and if it had been kept clear throughout the whole extent it would have been possible to do without the dam altogether. With this object in view, the Saryks attempted to remove the starting-point of the canal higher up; an immense aryk was dug, but an unfortunate direction having been given to it, it ended in the sands, and was abandoned.

Trade.—As, on the one hand, the Saryks have hardly any wants in consequence of their poverty and low state of civilisation, and as, on the other hand, communication with the neighbouring countries is difficult, it is easy to understand the small extent of their trade.

The Saryks in Iol-otan receive cotton prints, iron, kettles, tea, and silk mainly from Bukhara, and robes from Khiva. From Herat they bring also tea, silk, sugar-candy, indigo (the last for Bukhara and Khiva).

In Pende the articles of trade are nearly the same; but owing to the

terrible dangers of the road from Iol-otan to Pende the former settlement procures its wares mainly from Bukhara, the latter from Herat.

From Bukhara they also bring small articles of cabinet-work and other wooden wares, coffers, doors for their tents, etc., and from Khiva frame-works for their tents. When the Kushk and Kash dry up early in the year, or, as often happens in Pende, the harvest proves a failure, or it may be from various other causes, grain is purchased in considerable quantities in Merv or Herat.

The principal exports from the two oases are sheep (to Bukhara), horses and camels (to Herat). The price of the largest sheep is from 20 to 25 tenge. The wood growing on the Murg-ab is felled and floated down for sale at Merv, where a good tree fetches 6 to 7 krans. At Bend-i-Kazakhly the rafts are loosened and carried over to the other side of the dam; for this the guards take a tax in kind, one tree from so many, employing what they receive for repairing the dam and the bridge at Iol-otan.

The rice grown in Pende is famous in all the surrounding countries as the best, and it is exported to Herat, Persia, and Merv.

In the hills on the banks of the Murg-ab and the Kushk foxes are caught, the skins of which are sold at Bukhara for 36 to 40 kran the bundle.

The following productions of the Saryks are exported. The first place belongs to the carpets: in pattern they are somewhat different from those of Merv, and in quality they are not so good, on account of the mixture of cotton and the absence of silk; in the oasis there are no mulberry-trees and no silk-growing. The cost of the carpets is almost the same as those of Merv. Cow-hair felts are made in considerable quantity in Pende: a piece five arshin long and about three wide (12 by 7 feet) costs 20 krans. From the soft hair of young camels (one or two years old) they make a beautiful stuff for gowns; one woman can make in the course of a year one piece about nine arshin (21 feet) long and from 14 to 15 vershoks broad (21 by 26 inches). This stuff fetches a very high price in Persia and Herat: a piece of it costs 200 to 300 krans; none of the Saryks are rich enough to wear gowns of this kind. A cheaper stuff of the same sort (80 krans the piece) is made of sheep's wool; it is white. The other products of Saryk industry serve only to satisfy local needs.

In consequence of the unsettled state of the country, commercial traffic can only be maintained by taking great precautions. For the protection of a caravan of 100 camels, it is necessary to employ fifty to sixty footmen (mergeni), at a pay of 50 tenge as far as Char-jui. To Bukhara the journey lasts five to seven days with camels and twelve days with sheep, in great part by the road through Repetek, which is considered the best; it is sufficiently provided with water, and the quantity of sand along this route is not great; traffic is also greatly interfered with by the raids of the Mervians and Yersaris. The difficulty of communication tells on the price of goods: a piece of red cotton stuff, 56 arshin broad, costing 38

tenge in Bukhara, is sold for 60 at Pende. A pound of sugar costs 60 kopecks.

In the markets held twice a week mainly local products are sold; objects obtained from other districts are sold in shops by the Jews, who number about twenty men, in Iol-otan; they hold in their hands the whole transit trade between Herat and Bukhara; Iol-otan has been a very suitable entrepôt on account of the friendly relations of its inhabitants with Pende, and their more or less peaceful relations with the Mervians.

Up to the present time the coins which circulate among the Saryks have been mainly the Bukhara tenge (four of which are equal to a credit ruble = 2 shillings), and the old Persian krans (about 30 kopecks). Even in the spring of the present year they had neither the new Persian krans (40 kopecks) nor paper money.

The Salors.—According to the investigations of General Petrusevich, the Salors are divided into three clans or tribes—Kipchags, Dazardu-Khoja, and Karaman-Yalavach. In the neighbourhood of Old Serakhs there are now about 3000 tents (the Salors themselves estimate 4000); besides these there are about 1000 on the Murg-ab (between the Mervians and the Saryks), at Char-jui 400, at Maimene 200, and near Herat and Pul-i-Salar about 100 houses.

The Salors are the poorest and weakest of the Turkoman tribes: all live in reed huts plastered with clay; they have hardly any flocks, and very few horses and cattle; they have long given up engaging in raids, and agriculture is now almost their only occupation. Their settlements are scattered, partly at Old Serakhs, partly at the ruins of Koushut-kale; for irrigation they use canals, beginning at Doulet-abad, the water in which is diverted by temporary dams, renewed every year when the floods subside. The system of irrigation is just as imperfect as that of the Mervians and Saryks.

Historical Sketch.—At the close of the eighth decade of the last century,[1] after Merv was destroyed by the Emir Maasum of Bukhara and its inhabitants were removed, partly to Bukhara, partly to Mesh-hed and Herat, the country on the Murg-ab, near Bairam-Ali-kala, was taken by the Turkoman Saryks, and it continued in their power till the middle of the present century, and was the centre from which they made excursions into all the neighbouring regions, not excepting those occupied by the Turkoman tribes.

For the irrigation of their lands they constructed the dam of Jenaali-bend, not far from the one that still exists; it was frequently destroyed by the floods, and sometimes by the enemies of the Saryks.

[1] Some information about the more ancient history of those countries is given by Sir H. Rawlinson in *Proceedings of the Royal Geographical Society*, Jan. 7, 1883.

In the close of the second decade of the present century the Saryks submitted to the Khan of Khiva, and this was still the state of matters in 1839, as Abbott bears witness. The Turkomans frequently rose against the people of Khiva, and war was carried on with great pertinacity under Medemii Khan, who almost every year undertook campaigns against the rebels. On all the roads from Khiva to Merv and Atek, and along the Murg-ab to Pende and thence to Serakhs, the traces of those expeditions are still to be seen; in the sands there is an uninterrupted line of the bones of beasts of burden, in other parts at every march they point out the khandeks of Medemii Khan, *i.e.* the entrenchments with which the people of Khiva surrounded their camps.

At the time of those wars a fortress was built near the dam of Jenaali-bend, the ruins of which are known to the Tekkes under the name of Porsu-kala.

At first the expeditions of Medemii were successful, but the last of them, in 1855, against the Tekkes, who lived at Old Serakhs, ended in complete disaster; the Khan himself was slain, and the people of Khiva fled, not only from Old Serakhs, but also from Merv.

Almost immediately after this, the Tekkes, pressed on by the Persians, advanced under Koushut Khan from Serakhs to Merv, and, after a two years' contest, drove the Saryks to Pende, whence the latter in their turn expelled the Salors. In consequence of the deficiency of cultivable ground in Pende, as already explained, and the difficulties attending its irrigation, ten years after the capture of Pende, the poorest part of the Saryks took possession of Iol-otan (1867).

In the beginning of the third decade of the present century we find the Salors at Old Serakhs. That point was considered very important; for it both the Khan of Khiva and the Emir of Bukhara contended. When Abbas Mirza decided to confirm the power of the Shah from Khorassan to the Oxus, the first thing he thought imperative was to capture Serakhs.

Although the Salors who lived there did not make raids themselves, they supplied arms to the enemies of Persia, and received in exchange for that service Persian captives, part of whom they kept in the quality of slaves, while they sold others to Khiva and Bukhara. Altogether there were about 3000 Shiite slaves in Serakhs.

In 1832 Abbas Mirza demanded the surrender of Serakhs, and when the inhabitants did not come to terms he took it by assault. The place was pillaged, and a great part of the people massacred. The remainder, about 5000 men, were ransomed by the Khan of Khiva for 50,000 tumans, and undertook the duty of protecting the Persian frontier against the Tekkes and Saryks. This last arrangement was not carried out.

After this destruction the Salors withdrew from the banks of the Heri-rud to the middle course of the river Murg-ab, and built there Taza-Pende and the extensive fortress of Iol-otan, the ruins of which are now occupied by the Saryks. From Pende they drove out the Yersaris who

were living there (the Chorshangi tribes), and who removed to Shibir-khan and Balkh.

The ruin of the Salors was so thorough that they have never been able to recover. When twenty-five years afterwards the Saryks made their appearance in those lands, they met hardly any opposition; the Salors migrated, with the permission of the Persian authorities, to Zur-abad. In the mountains of Zur-abad there is abundance of water, but the streams flow through narrow gorges, and there is no room for tillage; at Zur-abad itself the plain suitable for tillage is not large, and to supplement the scanty supply of water the people have to make shift with aryks from the underground channels, as the forming of canals from the Heri-rud would present difficulties of too serious a nature. Consequently, after twelve years' residence there, the Salors began to ask for the right bank of the Heri-rud to Old Serakhs. The Persians agreed, but demanded that they should undertake the maintenance of the cordon for the protection of the Persian frontier against the Saryks and the Mervians. The latter, angry at this conduct on the part of the Salors, carried off all their live-stock, and agreed to restore them to the owners only on condition that the whole tribe migrated to Merv; which actually took place. There the very few who possessed flocks betook themselves to stock-raising; a portion engaged in agriculture, and for the use of land and water paid a fourth of the crops to the Mervians; but the majority—the poor—became at once labourers for the Mervians.

In 1881, by the advice of Tykma-sirdar, the Mervians determined to keep the Salors no longer, but to send them back to their old quarters. To the number of more than 2000 tents they appeared at Serakhs, asking permission of the Persian authorities to settle there. Instead of that, partly by corruption of the elders and partly by promise of assistance, the ruler of Khorassan succeeded in settling the bulk of the Salors at Zur-abad, that they might form a cordon along the Heri-rud against the attacks of the Saryks and the Mervians. From Pul-i-khatun to Zur-abad, and further to the south along the bank of the river, the Salors took possession of all places suitable for tillage. A small number of houses besides were left at Old Serakhs.

The relations of the Salors to the Persians were very unfriendly. For the same cause as formerly, the nomads did not like the mountainous districts about Zur-abad. And the Persians built a fortress there, introduced a garrison and guns, and did not refrain from oppressing the settlers. In consequence of this, immediately after the capture of Koushut-kala (near old Serakhs) by the Russian armies, all the Salors in Zur-abad joined those living at that place, and at the present time about 3000 tents of this tribe are gathered on the right bank of the Heri-rud.

The Relations of the Saryks to their Neighbours.—The order and methods of management introduced by the Saryks into the lands they occupied have been maintained almost without change from the beginning

of the settlement to the present time. On the other hand the relations of the Saryks to their neighbours, the Turkomans of other tribes, the Persians, and the Afghans, have been essentially changed last year, mainly on account of two events—the capture of Geok-tepe (12th January 1881) and the capture of Merv (3d March 1884).

The relations of the Saryks to the Tekkes were always hostile. The contest for possession of the Merv oasis brought the mutual hatred of the tribes to the highest pitch, and to the present time the Saryks cannot reconcile themselves to the thought of the loss of the fertile region of the lower Murg-ab. When I passed through Pende in the spring of the present year, many declared that now that the Russians had taken Merv it would be just to drive the Tekkes thence to the lands formerly occupied by them in Atek, and near Serakhs, and to restore Merv to the Saryks.

At the time of the expedition of the Persians against Merv in 1860, the Saryks sided with the assailants, and ever since, down to the most recent times, the most persistent war was carried on between the two tribes, expressing itself, of course, not in any feats of arms, but, after Turkoman fashion, in a series of raids. The raiders of the two tribes went their own ways, so as not to meet each other, and attacked only unarmed people on the frontiers of the oasis, flocks, and caravans. Mervians went by the road to Serakhs as far as Kel-gouz or Niyaz-abad, and thence by Adam-elan, Ak-robat, to Pende. The Saryks generally kept by the river Murg-ab.

In the Kara-kum they rarely went further north than the road from Bukhara to Merv and Serakhs, although sometimes attacks took place near Dert-kui and Karry-bend. On the road just named, however, the appearance of the Saryks was a very common occurrence, and greatly hindered the development of the trading relations of Bukhara with Merv and Persia. In view of all this, the statement that the Saryks of Pende assisted the Tekkes at the time of the siege of Geok-tepe, is not likely to be true; if the Saryks did take part in the hostilities, it was probably the inhabitants of Iol-otan.

These latter were in considerable dependence on the Mervians; they could not even occupy the northern oasis without the consent of the Tekkes; and at the present time many people in Merv speak of the Iol-otanians with disdain, saying that Iol-otan is the *pesh-kesh* (= present), which Nur-verdy Khan and Koushut Khan gave to the Saryks. The fields of the Saryks ran side by side with the fields of the Mervians, but for all that the relations between them were very undefined, such as are possible only in Asia; whilst some of the inhabitants would meet each other to engage in trade, others would go to the same place to steal horses, sheep, camels. Of course this could not remain unknown, and drew forth reprisals from the injured parties, and the war was prolonged, but only clandestinely. In relation to their other neighbours, Iol-otan and Pende maintained a continual alliance; the people of the two places went in company against Yersaris, Persians, and Afghans. The alliance of Iol-otan and Merv was best expressed at the capture of the latter city by the Russian armies: the

people of Iol-otan fully recognised the impossibility of separate existence, and on the advance of our detachment from Karry-bend, applied to the Mervians proposing to unite the destiny of the two nations; and when the oasis was taken, they at once asked to be admitted as subjects of Russia.

The capture of Merv exercised great influence on the relations of the Pendians to the Mervians; the latter completely gave up their robberies; the Pendians, on their side, perceive that attacks on Russian subjects do not go unpunished, and at present all is quiet on the Murg-ab. The Yersaris in their incursions advanced to the Murg-ab, and drove away thence the flocks of the Saryks; that is the cause why flocks were not kept on the right bank either by the inhabitants of Iol-otan, or even by those who lived further to the east.

The relations of the Saryks with the Salors were the same as with the Mervians and the Yersaris. Wherever the Saryks lived they always kept the eastern part of Persia in alarm; after they were driven south, about the middle of the century, the radius of their ravages was changed, and it was mainly the provinces of Jam, Bakharz, and Seistan which began to suffer; they did not venture to attack the northern parts of Khorassan, for fear of meeting with the Mervians. For their plunderings the Persians avenged themselves by several invasions, sometimes of a very serious character—for example, the expedition in 1877 from Turbet Sheikh-i-Jam against the oasis of Pende; on that occasion they carried off as many as 100,000 sheep from the Saryks.[1]

The Persians, however, never attempted to take radical measures for holding the Saryks in check, and establishing their own power on the right bank of the Heri-rud; even on the left bank of that river between Doulet-abad and Kusan their authority was merely nominal. General Petrusevich visited those parts in the close of the seventh decade of the present century, that is, immediately before the subjugation of Akhal, and he has very carefully described the condition of affairs at that time in that part of Persia.[2] "In the triangle formed by the river Keshaf-rud, a straight line from Mesh-hed to the frontier from Herat (along it passes the road from Mesh-hed to Herat), and the river Heri-rud from the junction of the Keshaf-rud to the Herat frontier, there was formerly, according to the elders' accounts, an immense population; in the single district of Pyass-i-kukh-i-jam (it was included in the mountainous region lying to the left of the Heri-rud round about Zur-abad) were counted 460 villages, of which only 20 remain, and these solely owing to their nearness to Mesh-hed; the others were annihilated by the invasions of the Bukhariots and Khivans, and more especially the subsequent attacks of the Turkomans, which have not yet ceased.

"The whole triangle above described I had the opportunity of visiting,

[1] Details may be found in the Report by General Petrusevich, *Zapiski Karkaskago Otdyela*, *I.R.G.O.* vol. xi. Part I. pp. 40 and 41.

[2] *Ibid.* pp. 91-93.

and I was convinced that not only was there no settlement on the Heri-rud, but there was none in the vicinity of the river.

"On the Keshaf-rud the last settlement is the village of Shadiche, distant 50 versts from Mesh-hed. Beyond that, and further to the north, there is no settlement, although there are not a few ruins of former villages; but for the protection of the inhabitants from sudden raids there is situated at the beginning of the Ak-derbend, through which the Keshaf-rud makes its way, and 40 versts from the village of Shadiche, the unimportant fortress of Ak-derbend, with a garrison of fourteen *Shamkhalchi* (militia), and at a distance of 20 versts, in the half-destroyed wall of the village of Bag-i-bagan, is a post of four Sham-khalchi. On the direct road south from the village Shadiche, near the place called Olengi Shakhi, there are six hamlets—Suleimani, Arrau, Jelal-abad, Jez-abad, Kelmesan, and Heiamei, with altogether 100 houses, and occupied by the *Sistani* and *Mervli* tribes. These six hamlets form an altogether peculiar settlement, distinguished from the other settlements in Khorassan by their advanced position, owing to which the villages are more exposed than others to the plundering parties of the Turkomans. This is the most eastern settlement in Khorassan, and to the south of Mesh-hed all the population is distributed along the road going to Herat. To the east of this road there is not a single settled spot, so that, although the Persians consider the Heri-rud as their boundary, they not only have no settlements on that river, but no guards or any military posts, except the great fortress of Serakhs, and, 15 versts (10 miles) further down the stream, the fort of Doulet-abad, where there ought to be 20 Sham-khalchi, but in reality there are only six. It is true, they say that the *Sertip* (colonel) Ali Merdan Khan-Teimuri is bound to maintain a mounted patrol on the left bank of the Heri-rud; but in my journey, at those very places where one ought to have met the patrols, not only did I not see any, but I observed no traces of any, although we passed a small party of Tekkes who had been plundering on the frontiers of Herat and Khorassan, and after us, on the Keshaf-rud, a considerable party fell in with thirty Sham-khalchi, who were going to relieve the Sham-khalchi guard of the fort of Muzderan, on the direct route from Mesh-hed to Serakhs.

"Thus the real frontier on the east lies, not on the Heri-rud, but further west, from the fortress of Serakhs to the fort at Doulet-abad, whence it bends a little to the south-west, to the deserted fort Shurje, and after that to fort Ak-derbend, and so up the valley of the Keshaf-rud to the village of Shadiche. From this village it runs due south to the group of six hamlets near Olengi Shakhi, whence it passes to the upper regions of the river Jam, at the settlement of Feri-mun. After that it follows the course of the Jam to the little town of Turbet-i-Sheikh-i-Jam, thence along the great caravan route to Mukhsin-abad and Keriz, beyond which population ceases on the eastern frontier for a considerable distance. The points enumerated form the limit of the Persian right of possession, or of the eastward extension of population in Khorassan."

It is well known what a change was made in the relations of the Persian authorities to the Turkoman Tekkes by the Russian capture of Geok-tepe. By the close of 1881 began a whole series of attempts to occupy places not previously possessed by Persia; in Baba-durmas was undertaken the restoration of the abandoned Turkoment fort, the fields on the Atek plain were sown, and the fortress of Rukn-abad, on the right bank of the Tejen, was erected.

But in the districts near the Saryk settlements the Persians did not dare to act so decidedly. This tribe did not suffer from the capture of Geok-tepe, and continued in its former activity. In the beginning of 1882 the Persians in Serakhs asserted to me that the right bank of the Heri-rud was inaccessible on account of the raids of the Saryks; but in the autumn of the same year the commandant of Zur-abad reported that he sent patrols from Zulfagar to Keriz-Iliyas; the Salors in this fort, when questioned about the matter, laughed at this boasting of the Khan; "We do not go there, but," said they, "the Persians have never ventured to do this." The horsemen stationed at Mokhsyn-abad also declared that their patrols were confined to the left bank of the river.

After the appointment of the commandant Ali Merdan Khan to Saryks, the Persians began to act more decidedly, and, taking advantage of the effects produced by the advance of the Russian army to Merv, they began to send patrols to the right bank of the river. These patrols, of course, were neither legitimate nor constant. The Persian horsemen slipped in secretly, followed the movements [of the robbers, and, in case of their approach, warned the inhabitants of the left bank, generally without themselves entering into the contest, as the composition of the patrol was always very insignificant; in the raiding-bands (alamans), on the other hand, not less than ten to twenty men usually took part. It is necessary to mention that those patrols also constitute the whole system of defence of the Persian possessions; on the right bank of the Heri-rud they not only have no posts, but they will not be able to establish any till the complete pacification of the district—*i.e.* till the subjection of the people of Pende (Panj-deh) to Russia, without the construction of fortified places for defence from the raids of the Saryks and storing of provisions; a small post would be destroyed, or at least plundered by the nomads. The presence of the Russians in Iol-otan does not prevent the people of Pende from raiding in Seistan and Bakhars, and in the spring of this year they still went forth.

All the talk about posts is the result mainly of the boasting of the Persian authorities on the frontier, and to some extent of the misapprehension arising from the confusion of our ideas about posts, patrols, and pickets with what passes under this name in Asia.

As regards the relations of the inhabitants of Southern Turkomania to the authorities of Kabûl and Herat, the Yersari tribe (Chorsangi clan), who occupied the middle part of the Murg-ab before the Salors, and afterwards the Salors, who drove them out in the beginning of the third

decade, had no dealings with the Afghan rulers. In 1839 Abbot, travelling along the Kushk and Murg-ab, by the road from Herat to Khiva, states that the Jamshidis did not venture to settle below Kara-tepe; shepherds from Merv, however, came to feed their flocks there; at Kalei-i-mor the authority of the Kharezmian Khan began.

The last Afghan settlements were Kusan and Bala-Murg-ab; near some of the passes across the Borkhut Mountains still are seen remains of the watch-towers (Karuan-ashan) abandoned by the Afghans at the time of the disorders accompanying the siege of Herat by the Persians in 1839; from that period those towers have neither been restored nor occupied.

The Afghans have never interfered with affairs on the Murg-ab. Although in 1850 Dost Mohommed Khan ultimately conquered the province of Afghan-Turkestan, he put forward no pretensions to the country east of Maimene. It was subject to Khiva in the same way as Merv. Medemii Khan of Khiva appeared there more than once with his army, to punish the Turkomans who had revolted against him, remained for a long time in Pende, and went thence to Serakhs; and all this called forth no expostulations on the part of the rulers of Kabul or Herat.

The Saryks settled in Pende had very considerable flocks; but the disturbed state of the country made great part of their pastures inaccessible to them, and thus it occurred to the new settlers to enter into arrangements with their neighbours; war and the expulsion of the Jemshidis to the south were impossible, in consequence of the support which that tribe received from the Herat Government; and the Saryks began to drive their flocks for pasture on the northern slopes of the Paropamisus, paying for that to the Herat authorities 6 or even 8 tenge per 100 sheep. For the right to till the ground and use the water, the Saryks, as before, paid nothing to any one, as the lands occupied by them had long been considered Turkoman property. The pasture tax was paid very irregularly. When the power of the Amîr was strong in Afghanistan, and especially in Char-vilaet and Herat, the Saryks carefully paid the money due from them; but as soon as any disorder began, the Saryks immediately took advantage of it to refuse the covenanted payment. The Afghans never appeared to collect the money; but when the Saryks resisted, they seized the pastures and part of the flocks, which they did not surrender until their claims were satisfied. At the same time, the Saryks raids in the plain of Herat were really very general.

Not more solid was the connection of the Saryks with Bukhara. There was an important party both in Pende and Iol-otan which recognised the authority of the Amîr of Bukhara; in token of the subjugation, the Saryk Khans went to Bukhara and received presents from the Amîr, and if he suffered personally from the raids of the tribe, they did their best to restore what had been stolen. Of course, the Saryks did not on this account cease to plunder the Bukhara caravans, or the Yersaris those of the Saryks.

Such was the condition of the country at the moment of the capture of Geok-tepe, and for some time after.

Only quite recently the Amir Abdulrahman began to lay claim to the possession of Pende ; and to support his pretensions in the beginning of last year he placed in Bala-Murg-ab 1000 horsemen with their families from the Khazare (Hazara) and Jemshidi tribes under an Afghan general (Jerneil). The Saryks who lived along the canal, starting at Bend-i-Joukara, were driven from their settlements, and their lands given to the new-comers.

With the Jerneil there is a specially appointed collector of tribute, who, relying on the nearness of the Afghan soldiers, appears in Pende to obtain the payment for the pasture of the sheep on the slopes of the Paropamisus. In autumn of last year he began to demand from the Saryks new taxes, viz. one-tenth part of the crops. Only the inhabitants of Meruchak, being near the forts occupied by the Afghans, agreed to pay it, since, if they refused to satisfy the demands made on them, the Jerneil would lay waste their tillage. In the other settlements nobody recognises the new imposition. The Afghans dare not descend into the oasis proper for the perpetration of violent deeds.

In May of the present year the Saryks who arrived in Askh-abad stated that in Bala-Murg-ab there were three battalions (fouj) of Afghan troops, and that they were preparing to build a fort near Dash-kepri. This last assertion has not yet been confirmed.

Saryks are very hostile to the Afghan proceedings, but they are unable to offer any resistance ; their relations with the Afghans are the same as those of the inhabitants of Atek formerly were with the Khan of Kelat and Deregez ; their fields and flocks are always exposed to the sudden raids of Afghan troops.

The Saryks are now convinced that subjection to the Afghans would not be an advantage to them. It is true the Afghan authorities do not prevent them from carrying on their plunderings in Persia and among the Yersaris ; but that is now rendered difficult by the neighbourhood of the Russians, and so this solitary enticement disappears, and the arbitrary conduct of the authorities, the exactions and high taxes, force the Saryks to wish to place themselves in the same condition as the people of Merv and Akhal. It is only the most obstinate raiders who are unwilling to forget the old mode of life, and hope that under the protection of the Afghans they will still be able to carry it on. Of such people there are but few, and it is certain that if the Russians appear in Pende they will be welcomed with perfect sympathy by the great mass of the population of the oasis.

PROCEEDINGS OF THE SCOTTISH GEOGRAPHICAL SOCIETY.

At a meeting of Council on April 28th, the Secretary submitted his Report on the Organisation of the Glasgow Branch of the Society. The arrangements for a joint working scheme between the Society and the Geographical Section of the Philosophical Society of Glasgow were reported on, and unanimously approved of. Under this scheme, which has already been adopted by the Glasgow Philosophical Society, and by its Geographical Section, the members of both Societies will be entitled to attend all ordinary Geographical Meetings held under their respective auspices in the Lecture Hall of the Philosophical Society.

On the invitation of the Council, Professor Arminius Vambéry, Honorary Corresponding Member of the Scottish Geographical Society, came to Scotland for the purpose of delivering two lectures on "Herat and its Environs," under the auspices of the Society. His first address was delivered in the Queen Street Hall, Edinburgh, on the evening of the 7th May, when he was very cordially received by a large audience, consisting of Members and the general public. The Right Honourable Sir George Harrison, Lord Provost of Edinburgh, Vice-President, presided; and the distinguished traveller was accompanied to the platform by Bishop Cotterill, Dr. Cleghorn, Bailie Clark, Professor Donaldson, of Aberdeen; Professor Geikie, Mr. John Murray, of the *Challenger* Expedition; Dr. Marshall, Dr. Sandford, Dr. George Smith, Mr. William C. Smith, Advocate; General Wahab, and the Office-bearers of the Society. On the conclusion of the proceedings, Professor Vambéry was entertained by the Council at a complimentary supper in the Windsor Hotel.

The second address, which forms the leading article in this number of the *Magazine*, was given on the following night by Professor Vambéry at a numerously attended meeting, convened by the Glasgow Branch of the Society, in the St. Andrew's Hall. Mr. A. Renny Watson presided; and there were also on the platform Dr. Blackie, Dr. Christie, Mr. Ewing, Mr. Robert Gourlay, Professor Grant, Bailie Shearer, Dr. Turner, and others.

The last ordinary meeting of the Society in Session 1884-5 was held in the Masonic Hall, Edinburgh, on 20th May, when Dr. Robert W. Felkin read a paper on "The Egyptian Sûdan," which we print as our second article. Mr. Adam W. Black, Member of Council, presided; and Dr. Clyde moved a vote of thanks to the lecturer on the conclusion of his interesting address.

The Secretary announced that since the first meeting, held last October, when the Society was formally constituted, up to the one that evening, the Society had had no less than fifteen Ordinary Meetings, seven of which had been held in Edinburgh, four in Glasgow, two in Dundee, and two in Aberdeen. Among the distinguished explorers and travellers who had addressed these meetings were the following:—Mr. H. M. Stanley, Mr. Joseph Thomson, Mr. H. O. Forbes, Mr. Frederick L. Moir, Captain Brandon Kirby, Mr. H. H. Johnston (by deputy), Professor Vambéry, and finally, Dr. Robert Felkin. The Lecture Committee had already received promises of Papers for next session from—Mrs. Bishop (Miss Bird), Lieutenant Greely, Lieutenant Hovgaard of the *Dijmphna* Expedition, Professor Vambéry, Professor Geikie, Mr. Holt Hallett, Dr. Laws, Mr. H. H. Johnston, and several others. A further announcement was made to the effect that the membership had already reached 900, and Members were requested to so far identify themselves with the interests of the Society as to use their best endeavours to introduce each another Member, when the Society would be in a better position to carry out some of the more important national and international objects for which it was founded.

QUERIES AND REPLIES.

Professor Dr. J. J. Egli, of Zürich, the leading authority on geographical nomenclature, has expressed his willingness to act as Honorary Corresponding Member of this Society, and has of his own accord been kind enough to contribute the following :—

Reply to C. D. in No. 1 (p. 49) as to whether the names Green River, White River, etc., in the Colorado district, were given on account of the actual colour of their waters.—Upon this question I offer the following remarks, which, though not answering it directly, will yet throw some light upon it, I believe.

The main stream, the Rio Colorado, is so named from its conspicuously reddish colour. Spanish words derived from the Latin *color* (= colour) are generally used to designate what is bright, gay in tint, especially if red ; for instance, *colorar* = to blush, *colorado* = red, and, in a metaphorical sense, *colorear* = to colour, cloak, palliate. Hence Rio Colorado = red river.

As the name implies, the river was discovered by the Spaniards. Fernando Alarchon was despatched by Antonio de Mendoza, Viceroy of New Spain, to explore the Gulf of California. He set sail on 9th May 1540, and, having reached the head of the gulf, discovered the embouchure of a "very mightie river." Taking with him two boats and twenty men he proceeded (Aug. 1540) up the stream for fifteen and a half days, a distance that he accomplished on his return by land in two and a half days. On the 14th of September he repeated the journey with three boats, and directed that the country should be called Campana de la Cruz, that a chapel should be built to our Lady de la Buena Guia, and that the river should be named Rio de Buena Guia. Agreeably to the prevalent spirit of that age, the Spanish discoverer regarded the regions he opened up as a field for Christian missionary effort, and as new ground whereon to plant the Cross. He used to distribute largely his crosses among the uncivilised people through whose lands he passed, and he was filled with joy when women and children raised their hands to the holy symbol and fell on their knees before it.[1] For him the colour of the river was not red : he was not a student of natural phenomena, but a Spaniard of the militant age of the Church. Alarchon's naming of the river therefore was analogous to the ecclesiastical act of baptism. Here we have an example of the general principle, laid down and supported by scores of instances in a collection of 17,000 names, taken from all lands and all languages, in my book on Names,[2] viz., the principle that geographical nomenclature is not the result of the working of blind chance, but bears the stamp of intelligible laws, which express the spirit that was embodied in the age, nation, and discoverer from which a name has come. From these circumstances it is at once plain that the name Rio Colorado must date from a later period ; and doubtless it was first used to designate the river by a race of people, the offspring of poorer Spanish immigrants and natives, whose mode of life rendered a closer observation of nature imperative. The Canadians, indeed, believed the river was discovered by the Spaniards, since they called it simply *La Rivière Espagnole*, or the Spanish River.[3] Later travellers state that the waters of the lower course of the river, *i.e.* after the confluence of its two main tributaries, Green and Grand Rivers, are of a strikingly red colour, and that they carry down a red sediment which tints the waters

[1] R. Hakluyt, *Principal Navigations*, iii. p. 425 sq., 537 ; London, 1600.

[2] J. J. Egli, *Nomina Geographica*, Leipsic, 1872.

[3] Duflos de Mofras, *Exploration du Territoire de l'Orégon, des Californies et de la Mer Vermeille*, i. p. 215.

of the Gulf of California to a considerable distance from the shore. It was this circumstance which led the earliest Spanish navigators to call the gulf the *Mar Bermejo* (=Purple Sea) and *Mar Rojo* (=Red Sea). The American, Captain J. C. Ives, having been commanded, "by order of the Secretary of War," to ascend the stream in 1857-58, found that, at a distance of little more than six miles from the mouth, at a depth of 3½ fathoms, the current diminished in size, whilst the water "became of a deeper red, and very turbid. . . . The water is perfectly fresh, of a dark red colour, and opaque from the quantity of mud held in suspension."[1] Alluding to its tributary, Flax River, the Report says: "The river is smaller than the Colorado, but . . . much resembles the other at its low stage. There are the same swift current, chocolate-coloured water. . . . At Fort Yuma and above, the sediment consists of fine micaceous sand and red clay, which at all seasons of the year exist in such quantity as to render the water both red and opaque."[2] "The Rio Colorado," says Oscar Loew,[3] of the expedition of Lieut. Wheeler (1875), "owes its name to the fine red mud held in suspension in its waters, and rivalling the sedimentary deposits of the Nile in their fertility. If water from this river be allowed to stand for a couple of hours the sediment sinks to the bottom of the vessel, and the water is found to be clear and pleasant to the taste." Speaking of his expedition of 1869, E. O. C. Ord[4] bears similar testimony: "The water is of a yellowish muddy colour, heightened at this vicinity on account of the waters received from the Rio Virgin."

The water derives its red colour from the geological constitution of the country it passes through, especially from the neighbourhood of the Purple Hills, through which the river forces its way. When on 12th January, 1858, Captain Ives passed the gap, he and the whole expedition were struck by the beautiful coloration of the walls of rock—the stone, bright red and violet, and still wet from the rain that had fallen in the night, appeared as if it had just received a new coating of colour.[5] The scenery was strikingly bold, "and the variety of colours assumed by the rocks adds to its beauty; . . . several ranges, to which, from the general colour they exhibit, the name of Purple Hills was given. They are composed of granite and mica slates, associated with which are purple porphyries and trachytes, in sufficient quantity to impart to them their prevailing colour."[6]

I have no direct evidence as to the colour of the waters of Green, Blue, and White Rivers; but here we have plainly the key to their nomenclature. When the immigrants, ascending the red stream, often turbid from the red mud held in suspension, came to the limpid torrents in the mountains, the obtrusive contrast in the colour of the waters would naturally enough determine them in giving names to the streams. Similar instances occur elsewhere. The contrast between a turbid milky-white and a bluish-green arm of the Nile at Khartoum, where they unite and flow on side by side for some distance without mingling their waters, has led the Arabs to call them Bahr el-Abiad (White River) and Bahr el-Azrek (Blue River). On the frontier between Patagonia and the Argentine Republic two differently-coloured streams in the same district were distinguished by the Spanish settlers as the Rio Colorado (=Red River) and the Rio Negro (=Black River). The valleys of Grindelwald and Lauterbrunnen, two of the naturally most beautiful Alpine valleys, are traversed, the former by the Schwarze (Black) Lütschine, the latter by the Weisse (White)

[1] *Report upon the Colorado River of the West*, pp. 19, 26, 39; Washington, 1861.
[2] *Ibid.* iii. p. 20.
[3] A. Petermann, *Geogr. Mitteilungen*, 1876, p. 339.
[4] *Preliminary Report upon a Reconnaissance through Southern and South-Eastern Nevada*, p. 55; Washington, 1875.
[5] Möllhausen, *Reisen in d. Felsengebirge*, i. p. 169.
[6] Ives, *Report*, iii. p. 21.

Lütschine, the two streams uniting at Zweilütschinen and flowing into the Lake of Brienz at Interlaken. The difference in the colour of their waters has always been observed ; and a hundred years ago, when the sons of Albion were far less numerous in the Bernese Oberland than they are to-day, it was alluded to and explained by two German writers. The current originating from the lower Grindelwald glacier receives its dark tint from the Bergelbach, which is coloured by disintegrated clay-slates.[1] The colour of the Lauterbrunnen stream is due to the fact that its feeding waters from the glaciers pass over impure quartz in the higher regions, and bring down with them an enormous quantity of rocky particles.[2]

These examples could be supported by several others. Wherever a conspicuous natural feature has given rise to a corresponding name, contrast easily suggests similar cognate names. The hydrographic system of a "red" river *must* embrace green, blue, and white streams as soon as the surface-water is observed to contrast with the red ; moreover, amongst them will appear a Rio Colorado Chiquito, *i.e.* a Little Red River, as soon as one of the arms, differing from the rest, resembles the main stream in colour.

These theoretical observations only require confirmation from eye-witnesses.

GEOGRAPHICAL NOTES.

EUROPE.

British Association Meeting at Aberdeen.—*September* 1885.—The complete list of the Office-bearers of the Geographical Section has now been published, and is as follows :—The *President* will be Lieut.-General J. T. Walker, C.B., R.E., F.R.S., F.R.G.S. The *Vice-Presidents* will be Professor James Donaldson, LL.D., F.R.S.E., a Member of Council of the Scottish Geographical Society, and Dr. John Rae, M.D., F.R.S. The *Secretaries* of the Section will be Mr. J. S. Keltie, the Librarian of the Royal Geographical Society, Mr. J. S. O'Halloran, F.R.G.S., Mr. C. G. Ravenstein, F.R.G.S. (Recorder), and the Rev. George A. Smith, M.A., Aberdeen, of the Scottish Geographical Society.

Iceland : Exploration of the Interior.—It is well to remember that there are unexplored areas and lofty unclimbed mountains much nearer home than Central Africa. Europe—for Iceland is a European Island—has corners about which little is ascertained save by inference or guess-work. The largest part of course is known sufficiently well for all but scientific purposes. Many tracks through the interior are familiar ; some are difficult, but are more or less frequently traversed by natives or foreigners ; but the highest-lying Jokülls, with their vast glaciers, may be said to be as yet unexplored. In 1881 the Icelandic Althing or Parliament resolved to do something for the exploration of heretofore unvisited districts, and Mr. Thorvaldur Thoroddson received a commission to examine some of the most desolate and inaccessible portions of the great central table-land, including the arid wilderness of Odádahraun. By reason of the great natural difficulties in the way, this arid waste, the largest lava-field of Europe, had in great measure remained unvisited. Among the difficulties are the necessity of carrying with one all the

[1] Joh. Gottfr. Ebel in his *Anleitung, die Schweiz zu bereisen*, ii. p. 425 (the forerunner of all later travellers' handbooks), 1793.

[2] G. K. Chr. Storr, *Alpenreise*, i. p. 97.

supplies needed for a sojourn in the more inhospitable regions ; the total lack of grass or herbage for the ponies over large areas ; absolute want of water in some places, and in others the soft wet clay in which horses sink to the knees ; ground so rough and rocky as to be nearly impassable for hardy and sure-footed Iceland ponies, with deep and sudden clefts and fissures almost or wholly impossible to cross, and necessitating tedious circuits. Almost worse than any other obstacles are the deserts of loose and shifting sand or dust, fine enough to rise with even a slight wind in masses so dense as to render outlook impossible ; add to this the fierce storms of wind, snow, and rain that, even in the most favourable months of the year, may suddenly descend on the traveller, and the biting cold which may at night render sleep impossible even in the best shelter that a tent can be made to afford. Mr. Thoroddson contended with these and other difficulties, not without marked success, and, in an article communicated to a Swedish paper (and translated in the *Globus*, xlvii., No. 12), has given an account of his adventures and experiences in the third of three seasons spent in exploring work—that of 1884, devoted to the desert of Odádahraun and the adjoining mountains. In a journey extending over ten weeks, he spent five weeks in wholly uninhabited mountain regions, and claims to have really explored a very extensive area, of which about one-half was quite unknown. He crossed or skirted some of the worst portions of the great lava wilderness, worked his way along the northern base of Vatna Jokŭll, and ascended some peaks as yet unvisited. In his paper he gives a vivid picture of the strange and fearful aspects presented by nature in these fastnesses of winter and storm-spirits, and gives a lively notion of the conditions of travel—mostly unpleasant or alarming, and always laborious—in Central Iceland. He has made many corrections of height and position, and affirms that the Jökulsá, usually regarded as the longest river of Iceland, is considerably exceeded by the Thiorsá, which is about 120 miles long. He cowered shivering for an hour and a half on the highest point of Dyngia, a large volcano never before touched by the foot of man, waiting till the weather would allow him to use his instruments. The crater is nearly 1600 feet wide, and in its floor there is a second or minor crater, itself sufficiently noteworthy. The lower crater is a vast abyss 600 or 700 feet deep, and its precipitous sides are encrusted with glittering ice. The lava on the mountain side has assumed marvellous shapes and appearances, great pyramids alternating with pillars 100 feet high. In exploring Askja, a volcano which caused such devastation in 1875, the explorer and his two companions were on their feet for 36 hours continuously. The volcanic activity in the crater is still so great that the noise of escaping vapour sounds as if innumerable locomotives were letting off steam at once.

Arctic Exploration.—Lieutenant Jensen left Copenhagen the 24th March on board the Danish vessel *Thorvaldsen* for West Greenland, in order to continue his explorations there. According to a letter we have received from Lieutenant Hovgaard, the next *Dijmphna* expedition has been definitely postponed until next year. In a pamphlet entitled *The Danish Arctic Expedition*, published in Copenhagen, Lieutenant Hovgaard, who, it will be remembered, commanded the late *Dijmphna* expedition, gives his views in regard to Arctic exploration. Referring to the best point at which an expedition should enter the unknown northern region in order to penetrate as far as possible towards the pole, Lieutenant Hovgaard says :—" Nordenskiöld's and Parry's experiences warn us against using Spitzbergen as a base, those of Nares against Greenland and Smith Sound ; it has been proved that by these routes there is scarcely any prospect of penetrating further than 83° N. latitude." He himself advocates Franz Josef Land, *viâ* Cape Tchelyuskin, but says :—" It should first be ascertained by a reconnoitring expedition whether

Franz Josef Land really extends to Cape Tchelyuskin, and make certain that the circumstances of current and ice are such as to allow of a base of operations being reached without incurring too great risk, and finally that the eastern coast of Franz Josef Land at this point trends in a northerly direction. When these three things have been practically proved," continues the intrepid young officer, "the route may be said to have been opened, and great expeditions can then follow in the track of the reconnoitring expedition, and penetrate into the unknown regions to which the door will thus have been opened." Lieutenant Hovgaard, who will be on active service this summer, hopes to be able to visit Edinburgh in order to read a paper before the Scottish Geographical Society.

The Commerce of Sweden.—Mr. Edmund Cope, in his Report, dated December 1884, on the commerce and agriculture of Sweden, is only able to give the complete statistics for the year 1882, as taken from the return published by the Royal Statistical Department at Stockholm. The value of the imports was £16,656,663, and of the exports £14,104,859—total, £30,761,522. Of this total the share of the United Kingdom amounted to £11,425,444, viz., £4,344,500 of imports and £7,080,944 of exports. Leaving out of account the sister kingdom of Norway, the united trade of the neighbouring countries, Denmark, Germany (including the enormous transit trade of the Hanse towns), and Russia, in the year 1882, exceeded that of Great Britain by only £310,000. The trade of Sweden with this country was also considerably more than double the value of the united trade of France, Holland, Belgium, and the United States of America. The emigration from Sweden in 1882 was 50,178, of which number 44,359 went to the United States ; the figures fell in 1883 to 24,850, and in 1884 to 16,840. It is noted that the emigration movement in Sweden is subject to great fluctuation, the figures rising from 7206 in 1866 to 39,064 in 1869, and again falling to 7610 in 1877. The population of Stockholm was 185,325 in 1882, as against 143,735 in 1872. As the annual increase in the population of the city has of late exceeded 7000, there is little doubt, Mr. Cope thinks, that, when the statistics at the end of the current year are made out, it will be found that the number of inhabitants of the Swedish capital has reached 200,000.

ASIA.

The "Great Haj."—1885 will, it is understood, be regarded in the Mohammedan world as Haj el Akbar, or the Great Haj, so called from the chief day of the religious year of Islam falling on a Friday (September 19th) ; and consequently it is expected that twice the usual number of pilgrims will visit the holy places at Mecca and Medina. From Consul Jago's report on the trade of Jeddah for 1884, we learn that the total number of pilgrims that assembled last year at Mount Arafat was 65,000, or 5000 more than in 1883. Of these 31,157 came by sea (62·5 per cent. in British vessels), compared with 28,883 in the previous year ; 3000 arrived by the Damascus caravan, including many Baghdadis and others picked up on the road ; 5000 were Bedouins and Arabs from the Yemen ; 5000 cameleers and drivers ; and 21,000 inhabitants of Hedjaz. Last year the Egyptian *Mahmel* came direct by sea from Suez, instead of making the usual forty days' journey through the desert, thus saving much pecuniarily, and still more in sufferings and privations to the *Hajis*. Of the sea-borne pilgrims, 9262 were British Indians, comprising also Mohammedans from Central Asia, these figures showing a falling off to the amount of 2504 ; 7716 were from the Dutch East Indies, the Malay States, and Indo-China ; 6348 Turks and Syrians ; and 2387 Egyptians. The others comprised :—

1351 Zanzibaris ; 1329 Tripolitans and Tunisians ; 969 Yemenis ; 268 Persians ; 268 Sudanese ; 377 Arabs ; and 882 of unknown nationality brought by native coasters. Mr. Jago discusses the facts relating to the pilgrim trade from the strictly commercial standpoint. The imports of Jeddah, the port of Mecca, consist, he says, in what is necessary to clothe and feed the floating and permanent population of the Hedjaz, while its exports consist in hides and skins, a little gum, and mother-of-pearl shells fished from the Red Sea ; and as the vast majority of the inhabitants of the province depend entirely upon the profits made out of the pilgrims, a good or bad "pilgrim season" makes the same difference in local prosperity as good or bad harvests in countries more favoured by nature than the sandy unproductive wastes of Arabia. Complaint is made, however, that even when pilgrims are numerous nowadays the profits to be made out of them have diminished when compared with former years, owing, first, to the vast majority being confined to the poorer classes, or to those who go on pilgrimage with the strictest regard to economy, by carrying with them from home provisions sufficient to last them during their whole stay in the Hedjaz ; and second, to the now extremely rare advent of wealthy devotees of the Moslem world, whose position renders it incumbent on them to scatter largesse in profusion among all classes of the Hedjaz, and notably among the numerous office-bearers and attendants of the holy places. The Consul mentions that a scheme is afloat for providing Jeddah with pure water, at a cost of £12,000, by means of pipes from a locality in the neighbouring hills. Little rain has fallen for three years, and the supply in the desert tanks and cisterns has been alarmingly scanty and bad.

British Mission to Cashmere.—A Reuter's telegram from Simla, dated 26th May, says:—"A British Mission is being sent to Cashmere in charge of Colonel Lockhart, who is accompanied by Major Woodthorpe, Captain Barrow, and Dr. Giles, and an escort consisting of two non-commissioned officers and twenty men of the 24th Bengal Infantry. The chief object of the mission is to obtain further geographical information concerning the countries on the northern and western frontiers of Cashmere. It will visit Chitral, and the neighbourhood of that place, and will be absent for several months."

The Population of Persia.—A census of Persia is still a project of the future—if, indeed, the question has ever got so far as to be a project. The estimates hitherto made have all admittedly been of the nature of approximations ; and the information available from native sources is open to grave suspicion. Some figures on the subject, collected by Mr. Dickson, H.M.'s Secretary of Legation at Tehran, in a report on the trade of Persia, are, however, perhaps more worthy of attention than any that have hitherto been available. They have been supplied by Mr. Schindler, a gentleman who has travelled over the greater part of Persia, and who, says Mr. Dickson, has taken great pains to ascertain the condition and resources of the country. The area of Persia is given at about 1,647,070 square kilomètres (about 635,770 square miles) ; and the total population at 7,653,000, distributed as follows :—99 towns containing 363,630 families, or 1,963,800 individuals ; villages and districts without towns, 3,780,000 inhabitants ; nomads—Arabs, 52,020 families ; Turks, 144,000 families ; Kurds and Leks, 135,000 families ; Beluchis and Gipsies, 4,140 families ; and Bakhtiaris and Lurs, 46,800 families—in all, 381,960 families ; or, 1,909,800 persons—total population, as above, 7,653,600. Divided according to creeds, the figures are given as follows :—Shiiahs, 6,860,000 ; Sunnis and other Mohammedan sects, 700,000 ; Parsis, 8,000 ; Jews, 19,000 ; Armenians, 43,000 ; and Nestorians and Chaldeans, 23,000. Of the Armenian population, 52·8 per cent. are males, and 47·2 females ; and of the Mussulman population, the mean propor-

tion is 50·5 per cent. females, and 49·5 males. The following list is furnished of the more prominent Persian towns, and their respective population :—

Tabriz,	164,630	Zenjan,	24,000
Ispahan,	60,000 to 70,000	Kazvin,	40,000
Yezd,	40,000	Resht (including adjoining villages),	40,000
Kerman,	41,170	Astrabad,	10,000
Shiraz,	30,000	Nishapore,	11,000
Shuster,	under 20,000	Sebzevar,	12,000
Dizful,	25,000	Meshed,	60,000
Burujird,	20,000	Kashan,	30,000
Kermanshah,	30,000	Kûm,	20,000
Hamadan,	30,000	Mianeh,	7,000
Maragha,	13,250	Mohammera,	51,000
Sujbulak,	5,000		

Taking the medium between the highest and lowest figures obtained, Mr. Dickson thinks the population of Tehran may be about 120,000. Colonel Ross estimates that of Bushire at 10,000.

AFRICA.

The Death of Dr. Nachtigal.—It is with deep regret that we have to record the death of Dr. Nachtigal, the famous African explorer, and the pioneer of German colonial policy on the West Coast of Africa, who died of intermittent fever on board the German gunboat *Möwe*, on the 20th April, and was buried the following day at Cape Palmas. An account of his life and writings will be given in the obituary to be published at a future date.

German Colonisation in Tropical Africa.—Dr. Fischer, a doctor practising at Zanzibar, who has been for seven years resident in Equatorial East Africa, has published a small book pointing out the difficulties in the way of many Germans settling or working in these regions, and thereby damping some unreasonable hopes that seem to have been cherished in the Fatherland. He estimates that the coast territory of Zanzibar, some 900 miles in length, raises annually exports worth about £1,000,000, but affirms that the vast interior produces at present nothing worth the cost of conveying to the coast save ivory, now greatly decreased in quantity. The available caoutchouc, copal, spices, red pepper, skins, sesamum, and earth-nuts are hardly more than sufficient to employ eight or nine European firms in Zanzibar. The only chance of important growth of German exports to these regions, is in gunpowder and spirits ; knives, iron goods, or pottery could be but very slowly worked off ; and German cotton cloths, he thinks, could not hold their own here against English goods. The climate is in the most important places decidedly unsuitable for Europeans ; and the longer they stay the more do they suffer from unfavourable climatic conditions. Even in the highly-praised uplands of the new German territory, Ussagara, the heat is such as to render physical exertion very fatiguing for Europeans. The action of the heart is so increased that healthy men become short-winded, and not infrequently suffer from enlargement of the heart, not to speak of inevitable and debilitating attacks of fever. Throughout Equatorial Africa, the universal rule is, the healthy districts are unfruitful, the fertile ones are unhealthy. Thus, Lüderitzland is perfectly healthy, but hardly a blade of grass will grow there. Agriculture or other plantation work can only be done by Negroes or other natives, of whose gradual civilisation Dr. Fischer has good hopes.—From *Mehr Licht im Dunklen Welltteil*, by Fischer, quoted in *Das Echo* of 1st May.

AMERICA.

The Canadian Pacific Railway (*vide* Map).—In these days, when modern civilisation and enterprise form such important factors in the destinies of nations, each new great undertaking successfully accomplished must be taken into account by the statesman and political economist. We therefore welcome any improved means of communications between the mother country and her distant colonies, or strategical points which are eminently suited to protect them, as not only a guarantee for better commercial prospects, but also as a means of spreading western civilisation and culture to remote parts, and as a medium for consolidating our Empire and making Imperial Federation not merely an ideal aim, but a very possible reality. The completion of the Canadian Pacific Railway, which has just been announced, will now offer a continuous line of communication, in no part leaving British territory, from Halifax, one of the chief military positions which form the corner-stones of the Empire, to Port Moody, in British Columbia, thus connecting the Atlantic and Pacific Oceans. It is calculated that the time it would take to transport troops from one point to the other would not exceed seven days; and the distance from Liverpool to Halifax being only 2855 statute miles, it would now be possible to make the port on the Pacific a base of operations either for purposes of defence or attack. The advantages of this, both on Imperial and other considerations, are too obvious to need any comment. It is, however, interesting to notice some of the conditions which this increased rate of transit now offers. The Canadian Pacific Railway has advantages which ordinary cartography, owing to the illusion of projection, does not adequately exhibit. It seems from most maps of the American Continent as if the Canadian Pacific line were a good deal longer than its rivals, which run through the territory of the United States. The distance, however, from Montreal to Port Moody is only 2870 miles, while the distance from New York to San Francisco, by the shortest of the United States lines, is 3331 miles. Not only Halifax, but New York and Chicago, are nearer to the Pacific terminus of the Canadian line than to San Francisco. Indeed, the route across the Atlantic overland by the Canadian Pacific line, and from British Columbia across the Pacific to China or Japan, ought to insure, when properly organised, a considerable saving of time over any of the present routes. The chief towns along the main line, between Lake Superior and the foot of the Rocky Mountains, are Port Arthur, which, from its position, will become the chief place of transhipment on Lake Superior for traffic carried by way of the lakes; Fort William, about six miles from Port Arthur; Rat Portage, which, possessing unlimited water-power, should in time assert its position as one of the largest manufacturing centres on the Continent; Winnipeg, the capital of Manitoba, the great distributing point for all of the country between the Red River and the Rocky Mountains; Portage La Prairie, Carberry, Brandon Virden, Moosomin, Broadview, Indian Head, Qu'Appelle; Regina, the capital of Assiniboia, where the captive rebel, Riel, now awaits his trial; Moosejaw, Medicine Hat, and Calgary. The riches of the country which the main line will open up are not yet thoroughly explored, but that they are very great is certain. On the Pacific side there are vast and undeveloped fisheries, forests, and mines; at the base of the Rocky Mountains there are immense cattle ranches; in the prairie country there are boundless possibilities of wheat-growing; and in the region bordering on the great lakes—bleak and almost desert as it is—there is much wealth both in minerals and timber. By the mother country, the growth of a sense of union among her children—says the *Times*, commenting on this subject—must always be regarded as a source of strength; and in these days it points, happily, to a larger and wider conception of Imperial unity which will not remain, it may be hoped, an aspiration only.

SKETCH MAP SHOWING THE ROUTE OF THE CANADIAN PACIFIC RAILWAY AND ITS CONNECTIONS.

Scottish Geographical Magazine, 1885.

The Canadian Pacific Railway in British Columbia.—The question naturally rises to one's mouth when contemplating the comparatively undeveloped condition of British Columbia, What traffic will the Canada Pacific line have in this country? In the opinion of many who know the country, there are few, if indeed any, districts of the size of British Columbia for which the amount and diversity of its natural resources promise a more prosperous future. Its coal-beds produce fuel that is generally acknowledged to be the best on the whole Pacific slope, a circumstance amply corroborated by its large export to San Francisco and other American ports. Of the timber wealth it is not necessary to speak, for British Columbia has to-day by far the largest and by far the finest forests in the world. Its fisheries are finer than anything on the east coast of America or in Europe, while what good judges pronounce to be perhaps the most important of its resources—that is, its minerals —deserves very much more attention by capitalists than it has hitherto received. The extent of its agricultural land is limited, but what there is is usually of the most productive alluvial character. Its grazing areas are limited to certain districts, where excellent bunch grass and a mild winter climate prevail. In a few valleys, such as the Upper Kootenay Valley in the attractive Kootenay district, through which the Canada Pacific is now being built, there is a rare combination of both these kinds of lands; and, withal, the whole country is one where life is not made unpleasant by extremes of temperature.—*Mr. W. A. Baillie-Grohman, in the Pall Mall Gazette.*

Manitoba.—The *Canadian Gazette* for 7th May contains the following:—"There has been issued from the United States Printing Office a volume of Consular Reports. One, that of Consul Taylor, at Winnipeg, will be of special interest in the North-west. He makes the statement that the exports from that province (mainly to Eastern Canada) in wheat have increased over 1,000,000 dols. in 1884 over the exports of 1882. The surplus crop available in 1883-4 was 1,000,000 bushels, against half that amount in 1882-3. The estimated surplus for 1885 is 3,000,000 bushels. The conditions and rate of increase are similar to those of the first crops in Minnesota, he declares, and says that Manitoba promises to be a good country for all the small grains. He notes a large commerce with the United States, which he attributes to the construction of the Canadian Pacific, and he affirms his belief that reciprocal trade will increase with the completion of the line from Montreal to the Pacific Coast."

AUSTRALASIA.

New Guinea Exploration.—A conference took place on March 31st, by telegraph, between the Melbourne and Sydney branches of the Geographical Society of Australia, on the question of New Guinea exploration. It was decided to subsidise Mr. H. O. Forbes' expedition to New Guinea to the extent of £500, on condition that the two colonies received copies of the explorer's diary and despatches, and duplicates of his collection of specimens. The conference also decided to despatch an independent expedition from the Aird River, the whole expenses to be defrayed by the Society. This latter expedition will be placed under the leadership of Captain Everett, who will be accompanied by Dr. von Lendenfeld.—*The Colonies and India*, 15th May.

British North Borneo.—A paper on British North Borneo was read by Sir Walter H. Medhurst at a meeting of the Fellows of the Royal Colonial Institute held in London on 12th May.

The shape of the island of Borneo, Sir Walter stated, resembles that of a Burgundy pear, the stalk end pointing northwards towards China, and the base

lying southwards upon the equatorial islands of the Eastern Archipelago. Supposing the stalk end of this huge pear to be cut off to the extent of about one-eighth of the whole length of the fruit, the morsel so detached would, roughly speaking, represent the portion of territory ceded to the British North Borneo Company. They consequently possess a sea-coast in three directions, namely, on the stalk or north end, and on the eastern and western shoulders. On the west coast of Borneo, and contiguous with the southernmost limit of the Company's western boundary, lies Brunei, a quasi-independent State, governed by a Sultan ; and next beyond that the Rajahdom of Saráwak. The entire line of sea-coast owned by the Company is said to be 600 miles in length, and it is indented at various points by bays and harbours, some of them scarcely to be equalled elsewhere as safe and commodious refuges for shipping. The principal stations thus far opened by the Company are Silam and Sandákan on the east coast, Kudat on the northern point, and Gaya, Papar, and Kimanis on the western coast. Silam was opened mainly as a depôt for experimental gardening. The sugar-cane had already been extensively introduced by the natives, and was found to grow so readily, and to such perfection, that great hopes were at one time entertained of its becoming the staple product of the colony. It has been found, however, that the climate and soil of North Borneo is also peculiarly adapted for the cultivation of tobacco. Planting takes place in April or May, and the gathering of the leaf may be looked for in about seventy days afterwards. Sandákan is the principal centre of trade ; its position is a grand one. It nestles just inside the entrance of a most picturesque as well as commodious bay, into which some seventeen rivers are said to discharge themselves. The site of the settlement comprises a frontage of about 5000 feet, with water deep enough to admit of large vessels being laid alongside its future wharves, which are at this moment represented by one well-built wooden pier, 450 feet in length, and enabling vessels drawing 20 feet of water to go alongside. At the back of the settlement there is an unlimited amount of land available for suburban and country dwellings, and for plantation farms. Drinking-water is plentiful, and most excellent in quality. The trade seems to be almost entirely in the hands of the Chinese, who traffic directly with the natives. The imports consist of treasure, provisions, rice and flour, cloth, spirits, opium, hardware, brassware, tobacco, sugar, oil, cattle, crockery, and sundries. The exports comprise birds'-nests, rattans, gutta, damar, trepang, pearl shells, sharks' fins, camphor, and sundries. Kudat is situated upon the shore of a small but deep and safe harbour, forming one of the indentations on the west side of Marudu Bay, the great arm of the sea which penetrates the north point of Borneo. The soil in the neighbourhood has been favourably reported upon by European and Chinese planters, and the country around abounds in several sorts of good and large timber, which only need to be known in order to take a prominent place in Chinese and other markets. The population is estimated at 1250, of whom more than one-half are Chinese. Gaya, although only opened in September 1882, has already shown indications of material progress and success. Papar and Kimanis are stations further along the west coast, where the population is more numerous than in any other part of the territory, owing to the soil being good, and the country being better adapted for the cultivation of products such as the natives are partial to, namely, rice, sugar, sago, pepper, and other low country produce.

The Company have lately acquired a valuable cession of territory from the Sultan of Brunei, extending their boundary from Kimanis, on the west coast, to Sipitong, a small stream rising in Mount Mirapoke, and which empties itself into Brunei Bay. This acquisition adds about sixty miles of coast-line, and 4000 square miles to the Company's territory. The above-described stations constitute the main points at which the Company have established themselves, and they from

the outposts, as it were, from which the influences of civilisation and commercial development are being brought to bear upon the extensive and, as yet, partially explored interior.

Amongst the sources of revenue, opium is at present the most productive ; and next to it come royalties on export, sale of birds'-nests, profit on coinage, etc. The great find for birds'-nests is at some mammoth caves, called Gormanton, situated in the vicinity of the Kinabatangan River ; and these same caves having been a resort for vast flights of bats for untold generations in times past, there is to be found in their recesses a deposit of guano, the extent and depth of which have not yet been ascertained. The depth, however, must be exceptional, as a twenty-foot pole has failed to reach the bottom in those parts tested. Still richer caves have been discovered in the neighbourhood of Darvel Bay, near Silam Station. Gold has lately been discovered in the alluvial soil of the Segama river, samples of which have proved on analysis to be worth 72s. per ounce. Indications of coal have also been met with in several localities.

The climate is favourably reported on by medical men. It is, of course, tropical, and precautions have to be taken against undue exposure. The period of the north-east monsoon is the rainy season of the year, but a day hardly ever passes during the drier months without a refreshing shower. The uniformly warm temperature, and the abundance of moisture combined, have the effect of covering the country with a perpetual verdure. Palm trees, of many varieties, of which the *nipa* and sago are the most valuable, grow luxuriantly everywhere ; and camphor, gutta-percha, the resin called "damar," vegetable tallow, and oils of various sorts are to be had merely for the trouble of working.

The flora of North Borneo is as numerous, delicate, and beautiful as the forests are grand and imposing. The most prominent in profusion and beauty are the orchids, and the various varieties of nepenthe and rhododendron.

The elephant and rhinoceros are plentiful in certain parts, and wild cattle abound in the more remote forests ; deer of several kinds are also to be met with ; wild, pigs and monkeys swarm ; and the famous orang-outang makes Borneo his chief home. Crocodiles are plentiful in all rivers and bays, and reptiles and insects, some of the latter of beautiful forms, abound all over the country.

[For comparison with this interesting account of Sir Walter Medhurst's, our readers will find an abstract of a paper by Mr. E. P. Gueritz, in the Report, just issued, of the Montreal Meeting of the British Association. Mr. Gueritz speaks from three years' personal observation, and with a knowledge of several official reports.]

Borneo and Continental Powers.—When the territories of the British North Borneo Company were occupied, objections were raised by Spain, as suzerain of the Sultan of Sulu, who had certain shadowy claims on the north-east coast of Borneo. By a protocol signed at Madrid on the 7th March, Spain renounces these rights on the mainland of Borneo, as also over the islands of Balambangan, Banguey, and Malawali, with any others lying within three maritime leagues of the coast. Great Britain, on the other hand, recognises the claims of Spain to the rest of the Sulu Archipelago, embracing all the islands lying between Mindanao on one side and Borneo and the island of Paragua on the other, although much of this region has not been occupied by Spain. But while Spain is left free to impose all Spanish tariffs on goods entering the ports of Sulu, Great Britain "engages to see that there is entire freedom of commerce and navigation in the territory of North Borneo." The policy of thus hampering the freedom of action of a very young colony may perhaps be questioned. The protocol is also signed by Germany.

New Zealand and Samoa.—"A very able letter," says the *New Zealand Herald*, "has been forwarded by the Premier to the Agent-General respecting the position of Samoa. A remarkably interesting account is given of the whole of the negotiations respecting the Navigator's Group, and it is gratifying to find confirmed what existed only as a rumour before, that Ministers had agreed to ask Parliament to pay the cost of governing the islands, as an inducement to the Imperial Government to annex them to the Empire. There are several reasons advanced, not ostensibly, but really in support of this position, all of which show the Ministry to be thoroughly alive not only to the distinctive interests of New Zealand, but also the general interests of the Empire in the Pacific. First of all, there is the importance of having the control of the Central Pacific in the hands of Great Britain, whose numerous large colonies are in close proximity, and whose interests are therefore paramount in these waters. Then there is the expressed wish of the king and chiefs and the general inhabitants of the Samoan group for incorporation with the British Empire, and specially for association with the colony of New Zealand. And, finally, there is the fact that New Zealand colonists have acquired landed interests there, and that the trade between these islands and New Zealand exceeds that carried on with them by all the other Australasian colonies put together. The last of these facts is represented as the basis of the proposal, sanctioned by the New Zealand Parliament, to subsidise a steam mail service between the colony and Samoa, Tonga, and Tahiti." —*The Colonies and India*, 15th May.

British and German Interests in the Pacific.—The Pacific Commission has finally concluded its labours. The following are said to be the leading points of settlement:—The subjects of one Power are to have equal rights in all respects in the territories of the other Power. Whatever advantages have arisen to German subjects as a consequence of the annexation of New Ireland and other places recently placed under the German flag will be shared by all English traders. Germans, on the other hand, will enjoy the advantages of British subjects in British New Guinea. There are to be no differential duties, nor is one Power to impede the ships of the other. Arms, ammunition, and alcohol are not to be sold by either Power. The Salomon Islands, the New Hebrides, Friendly Islands, and Navigator's Islands are to remain open as common fields of action, and their independence is not to be interfered with. The special interest of British trade is recognised in the Ellice, Gilbert, and other groups, and the preponderance of German interests in the Caroline and Marshall Islands is admitted. It is hardly probable that the claims of New Zealand in respect to Samoa will be recognised.

MISCELLANEOUS.

Royal Geographical Society.—The Marquis of Lorne has been nominated to fill the Presidentship of the Royal Geographical Society, vacated by Lord Aberdare.

Manchester Geographical Society.—We welcome the first number of *The Journal of the Manchester Geographical Society*, which, in addition to the record of proceedings and other general matter relating to the foundation of the Society, contains a very able inaugural address by Mr. J. F. Hutton, J.P., President of the Chamber of Commerce; Mr. Stanley's lecture on *Central Africa and the Congo Basin, or, The Importance of the Scientific Study of Geography*, and a paper by Mr. Arthur Arnold, M.P., on *Our Commercial Opportunities in Western Asia*, a subject which cannot too much be impressed upon the attention of the commercial world.

NEW BOOKS.

Sketches in Holland and Scandinavia. By Augustus J. C. Hare. London: Smith, Elder, & Co. 1885.

This little volume will be welcomed by those who propose visiting the countries described, or who already have some acquaintance with them.

In the short compass of 134 pages, the writer gives a very brief description of Holland and Scandinavia, seizing on the most salient features and sights interesting to the tourist, and describing them in an unpretentious and a popular manner, the charm of which is only marred by being too slight and sketchy. Scandinavia, especially, so rich in folk-lore, is thus treated charmingly, but so superficially that the desire to learn more is only excited. The exquisite little woodcuts give a very just picture of some of the places which Mr. Hare visited.

The True Story of the Rebellion in the Sûdan. By Richard Buchta. Translated from the German by Mrs. R. W. Felkin. London: Abraham Kingdom & Co., 1885. Pp. 51, and Map. *Price*, 1*s*.

The writer of this pamphlet, Herr Buchta, is an Austrian photographer, who travelled for several years in the Sûdan. He was personally acquainted with the Mahdi, and his pamphlet contains a very good account of the Mahdi's rebellion from its commencement until the battle of Kashgil. He gives a description of the people who inhabit the northern part of the Sûdan, and indicates some of the causes of the revolt. His account of the terrible blunders committed by the officials in dealing with the beginnings of the rising is well worthy attentive perusal. At page 45, there is a chronological table of the principal events connected with the rebellion from July, 1881, to the battle of Abu Klea on January the 17th, 1885. This pamphlet forms a valuable addition to the scanty literature which exists on the subject, and we heartily commend it to the attention of our readers. Mrs. Felkin's translation is an able one.

With Hicks Pasha in the Soudan. By Colonel the Hon. J. Colborne. Second Edition. London: Smith, Elder, & Co., 1885. Pp. 288, and a Frontispiece.

This book is an account of the Sennâr campaign of 1883. Its author is one of the only three survivors of an army of 12,000 men. He found moments now and then, amidst the turmoil of a camp, to write down his impressions for the benefit of the public at home. Reprints of communications made to various journals have been incorporated with the central narrative. The book describes the author's journey from Cairo to Khartûm, and, after giving a history of the marching and fighting in Sennâr, it concludes with a short description of his homeward camel-ride. His notes on the scenery, the people, and the various incidents of his journey, are given in a lively manner; and a few hours may be profitably spent in their perusal.

Across Africa. By Commander Verney Lovett Cameron, C.B. London: George Philip & Son. New Edition. 1885. Pp. 569. Maps and Illustrations. *Price*, 12*s*. 6*d*.

Commander Cameron's *Across Africa* is now well known as one of the standard works of recent African travel, and although it is now ten years since Cameron returned from Africa, yet his book covers so much ground which has not been trodden by any traveller before or since, that it may still be considered as a new book, and the most recent authority for many parts of Central Africa. In the new edition, the author has added several interesting chapters on recent political and commercial progress; and the map is corrected to date. Although reduced in price, the new volume is much more tastefully got up than the original edition, and does credit to the publishers.

Amongst the Shans. By Archibald Ross Colquhoun. London : Field & Tuer, 1885.

Although the travels here recorded by Mr. Colquhoun are of a less adventurous character than his subsequent journey through Southern China, the geographical problems, physical and political, connected with the Shan country, are, especially at the present time, of the highest interest. The journey here described, and the views formed on that occasion by the writer of the feasibility of a railway which should form the great trade route between Moulmein and South-Western China, led indeed to his attempt to cross from Canton through the Shan country to Burmah, which, as will be remembered, was baffled at the Shan-Chinese frontier. In some respects this book is disappointing ; there is a want of method in its composition, and it is not always easy to know whether the information given is at first hand or from hearsay. Nevertheless it contains much interesting information. It describes in some detail the line of country between Moulmein and Zimmé (Kiang-Mai), over which Mr. Colquhoun proposes to take the railway, and which constitutes the most difficult part of the journey from Yun-nan. It is hoped that at the same time a line will be constructed from Bangkok to Zimmé, thus constituting a bond of union between Siam and British Burmah, which, besides its importance to British trade, would, the author believes, be the best, if not the only guarantee of Siamese independence against the threatened encroachment of the French from the eastward.

Mr. Colquhoun's notices of the Karens, Kakhyens, and other tribes of the hill countries through which he passed, are interesting, as is the description of his intercourse with the Shans, and of their social condition. The Shans may be said to be the most important race of the Indo-Chinese peninsula, the Siamese being, so to speak, a younger branch ; and, though now broken up into fragments, and necessarily owning the supremacy of the nearest big neighbour, it must be inferred, from the remarkable identity of language, religion, appearance, and customs over so wide an area, that the race before its dispersion had attained at an early period to some civil and political unity.

The value of the book is enhanced by an important essay on "The Cradle of the Shan Race," by M. Terrien de la Couperie, the extreme condensation of which is its only defect, and by a chapter on Shan history by Mr. Holt Hallett.

We hesitate to differ from Mr. Colquhoun on such a matter, but we are at a loss to know on what grounds he has inserted in his map, to the east of the "Independent Shan Country," a region of "Independent Tribes," between "Tonquin" and "China."

NEW MAPS.

EUROPE.

FIFTY MILES ROUND LONDON.—Letts' Cyclist's Map, from the Ordnance Survey, by John Bartholomew, F.R.G.S. Scale, 4 miles to an inch. New edition, May 1885. *London: Letts, Son, & Co., Limited. Price, in case, 2s. 6d.*

This map appears with several new improvements which make it still more useful as a guide for cyclists. The publishers, however, in being anxious to give the public good value for their money, have perhaps made the sheet inconveniently large for easy reference, especially for the cyclist *en route.*

BOSNIEN UND DER HERZEGOVINA, Generalkarte von.—Im Massstabe 1 : 150,000 (2 geographical miles to an inch). Herausgegeben als provisorischer Behelf. *Wien : K. K. militär-geographischen Institute*, 1884-1885.

The Austrians, anxious to hurry out the new survey of their recently acquired provinces, have made a provisional issue of photo-lithographed sheets, of which eleven have just been issued. The publication of a survey such as this will, no doubt, help in developing the resources of these countries as well as in bringing them more completely under the Austrian Government.

ASIA.

AFGHAN BOUNDARY.—Preliminary Map of the Route followed by the Afghan Boundary Commission by Major T. H. Holdich, R.E. Scale, 24 miles to an inch. *Proceedings of the Royal Geographical Society, May* 1885. *London: E. Stanford.*

THE IRAWADI RIVER.—Sketch Map, showing the probable course of the Sangpo of Tibet to the Irawadi of Burma, according to native authorities, by Robert Gordon, C.E. Scale, 20 miles to an inch. *Proceedings of the Royal Geographical Society, May* 1885. *London: E. Stanford.*

The Sangpo is a most troublesome river; for many years it has been a bone of contention among geographers, one set claiming it as an affluent of the Brahmaputra, and another as belonging to the Irawadi. The physical configuration of northern Burma is very peculiar; the rivers are confined to such long, narrow, trench-like basins, all running so comparatively close together, that their identity has got rather mixed and requires considerable unravelling. In opposition to the opinion most generally held by geographers at present, Mr. Gordon favours the old native authorities, and believes, judging from extensive evidence which he has accumulated and studied, the great volume of water discharged by the Irawadi, and other facts, that the Sangpo and Irawadi are one, and that consequently the Irawadi has its source in Central Tibet; whereas, according to our Indian geographers, the Sanpgo flows into the Brahmaputra and the Irawadi has its source in the north of Burma, thus depriving its length of about 500 miles. Mr. Gordon's able paper, read before the Royal Geographical Society, followed by the discussion and strong opposition of General J. T. Walker, is extremely interesting, and gives very fully all the evidence for and against the two theories; but the question will probably remain a doubtful one until this wild mountainous region has been more thoroughly explored.

AFRICA.

CENTRAL-AFRIKA.—Karte von Central-Afrika im Massstabe von 1 : 500,000, zur Veranschaulichung der Resultate der Kongo-Konferenz, und der neuesten politischen Gestaltung Central-Afrikas. Im Auftrage des Auswärtigen Amts bearbeitet, und gezeichnet von L. Friederichsen, Erstem Sekretär der Geographischen Gesellschaft in Hamburg. *Hamburg: L. Friederichsen & Co. Price*, 4.50*M.*

This map, which is published in the German Government White Book on the Congo Conference, shows on a fairly large scale all the latest discoveries and political divisions of Central Africa.

KAFFRARIA, und die östlichen Grenzdistrikte der Kapkolonie, von H. C Schunke. Scale, 1 : 750,000 (12 miles to an inch). Nebenkarte : Übersichtskizze der Trigonometrischen Aufnahmen des Tembulandes, sowie der hauptsächlichsten Höhenschichten von Kaffraria. Scale, 1 : 1,300,000. *Petermann's Mitteilungen, Jahrgang* 1885, *Tafel* 9. *Gotha: Justus Perthes.*

This is the best map published of the country between Grahamstown and the frontiers of Natal, a country which is now rapidly settling down to civilised life,

and beginning to develop its resources. The author's paper, descriptive of the country, illustrated by his map, is a valuable contribution towards the general geography of South Africa.

AMERICA.

NORTH AMERICA.—Sixteen Maps accompanying the Report on Forest trees of North America by Professor C. S. Sargent. *Washington, Department of the Interior (Census Office).*

These maps are most beautifully executed, and show the results of long and laborious work. The accumulation of data regarding distribution of forests and their trees from all parts of the North American continent, its reduction to statistical shape, and finally to map-form readily intelligible to every one, is a work the value of which can scarcely be over-estimated, and it may at once be recognised as a direct boon to science no less than to commerce and general industry. There are few governments so enthusiastic on behalf of geographical science, and certainly none so liberal in diffusing their valuable results, as the Government of the United States, but no doubt the praiseworthy expenditure on such good work will prove to be seed well sown. The spirit of liberal enterprise and desire on the part of the United States Government to be of real use to the public is very gratifying compared with the strictly official and almost selfish policy which is the rule in this country. Millions are spent on imaginary British interests, while thousands, which would buy real British interests, promote and extend our commerce, are short-sightedly withheld. Why should we not have such maps to illustrate and enhance the value of our consular reports, census tables, and blue-books? Surely British cartographers, who have taught the art of map-making to the Americans, have not yet allowed themselves to be outstripped by their pupils! But, after all, there cannot be much progress in any art unless it meets with appreciation.

VENEZUELA, Mapa Fisico y Politico de los Ee. Uu. de,—Scale, 79·5 geographical miles to an inch. With inset maps, statistics, and descriptive notes. *Caracas, published by the Government of Venezuela*, 1884.

This map may be said to accompany a sort of State prospectus holding forth the advantages and inducements offered to emigrants to Venezuela. The maps and statistics supply a very complete general knowledge of the country, and are of considerable geographical value.

ATLASES.

HISTORISCHER HAND-ATLAS Professor G. Droysen's Allgemeiner, — In sechsundneunzig Karten mit erläuterndem Text. Ausgegeben von der Geographischen Anstalt von Velhagen & Klasing in Leipzig unter Leitung von Dr. Richard Andree. 1 Lief., April 1885. *Bielefeld und Leipzig, Verlag von Velhagen & Klasing. Price, 2M.*

The great success achieved by Dr. Andree's Hand Atlas seems to have induced the publishers to get up a companion historical atlas. Certainly maps so really well done, and at such a moderate price as in Andree's Atlas, could not fail to meet with a large sale among such an appreciative and geographical people as the Germans; and it is highly probable that Dr. Droysen's Historical Atlas, edited by Dr. Andree, will be a similar success. It seems to aim at being very thorough and complete, and, to judge from the first part and the list of contents of ninety-six maps, the public may expect a powerful rival to "Spruner-Menke" at the exceedingly low price of 20 marks.

THE SCOTTISH
GEOGRAPHICAL
MAGAZINE.

NOTES OF A VOYAGE UP THE CALABAR OR CROSS RIVER IN NOVEMBER 1884.

By the Rev. Hugh Goldie.

(*With a Map by the* Rev. R. M. Beedie.)

The principal branch of the Calabar River, which divides a little below Duke Town (Atakpa) gets the name of the Cross River, from its having been supposed that it was a branch of the Niger. Mr. M'Queen, in his *Geographical Survey of Africa* (1840), asserts that "there can be no doubt that it is so," and this was the view generally held at the time he wrote. He mentions the account sent to the Royal Geographical Society, by Mr. Colthurst, who in 1832 attempted to enter the continent by this river, as proving this; but Mr. Colthurst proceeded no further than Ikorofiong, only a day's journey from Duke Town, when he fell sick, and, returning, died at Duke Town. Mr. Colthurst "pointedly states," says Mr. M'Queen, "that by means of the Cross River, the people above the Old Calabar inlet traded with the Niger and Eboe." Such an intercourse is carried on from the Niger to the region watered by the Cross River, but the latter does not afford a highway for it; the route of the Niger traders is overland. Becroft's expedition in 1842 disproved the old opinion, by showing that the Cross River could not possibly be a branch of the Niger. This misleading name should be exchanged for an appropriate one.

The people of Old Calabar (Efik), who inhabit the region of the estuary of the Cross River and its confluents, were originally, according to their traditions, from Ibibio, a territory which lies between the Cross River and Ibo on the Niger. Expelled by civil war, they came down to the lower parts of the river, but they have no record of the time of their compulsory migration. We learn from Clarkson's *History of the Abolition*

of the Slave Trade, that in the last century they were located in their present position and busily engaged in the slave-trade, then the only traffic. Their expulsion from Ibibio must, however, have been long before, for though their language is evidently that of Ibibio, the dialectic difference is considerable. Their land is divided into four districts, representing, no doubt, distinct families of the exodus; Iboku (Duke Town and Creek Town), Obutong (Old Town), Adiabo (Guinea Company villages), on the Calabar River, and Mbiabo (Ikunetu and Ikorofiong) on the Cross River.

The Bonny branch of the Niger and Calabar were formerly the chief seats of the slave-trade on the coast, as they are now of the palm-oil trade. The people of Old Town, then living nearest to the ships, endeavoured to monopolise the traffic; and to circumvent them, a number of the inhabitants of Creek Town obtained land from the Aqua people, planted themselves below Old Town, and built Duke Town, then called New Town, which has now the principal part of the trade of the country. In Clarkson's *History* (vol. i. chap. xiv.) we have an account of a massacre of the principal inhabitants of Old Town, concerted between the British traders then in the river and the founders of New Town. The former invited them to a friendly conference on board their ships, and, when alongside in their canoes, poured shot upon them, while the latter lurked in the bush at the margin of the river, to kill any that might chance to escape the fire of the ships. By this deed of treachery the power of Old Town was broken, and it has never been able to regain its first position in the commerce of the country.

On the discovery by the Landers of the outlet of the Niger, the late Mr. Robert Jamieson, of Liverpool, expended a large sum in exploring its mouths, and those of the adjacent rivers, in order to make way for a legitimate traffic. He employed a steamer, the *Ethiope*, under command of Captain Becroft, in this work, who in 1842 made the voyage up the Cross River above mentioned. He proceeded until stopped by rapids, into which he was afraid to venture, the steamer being of small power, and his long-cherished desire to obtain a more suitable vessel was never realised. An account of this expedition by Dr. King, the medical man on board, was published in the *Journal* of the Royal Geographical Society in 1844.

Two years ago the Rev. S. H. Edgerley and other members of the United Presbyterian Mission, Scotland, established in Calabar, went up the river, but did not reach quite to the rapids, and a few sentences appeared in the journal of that society, gleaned, I suppose, from a notice in the periodical of the Mission.

In November last, having been provided with a small steamer by the children of the Church, the voyage was again undertaken. I give the following notes respecting it, in which there is nothing added to Dr. King's narrative, except fuller notices of the tribes inhabiting its banks.

Monday, 10th Nov. 1884.—We embarked in our little steamer, the *David Williamson*, and took our course up mid-channel. Opposite Duke and Creek Towns the river spreads out into an extensive estuary, its waters

divided by numerous islands covered with mangrove forest, which streams unite between the towns of Ikunetu and Ikorofiong, as they do also in their progress towards the sea below Parrot Island, and so give a better entrance to ships of burden than any of the mouths of the Niger. In the evening we anchored off Ikorofiong, the most northern Calabar town, built on Ibibio soil, and where there is a large oil-market. It is the Ibibio people who produce the greater part of the oil exported from Calabar. The petty wars constantly breaking out with Calabar, and amongst themselves, much hinder their industry and retard their advance in every way.

Tuesday, 11*th*.—Left Ikorofiong at 8 o'clock in the morning, and arrived at the first town of the Umon tribe early in the afternoon. On our way up we passed Itu, a town of Ibibio, where there is also a market. Before reaching it we passed an island showing sandstone strata, pleasant to be seen after the perpetual mud of Calabar, and opposite the beach another islet showed the same foundation, while this rock was constantly cropping out in the banks of the river. This Umon town is situated on the top of a long island, looking up the river pouring down from the interior, which floods it in the rainy season. It is of importance as the site of a market to which the surrounding tribes resort, and is the furthest-up place which the Calabar traders reach. The Umon people have command of the river, and bar the way, not permitting them to go further up, and refusing a pass to those above. The chief articles of trade are palm-oil, yams, and canoes, the tribe possessing the following towns besides the one on the island, Ikot Ana, Biakpan, Ukpan, Ekin, Aqua, Ikun, Ikun-eset-ikot. We found the town under the despotic power of the Fetish priesthood, and in consequence the murder of twin children and expulsion of the mother, the frequent use of the ordeal for witchcraft, and other customs of blood, keep the poor people under constant fear.

As soon as we dropped anchor we went on shore to make ourselves and the purpose of our visit known, but had to wait a considerable time for the appearance of the chief, having in view a juju house, around which were arranged a large number of human skulls, painted with various coloured earths. At length he made his entrance into the palaver-house, accompanied by his constant attendant, the chief priest, who, as he is persuaded, keeps him alive. Our reception was not at all cordial, and when, on the following morning, we paid a parting visit to make the usual present, which was not reciprocated according to custom, the priest attempted to stop us, when he learned that we were intending to go up the river. The young man who acted as interpreter said that the missionaries were in the habit of going where they liked, and then he gave us permission to go in a canoe, but prohibited us from taking up the steamer.

Wednesday, 12*th*.—Early in the morning we got up steam, and reached Ikot-Ana, another Umon town, in the afternoon. The people had got notice of our intended visit, and we saw the British ensign flying as we approached the town. Here we met with a cordial reception. The founder of the town, Ana by name, was a great friend of King Ego II. of

Creek Town, and followed him in rejecting some of the barbarous customs of the country. This led to a civil war with the party in the island town where he then resided, who clung to the old ways; and he withdrew with his people, and formed this town; Ikot-Ana being literally the people of Ana. The head-men are desirous that the Mission plant a station amongst them; and have given sites for church, school-house, and residence. A brother of the chief was, in his boyhood, for a time in one of the Mission-houses.

So far we made our way with Efik, but above this, though we found everywhere we went some one who understood our tongue, we required an interpreter. We failed in getting one in Calabar; but here the chief supplied our lack by giving one of his people, named Etang, to accompany us. He is a native of Atam, has a good knowledge of Efik, and made himself understood by the people of the various towns which we visited. He interpreted our message of Gospel truth as faithfully as he could, so far as we could judge from his anxiety fully to understand what we stated to him in Efik. Still we spoke of things of which he had no personal knowledge, and in which he had no interest.

The chief, with his following, came on board to see our wonderful canoe, and in the following morning took a short trip in it, his own canoe following to take him off.

Thursday, 13*th*.—Left Ikot-Ana at 8.45, and made Okureke (Akurike), the first town of the Akunakuna tribe at one o'clock; we anchored by mistake at a small town a little below it, and paid our respects to the chief, a withered old man, who was quite delighted to receive us. Having exchanged gifts, according to use and wont, we went on to the beach of Okureke. Besides this town, the tribe possess:—Abinabiang, Ibinsuba, Udine, Itu, Ikpisim, Emumurua (Emura-mura), Ikun, Abiangwan, Aduno.

Okureke is situated on a rocky eminence, and from its position, being a short distance from the river, with a morass between, access to it must be had by canoe, in the rains. As we went up we saw a number of canoes in the process of manufacture, this being a principal industry in the upper parts of the river. They are so far roughly prepared, and the purchaser finishes them to suit his taste or purpose. They are made of large hard-wood trees, capable of conveying the palm-oil puncheons, carried to market by the Calabar traders. A wondering crowd, as usual, surrounded us on our landing, and as we passed on we noticed a remarkable specimen of native art—a section of a large tree rudely carved to represent two persons, larger than life, the one standing above the other.

We were conducted to the house of the chief Okun Aba, but had to wait some time on his appearance; and in the meantime the elders of the town kept going out and into the apartment where he was secluded. When he came out he wore a surly face, as if he made us anything but welcome, and the frown he did not smooth down, even when Mr. Beedie, one of my fellow-travellers, presented him with some carpenter's tools, which had been promised him on the former visit. He seemed something

of a character, and could enjoy a practical joke—at least when made by himself. He transferred the hat of my fellow-voyager, Mr. Janett, to his own head, and joined in the boisterous laughter with which his followers hailed the transformation. Okun went through a formal ceremony in receiving us. Calling for a lump of salt, he scraped a little on the ground with his thumb, muttering something as he did so; then took a horn of palm-wine, uttered a somewhat long speech over it in a low voice—perhaps a prayer to his juju—and then poured it on the ground by way of libation. A piece of dried venison was handed round, of which all took a morsel; and thus a friendly alliance was made. All then set to drinking the palm-wine while it lasted. The chiefs of all the tribes we visited, in making friends, went through this ceremony more or less fully; the partaking of a little dried venison or fish never being omitted, likely because it is the only article of food they can have by them always ready for use.

Here we fell in with Eko, the young man who had attached himself to the company who visited these parts two years ago. He again offered his services as pilot, which we accepted; but the Okureke people extracted an oath of him in their own mode, that he would not help us to a knowledge of traffic. Human nature, civilised or savage, holds tenaciously to the monopoly of any benefit it can secure to itself.

Friday, 14th.—This morning we had a great many visitors; and at length the old chief appeared with his followers to inspect the steamer, wondering at and admiring everything. This being done, and having exchanged gifts, we left at 8.40.

Anchored off Emumurua at 10.35. The people here also had possessed themselves of a British ensign, and hoisted it in honour of our arrival. Three or four villages in close proximity to each other lie along the bank of the river, and unitedly give a large population. We visited the chiefs of two of them, both very old men. Whether the one Word of Truth and Life which they heard penetrated the darkness which has been deepening upon them through a long life, only He who has immediate access to the minds of His creatures can tell.

Left Emumurua a little after midday, and dropped anchor off Ibum (Ebom), in the evening. In our way up we passed a number of Afikpo people, a tribe on the opposite side of the river, who crowded down from their town, named Unwana, placed on the top of a hill, in order to get a nearer view of the steamer. We hailed them, and asked them to provide firewood against our return; but, very probably, they wondered to what use we could apply it.

Mr. Edgerley and his companions had spent a Sabbath at Ibum, travelling in a canoe; but when the people saw us moving along in our large smoking canoe, they evidently feared that it might be something uncanny. When we landed there was a good deal of altercation amongst the elders of the town, evidently in regard to our reception. The chief, it seems, had hid himself, not knowing what we might be, nor what our purpose in coming upon them in such a strange way, so that we had to return on

board without seeing him. We asked them to provide firewood for the steamer, and next morning they set heartily to work, and soon had a large pile heaped up.

We went to call on the chief after breakfast, and get a meeting with the town's-people. Immediately above the bank we passed through a market, which was being held under the shade of trees. The articles exposed for sale were the common produce of the country, with cloth and other European goods imported into Calabar and Bonny. Those from the Niger are brought across the country by the people of Inokim, a town or district of Ibo so-called, who travel amongst these tribes, making trade in every commodity they can get sold—slaves included. Their women are distinguished by the tasteful mode in which they dress their hair. Their scanty clothing, merely a loins' cloth, gives little scope for displaying their desire for personal adornment, but they are at great pains to do this in their hairdressing. We do not often see such ornamental heads in Calabar; but the women of Gaboon have an elaborate mode of producing them. It is said to take a day to dress a head, but that one dressing will suffice for a fortnight.

We found the king, a little old man, busy weaving a fishing-net. As we passed through the town we saw many engaged in making cord of bark, and weaving nets much in the same mode that the art is practised in Scotland. He seemed to have lost his timidity, and received us gladly, at once agreeing to call the people together that we might have opportunity of addressing them. In speaking of the duty God requires of us to each other, our auditors, among other things, took exception to the sixth precept of the Decalogue. The Afikpo people, they said, were at war with them, and all their negotiations had been unsuccessful in procuring peace. They themselves injured no one, but they must defend themselves when attacked, in the reasonableness of which we acquiesced.

We had a large intercourse during Saturday, all day long; and as we purposed remaining at anchor during Sabbath, we arranged with them to have meetings on that day. However, on Sabbath morning an alarm of war was raised, from one of their villages in the neighbourhood, and all flew to arms. They poured out along the bank of the river towards the place where they supposed the Afikpo people had made an attack; most of them armed with guns, a few with merely a hatchet. It proved a false alarm, and they soon returned, giving us the opportunity we desired of meeting them. We had asked them not to visit the steamer on God's day, and a proclamation was made prohibiting this, which was faithfully obeyed, but a crowd kept its position on the beach throughout the day, gazing at the *David Williamson*, and observing everything done.

The chief suggested the palaver-house as a better place of meeting than his yard. To it we repaired, and had an overcrowded audience. After our address the elder freely expressed their mind respecting the strange things brought to their ears, which we were glad to hear, as showing that they paid attention to what was said, and also giving us

an opportunity of meeting their views. At an afternoon meeting, the first spokesman, before giving his opinions, made obeisance to the chief by bowing down and touching the ground with the tips of his fingers, then turning to us he placed his palms that we might blow into them, and we returned the compliment.

The following names we got of towns in the neighbourhood :—Afaifai, Ediba, Anon, Eken, Edyumedyum, Asubo, Ekpiakpun, Etemtet. Several of these tribes are reputed cannibals, and very likely all are guilty of the horrid custom during war.

Monday, 17*th*.—Left at 7.15, and, passing several villages, cast anchor between two, Ediba and Edidi, situated on opposite sides of the river. We saw the chiefs of neither, and got up steam again at midday, wishing to get to one named Inyanyaha before sundown. In this we did not succeed, and so we anchored off the bush below the town.

Tuesday, 18*th*.—In a little more than one hour we reached it this morning, and had our audience of the usual noisy crowd, but the chief we saw not. Leaving a present for him, we took our departure, and at 3 o'clock anchored off Ekudi. A great crowd lined the beach, a market having been held during the day, and canoes from various quarters lay at the landing. A shouting procession accompanied us to the chief's place, who seemed reluctant to make his appearance, but eventually came and presented us with the usual gift—a goat and a few yams. Many in the crowd were the worse for liquor, having partaken freely of the white man's strong drink, some man kindly offering a bottle of that which he himself loved so well. With difficulty we made ourselves heard, and, having given the chief our gift in return—a morning gown, a piece of cloth, and a few small articles—we left and passed up to Adadaha, on the opposite side of the river, and anchored for the night. As soon as we had dropped anchor, the brother of the chief came on board, and invited us on shore, the first instance of such confidence we have met with.

Wednesday, 19*th*.—After visiting the town and addressing the people, weighed anchor and steamed past the Atam villages. The river was falling rapidly, and we were anxious to reach the rapids, so did not drop anchor till we reached a town called Alaha, at 4.10. When we went on shore, two fowls were sacrificed on the beach, no doubt to counteract any evil influence we might bring with us. The town is built on a hill of moderate height, and the houses, while very low, have the walls plastered in a style superior to those of the other tribes through which we passed. Entering the court of the chief's house, we waited for his appearance, but it was only by considerable urgency on the part of our interpreter, that he was prevailed on to come forth. When he did appear, we saw a strong young man, who came covering his eyes with his hands, as a child overcome with shyness before strangers, at the same time laughing at his own awkwardness. We made ourselves and our purpose in this visit known, and in reply he stated that they knew of white men, mentioning Captain

Becroft's expedition, and the visit of our friends two years ago, though they did not reach so far as Alaha. But they were afraid to see white men, for our friends had brought chigoes into the country, and they were apprehensive some evil might follow our coming. However, as we had come they bade us welcome, and would give us food, asking what they would prepare for us. To this we replied, "The food you make for yourselves."

In the morning we returned to the town, and found abundant food provided, in the form of fufu, with its accompanying sauces. After addressing the town's-people, and having some intercourse with the chief, he so far mustered courage as to accompany us on board to see the steamer, and all the wonderful things in it. When he got the customary present, he with great complacency examined every article, and when he went on shore exhibited them to a crowd which surrounded him. He expressed a wish that next time we came we should bring some things for trade.

All day long we were employed in getting firewood, and the people came alongside, to get a nearer view of the steamer, many coming on board with the present of a few ground-nuts, a jar of palm-wine, or anything they had at hand.

Thursday, 20th.—Started early this morning, but made very little way, a dense fog coming down on the river, which stopped further progress. We feared also that our fuel might fail, and we reluctantly turned the bow of the steamer homeward.

At this distance from its mouth, the river presents a fine appearance; a broad stream, bordered by a hilly country, while a range of mountains appears in the distance.

In our downward journey we first stopped at Uyenge, a town of Atam. When passing up, the people invited us on shore, and now they were pushing off a canoe to intercept us, so as to secure a visit. We however, intended to call here in order to procure the seeds of a palm which we have not in Calabar, frequently mentioned by Dr. Barth as the debel-palm, which he found plentiful near Lake Chad and in other places.

At midday stopped at another town called Okpürokŭp. The people listened attentively to our message, and in reply stated that the time was not propitious for giving attention to the things we brought to their knowledge. Their town was at a distance, but a neighbouring people had scattered them, and they at present formed a temporary settlement at the side of the river, still hoping to be able to return to their former possessions.

Early in the afternoon anchored at Omine, a town of a district called Ofungmbungo. In one of the juju houses we saw a row of human skulls, such a display as we have not seen since leaving Umon. In the former visit, however, the Rev. Mr. Beedie, who gives the account of it, says, respecting another village whom they visited, named Inokpafia, "we were taken to the palaver-house, where we counted 151 skulls ranged around. Many of them, from their size, must have been the skulls of mere infants, and

all of them were trophies of war. Several of them had been cut open, which would indicate that they had fallen in fight, but the children had been caught and butchered. The people said that they had observed that we did not look at the skulls in an approving way. Strangers who came to the town usually praised them, because they could show so many heads of their enemies. They would take them down, but what would they do with them? Mr. Edgerley said they should bury them in the ground. We were anxious to visit another village about three miles in the opposite direction called Mbana. When a little more than half-way, we passed through the site of a town which had been destroyed by war about four years ago. It had covered a large space of ground, but all that remained were clay mounds and the war-fence surrounding them. One of our guides showed us a thicket down in a hollow place where, he said, about 500 women and children had been taken by the victors and butchered. Making allowance for exaggeration, there is no doubt a dreadful massacre had taken place."

Passed several towns, the people of which, seeing we did not intend to call, sent off to the steamer their goat or sheep, thus showing their desire for friendly intercourse. Anchored for the night at Inyayaha.

Friday, 21*st*.—Left this morning, and reached Ibum about midday, and took on board some firewood, then crossed the river to visit a town of the Afikpo people, called Mkpüro. It is built on the top of a hill, and when we made the ascent, we had an extensive view of the country. A small lake appeared between the left bank of the river and hills in the opposite region. A higher range lay beyond these. The lake, we were told, had no connection with the river. It being the first appearance of the white man amongst them, the elders of the town were evidently at a loss how to receive us and do the honours for their village; and we interrupted their conference, while we relieved them of their difficulty, as we thought, by telling that we could not wait till they cooked food for us, but wished them to give a hearing to what we had to say. This they did most attentively. The Afikpo people, as we saw them here, have scantier clothing than the other tribes we visited—little as that is in all cases—the loins' cloth sufficing all, and they appeared altogether ruder. Mrs. Ludwig, one of our number, having made friends with the women, as she did at all the places visited, by a present of needles, thread, etc., they in return sought to meet her friendly advances by giving anything they had at hand, and here some, having nothing to bestow but articles of their own industry presented her with a collection of pots and dishes of various sorts. The women are the potters in these tribes, and in forming their ware for various uses, they make the clay into rolls, and build up the articles by successive layers of these, kneading the clay inside and out. They make their crockery very neatly, but the burning is very defective.

We passed on in the afternoon to Itu, a small town lying between Emumurua and Okureke, to which our pilot, Eko, belonged. He had been sold into Calabar, but found opportunity to escape to his own country.

We found him intelligent and careful. We spent the Sabbath here, meeting with the people; and in replying to the various matters spoken of, the old chief acknowledged that when any townsman died, they hunted in the bush, and killed any stranger they found to bury with him, but they would give up the practice. This is the mode in the Umon tribe also, of killing for the dead.

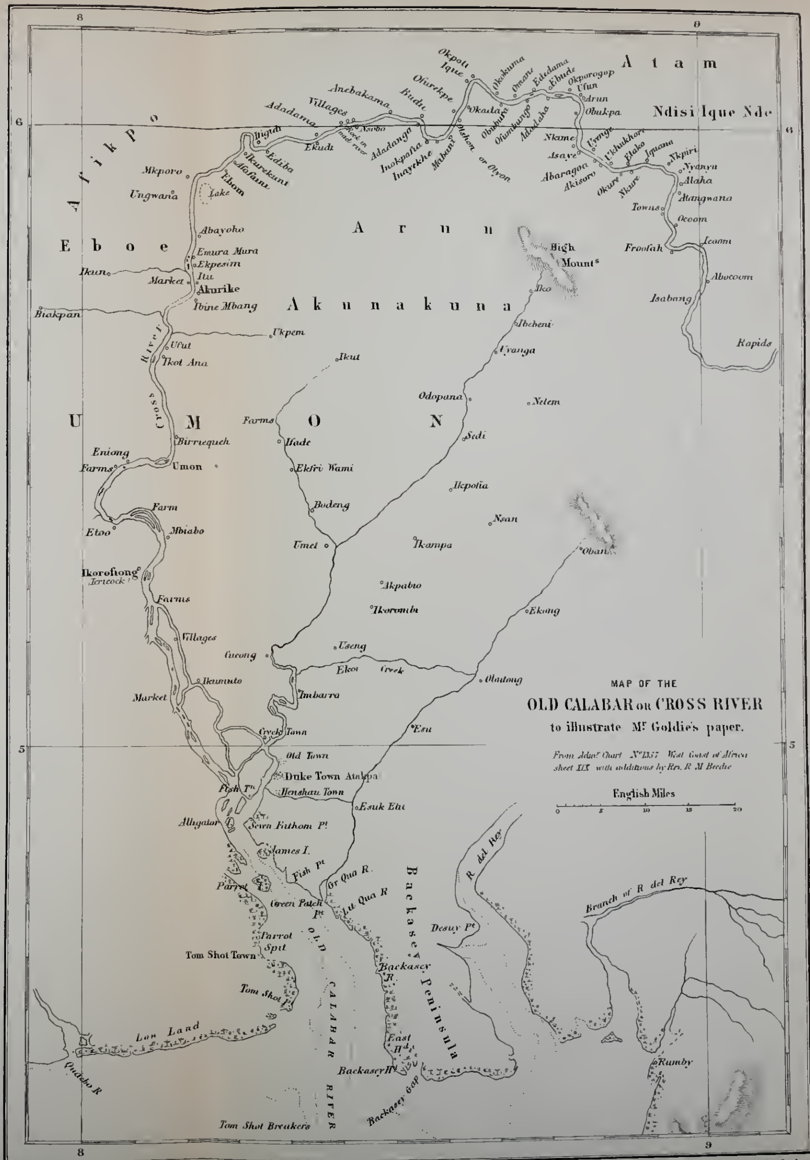
Monday, 24th.—Weighed anchor at 7.35, but missing the channel, soon stuck on a sand-bank. This was hazardous, as the river was falling rapidly, so all hands set to work, and after four hours' hard labour we got off. This delayed us, so that we did not reach Ikorofiong in the evening, as we intended, but anchored for the night beside some Eniong farms. Visited the farm-people of this tribe while getting up steam next morning, but, after starting, again got on a bank, which detained us for two hours. Arriving at Ikorofiong beach, we landed Rev. Mr. Janett; then on to Ikunetu, where we landed Rev. Mr. Ekanem, and so on to Creek and Duke Towns, which were reached before night, terminating our voyage of two weeks and two days.

We found a large population along the banks of the river, so far as we went. About Calabar—and lower down, large mangrove swamps, unfit for habitation, limit the population of the estuary, but before the northern boundary of Calabar territory is reached, those swamps disappear, and above Umon the towns and villages are thickly planted on the river's bank.

The population in this part of Africa, however, has been broken up by the slave-trade into small tribes,—Calabar and Bonny, as I have stated, having been the great seats of this traffic when it prevailed. Though a limited traffic to some extent unites them, each tribe remains isolated in its own little territory, at enmity with its neighbours when not in actual warfare, and so great is the feeling of insecurity that the head men will not venture out of their own town district.

We found all the towns of Akunakuna built on sandstone strata coming up to the surface. A good material for building thus lies at hand, but the people do not make use of it. In Umon and above, except in Ikot Ana, the rudest, because the easiest, mode of house-building contents the people. A rude wall is built of wattle, plastered with clay, but no pains are bestowed to make it smooth, as is done in Calabar. The clay is thrown on to the frame of sticks only on one side, and protrudes through the interstices. To support the wall, though it is built low, longer sticks, crooked and rough as they may happen to be when cut in the bush, are placed here and there.

The country ascends and presents a varied and pleasing aspect as one goes up the river. At Akunakuna and above, the perpetual jungle of the lower courses of the river is broken in upon; low hills of rounded form, showing a sandstone formation, appear covered with Guinea grass, interspersed with trees, which reminded some of us of Jamaica. This grass forms the pastures of that island, and is so named from having been got from this coast.



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The industry of the tribes through which we passed is chiefly given to the cultivation of their farms, in which they raise yams, plantains, maize, sugar-cane, grown only for eating, ground-nuts, etc. Large quantities of yams are imported into Calabar, which does not grow sufficient for its own support. These come through Umon, through which channel a considerable quantity of palm-oil is brought down. The oil-palm is not so plentiful inland as nearer the coast, so that I doubt if much increase of that article of export is to be looked for from the up-country. We saw several groves of this palm, but the upper regions are, for the most part, destitute of it. It might doubtless be extensively cultivated, but the people take no thought to plant it.

One thing which tells much against the advance of these tribes is the free use of the "fire-water" with which our traffic floods the coast. It has penetrated into regions which the traveller has not yet entered, so we found it in advance of us wherever we went. At Ibum and Alaha the empty gin-bottles were neatly piled up so as to form, apparently, a potent juju. It must have sadly disappointed any one who desires the welfare of his fellow-men above his own gain, that the motion made at the Berlin Congo Conference, to prohibit the import of strong drink into the newly formed state, was not adopted. In snatching at present gain through a traffic in intoxicating liquors, now so extensive among the tribes of the West Coast, the African merchant is repeating the achievement of the man in the fable who killed the goose which laid the golden eggs. A healthy and extensive commerce cannot be created where "fire-water" floods the land. When the greater part of their industry is expended by the poor people on intoxicants, can they arise from the degradation into which the slave-trade sunk them? The time must come, if Africa is to arise, when the nations of Christendom shall agree to prohibit trade in them, as they have prohibited the slave-trade.

AUSTRALIAN TRADITIONS.

By the Rev. Robert Hamilton, Melbourne.

The following Traditional Tales, collected from the lips of the older aborigines with whom the writer has personally come into contact, may help to throw light on the much-disputed question of the affinities of the Australians. The attempt has been made to present them as much as possible in their natural simplicity, though the writer confesses that, to his mind, their most striking features are the coincidences they present with the narratives of the Hebrew Scriptures, of which he believes they are but "broken lights."

The Saving of the Human Race from the Woman and the Serpent.—There are three Divine Intelligences acting in concert, Bûnd-jil,

Tûd-ger, and Tarrang or Dhar-na-nang, the first *father*, the second *brother*, the third *son*. They are benignant, and have often taken an active interest in the welfare of the human race. As for instance:—There was once a wicked woman who made alliance with a serpent, which she kept in the hollow trunk of a large fallen tree. When she saw "black fellows" passing she "cooeyed" to them, and persuaded them to come near the tree to catch the fine bandicoot she promised to drive out. Instead of bandicoot the snake darted out, and stung the unwary victims to death. The destruction of mankind in this manner seemed inevitable. Bûnd-jil at length intervened, and sent brother Tûd-ger to prevent such a catastrophe. Tud-ger appears near the tree in the likeness of a black fellow, but when the woman makes her usual proposal, he insists on driving out the bandicoot for her to catch. When at length she reluctantly yields to his demand, she meets the fate she had dealt out to others.

The Saving of the Human Race from the Woman with the Fire.—Another wicked woman planned the destruction of the human race. She lived in a region where there was a great mountain. A large opening into the mountain-side, like a huge tunnel or wombat-hole, seemed as if it were a natural passage to attractive hunting-fields on the other side. This the woman lined with dead boughs of the peppermint tree and of all quick-burning woods, to give it the appearance of a large store for the use of a multitude. Near the mouth she had also a great number of mia-mias in the form of an encampment; and she kept the camp-fires constantly burning. The blacks who passed within sight readily believed in the presence of natives; and when, in answer to the cooey, they approached and found only one solitary woman watching the fires, she explained the astonishing circumstance, by saying that the people from the camp had gone a-fishing, to the hunt, or to hold corroboree, but if the visitors followed their tracks through the tunnel they would soon find them. When she saw them walk within the passage she set fire to the fuel at the mouth and smothered them to death. Bûnd-jil sent his son Tarrang to deliver the human race from this ogress. Tarrang appeared like a black fellow, entered the tunnel as directed, but forced his way out by a new passage; and, suddenly coming upon the woman from behind, pushed her into the flames she had lighted for his destruction.

Tradition of a Deluge.—Among the aborigines of the Portland district there is a tradition that a flood destroyed the whole human race with the exception of one man, who was saved by one of the great powers taking hold of his long spear and drawing him up into the clouds from the top of a volcanic hill (Mount Eccles). On the flood passing away the man returned, and became the father of the new race of men.

The first obtaining of Fire.—A maiden, whose native name was

Mûn-mûn-dik, had somehow or other become the sole owner of fire, which she kept in the end of a yam-stick. (The yam-stick, it may be explained, is a rod about 5 feet long, the point of which is hardened by fire to fit it for digging up roots out of the earth). The maiden used the fire for her own convenience and comfort, but no persuasion could make her share the benefits with others, and all attempts at securing the treasure by force or fraud proved unsuccessful. Bûnd-jil, however, sent his son to the assistance of the race. Failing to persuade the fire-maiden to a voluntary surrender, he had recourse to stratagem. Having buried a poisonous snake in a great ant-hill, he asks her to come and help him to dig up the ants' eggs—considered a delicacy. She, of course, digs up the snake. Tarrang calls out, "Hit it, hit it!" As she strikes the creature with her yam-stick the fire is set free. Tarrang seizes it, and bestows it upon men. To prevent the maiden ever resuming her monopoly, he removes her to a place in the sky, where she became the "Seven Stars." "She is to be seen there now."

The Castle of the Evil Spirit.—Ta-ga-din was the house of the Wicked One. It was a most formidable and strongly fortified place among the wild ranges on the Big River, one of the tributaries of the Goulburn. The "Blacks" of Corandirrk frequently go a day's journey to the neighbourhood in search of pheasants, lyre-bird, and other game; but they scrupulously keep aloof from the spot. They have been taught in early life how the Wicked Spirit cooeys to the Blacks, entices them to his stronghold, and keeps them as miserable captives; boys, especially, being the object of his pursuit, that he may turn them into demons like himself. Bûnd-jil, they say, tried many plans to break down the mighty stone walls of this castle. Appearing, by his son or brother, in the form of man for this purpose, he found the perpendicular walls could not be scaled. But at last an invisible agent passed over the castle in a big black cloud, and sent down great flashes of fire which split the rocks in pieces, and opened a way for the prisoners to escape. The enemy has never been able to rebuild his house.

Return from the Dead.—Any one having before death drunk water from the moon will come back to life; but any one having drunk from the native pigeon (Mûn-gû-bra) will never come to life again. By this restoration to life is understood reappearance in another human form. There is no possibility, unfortunately, of ascertaining beforehand who has drunk from the moon, and who from the pigeon: no one could tell to which class he himself or any one else belonged, nor was there any knowledge of where either kind of water was to be obtained, or of how it was drunk. An old Black, Jamie Webster, whom I personally knew, was a singular illustration of this delusion. He maintained to the last day of his life that Mr. John Green, Manager at Corandirrk, was his deceased brother in new form. No assertion or argument could drive the notion

out of his head. He clung to Mr. Green as to his real brother, and always took up his abode as near as possible to him, displaying the utmost confidence and esteem, and invariably telling him where he was going when he went to fish or to hunt. When he spoke of matters which had occurred in his brother's lifetime, he expected Mr. Green to join in the conversation, as if he knew all about the events. To all Mr. Green's protestations of ignorance, he would reply in the most serious manner: "You not 'member —you forget—you not tumble down (die) yet. That long time before you tumble down." When Mr. Green spoke in his hearing of what was revealed in Scripture concerning the unseen world, Jamie implicitly believed, and his assurance was confirmed that his brother had come from the dead, and was simply relating what he had seen and heard in another world.

NOTES ON THE PLACE-NAMES OF KINROSS-SHIRE AND VICINITY.

By W. J. N. Liddall, M.A. (Edin.), B.A. (Lond.), Advocate.

The scientific investigation of the origin and meaning of place-names is a study as important as it is interesting, and to pursue it successfully demands a combination of several qualifications. That it can be made a popular subject, even when elaborated in a scientific method, is clear from the deservedly well-known books of Mr. Joyce.

We are already familiar with the warning of how misleading it may be to identify race by language, and we need to be equally cautious in discerning to what particular language a place-name is referable. It is remarkable with what constancy place-names are retained by a race of different language which has acquired a country; and the names respectively belonging to a number of superinduced languages have to be marked off, just like the geological strata of the country. The familiar instance of Wansbeckwater shows a name containing a word of the same signification in three dialects. We have to guard too against the tendency to make a name belonging to an unknown language somewhat intelligible by assimilating it to a word of the language of the people using the name, just on the same principle that a gardener talks of "sparrow-grass."

It is specially in reference to Scottish topography that I wish now to consider the subject, and I am glad to see that its importance is emphasised in the article "Gaelic," in the *Encyclopædia Britannica*, by Dr. MacLauchlan, who writes: "The study of this subject is full of interest, and is capable of producing important results, both linguistic and historical. The field is as yet unoccupied, and affords much to encourage the judicious and painstaking student."

Now while every one, Celt or Saxon, may help this work by collecting and tabulating place-names, the final results cannot be arrived at by one

who knows merely Scottish or Irish Gaelic, or Welsh, or all three, but by one who has a thorough grasp of the principles of philology, and, in detail, of those principles as applied to the Celtic languages. Further, the study is a comparative one in every way, and the student must have a thorough knowledge of Irish topography. The difficulties of Scottish Celtic topography are greater than Irish in this respect as well as in others, that while in both countries there are districts where Celtic is no longer spoken (but where names are, of course, Celtic), in Ireland we have the literary forms preserved in compositions, while in Scotland we have not. The vowel system of Celtic is far finer and more delicate than that of English, and the result is that often two, or it may be three or four, quite distinct Celtic words are represented by one and the same spelling of the slovenly-speaking Saxon. Nevertheless, by a careful examination of extant Scottish charters and other documents, it is astonishing how certainly we can often analyse an apparently hopeless form.

I propose now to illustrate the subject by an investigation carried on by myself. The district I selected was Kinross-shire and vicinity. It was a county I had a personal interest in from residence there at times. But, over and above that, I had in view the problem, Could I identify any Welsh, or to use the extremely convenient and more accurate term of Professor Rhys, Brythonic forms? The following passage from Dr. Skene's *Celtic Scotland* will explain why one should look for such forms. Speaking of the analysis of the list of Pictish kings, Dr. Skene writes that—

"Another part of the list shows Gaelic forms, but more removed from the Irish, with a considerable British element; that this part of the list is more connected with the Southern Picts; that the British element is not Welsh but Cornish, and belongs to that part of the territories of the Southern Picts which lay between the Tay and the Forth. The explanation probably is that this district formed part of the territory occupied by the Damnonii, who, as they bore the same name, were probably of the same race as the Damnonii of Cornwall; and when a part of this tribe was included in the Roman province, the northern part beyond the wall which formed the boundary of the province was incorporated into the Pictish kingdom."—*Celtic Scotland*, i. 211.

Besides consulting early records for this work, I have made use of the maps of Bleau and of Timothy Pont, but it is necessary to warn any one using them for this purpose that the greatest caution must be exercised in accepting any forms found there.

My result is that the topography of Kinross-shire is purely Gaelic. I cannot with anything like certainty place my finger on a single name of Brythonic origin. The only comparison that is obviously suggested is the existence of the name Devon as a river in the district in question, and as a county in the south of England,—a circumstance which seems to be parallel to the occurrence of the name Damnonii, referred to in the above extract from *Celtic Scotland*. One or two Scandinavian names can be pointed out.

Of course Gaelic has long ceased to be spoken in this district, and the

names are not the Tertiary deposits (to use the language of Geology) of the Highlands where Gaelic is spoken, but correspond to at least the Secondary strata.

An easy test of Gaelic topography is *bally* (*baile*, town). This is adequately represented in Balado, Balleave, Ballingall, Ballingry, Balgedie, and probably Shanwell (*i.e. sean bhaile*).

Innis occurs with the two meanings it has in Ireland—island, or a piece of meadow-land bounded by water. Thus we have the Inch, in Lochleven, and also, in the other sense, Inchgall.

The Derrys of Ireland (*doire*, oakgrove) are represented by Auchterderran (that is, *uachdar*+*doirean*, the height of the oaks).

Leamhna, the elm, gives its name to Lochleven, and the river Leven. In Ireland it occurs as the *Launе*. Compare Achaleven, in Argyllshire, which must mean, "the field of elms."

Iubhar (pronounced *yure*) is the yew-tree. It is frequent in Irish names, and the town of Newry takes its name from this word, the initial *n* being the article—a common phenomenon in Irish, just as in English we have *newt* and *eft*, or in French *lierre* (=*hedera*). Now in Kinross-shire we have a parish Orwell, of which I find an old form *vuerquhell* (*Reg. Dunf.*), and on the map, in this parish, or near it, is a rivulet, Ury. I suggest therefore that Orwell is made up of *Iubhar* and *coille*, a wood. The same word explains Ury (Irish, *Uragh*). Further, in this parish there is a farm Craigo. In Irish there is a simpler form, *eo*, signifying a yew, thus Craigo would be Yew Craig.

Chillerney is a name I find on an old map. I think it may be explained in the light of Killarney, which is given as *Cill-airneadh*, the church of the sloes, but the first part of Chillerney may be *coille*, a wood.

Hattonburn may derive its name from *aiteann*, furze, whence comes Ballynahatten in Down. Duncrievie is the fort of the trees (*dun*+*craobh*). *Beith*, the birch-tree, occurs frequently, as in the parish of Beath, and in Crambeth. Dowhill (old form Doichill) is *dubh*+*coille*, that is, dark wood. Kilduff is the same in inverse order. The term Feus, as the Feus of Drunzie, the Feus of Cash, is from *fidh* or *fiodh*, wood. Fews, the name of two baronies in Armagh, is the same word. Kelty seems to be *coillte*, the plural of *coille*, a wood. Fruix is doubtless from *fraoch*, heather.

Coldrain seems to contain *draeighean*, a sloe-bush, a word which appears in Ireland as Dreen, Drain, and similar forms.

Mach, a plain or field, is represented in the name Mawcarse. *Mach* is very common in Ireland, it occurs also in Roto-mag-us, Cæsar's form of the name of ancient Rouen. Contiguous to Mawcarse is Arlary. In an early charter I find the two names combined in the name Macherderrly, thus clearly showing the origin of *Maw* in Mawcarse. In the county we have also Mawhill and Mawmill. Arlary is *ard*+*larach*, that is, the height of the foundation, just as Finderlie (old form Finlaurie) is *fionn* and *larach*. I find in an old charter index an entry relating to lands in this county, and, amongst the names, Mawcloych, to be connected likely with

Mawcarse, as Arlary is also mentioned. Mawcloych (Mawcloych=*Magh* +*clach*) means "field of stones," and near Mawcarse there still remain the "Standing Stones" (of Orwell, I think they are called).

Riasg, a marsh. This occurs in Ireland as Risk. In an old map of the farm of Findatie, one of the fields is called the Risk Park. This is evidently the same word. Findatie occurs in the Chartulary of St. Andrews as Fyndawchty. The name Findochty is at present in existence near Fochabers. For the origin of the latter part of the name I offer no suggestion.

Arngask is the name of a parish in the neighbourhood of which is Glenfarg. In the Chartulary of Cambuskenneth it appears as Arringrosk. A form Arengorsk also occurs elsewhere, exhibiting the familiar transposition of "r" arising from its semi-vowel nature. This name seems identical with Ardingrask or Ardingrosk, an old name occurring in the Inverness district. *Crask*, I believe, indicates a pass or opening, and the name would thus signify "the height of the pass"—a meaning exactly descriptive of the place. Moreover, on an old map between Arngask and Milnathort I find Dun*creesk* Moor, a name evidently containing the same word. I have endeavoured to trace *crask*, as it appears in Arngask, further. In the county there is a farm now called Carsegour, but an old form is Caskygour. This name may therefore be explained by *crask* and *gobhar*, that is, "the pass of the goats." Again, in Fife we find a name Kaskybaran. I would suggest *crask* and *bearna* ("an opening between highlands"), which is so common in Irish place-names, and occurs in Kinross-shire probably in the name Barns.

Ledlation is a name obscure till we find an early form, *Ledeglaschun*, and the latter part is the same as that of the Irish Ardglushin.

Land seems to be a common corruption of *let*, which may stand for *leathad*, a side, or *leacht*, a monument. Thus the modern Drumgarland seems to be connected with the old name given, as in this county, Darrgarlet, *darr*, representing probably *doire*, oak. With this may be compared the Irish Derlett (in Armagh), *i.e. doire-leachta*. So the modern Morland, is, on an old map, Morlet. So Freeland may be from *fraoch* and *let*.

Across the Ochills is an old drove-road, known as the Butter Road. This seems to be the Norse personal name Buthar, as seen in Buttermere, and Buttergill in the Lake district. It may have been the line by which a Norse pirate, landing on the Tay, may have driven his booty to meet his ships in the Forth.

At the foot of the Lomond, some six or eight miles from the Butter Road, is the farm of Butterwell, no doubt deriving its name from the same origin, and next to it is the farm of Gospetry, no doubt from the personal name Gospatrick. Between Butterwell and the Butter Road we meet with Ballingall, "the town of the strangers." Near Butterwell we have Pittindreich (a form Pitnadrecht occurs), of which indeed I think Butterwell is a feu. Now "Pit," which occurs only in certain parts of

Scotland, cannot be of Gaelic origin, for initial *p* is unknown in Gaelic, having been lost in prehistoric times. "Athair," for instance, is the equivalent of "*pater*," English is half way: it aspirates but does not eliminate "*p*," hence its equivalent is "*father*." Now Professor Rhys takes "Pit" to be the Norse *thveit*, a plot of ground, which occurs in north of England as *thwaite*. The proximity of Pittendreich to the Norse Butterwell emphasises this explanation. Pittendreich is the only instance of "Pit" in Kinross-shire known to me, but on the borders of Kinross, in Fife, near Lochgelly, a cluster of "Pits" occur (Pitkinny, etc.), and it is noteworthy that in the neighbourhood is Inchgall, that is, *the Inch of the strangers*.

Tully (*tulach*, a hill), a good test of Gaelic topography, is frequent in Kinross-shire. We have Tulliebole (an old form, Tullochbole, occurs), Tillyochy, Tillywhally, Tillyrie. It may be well to note here that one of the best tests of a Celtic etymology, is how far the meaning is descriptive of the scene, as Celtic genius for art has displayed itself in its place-names.

I propose in a subsequent paper to give some more results of my work in Kinross-shire. These papers at the best are notes selected at random from my work, and are merely illustrative, and by no means exhaustive. I trust a faithful band of workers will soon set themselves to the splendid task of elaborating Scottish topography. Day by day, as Gaelic slowly dies, the task will become more difficult, its accomplishment the more imperfect.[1]

THE CONGO FREE STATE.[2]

THE volumes before us form a worthy record of hard work and successful enterprise, and their author, Mr. H. M. Stanley, may justly feel proud of what he has accomplished.[3]

The mouth of the Congo was discovered 400 years ago by a Portuguese naval officer, but the mystery of its winding course and immense extent remained to be solved by the intrepid explorer of 1877. One would have thought that the importance of such a discovery would have been eagerly acknowledged by all; but it was not so, for when Stanley told of the wondrous fertility of the land and of the possibilities which the river opened up for trade, he was called a dreamer, a Quixotic journalist, or a penny-a-liner. But he has lived to prove his case, and the readers of the story he tells, in the two volumes just published, will hardly fail to be convinced that the mighty Congo has a great future before it.

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[1] I am glad to see that Professor Mackinnon seeks to have the importance of the subject recognised. In the *Edinburgh University Calendar*, he offers a prize for a paper on the topography of any district.

[2] *The Congo and the Founding of its Free State.* A Story of Work and Exploration. By H. M. STANLEY. Two vols., 122 Illustrations, two large Maps, several smaller ones. London: Sampson Low, Marston, and Co., 1885. Pp. xxvii. and 528; Vol. ii., x. and 483; and Index. Price 42s.

[3] Compare biographical notice in the *Magazine* for January-March.

When Stanley arrived at Marseilles, in January 1878, he was waited on by two commissioners from his Majesty the King of the Belgians, who told him that the king wished to do something substantial for Africa, and hoped that he would help him. Though rejoiced that Africa had such a friend, it is no wonder that Stanley, who had only just returned from the great hardships and sufferings of his long explorations, replied, "As for myself, I am so sick and weary, that I cannot think with patience of any suggestion that I should personally conduct it [referring to the expedition to the Congo proposed by the king]. Six months hence, perhaps, I should view things differently, but at present I cannot think of anything more than a long rest and sleep." By August of the same year Stanley was again restored to health and strength; in November he went to Brussels, where the "Comité d'études du Haut Congo" was formed, and, by the end of the next January, he was on the way to commence the work which had been so nobly conceived and was afterwards so munificently supported by King Leopold II. To him, indeed, is owed a great debt of gratitude by Africa, humanity, and commerce, for all he did in starting this great expedition. May the future success of the Congo Free State prove an ample reward to the generous, philanthropic monarch!

These volumes treat of many subjects: geography, politics, commerce, ethnography, meteorology, etc., all find a place. We will quote various extracts, so that our readers may gain some idea of the interest of the book, and wish to read the whole of it for themselves.

During his journey down the Congo, Stanley was only able to make a rough provisional survey of the river, and to put down general outlines to be filled up by subsequent work. This work he has accomplished since his return to Europe, and, notwithstanding that his time has been much occupied with diplomatic and other hard work, he is able now to present to the world a large store of valuable and interesting information about the vast portion of the "Dark Continent" which he has opened up.

The first five chapters are devoted to an account of the ancient history of the Congo, political and geographical, and to the starting of the expedition. Stanley says:—

"In the preceding pages I have told the story of two years. On the 12th of August 1877, I arrived at Banana Point, after crossing Africa and descending its greatest river. On the 14th of August 1879, I arrived before the mouth of this river to ascend it, with the novel mission of sowing along its banks civilised settlements, to peacefully conquer and subdue it, to remould it in harmony with modern ideas into national States, within whose limits the European merchant shall go hand in hand with the dark African trader, and justice, and law, and order shall prevail, and murder and lawlessness and the cruel barter of slaves shall for ever cease."

It was not only a novel mission, but one which needed an immense amount of energy, tact, and wisdom, and indomitable perseverance to bring it to a successful issue.

It may be interesting to glance at the size of the Congo Free State.

It is 1,065,200 square miles in extent. The population is estimated at about 42 millions, the navigable rivers at 7,251 miles, and the area of the lakes at 31,694 square miles.

In order to throw open this country to trade, civilisation, and Christianity, a railway from Vivi to Stanley Pool is required—a distance of 235 miles—at a cost of £940,000. This railway, Mr. Stanley estimates, would give a gross return of £300,000 almost at once, for even to-day £52,000 are paid per annum for porterage between Stanley Pool and the coast. This alone would be equal to 5½ per cent. on the capital required for the railway. Judging from what has been accomplished on the Lower Congo, Mr. Stanley estimates that the Upper Congo would soon export, were a railway provided, produce weighing 156,000 tons, valuing £5,667,000 per annum.

He closes his account of the capabilities of the Congo as follows :—

"It is specially with a view to rouse the spirit of trade that I dilate upon the advantages possessed by the Congo basin, and not as a field for the pauper immigrant. There are over 40,000,000 native paupers within the area described, who are poor and degraded already, merely because they are encompassed round about by hostile forces of nature and man, denying them contact and intercourse with the elements which might have ameliorated the unhappiness of their condition. European pauperism planted amongst them would soon degenerate to the low level of aboriginal degradation. It is the cautious trader who advances not without the means of retreat ; the enterprising mercantile factor who with one hand receives the raw produce from the native, in exchange for the finished product of the manufacturer's loom—the European middleman who has his home in Europe but has his heart in Africa, is the man who is wanted. These are they who can direct and teach the black pauper what to gather of the multitude of things around him and in his neighbourhood. They are the missionaries of commerce, adapted for nowhere so well as for the Congo basin, where are so many idle hands, and such abundant opportunities all within a natural 'ring-fence.' Those entirely weak-minded, irresolute, and senile people who profess scepticism, and project it before them always as a shield to hide their own cowardice from general observation, it is not my purpose to attempt to interest in Africa. Of the 325,000,000 of people in civilised Europe, there must be some surely to whom the gospel of enterprise, preached in this book through the medium of eight languages, will present a few items of fact worthy of retention in the memory, and capable of inspiring a certain amount of action. I am encouraged in this belief by the rapid absorption of several ideas which I have industriously promulgated during the last few years respecting the Dark Continent. Pious missionaries have set forth devotedly to instil into the dull mindless tribes the sacred germs of religion ; but their material difficulties are so great that the progress they have made bears no proportion to the courage and zeal they have exhibited. I now turn to the worldly-wise traders, for whose benefit and convenience a railway must be constructed."

We must refer our readers to Mr. Stanley's own account of the immense difficulties which he underwent before the twenty-four stations which now flourish upon the Congo were founded. Roads had to be made in some places where the rate of progress was only 42 yards per day ; in others the progress was 850 yards a day ; and along these roads they

had to haul their steamers and boats, and transport all their provisions and stores.

A *résumé* of one year's work will give an idea of this extraordinary labour:—

"Computing by statute miles the various marchings, and as frequent countermarchings, accomplished during the year, we find they amount to the grand total of 2352 English miles, according to tape-line measurement of foot by foot, making an average of 6½ miles performed throughout each day in the year, to gain an advance into the interior of only 52 English miles. Take away the necessary days of rest enjoyed during the year, the period of ninety-one days employed in making a passable road for our wagons, which, unless tolerably level, would have been impassable for our top-heavy wagon-loads, and the average rate of travel will prove that we must have had an unusual and sacred regard for duty, besides large hope that some day we should be rewarded with positive success after all this strenuous endeavour.

"That it was not a holiday affair, with its diet of beans and goat-meat and sodden bananas, in the muggy atmosphere of the Congo cañon, with the fierce heat from the rocks, and the chill bleak winds blowing up the gorge, and down from sered grassy plateaus, let the deaths of six Europeans and twenty-two natives, and the retirement of thirteen invalid whites, only one of whom saw the interior, speak for us. It has been a year dark with trial and unusual toil. Our little band of labourers are proud of the grand work their muscles have accomplished, but are more hopeful of the future, inasmuch as their labours, by means of the steamers, will be greatly lightened."

Mr. Stanley's work would have been much lightened had he been more fortunate in the Europeans who were sent out to assist him. He seems to have had immense trouble with them, and this added greatly to the anxiety and difficulty of his undertaking. We refrain from quoting his account of their numerous shortcomings, and can only hope that in the future he may be more ably supported.

There is considerable diversity of opinion as to the climate of the Congo, and its effects upon Europeans. As this is a most important subject, we are glad that Mr. Stanley devotes a good deal of room to it. Almost at the outset of the book we find valuable hints as to dress, food, and the necessary care to be taken when first landing in Congo-land; also a warning against the "*petit verre de Cognac* or the glass of small beer."

"'What can they matter!' ask the inexperienced pleadingly.

"To me, personally, nothing! To you, a sudden death, perhaps—a *coup de soleil!* A frantic and insensate rush to the hot sun out of the cool shade, an imprudent exposure, may be followed by a bilious fever of who-knows-what severity, or a rheumatic fever that will lay you prostrate for weeks, perhaps utterly unfitting you for your work and future usefulness. You were inspired by that *petit verre* of Cognac—which had you not taken, you might have been more deliberate in your movements, and more prudent than to needlessly exert yourself in the presence of an enemy so formidable as is the tropic sun to a white man's head, when sensitised by the fumes of Cognac.

"Should you recover, you will blame Africa. 'Africa is cruel! Africa is murderous! Africa means death to the European!' And your stupid unreflecting friends, with their cowardly jargon in Europe, will echo the cry—simply because a weakling like you could not resist your *petit verre* at midday. Must all this continent be subjected to the scourge of your vituperative powers?

"'A man cannot exist on tea and coffee, or be continually drinking soup and water!' whines one whose propensities are alarmed.

"I do not demand that you should confine yourself to tea, or coffee, or soup—or water, or lemonade, or seltzer, Apollinaris, or whatever other agreeable liquid you may wish to quench your thirst. I only suggest that if you wish to enjoy Africa, and do your pledged duty, avoid stimulants, under whatever name they may be, during the day; in the evening moderate indulgence with your dinner in clarets, Madeira, or white wines and champagnes is not harmful but beneficial. At the same time this advice is not especially intended for you; but for young men desirous of distinguishing themselves for their ability to live and work in Africa. The brave man is he who dare live, and will not yield to death without a contest."

Chapters XXXV. and XXXVI. in the second volume are very valuable, and should be read with care by all who think of going to Africa.

Mr. Stanley admits that some points on the Congo are very unhealthy, but he strenuously denies that the climate is on the whole a bad one, and says that with ordinary precautions Europeans will thrive there. He recommends, however, a change to Europe for a few months every three years. As the ground is cleared, and as drainage and sanitary matters improve, there will be an improvement in the health of European residents. In the Upper Congo, since 1882, out of twenty-nine Europeans who have been above Leopoldville, two have met their death by drowning, and only one through sickness, while twenty have either served their three years, or are nearly completing this term of service; one only has resigned on account of severe illness.

Vivi appears to be very unhealthy, which fact Mr. Stanley attributes to its situation on a projection in the neck of a mountain funnel, where it is exposed to the 14-knot breeze from Banana, but we think that it suffers quite as much because situated on a rocky plateau, for malarial fevers often occur in such places, as in Guernsey, Gibraltar, parts of Tennessee and Kentucky, on the western coast of Italy, in the Canary Islands, and in Costa Rica.

At Vivi the rainfall is 41½ inches per annum; the mean highest temperature is 90·7; the mean lowest, 67·3; the variation, 25. The barometer varies 5·14, and 90 per cent. of the winds are from the west. The temperature is therefore not very high, but then the moist atmosphere is far more enervating than a dry heat.

"Cruel, murderous Africa!" exclaims the northern European. "Deadly and hateful Europe!" exclaims the dark aboriginal from the African tropics, when the first cold draught from the open window or door visits him with a protracted bronchial sickness.

On the whole, Mr. Stanley himself seems to have borne the climate

very well, notwithstanding the immense mental and bodily work he performed; but he had one or two severe illnesses, and on one occasion he tells us he prepared for death.

The following quotations, referring to the way in which the treaties between Mr. Stanley and the various kings or chiefs were made, will serve several purposes. They will show how much patience and local knowledge is needed in dealing with natives; they will introduce the reader to the methods of Congo diplomacy, and, while giving an insight into the character of the chiefs, they will at the same time show what an inborn capacity for trade is possessed by the African:—

"In the management of a bargain I should back the Congoese native against Jew or Christian, Parsee or Banyan, in all the round world. Unthinking men may perhaps say cleverness at barter, and shrewdness in trade, consort not with their unsophisticated condition and degraded customs. Unsophisticated is the very last term I should ever apply to an African child or man in connection with the knowledge of how to trade. Apply the term if you please to yourself or to a Red Indian, but it is utterly inapplicable to an African, and this is my seventeenth year of acquaintance with him. I have seen a child of eight do more tricks of trade in an hour than the cleverest European trader on the Congo could do in a month. There is a little boy at Bolobo, aged six, named Lingenji, who would make more profit out of a pound's worth of cloth than an English boy of fifteen would make out of £10 worth. Therefore when I write of a Congo native, whether he is of the Bakongo, Byyanzi, or Bateké tribes, remember to associate him with an almost inconceivable amount of natural shrewdness, and power of indomitable and untiring chaffer."

The first treaty which Mr. Stanley appears to have made, was with the five chiefs of Vivi. After giving a short description of each, and noting that their men-at-arms were not bad-looking, although many were dressed in second-hand European clothes, for which Mr. Stanley seems to think there is a very ready market in Congo-land, he proceeds:—

"And now—some on native mats, laid over a large space under the shade of a wide-spreading tree—the chiefs are seated in the foreground; decorously behind, at a respectful distance are the men-at-arms. Massala, the lingster or spokesman, is requested by scowling Vivi Mavungu to address the words of welcome to me; and a clever interpreter, learned in the English as well as in the dialect of Vivi, conveys them to me in very complimentary form, as thus:—

"'We, the big chiefs of Vivi, are glad to see the mundelé (trader, formerly, but now applied to every white). If the mundelé has any wish to settle in our country, as Massala informs us, we shall welcome him, and will be great friends with him. Let the mundelé speak his mind freely.'

"I replied: 'State that I am glad to hear them speak so kindly to the white man. To-day I do not want much. I want ground to build my houses, for I am about to build many, either here or elsewhere. I want ground enough, if I can get it, to make gardens and fields. Vivi is not good for that unless I go far up; but what I do get I want for myself and people, and the right to say what white man shall come near me. At Boma the chiefs have cut the ground up small; there is no room for me. I want plenty of room, and that is why I have come up here. I want to go inland, and must have the right to make roads wherever it is necessary, and

all men that pass by those roads must be allowed to pass without interruption. No chief must lay his hand on them and say, "This country is mine; pay me something; give me gin, or cloth, or so many guns." You have heard of me, I know, for Dé-dé-dé, who is here, must have told you. What I saw on the road to Boma must not be repeated here. You have no roads in your country. It is a wilderness of grass, rocks, bush; and there at Banza Vivi is the end of all life. If you and I can agree, I shall change all that. I am going to stop here to-night; think of what I have told you, and I will listen. To-morrow you can return at the third hour of the day, and speak.'

"After a little consultation together they returned homeward, taking with them Dé-dé-dé and Nsakala, my friends of 1877, and Massala, the lingster. Each of the chiefs begged for, and received, a bottle of gin."

The chiefs returned next day, punctually to the appointed time, and their armed retinues appeared, tricked out in Congo fashion's garb, second-hand military and lackey coats, and gay cottons. All the men were sober and cleanly, and after four hours expended in bargaining, the treaty was concluded at the cost of £32 down in cloth, and a rental of £2 per month.

At Banza Nsanda, they had to stop to make a treaty for the right of road.

"We must halt here, because Dé-dé-dé is a constant friend, though given overmuch to the drinking of gin, and fond, unsatisfied, expectancy of gifts. The guides of Vivi must be changed here also for the more experienced travellers of Nsanda. The fact of my arrival at Nsanda has become generally known; and various chiefs have sent their boys to me to say that I must expect friends and visitors. It is politic to submit to any trifling delay of this kind, for I shall presently have to obtain workmen from them to make the great wagon-road into the interior.

"Knowing beforehand that the gifts expected by so many this day will amount to a large sum at night, my trusted servants have been busily sorting and arranging the various piles ever since daybreak. First comes Sadika Banzi, lord of an untenanted district extending from the Mpagassa gorge south to the Congo—fully six miles; the Mpagassa stream bounds his territory southward, while an uninhabited wilderness lies between him and the Bundi five miles northward. He has a retinue of cotton-clothed youths armed with lengthy flintlocks, and his gift to me consists of a goat, six chickens, a bunch of bananas, and a large gourdful of palm wine, which last we are expected to finish during the social call."

One after another, thirty chiefs arrived. They represented a population of 12,000 souls, who are thinly scattered over an area of about 1000 square miles. They all brought goats, fowls, and bananas. Mr. Stanley continues:—

"Chief Dé-dé-dé is an important man this day. He has done his work well, his messengers have been despatched all over the country, summoning to an important conference (the sovereign chiefs of Western Africa are as partial to conferences as the peace-loving powers of Europe) the powers of Nsanda. The ceremonious greetings being over, the gifts brought by the chiefs duly accepted, I opened the palaver by announcing the purpose of my presence at Vivi, and explaining the reasons for this convention; reasons which are very well known to them for some time, yet etiquette in this assembly, as in others, requires that all shall be publicly explained. . . .

"The day was closed by the distribution of gifts to each of the thirty chiefs. And though the gifts, consisting of military coats, gay shawls of woollen fabric, cotton-velvet cloths, crimson savelist, cotton handkerchiefs, and pieces of unbleached domestic, with a few cutlasses, swords, knives, beads for the female sex, and a few bottles of gin to each, might be considered trivial in the eyes of Europeans, in casting up the gross account of the expenditure, I discovered that £150 in English gold had been paid for them. Considering that for this sum we had only obtained right of way through a territory generally unoccupied, and of no present use to any person, with a few goats and bananas thrown in, it was a prodigal expenditure of money. We had no reason to regret it, however, by the very good effect it created, as it smoothed the way for future and more important negotiations, including requests for labourers and carriers. It created a hope, too, in every man that he possessed something that was saleable, in a region hitherto inaccessible, and where products were only sold by dint of a long and laborious journey to Boma ; and, finally, that the force of those masses of muscle on their arms had become marketable and valuable."

Mr. Stanley was compelled to make blood brotherhood on many occasions. The following extract tells how this ceremony is performed, and also illustrates African oratory :—

"A forked palm branch was brought. Kokoro, the heir, came forward, seized it, and kneeled before me, as drawing out his short falchion, he cried, 'Hold the other branch, Bula Matari !' I obeyed him, and lifting his hand, he cleaved the branch in two. 'Thus,' he said, 'I declare my wish to be your brother.'

"Then a fetish-man came forward with his lancets, long pod, pinch of salt, and fresh green banana leaf. He held the staff of Kokoro's sword-bladed spear while one of my rifles was brought from the steamer. The shaft of the spear and the stock of the rifle were then scraped on the leaf, a pinch of salt was dropped on the wood, and finally a little dust from the long pod was scraped on the curious mixture. Then our arms were crossed—the white arm over the brown arm—and an incision was made in each ; and over the blood was dropped a few grains of the dusty compound, and the white arm was rubbed over the brown arm.

"Now Mata Bwyki lifted his mighty form, and with his long giant's staff drove back the compressed crowd, clearing a wide circle, and then roaring out in his most magnificent style, leonine in its lung-force, kingly in its effect—

"'People of Iboko ! You by the river side, and you of inland. Men of the Bangala, listen to the words of Mata Bwyki. You see Tandelay before you. His other name is Bula Matari. He is the man with the many canoes, and has brought back strange smoke-boats. He has come to see Mata Bwyki. He has asked Mata Bwyki to be his friend. Mata Bwyki has taken him by the hand and has become his blood-brother. Tandelay belongs to Iboko now. He has become this day one of the Bangala. Oh ! Iboko, listen to the voice of Mata Bwyki.' (I thought they must have been incurably deaf not to have heard that voice.)

"'Bula Matari and Mata Bwyki are one to-day. We have joined hands. Hurt not Bula Matari's people ; steal not from them, offend them not. Bring your produce and barter with him. Bring food and sell to him at a fair price, gently, kindly, and in peace, for he is my brother. Hear you, ye people of Iboko !—you by the river side, and you of the interior !'

"'We hear, Mata Bwyki !' shouted the multitude."

The following description of Edunga dancing is interesting, and we should imagine somewhat unique :—

"A market was extemporised, which was well attended ; and after a few hours of lively barter none of the youths and maidens, all fleshy and lithesome creatures, were loth to show us specimens of Ndunga dancing. Their performances were very clever, considered from a native standpoint. It was barbarous, of course, when compared with European art ; but the leaping and prancing and Pyrrhic movements were thoroughly—even with earnestness—done. The finale, however, was curious. While they danced they joined hands and formed a circle, as though they were about to sing 'Auld lang syne.' Two detached themselves from the crowd without, and entered the circle ; the youngest climbed up on the shoulders of his companion, unsheathed a sharp knife, and then led out a loud chorus. When the chorus sang out loudest, each time he drew the knife's edge down the length of his tongue until the blood began to drip, and his jaws were covered with blood. Higher and higher sang the chorus, quicker and quicker revolved the circle, and more frantic and daring became the bloody-tongued youngster, until, fearing that they might lose all control over themselves, the signal to stop was given, and the dancers were made happy with gifts. When the self-mutilated youngster had washed himself he seemed none the worse for his extraordinary excitement, and softly laughed as I patted him on the back and dismissed him with his reward."

In order that our readers may get an idea of the scenery on the Congo, the following quotations are given. Of the scenery near Boma, Mr. Stanley writes :—

"Notwithstanding, the general prospect, whether over river or land, is not prepossessing ; the eye is dissatisfied, it hungers after more evidences of man and commerce ; probably the human gregarious instincts are shocked, or chilled by the unaccountable feeling of loneliness. Look resolutely away, or over the factories at your feet, from the crest of yonder hill, and you will understand why. There is a grand sweep of massive hills lifting and falling to the north ; a long undulating line of hilly land is visible across the river, stretching away into the grey distance; there is a mighty breadth of living water slowly moving towards the sea, but I can detect no boat, large or small, just at this present moment, on any part of its hundred square miles of surface. Over all the vast area of land, visible upland and plain, I see no aspiring tower or dome, or chimney, nor even the likeness of a human structure. Unfortunately not even a column of smoke threads through the silent air to suggest the thought that I am not alone. All is nature, large, ample, untouched and apparently unvisited by man. From all I can see I may have been the first man, black or white, who has ever stood on the ungrateful soil under my feet. Truly this would be the impression of the view only a few miles removed from Boma ; but here I can turn my eyes at will to recall my unreal fancies, to gaze down upon the consoling and warm view of the Boma establishments ranged along the northern bank, with their tall flagstaffs and white-washed residences, and the long sombre thatched roofs of the stores and sheds, with sufficient leafy trees scattered about, and the tapering masts of steamers and sailing vessels, topped by the gay national flags, all combining to make a pretty picture worth a sketch.

"The feeling of loneliness and cheerlessness, touched upon above, is intensified through the fact that the heavy lines of hills, and broad expansion of plain, lack the deep dark masses of forest in ever-living exuberance which we are ever apt to associate with the tropics. The grotesque baobabs, thinly scattered with their feeble crowns of leafage on bits of terraces and tabular bits of hills, in no way compensate for the general and unlovely nakedness of the view. At this season—August—all nature appears parched, sere, withered, voiceless, except along the various channels of the Congo. This almost entire absence of vegetation is due to

fires, which during every dry season consume the robust crops of grass. It is also attributable to the minute hilly sections into which the land has been cut by heavy rains, and the steep and rapid drainage of every slope and rounded summit which sweeps away the *débris* of dead vegetation before it has had time to affect the soil. . . .

"When speaking of African sunshine, it must be remembered that there are different qualities of sunshine. For instance, there is the hard, white, naked, undisguised sunshine of North-Eastern America ; there is the warm, drowsy, hazy sunshine of the English summer ; there is the bright, cheery, purified sunshine of the Mediterranean. African sunshine, however, always appears to me, with all its great heat, to be a kind of superior moonlight, judging from its effects on scenery. Once or twice in this book I write of 'solemn-looking' hills. I can only attribute this apparent solemnity to the peculiar sunshine. It deepens the shadows, and darkens the dark-green foliage of the forest, while it imparts a wan appearance or a cold reflection of light to naked slopes and woodless hill-tops. Its effect is a chill austerity—an indescribable solemnity, a repelling unsociability. Your sympathies are not warmed by it ; silence has set its seal upon it ; before it you become speechless. Gaze your utmost on the scene, admire it as you may, worship it if you will, but your love is not needed. Speak not of grace or of loveliness in connection with it. Serene it may be, but it is a passionless serenity. It is to be contemplated, but not to be spoken to, for your regard is fixed upon a voiceless, sphynx-like immobility, belonging more to an unsubstantial dreamland than to a real earth.

"If you think of this attempt at analysing the cause of this unspeakable loneliness, when next you gaze upon African hill-scenes you will perhaps admit the truth of these remarks. You will perceive that it is purely a want of sympathy between you and them, owing entirely to the strange sunshine. If you doubt it, view the same scenes in the months of October and November, and bear witness to their vivid colouring wrought by the spring-tide of Nature. . . .

"Soon after leaving Mpamba Ngulu, I came to a valley running westward, parallel with the Congo, which turned out, after a little while, by proofs visible, to be another disused course of the great river, and may, indeed, in very high flood seasons, still serve as an outlet for surplus waters ; for a winding creek of still water, here and there spreading out into pools, extends along the bottom of the valley for about ten miles, until it is lost in two sandy outlets at the elbow of Inga district. From the spine of any of the island-like hills which rise in this many-branched valley, we could see the fretted Congo in a white rage, for mile after mile, one furious rapid chasing another in succession as far as the Inga elbow. Herds of buffaloes grazed in the conscious security which speaks of rare disturbance ; the antelope's graceful form was often seen pacing carelessly in the open, and finally a herd of half-a-dozen elephants on the verge of a pool luxuriously spraying their own sun-baked backs. Yet, with all this animal life, and the wild river dashing headlong down its rock-obstructed bed, there was an almost palpable stillness about the strange scene. It is a capital place for some recluse. In any of the obscure nooks and folds under the shade of a grove—with which man in general can have nought to do—removed as this corner of wild land is from the haunts of those who seek a living by barter—the recluse might build his hut—and be the sole human inhabitant of a sixty square mile tract, over which he might roam at pleasure for months without being disturbed.

"Of the adventures with buffaloes, it is not worth while to write. We were continually startling a herd, and startling ourselves also by the sudden unlooked-for encounter ; both animals and men foolishly gazing at one another, until the quicker-witted animals soon discovered it was a dangerous presence they stood in,

and vanished, with their tails erect in the air, while the men passed on in quest of more useful knowledge than that relating to their habitat. Nor will I dilate much upon the shock I suffered, when, after breasting a long steep slope, almost breathless, I found myself in the presence of a red-hided buffalo some forty feet from me, and unsuccessfully fired at him. How such a demon of fury as he appeared did not retaliate upon me, and toss me twenty yards high for my temerity, is incomprehensible, and must be relegated to the limbo of things inexplicable. Nor shall I say much of the agonising descent through a hitherto unexplored forest which clothed a deep fold in the Inga plateau, from summit to base, and while descending an almost interminable slope, we were startled by the crashing of an elephant herd somewhere away : at one time as though a charge was meditated upon us, while at another the forest echoes exaggerated their hasty movements into a grand march of trampling squadrons, overwhelmingly near. Long before we had completely traversed this unknown woodland, the sun had set ; the exasperating forest had yielded us liberty only to plunge us into a more annoying cane-brake, whose firm array of tall stalks daunted us all. Another half-hour was lost during the fast deepening gloaming, in searching for the shadow of a herd-track which, when found, only seemed to lead us deeper and deeper into the unexplored solitudes. We sought for water beside which we might rest for the night, and in the hope that another hour might reveal some pool at the bottom of the valley, or some tiny thread of a stream, the drain of the towering heights half enfolding us, we bravely held on. The herd-track disappeared ; it had led nowhere, or we had lost it in the black darkness of the gulfy hollow. Man after man tried to force his way through the roadless grass, but each after a spell retired exhausted. Finally a clever lad thought he could find the way, and led us half an hour, guided solely by his own wit. Another clever lad started impatiently to dispute the knowledge the first had boasted of possessing, and this was little Mabruki of the *Dark Continent* heroes.

"'Do you come here and try to do better?' says the first clever lad to Mabruki.

"Mabruki, being the only brave who had not as yet exhausted himself in crushing the grass down, cries 'Willingly—I will find a way in a short time,' and while he hurls himself against the stubborn grass, he keeps up a running fire of bitter comments upon the other's unmanliness, and woful ignorance of continental travelling, which, being briskly retorted to by the other, gradually threatens to end in a set-to in the wilderness. Suddenly, Mabruki throws himself, under the impulse of anger, more vigorously than ever, in a fresh assault upon the grass, when, to our horror, he disappears with a gurgling cry, in a lengthy gravelike fracture of the earth !

"'Where—O where, Mabruki, are you gone to ? Are you hurt, or dead ?'

"'Here,' cries the lad's voice from the depths. 'I have found water ; but I have broken my gourd !'

"Poor Mabruki had tumbled into a narrow watercourse, twelve feet deep ; but its exceeding narrowness had caused him to drop on his feet—in a pool of water. The laugh that followed the announcement of the accident to his gourd chased away all feelings of rising combativeness in the bosom of his antagonist ; it contributed to make our beds on the thick grass seem easier, and to cause us to forget the previous aching pains of thirst and fatigue. . . .

"For purely tropical scenes, I commend the verdurously rich isles in mid-Congo, between Iboko on the right bank, and Mutembo on the left bank, with the intricate and recurrent river channels meandering between. There the rich verdure reflects the brightness of the intense sunshine in glistening velvet sheen from frond

and leaf. The underwood presents varied colours, with their tufted tops or the climbing serpentine form of the lianes, and their viny leaves. Each and all have their own separate and particular beauties of colouring that renders description impossible. At all times I believe the same refreshing gladness and vigour of tropical nature may be observed about this latitude. Some of the smallest islets seemed to be all aflame with crimson colouring, while the purple of the ipomæa, and the gold and white of the jasmine and mimosa flowered, bloomed and diffused a sweet fragrance. Untainted by the marring hand of man, or by his rude and sacrilegious presence, these isles, blooming thus in their beautiful native innocence and grace, approached in aspect as near Eden's loveliness as anything I shall ever see on this side of Paradise. They are blessed with a celestial bounty of florid and leafy beauty, a fulness of vegetable life that cannot possibly be matched elsewhere save where soil with warm and abundant moisture and gracious sunshine are equally to be found in the same perfection. Not mere things of beauty alone were these isles. The palms were perpetual fountains of a sweet juice, which when effervescing affords delight and pleasure to man. The golden nuts of other trees furnishes rich yellow fat, good enough for the kitchen of an epicure, when fresh. On the coast these are esteemed as an article of commerce. The luxuriant and endless lengths of calamus are useful for flooring and verandah mats, for sun-screens on river voyages, for temporary shelters on some open river terrace frequented by fishermen, for fish-nets and traps, for field baskets, market hampers, and a host of other useful articles, but more especially for the construction of neat and strong houses, and fancy lattice-work. Such are the strong cord-like creepers which hang in festoons and wind circuitously upward along the trunk of that sturdy tree. The pale white blossom which we see is the caoutchouc plant, of great value to commerce, and which some of these days will be industriously hunted by the natives of Iboko and Bolombo. For the enterprising trader, there is a ficus, with fleshy green leaves ; its bark is good for native cloth, and its soft, spongy fibre will be of some use in the future for the manufacture of paper. Look at the various palms crowding upon one another. Their fibres, prepared by the dexterous natives of Bangala, will make the stoutest hawsers, the strength of which neither hemp, Manilla fibre, nor jute can match ; it is as superior to ordinary cord threads as silk is to cotton. See that soft pale-green moss draping those tree-tops like a veil. That is the Orchilla weed from which a valuable dye is extracted. I need not speak of the woods, for the tall dark forests that meet the eye on bank and isle seem to have no end. We burn specimens of their timber every day ; and engineers may be frequently seen admiring its colour and veining, and inhaling the fragrance of the gum. We are banqueting on such sights and odours that few would believe could exist. We are like children ignorantly playing with diamonds. Such is the wealth of colours revealed every new moment to us, already jaded with the gorgeousness of the tropic world. Rarities and treasures of vegetable life are passed by continuously ; we can do nothing with them, our mission at this time being to hunt up the human denizens, to experiment on human nature.

"Whatever interest we may profess, after all, in this many-hued splendour of the tropic bush, in the variegated beauty and overflowing vegetable life on these river isles, or the bountiful wealth of the Congo forests, it is but secondary to that which one must feel for the human communities, the muscles of whose members have a more immediate and practical value to us. For without these the flowers, the plants, the gums, the moss, and the dye weeds of the tropical world must ever remain worthless to them and to ourselves. In every cordial-faced aborigine whom I meet I see a promise of assistance to me in the redemption of himself from the state of unproductiveness in which he at present lives. I look upon him with much

of the same regard that an agriculturist views his strong-limbed child ; he is a future recruit to the ranks of soldier-labourers. The Congo basin, could I have but enough of his class, would become a vast productive garden. That is one reason why I always search sharply for cordiality of demeanour, a certain frankness of expression, from which I can extract hope for the future. I mentally review the faces thus seen, and say to myself, 'You are shy and strange now, my friend, but worse-looking fellows than you have been made useful to themselves and the world. A few more trips, and you would go anywhere with me.' I fancy sometimes the fellows seem to read my thoughts, and smile encouragingly upon me, as though they would say in vulgar idiom, 'You are right, my boy, but bye and bye.'"

We would call attention to Chapter XXX., for an account of some of the horrors of the slave-trade. We have only space to quote one extract :—

"The slave-traders admit they have only 2300 captives in this fold, yet they have raided through the length and breadth of a country larger than Ireland, bearing fire and spreading carnage with lead and iron. Both banks of the river show that 118 villages, and forty-three districts have been devastated, out of which is only educed this scant profit of 2300 females and children, and about 2000 tusks of ivory ! The spears, sword, bows, and the quivers of arrows, show that many adults have fallen. Given that these 118 villages were peopled only by 1000 each, we have only a profit of 2 per cent. ; and by the time all these captives have been subjected to the accidents of the river voyage to Kirundu and Nyangwé, of camp life and its harsh miseries, to the havoc of small-pox, and the pests which miseries breed, there will only remain a scant 1 per cent. upon the bloody venture.

"They tell me, however, that the convoys already arrived at Nyangwé with slaves captured in the interior have been as great as their present band. Five expeditions have come and gone with their booty of ivory and slaves, and these five expeditions have now completely weeded the large territory described above. If each expedition has been as successful as this, the slave-traders have been enabled to obtain 5000 women and children safe to Nyangwé, Kirundu, and Vibondo, above the Stanley Falls. Thus 5000 out of an assumed million will be at the rate of a half per cent., or five slaves out of 1000 people.

"This is poor profit, out of such large waste of life, for originally we assume the slaves to have mustered about 10,000 in number. To obtain the 2300 slaves out of the 118 villages, they must have shot a round number of 2500 people, while 1300 more died by the wayside, through scant provisions and the intensity of their hopeless wretchedness. How many are wounded and die in the forest, or droop to death through an overwhelming sense of their calamities, we do not know, but if the above figures are trustworthy, then the outcome from the territory with its million of souls is 5000 slaves, obtained at the cruel expense of 33,000 lives ! And such slaves ! They are females, or young children who cannot run away, or who with youthful indifference will soon forget the terrors of their capture ! Yet each of the very smallest infants has cost the life of a father and perhaps his three stout brothers and three grown-up daughters. An entire family of six souls have been done to death to obtain that small, feeble, useless child !

"These are my thoughts as I look upon the horrible scene. Every second during which I regard them the clink of fetters and chains strikes upon my ears. My eyes catch sight of that continual lifting of the hand to ease the neck in the collar, or as it displays a manacle exposed through a muscle being irritated by its weight, or want of fitness. My nerves are offended with the rancid effluvium of the unwashed herds within this human kennel. The smell of other abominations

annoy me in that vitiated atmosphere. For how could poor people, bound and riveted together by twenties, do otherwise than wallow in filth! Only the old women are taken out to forage; they dig out the cassava tuber, and search for the banana, while the guard, with musket ready, keenly watches for the coming of the vengeful native. Not much food can be procured in this manner, and what is obtained is flung down in a heap before each gang, to at once cause an unseemly scramble. Many of these poor things have been already months fettered in this manner, and their bones stand out in bold relief in the attenuated skin, which hangs down in thin wrinkles and puckers. And yet, who can withstand the feeling of pity so powerfully pleaded for by those large eyes and sunken cheeks?

"What was the cause of all this vast sacrifice of human life, of all this unspeakable misery? Nothing, but the indulgence of an old Arab's 'wolfish, bloody, starved, and ravenous instincts.' He wished to obtain slaves to barter profitably away to other Arabs, and having weapons—guns and gunpowder—enough, he placed them in the hands of three hundred slaves, and despatched them to commit murder wholesale, just as an English nobleman would put guns in the hands of his guests, and permit them to slaughter the game upon his estate. If we calculate three quarts of blood to each person who fell during the campaign of murder, we find that this one Arab caused to be shed 2850 gallons of human blood, sufficient to fill a tank measurement of 460 cubic feet, quite large enough to have drowned him and all his kin!"

The following description of Bwabwa Njali gives a very good idea of an African dandy:—

"He is an actor—that is, he is a man who affects to be what he is not. Polite to his guests—let them come as often as they may—from the moment he makes anybody's acquaintance, a systematic approach to their affections is commenced with the view to their spoliation. He presents himself to you as one who is as vain as a woman, and as frivolous as a child; but contrives before you have finally parted from him to impress you with the fact that he is an unprincipled rogue. It is 'My brother, what is this? My brother, what is that? Ah, truly, my brother! Put it away, good brother. Really now, has my brother come to see the country? Dear, good brother! Verily, a brother of brothers! My own true brother!' And thus he purrs continually around one, his eyes wandering about to every part of your person and belongings.

"And such state as he surrounds himself with on a stranger's arrival! A lion-skin—a real lion-skin—is spread out, a fat crimson bolster is in place of a chair of state, and a circle of respectful principals are seated around. While you are seated expectant of his appearance, Bwabwa Njali is touching himself up before a score of looking-glasses hanging around the walls of his house, straightening a hair here, giving another dab of ochre on his cheeks and forehead, a streak of yellow under an eye, a line of white under the other, the ridge of his nose coloured still darker with powdered charcoal, a loving tap on his chignon, a smooth of a crease in his red blanket, and lo! Bwabwa Njali emerges into view.

"I have often wondered, on viewing these efforts of African chiefs to ape the majestic strutting of kingliness, from what grand prototype they have drawn their demeanour. Mtesa, of Uganda, is too far off, and there is no one nearer that I have ever discovered or heard of, able by the rumour of his pomp to impress the sense of these fantastic mimics of kinghood. I presume it must be natural to man—to the African Nfumu as it is to the British beadle!"

We cannot conclude without saying a word of praise of the way in

which Mr. Stanley's publishers have done their part. The binding is attractive, the type good, and the pictures are produced in admirable style and add greatly to the pleasure of reading the volumes, which we have no doubt will have a very extensive circulation, and will do much to create a practical interest in the Congo Free State.

We very heartily agree with Mr. Stanley's concluding words :—

"All men who sympathise with good and noble works—and this has been one of unparalleled munificence and grandeur of ideas—will unite with the author in hoping that King Leopold II., the royal founder of this unique humanitarian and political enterprise, whose wisdom rightly guided it, and whose moral courage bravely sustained it amid varying vicissitudes to a happy and successful issue, will long live to behold his Free State expand and flourish, to be a fruitful blessing to a region that was until lately as dark as its own deep sunless forest shades."

THE STORY OF THE RESCUE OF GREELY.[1]

Not many months ago, the world was moved to an outburst, half of commiseration, half of horror, at the terrible story which the six survivors of the Greely Expedition brought home with them to mar the otherwise joyous return of these heroic men, who suffered terrible privations, and narrowly escaped death in the cause of science and duty. The facts must still be fresh in the memory of many of our readers, and we have no desire to further allude to them than to say that those who hope to find fresh details in the book under review, will be disappointed; the authors have wisely dismissed the subject with the remark that it were better to leave its disclosure to the survivors themselves. That is well said; better still, to "let the dead past bury its dead."

Undeterred by the failure of the previous summer, the Signal Office (U. S. N.), in the winter of 1880-81, boldly entered upon its preparations for a new expedition to Lady Franklin Bay. Stores for three years were procured and shipped on board the steam-sealer *Proteus*, of St. John's, which was chartered to take the expedition to its destination. The expedition, which consisted of twenty-five persons, was commanded by Lieutenant A. W. Greely; its work was to be—first, exploration; second, the collection of specimens; and third and last, the observations called for by the International Polar Conference. In the instructions issued on June 17th by the Chief Signal Officer, we read :—

"The *permanent* station will be established at the most suitable point north of the eighty-first parallel and contiguous to the coal-seam discovered near Lady Franklin Bay by the English Expedition of 1875."

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[1] *The Rescue of Greely.* By Commander W. S. Schley, U.S.N., commanding the Relief Expedition of 1884, and Professor J. R. Soley, U.S.N. London: Sampson Low & Co., 1885, pp. vi., 277, Maps. Price 12s. 6d.

And again :—

"The steamer should, on arrival at *permanent* station, discharge her cargo with the utmost despatch, and be ordered to return to St. John's, N. F., after a careful examination of the seam of coal at that point has been made by the party to determine whether an ample supply is easily procurable. A report in writing on this subject will be sent by the returning vessel. In case of doubt an ample supply must be retained from the steamer's stores.

"By the returning steamer will be sent a brief report of proceedings, and as full a transcript as possible of all meteorological and other observations made during the voyage."

On the way up, the only points to be visited, after leaving the Danish settlements, were the *caches*, or depôts of provisions, made by the British Expedition under Captain Nares in 1875. The importance of these caches lay in the fact that, in case of the abandonment of the station from any cause, they furnished a continuous series of supply depôts at intervals along the line of retreat between Lady Franklin Bay and Cape York. Their position, and the amount cached at each, became subsequently a matter of vital importance. Beginning with the most northerly, they were :—Cape Collinson, 240 rations. Cape Hawks, a quantity of bread (amount not exactly known), potatoes, rum, and stearine. Cape Sabine (Payer Harbour), 240 rations. Cape Isabella, 150 pounds of meat. Cary Islands, 1800 rations.

The instructions contemplated a stay of two years at Lady Franklin Bay, and stated that a vessel would be despatched to the station both in 1882 and 1883. These vessels were to bring "supplies for, and such additions to the present party as are deemed needful."

"If the vessel of 1882 failed to reach the station, she was to cache a portion of her supplies at the most northerly point reached on the coast of Grinnell Land, and to make a *small* depôt at Littleton Island. If the vessel of 1883 also failed to get up, she was to remain in Smith Sound as long as was safe, and, on leaving, to land all her supplies and a relief party at Littleton Island for the winter. Finally, if neither vessel reached the station, Lieutenant Greely was ordered to abandon it not later than September 1, 1883, and retreat southward by boat, until the relief vessel of 1883 was met or Littleton Island was reached, where he would find a fresh party with stores awaiting him."

On 7th July, 1881, Greely, with his command, left the port of St. John's on board the *Proteus* for Lady Franklin Bay. This was the opening act of the drama—"a drama marked by varied incident, by perilous undertakings, by successful achievements, and by unsurpassed sufferings; a drama which was to last three years, and to arouse the deepest interest and sympathy in Europe and America, until the rescue was accomplished and the few survivors were at last brought home."

After a most successful voyage, though not unaccompanied by moments of danger and anxiety, the *Proteus* reached Fort Conger on August 12. This had been the winter quarters of the *Discovery*, and was chosen in preference to the coal-seam at Watercourse Bay. The work of unloading and establishing the station began at once; and the *Proteus* shortly after-

wards set sail, on her homeward voyage, leaving the gallant band of explorers to the task which had been set them.

By far the most important communication made by Greely from his station at Fort Conger, in view of what afterwards happened, was the letter of August 17, in which he gave directions to govern the relief parties which had been promised; and in his last despatch, dated 25th August, 1881, which the *Proteus* carried home with her, he said:—

"All stores under cover. Freezing weather commenced. Observatory under way. House entirely done except inside work, which can be done at leisure. Start a small party north, and one into interior in few days."

So far all had gone well, but the authors go on to say:—

"The fortunate voyage of the *Proteus* in making her way in six days from Upernivik to the edge of Lady Franklin Bay without a check had one most unfortunate result. It created a false impression in everybody's mind, not only that the station could be reached easily, but that it could be reached without danger. The fact was forgotten that of all the vessels that had ever attempted to pass Kane Sea, only three had accomplished the voyage before the *Proteus*, and that these had accomplished it at great risk. The influence of this impression that the difficulties had been exaggerated was seen again and again in the events of the next two years."

The Relief Expeditions were sent out in 1882 and 1883:—

On the 8th of July, 1882, the *Neptune* sailed from St. John's, and had a prosperous voyage as far as Littleton Island. Unfortunately, however, an impenetrable barrier presented itself in the Kane Sea, five fruitless efforts being made to penetrate the ice. Baffled in each attempt, she was forced to return south, but not before leaving two caches on Littleton Island. After completing this work, she crossed over to Cape Isabella, and left the remaining whale-boat, marking its position by a tripod. This done, nothing could be gained by a longer stay, and on the 5th of September she started on her homeward voyage.

The first Relief Expedition could hardly be said to be a failure; it had not reached Lady Franklin Bay, but that was in no way essential, as Greely was to stay only one year longer and still had two years' supplies. But it was essential—indeed it became a matter of very great importance—to make such arrangements for the expedition of next summer as should insure success. A very careful plan was drawn up, based, of course, on Greely's letter of the 17th of August, 1881. Arrangements were made to charter the *Proteus*—the same vessel which had made the extraordinary trip in 1881; and on the 14th of May a request was made by the Chief Signal Officer that a vessel of the Navy should be detailed for service with the expedition. The *Yantic* was accordingly put into commission for this purpose; and the expedition placed under the command of Lieutenant Garlington. A very careful scheme of operations for the *Proteus* and *Yantic* was drawn up. They started from St. John's on the 29th of June, but did not remain long in company. In the Kane Sea the *Proteus* got into the pack, from which, being unable to extricate herself,

she received a fatal nip, which stove in the ship's side. The water rushed into the hold, and the deck planks began to rise. The pressure of the floes kept the ship up; and the stores, which had been got up on deck, were thrown on the ice. Plenty of time was given the officers and crew for making good their escape in the ship's boats; but, as the tide turned and the pressure of the ice slackened, the ill-fated *Proteus* began to sink, and soon passed out of sight. They made a desperate effort to reach the *Yantic*, but, owing to some misunderstanding of the arrangements previously agreed upon between the commanders of the two vessels, it was only after many adventures that they succeeded in again joining company. On the arrival of the *Yantic* at Littleton Island, a record which had been left there by Garlington on July 26th was found, and the first news obtained of the disaster to the *Proteus*. The junction was at last successfully made at Disko. But the season was advanced, and the question of returning across Melville Bay, to carry out the purpose of the expedition, was decided adversely; and the *Yantic* returned to St. John's.

When the news reached Washington of the failure of the second expedition, the country was thrown into a state of great anxiety, and there was a general outburst of indignation. A Greely Relief Board was constituted, and met in Washington for the purpose of considering "what was to be done for Greely?" Many plans were submitted; and, after a most complete and thorough examination, the Board, on the 22d of January, 1884, presented its report. As the work of the Relief Expedition was to be of a nautical character, the Board recommended that its control should be intrusted to the Naval Department. The Secretary of War and the Secretary of the Navy, acting conjointly, took steps for the acquisition of suitable vessels. The whaler *Thetis* was purchased at Dundee, and her Majesty's Government placed the *Alert* at the disposal of the United States Government. The greatest pains were taken, and every detail was carefully considered in order to render the expedition a success, the command of which was entrusted to Commander Schley. The *Bear*, which was the third vessel of the expedition, was despatched from New York on the 24th of April, to St. John's, Newfoundland, to fill with coal, take dogs on board, and inquire into the condition of the ice in Davis Strait; the *Thetis* followed next; and, finally, the *Alert*. General directions were given as to the conduct of the voyage. The officers and crews, owing to the exceptional nature of their mission, were animated with more than an ordinary zeal, and worked together in a truly admirable manner. The details of this forlorn-hope are given by the authors in a simple but effective manner, affording most interesting reading. The *Alert* was used only as a despatch vessel, but the *Thetis* and *Bear* proceeded in company through the "Gate-way of the Polar Sea." Many dangers and difficulties were successfully overcome, but their efforts were more than rewarded when, eventually, on Stalknecht Island, they discovered a cairn which had been erected by Greely. The records were hurriedly read aloud to the officers gathered round the ward-room table of the *Thetis*:—

"As one paper after another was quickly turned over until the last was reached, it was discovered with horror that the latest date borne by any of them was October 1st, 1883, and that but forty days' complete rations were left to live upon. Eight months had elapsed since then, and the belief was almost irresistible that the whole party must have perished during this terrible period of waiting and watching for relief.

"It was a wonderful story. It told how the expedition, during its two years at Lady Franklin Bay, had marked out the interior of Grinnell Land, and how Lockwood had followed the northern shore of Greenland, and had reclaimed for America the honour of 'the farthest north.' But there was no time now to think of what the expedition had accomplished,—that was already a matter of history. The pressing question was: Where was Greely's party now?—and to that question it was too probable that there was but one answer.

"The records had named the wreck-cache as the site of Greely's camp, and preparations were made at once to go there. The cutter, with Colwell and his party on board, had not yet got away, having been stopped by the cries from the shore, and she now steamed back under the stern of the *Thetis*. Colwell was directed to go to the site of the cache and look for the explorers; and if any were alive—of which the record gave little hope—to tell them that relief was close at hand. As he was about to leave, he called out for a boat-flag, and one was thrown to him from the ship. This was bent on a boat-hook, and set up in the stern of the boat."

The moving story of the rescue is thus described:—

"It was half-past eight o'clock in the evening as the cutter steamed around the rocky bluff of Cape Sabine, and made her way to the cove, four miles further on, which Colwell remembered so well from his hurried landing with the stores on the terrible night following the wreck of the *Proteus*. The storm, which had been raging with only slight intervals since early the day before, still kept up, and the wind was driving in bitter gusts through the openings in the ridge that followed the coast to the westward. Although the sky was overcast, it was broad daylight —the daylight of a dull winter afternoon—and as the cutter passed along, Colwell could recognise the familiar landmarks of the year before; the long sweep of the rocky coast, with its ice-foot spanning every cove, the snow gathered in the crevices, the projecting headlands, and the line of the ice-pack which had ground up the *Proteus*, dimly seen in the mists to the north, across the tossing waters of Kane Sea. At last the boat arrived at the site of the wreck cache, and the shore was eagerly scanned, but nothing could be seen. Rounding the next point, the cutter opened out the cove beyond. There, on the top of a little ridge, fifty or sixty yards above the ice-foot, was plainly outlined the figure of a man. Instantly the coxswain caught up the boat-hook and waved his flag. The man on the ridge had seen them, for he stooped, picked up a signal-flag from the rock, and waved it in reply. Then he was seen coming slowly and cautiously down the steep rocky slope. Twice he fell down before he reached the foot. As he approached, still walking feebly and with difficulty, Colwell hailed him from the bow of the boat:

"'Who all are there left?'

"'Seven left.'

"As the cutter struck the ice, Colwell jumped off and went up to him. He was a ghastly sight. His cheeks were hollow, his eyes wild, his hair and beard long and matted. His army blouse, covering several thicknesses of shirts and jackets, was ragged and dirty. He wore a little fur cap and rough moccasins of untanned leather tied around the leg. As he spoke, his utterance was thick and mumbling, and in

his agitation his jaws worked in convulsive twitches. As the two met, the man, with a sudden impulse, took off his glove and shook Colwell's hand.

"'Where are they?' asked Colwell, briefly.

"'In the tent,' said the man, pointing over his shoulder, 'over the hill—the tent is down.'

"'Is Mr. Greely alive?'

"'Yes, Greely's alive.'

"'Any other officers?'

"'No.' Then he repeated absently, 'The tent is down.'

"'Who are you?'

"'Long.'

"Before this colloquy was over, Lowe and Norman had started up the hill. Hastily filling his pockets with bread, and taking the two cans of pemmican, Colwell told the coxswain to take Long into the cutter, and started after the others with Ash. Reaching the crest of the ridge, and looking southward, they saw spread out before them a desolate expanse of rocky ground, sloping gradually from a ridge on the east to the ice-covered shore, which at the west made in and formed a cove. Back of the level space was a range of hills rising up eight hundred feet, with a precipitous face, broken in two by a gorge, through which the wind was blowing furiously. On a little elevation directly in front was the tent. Hurrying on across the intervening hollow, Colwell came up with Lowe and Norman, just as they were greeting a soldierly-looking man who had come out from the tent.

"As Colwell approached, Norman was saying to the man:

"'There is the Lieutenant.'

"And he added to Colwell: 'This is Sergeant Brainard.'

"Brainard immediately drew himself up to the 'position of the soldier,' and was about to salute, when Colwell took his hand.

"At this moment there was a confused murmur within the tent, and a voice said:

"'Who's there?'

"Norman answered, 'It's Norman—Norman who was in the *Proteus*.'

"This was followed by the cries of 'Oh, it's Norman!' and a sound like a feeble cheer.

"Meanwhile one of the relief party, who in his agitation and excitement was crying like a child, was down on his hands and knees trying to roll away the stones that held down the flapping tent cloth. The tent was a 'tepik' or wigwam tent, with a fly attached. The fly with its posts and ridge-pole had been wrecked by the gale which had been blowing for thirty-six hours, and the pole of the tepik was toppling over, and only kept in place by the guy ropes. There was no entrance except under the flap opening, which was held down by stones. Colwell called for a knife, cut a slit in the tent cover, and looked in.

"It was a sight of horror. On one side, close to the opening, with his head towards the outside, lay what was apparently a dead man. His jaw had dropped, his eyes were open, but fixed and glassy, his limbs were motionless. On the opposite side was a poor fellow, alive to be sure, but without hands or feet, and with a spoon tied to the stump of his right arm. Two others, seated on the ground, in the middle, had just got down a rubber bottle that hung on the tent pole, and were pouring from it into a tin can. Directly opposite, on his hands and knees, was a dark man with a long matted beard, in a dirty and tattered dressing-gown, with a little red skull-cap on his head, and brilliant, staring eyes. As Colwell appeared, he raised himself a little, and put on a pair of eye-glasses.

"'Who are you?' asked Colwell.

"The man made no answer, staring at him vacantly.

"'Who are you?' again.

"One of the men spoke up: 'That's the Major—Major Greely.'

"Colwell crawled in and took him by the hand, saying to him, 'Greely, is this you?'

"'Yes,' said Greely in a faint, broken voice, hesitating and shuffling with his words, 'Yes—seven of us left—here we are—dying—like men. Did what I came to do—beat the best record.'

"Then he fell back exhausted."

Of the return home, and the reception of the survivors by their countrymen it is unnecessary to speak. The life of Lieutenant Greely hung upon a hair; but eventually he recovered; and he is now at home preparing a report for his Government.

[As mentioned in another part of the *Magazine*, it is his intention to deliver an address to the members of the Scottish Geographical Society, when he will not only speak of his experiences, but also, it is hoped, formally open the new Session in November.]

MR. HENRY O. FORBES IN THE EASTERN ARCHIPELAGO.[1]

Considering the interest excited eighteen years ago by Mr. Alfred Russel Wallace's *Malay Archipelago*, it is a matter of no small surprise that so few English explorers, naturalists, and botanists have since betaken themselves to the region whose wonders he so admirably described. While from the Dutch press there issues an almost unbroken stream of Indonesian literature—comprising several substantial serials—it is only at comparatively rare intervals that a contribution of any considerable worth is made from this side of the Channel. And thus it happens that Mr. Forbes's portly volume, in spite of such slighter works as Mr. Burbidge's *Gardens of the Sun*, may be regarded as the first worthy successor of Mr. Wallace's masterpiece. That this should be the case is the more remarkable, because the unexplored area within the limits of the Indian Archipelago—as, for example, in Borneo, and in the Philippines, both north and south—is not only extensive, but rich with the most varied and valuable harvest of things new to science: it little matters to what department of inquiry the investigator has specially devoted himself, in the Indian Archipelago he will find both his work and his reward. Of this variety and abundance Mr. Forbes's record is the reflection and result.

It was late in the afternoon of the 17th of November 1878, that the *Celebes* dropped her anchor in Batavia Roads, and the "Naturalist's

[1] *A Naturalist's Wanderings in the Eastern Archipelago.* A Narrative of Travel and Exploration from 1878 to 1883. By Henry O. Forbes, F.R.G.S. With numerous Illustrations, from the Author's Sketches, and Descriptions by Mr. John B. Gibbs. London: Sampson Low, Marston, Searle and Rivington. 1885.

wanderings in the Eastern Archipelago" began; and it was on July 9th, 1883, that on board the mail-steamer *Quetta*, he bade good-bye to the scenes of his five years' exploration. During this period he had travelled through the whole length of the Archipelago, or thirty-nine degrees of longitude, having in the east landed on the coast of New Guinea, at Macluer Inlet, and in the west resided for some time in southern Sumatra. His narrative falls naturally enough into six divisions, dealing with the Cocos-Keeling Islands, Java, Sumatra, the Moluccas and Timor Laut, the island of Buru, and, finally, Timor.

The chapters in which Mr. Forbes describes the Keeling Islands (which have been a British possession since 1857), are among the most interesting in the volume, though the principal facts have been for some time accessible in the author's paper in the *Proceedings of the Royal Geographical Society*, 1879. As the Keeling atoll was most carefully examined by Mr. Darwin, and served him largely as a basis for his theory of coral reefs, a series of fresh observations at a distance of fifty years could not fail to be of value; but it was unfortunate, as Mr. Forbes himself remarks, that at the time of his visit he had not become acquainted with the newer hypothesis of Agassiz, Semper, and Murray. In 1878 the atoll was occupied by a little colony under the patriarchal government of G. C. Ross, whose grandfather first took possession in 1825. The great event in its recent history was a terrific cyclone:—

"On the 25th of January, 1876, the mercurial barometer indicated some unusual atmospheric disturbance, and the air felt extremely heavy and oppressive. On the 28th it fell to close on 28 inches, a warning which gave time for all boats to be hauled to a place of safety, and other preparations for a storm to be made. On the afternoon of the same day, there appeared in the western sky an ominously dark bank of clouds, and at 4 P.M. a cyclone of unwonted fury burst over this part of the Indian Ocean. The storehouses and mills, but recently renewed, were completely gutted and demolished; every house in both villages was carried completely away. Among the palm-trees the wind seems to have played a frantic and capricious devil's dance. Pirouetting wildly round the atoll, in some places it had cleared lanes hundreds of yards in length, snapping off the trees close to the ground; in others, it had swooped down, without making an entrance or exit path, and borne bodily away large circular patches, leaving unharmed the encircling trees; here and there, sometimes in the centre of dense clumps, selecting a single stem—a thick tree of thirty years' growth—it had danced with it one lightning revolution, and left it a permanent spiral screw perfectly turned, but otherwise uninjured.

"About midnight of the 28th, when intense darkness would have prevailed but for the incessant blaze of lightning, whose accompanying thunder was drowned by the roar of the tempest, when every one was endeavouring to save what rice—the only provision spared to them—they could, Mr. Ross discovered, to his horror, the bowsprit of a vessel which had been lying at anchor, riding on the top of a great wave straight for the wall behind which they sheltered. There was just time to make themselves fast before the water rushed over them, fortunately without carrying the ship through the wall; a second wave washed completely over the spot where Ross's house had stood, distant 150 yards from high-water

mark. The storm attained its height about one o'clock on the morning of the 29th. At that hour nothing could resist the unsubstantial air, worked into a fury; no obstacle raised a foot or two above the ground could resist its violence. The inhabitants saved themselves only by lying in hollows of the ground. To what distance the barometer might have fallen, it is impossible to say, for the mercurial was carried away, and two aneroids gave in at 26½ inches.

"The following morning broke bright and calm, as if the tempestuous riot of the night might have been an evil dream, only not a speck of green could be seen anywhere within the compass of the islands. Round the whole atoll the solid coral conglomerate floor was scooped under, broken up and thrown in vast fragments on the beach. On the eastern shore of Home Island, in particular just opposite the settlement, I observed a wall of many yards breadth, portions of it thrown up clear over the external high rim of the island, and several yards inwards among the cocoa-nut trees, all along the margin of the island. After six months, every tree and shrub was clothed in verdure; and before three years, they were in full bearing again.

"About thirty-six hours after the cyclone the water on the eastern side of the lagoon was observed to be rising up from below of a dark colour. The origin of the spring, which continued to ooze out for about ten to fourteen days, lay somewhere between the southern end of New Selima and the northern end of Gooseberry Island. The colour was of an inky hue, and its smell 'like that of rotten eggs.' From this point it spread south-westward as far as the deep baylet in South-east Island, where meeting the currents, flowing in at the westward and northern entrances, which run, the one round the western, the other round the eastern shore of the lagoon, its westward progress was stopped; whereupon, turning northwards through the middle of the lagoon (becoming slightly less dark as it proceeded), it debouched into the ocean by the northern channel. Within twenty-four hours, every fish, coral, and mollusc, in the part impregnated with this discolouring substance—probably hydrosulphuric or carbonic acid—died. So great was the number of fish thrown on the beach, that it took three weeks of hard work to bury them in a vast trench dug in the sand."

In one respect the cyclone seems to have been beneficent to the island by adding, "if not new species, at least a host of new individuals to the fauna."

The series of botanical and zoological observations, with which Chapter II. concludes, contains some curious facts, one of which may be quoted as an example:—

"As the swallow is to us, such a pet is this bird [the pure white Tern (*Gygis candida*)] to the settlers. It chooses a strange place to set its nest in, if one may so speak of its brooding place. Its solitary egg is deposited on the leaf of a young cocoa-nut palm, at the time when the leaf has rotated from its vertical position to one nearly at right angles to the stem. The egg is laid in the narrow angular gape between two leaflets on the summit of the arch of the leaf, where it rests securely, without a scrap of nest, in what one would think the most unsafe position possible, yet defying the heaving and twisting of the leaves in the strongest winds. The leaf, as in all palms, goes on drooping further and further till it falls; and among the settlers it is a subject of keen betting, when they see a Tern sitting on an ominously withered leaf, whether the young bird will be hatched or not before the leaf falls. The result I am told has always been in favour of the bird; if the leaf fall in the afternoon, the Tern will have escaped from the egg in the morning."

On his return from the Keeling atoll, Mr. Forbes spent a considerable time in Java, first at Genteng, Tjipanas, and Kosala in Bantam, and afterwards at Pengelengang (4500 feet above the sea) in the Preanger Residency. We can only briefly call attention to his description of *trassi*, the putrid fish condiment of which his men were so fond; to his discovery of the new genus of spider (*Ornithoscatoides*) which imitates the excreta of a bird so completely as to deceive even a naturalist's eye; to the observations on the *Myrmecodia tuberosa* and the more elaborate observations on the fertilisation of orchids; to the story of the introduction of *Cinchona Ledgeriana;* and finally to the account of the Karang and Badui tribes. That the upas tree is not altogether a figment the following passage will show:—

"Beneath the shady canopy of this tall fig no native will, if he knows it, dare to rest, nor will he pass between its stem and the wind, so strong is his belief in its evil influence.

"In the centre of a tea estate not far off from my encampment stood, because no one could be found daring enough to cut it down, an immense specimen, which had long been a nuisance to the proprietor on account of the lightning every now and then striking off, to the damage of the shrubs below, large branches, which none of his servants could be induced to remove. One day having been pitchforked together and burned, they were considered disposed of; but next morning the whole of his labourers in the adjacent village awoke, to their intense alarm, afflicted with a painful eruption, wherever their bodies were usually uncovered. It was then remembered that the smoke of the burning branches had been blown by the wind through the village; this undoubtedly accounted for the epidemic; but it did not allay their fears that they were all as good as dead men, for the potency of the sap as a poison is but too well known to them.

"To prevent a general flight of the workmen it became necessary to get rid of the tree altogether, but the difficulty was to find any one willing to lay the axe to its root. At last a couple of Chinamen, after much persuasion and the offer of a high fee, agreed to perform the hazardous task of cutting up and carting it away. To the surprise of everybody they accomplished their task without experiencing the least harm. They pocketed their fee and departed in silence, without, however, saying that they had, at intervals during their work, artfully smeared their bodies with cocoa-nut oil.

"The sap of the bark alone is hurtful, for the logs into which the stripped trunk was cut were made into furniture for the owner's dining-room, without ill effects to the carpenters. The bark of another denizen of the same forest—*Gluta benghas*, one of the *Anacardiaceæ*—contains a sap even more noxious, for, falling on the skin, it produces stubborn ulcers which, on the woodcutters—who often get splashed on their arms and body—require months to heal; but its sap is not used by them for poison, as the *antiarin* is. It is curious to reflect how acute native ingenuity has been in elaborating a pharmacopœia abounding in subtle articles to waste or take away life, while it contains hardly one to preserve it. The action of some of these preparations, whose effects I had heard of as well as seen, astonished me vastly, but no bribe that I could offer was tempting enough to induce their old *dukuns* to disclose their composition."

The most adventurous period in Mr. Forbes's wanderings was the eleven weeks (July 13th to September 28th, 1882) which he and Mrs.

Forbes (for by this time he was married) spent in Larat, one of the north-eastern islands of the Tenimber or Timor Laut group (7° 10′ S. lat., 131° 35 E. long.). This cluster has been little visited by Europeans, though it appears in Mercator's Atlas in 1636. The Englishman and his wife took up their residence at Ritabel, on the west coast, but found that it was practically in a state of siege, its inhabitants and those of the neighbouring village of Waitidal being at war with the people of Kaleobar, on the north-east coast. For the purpose of preparing the way for a peace between the combatants, Mr. Forbes visited Waitidal, with what result must be told in his own words:—

"As like most of the Tenimberese villages, it was situated on a flat space of some extent on the summit of a bluff which stood a good way back from the shore, we had in order to reach the gateway to ascend the perpendicular face of the cliff by a steep wooden trap stair, which I observed was of dark-red wood, its sides elaborately sculptured with alligators and lizards, and surmounted by a carved head on each side. On entering I saluted those nearest the gate, but we were rather coldly received. As we proceeded up the centre of the village two elderly men, who were evidently intoxicated, rushed at us with poised spears, gesticulating and shouting to those around to oppose us. The tumult brought out the *Orang Kaya*, whose approach prevented any immediate act of hostility, and to him my guide explained the object of our visit. Having shaken hands with us—a sign of friendship—he, accompanied by the older men, conducted us to his house, through the door-hole of which I ascended with the uneasy feeling of entering a trap. My proposals being fully explained to them, they were received at first with little opposition till my intoxicated friends joined the circle. One was evidently a man of some importance in the village, and at once opposed the project in a spirit of hostility, which gradually spread to the others. As no palaver is ever conducted without profuse libations, raw palm-spirit distilled by themselves was passed round in cocoanut-shell cups, and I was expected to keep pace—no slow one—with their drinking. As the spirit circulated the hostile feeling developed, especially as the discussion had merged into another, viz., that I should be persuaded to leave Ritabel and dwell in Waitidal. They found I had sold much cloth and knives in Ritabel, but had brought none over to them; I could have plenty of fowls among them; they would find me no end of birds, and would not cheat me in the way the Ritabel people were doing. To this, of course, I could not agree, and put my refusal as pleasantly as I could. I tried to bring the palaver to a close by rising to leave; but this they would not permit, for one of them barred my exit by sitting on guard on the top of the hatch. I shortly discovered that the subject of their excited wrangling was whether I should be permitted to leave at all. My guide, after whispering to me not to be alarmed and adding a remark I did not comprehend, went away, luckily leaving the door open, intending, as I imagined, to return soon; but he either joined some other drinking party and forgot to do so, or purposely left me to my own resources. Pretending to be quite pleased to prolong my visit, I presented my cup for more spirit, and as successive rounds were filled my companions became incapable of observing that I did not drain my cup till I had passed its contents through the floor, and was imperceptibly nearing the now open trap door. I took the first opportunity of diving through the orifice, and with a bold step shaped my course for the stairway at the top of the rock, where I felt I could dispute my departure on even terms. My guide appeared with rather a hang-dog look, and we wasted no time in getting to our boat and rowing out some distance from the shore."

Exhausted with fever, destitute of provisions, and alarmed by the news of an immediate attack by the people of Kaleobar, the strangers were glad when the arrival of the steamer *Amboina* gave them the means of escaping from Larat, in spite of the interest of its fauna and flora. The island Mr. Forbes describes as everywhere composed of coral, with no rock of a sedimentary or granitoid character; and the plants too belong to a typically coral island flora.

More than once in the course of his narrative Mr. Forbes mentions the hostile attitude assumed towards him by Mr. Riedel, the Dutch Resident of Amboina. "Beyond the simple item that the *Tugal* had just arrived thence, we obtained," he says, "no further information as to its movement, or intelligence from him about Timor Laut," and "I ultimately found it useless to attempt to carry on any investigations in the islands of the Moluccas under his sway." Since Mr. Forbes's return to Europe, Resident Riedel has attacked the accuracy of many of his statements, with a considerable display of animosity. He accuses him (*Tijdschrift van het Nederl. Aardrijkskundig Genootschap*, No. 10, 1884) of publishing as his own a defective sketch-map of the islands, which Mr. Riedel lent him, on the understanding that any corrections should be communicated to the owner. With a severity which seems somewhat misplaced, when it is remembered that Timor Laut is the name regularly used in the best Dutch text-books (such as Hollander's, 1882), he laughs at the traveller for using this form instead of what he says is the correct one, viz., 'Timor-lao, the "Far East." He also blames him for making Tenimber (or, as he prefers it, Tanember) and Timor Laut alternative names, while each has its own distinct application.

The blood of martyrs, it used to be said, is the seed of the Church, and so the quarrels of geographers, we suppose, may be the advancement of geography; but it is to be regretted that Resident Riedel did not exclude the personal element from his criticisms. Whether these are well founded or not matters very little, as far as the general value of Mr. Forbes's work is concerned. Amid a mass of observations so multifarious some "flaws may lurk;" but we know of no recent volume which one can take up and open at any page with greater certainty of dropping on something suggestive, surprising, or amusing. It would have been well if maps on a good scale had been provided for the chapter on Burus and Timor.

We close by quoting a passage which shows how Mr. Forbes can describe a piece of natural scenery:—

"My very last stage, however, was through, perhaps, as unwonted a scene as I may ever look on; it was an eight hours' sail through the city of Palembang itself, which is certainly one of the curiosities of the East. Throwing off from our anchorage about eight o'clock in the morning, we slid down between miles and miles of log-rafts moored to the banks, packed close together forming an immense pavement, with an abundant population; then on each side Rakits large and small, in all positions—sideways, lengthwise, crossways, choke-a-block, as if the river had swept away a village or two and stranded them there anyhow—to which a continuous stream of little skiffs were constantly bringing the dealers in the different products, who might be seen in little knots on the steering stages discussing terms over siri

and betel. Anxious to make advantageous terms, eager traders were shooting past on a several days' journey up stream to meet expected and valuable loaded Rakits, which, if large and freighted with dammar, gum elastic, gutta-percha, will cost as much as £500. As no bamboo grows near Palembang, and none of the larger sorts nearer than the sources of the river, the Rakit itself is an eager subject of barter, and always fetches a sum which largely remunerates the cost of its building and transport the whole length of the river. Seaward from this heterogeneous collection, which was not permitted to pass beyond the upper boundaries of the town, to clog its avenues, I entered Palembang proper, a single row of cabins on each bank, with their faces to the river, built on immense log rafts which stretched out in front of them as a broad platform, forming their landing stage and approach—on one side the Malay portion of the town, on the other the Chinese shops and abodes—the whole rising and falling many feet with every tide. Everywhere innumerable little boats flashed about over the bright sunlit water, here with a woman in a blue tunic and a deep scarlet head-cloth calling out her store of fruits; there, propelled by urgent arms conveying the busy merchant; and from a hidden corner where it had been lying in wait, would dart out, like a spider from its lair, some other prau, and lassoing a slowly passing log would pull in again with an item of livelihood gleaned from the flotsam harvest which the river was continually bringing down."

TOGO-LAND.[1]

(With a Map.)

THE German book market is just now being flooded with all sorts of books of travel and exploration, good, bad, and indifferent: the colonial fever is being ably treated by the publishers. The *Expansion of Germany* has yet to be written; but the materials for such a work are daily becoming more abundant.

Dr. Hugo Zöller's book on Togo-land is the first which has been issued of a proposed series dealing with the German possessions on the West African Coast. It will be remembered that Dr. Zöller went out last October, as the travelling correspondent of that very anti-English newspaper, the *Kölnische Zeitung*, to explore Togo-land—a little piece of territory on the Slave Coast, which Germany had placed under her protection—the result of his explorations being published periodically. These communications, of which the present volume is a recapitulation, have excited considerable public interest; we are, however, disposed to receive with some reserve his narrative of "How Togo became a German Protectorate."

The German traders at Great and Little Popo, we are told, oppressed by the excessive custom-dues levied upon them by the native chiefs, rose in open opposition; and for a time a *fracas* between the two parties seemed inevitable. This was, however, happily averted; the German traders made two appeals to the Berlin Foreign Office, and the German gunboat *Sophie* appeared off the coast to maintain their rights. Meantime,

[1] *Das Togoland und die Sklavenküste.* By Dr. Hugo Zöller. Illustrations and Maps. Berlin and Stuttgart: W. Spemann, 1885. Price 5M.

according to Dr. Zöller, a little intrigue was being carried on by a Mr. Lawson, an intelligent negro who had received a European training, to snatch the "hard-won" commerce from the Germans and place it in the hands of the British. He was not successful in this, for the gunboat *Sophie*, without consulting him, took him for a little sea-voyage for the benefit of his health. Mr. Firminger, another British agent, next appeared on the scene, accompanied with a body of thirty Haussa police. He recommended "the expulsion of the German traders from the coast within a certain period, or he would annex the land in the name of England." It appears that the natives had no great appreciation of the power of Germany, being under the impression that she had but the one ship they had seen so often, whilst British influence was paramount. Things began to assume a threatening appearance, when the German Consul-General, Dr. Nachtigal, arrived in the gunboat *Möwe*, and put matters straight by a treaty he concluded with the chiefs at Bagidá (July 5), by which Togo became a German Protectorate. Their troubles did not end here, however, and we believe there are still some difficulties to be adjusted before the full satisfaction of colonial possession can be enjoyed.

The political outlook on the Slave Coast is somewhat complicated, owing to the fact that between the British Gold Coast Colony and Whydah, the only port of the despotic kingdom of Dahomey, there are four little kingdoms, namely, Togo, Little Popo, Ague, and Great Popo; but, unfortunately, in none of these is there an absolute monarch; there seems, in consequence, to exist a certain difference of opinion that sometimes leads to unconstitutional measures being adopted by rival parties.

The German Protectorate is bounded on the east by Little Popo; on the south-west by the British Gold Coast Colony; and on the north-west by the still independent territory of the Anlo tribes. The northern boundary, although drawn in the air and embracing a considerable tract of land inland, "has, up to the present, not yet been definitely laid down." It has a coast-line of 22 miles (over 36 km.), an area of about 500 square miles, and a population of about 40,000 souls.

His description of the visit he paid to the fetish town of Bey, which is situated a mile from the coast, and dedicated to their all-powerful god Nyikpla, is very interesting; in the memory of the oldest inhabitants not six whites had before visited the place. His visit, however, was not attended with any great dignity, for he and his companions were obliged to divest themselves of their clothing before entering the holy town, and, only as a special favour, were they permitted to keep on their pantaloons. The inhabitants who met them were themselves clothed in all stages of dress, from the narrow 'slip' in front and behind, to the toga, which denoted rank. Oddly enough, whilst the unmarried women wore only the "slip," the fetish Nyikpla, himself, represented as seated on horseback, was abreast with the times by wearing European dress. The explorers were not permitted to see the temple, but were told to consider themselves fortunate in having seen so much.

Dr. Zöller undertook four expeditions 10 miles into the interior, for the purpose of discovering the so-called Avon Lagoon, which is represented in most maps to the north of Porto Seguro and Bagidá, as having an area of 37 miles long by 24 miles broad; but he was unable to discover such a large lagoon, nor were the inhabitants themselves aware of its existence. Dr. Zöller attributes this topographical error to the "extremely carelessly drawn English chart 'West Coast of Africa, sheet XV.,'" from which maps have been constructed, and upon which "no single place on the coast is correctly given." The Avon Lagoon, laid down "from hearsay," by the officers of the British ship *Avon*, has now been changed by the learned doctor to *Togo-See* (*vide* Map), which, he says, extends about 6 miles north and south, and from 6 to 7 miles east and west. The word *Togo* means "the other side of the lagoon." His attempts, at first unsuccessful, to find a river to the north which fed the Togo Lagoon were, on a later expedition from the five villages which form the capital, Togo, rewarded by the discovery of the Haho River, which enters it at the northern extremity. To John Duncan, who in 1846 visited these parts on behalf of the Royal Geographical Society, the honour of having first discovered the Haho is due; Dr. Zöller, however, doing good service in dispelling all suspicion that Duncan's discovery was founded on hearsay, and not on actual exploration.

Dr. Zöller did not penetrate as far inland as the mountains, which, he says, here, as well as in the eastern part of the Gold Coast, would appear to be from five to ten days' journey distant; but as far north as he did go, he reached a height of 300 to 400, and even 500 feet, the land falling by gentle undulations to the sea-coast. Nowhere did he find isolated hills or mountains. The soil in the vicinity of the lagoon was always light grey, and everywhere else of a dark red colour, and very fruitful. The country is well populated; the villages in the interior are dirtier than on the coast, though Porto Seguro (1200 inhabitants) he describes as the dirtiest of all. The inhabitants speak everywhere the same language, though different dialects; and the scantiness of their apparel is general.

[Petermann's *Mitteilungen* for June contains an excellent map of Togo-land].

PROCEEDINGS OF THE SCOTTISH GEOGRAPHICAL SOCIETY.

The Council of the Scottish Geographical Society met in the Society's Rooms on Tuesday, the 16th June, for the purpose of electing a Delegate to the forthcoming meeting of the British Association in Aberdeen. Mr. Coutts Trotter, F.R.G.S., a Member of Council, was unanimously chosen.

A donation was announced from Her Majesty's Board of Works, through the Surveyor-General, of the one-inch Ordnance Survey Maps of Scotland; and a communication was read from Lieutenant Greely, the famous Arctic explorer, intimating his willingness to open the next session of the Society in November.

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GEOGRAPHICAL NOTES.

EUROPE.

The Island of Eigg.—In the *Scottish Naturalist* for April there is a pleasant sketch of the geological features and history of this striking island by Mr James Durham, F.G.S., who gives full credit to Dr. Archibald Geikie for his discovery of the old river-bed existing beneath the pitch-stone porphyry of the Scuir. A view of the Scuir, from a photograph by W. N. Walker, illustrates the paper.

Hydrographical Survey to the South of Orkney.—H.M.S. *Triton*, Commander Thomas H. Tim, is now engaged in a hydrographical survey in the district of the south isles of Orkney and the Pentland Firth.

St. Petersburg a Seaport.—By the opening of the Maritime Canal, in the Bay of Cronstadt, the shallow upper extremity of the Gulf of Finland, St. Petersburg becomes as much a seaport as London. Before this great work was accomplished, St. Petersburg, although quite close to the sea, did not reap the benefits of a seaport, because all large vessels were obliged to discharge their cargoes at Cronstadt, being unable to approach nearer to the capital on account of the extreme shallowness of the water, the depth of the Neva at its bar being only 9 feet, and that of the navigable channel in no place exceeding 12 feet. The canal, which was projected by General Putiloff, has been cut through the shallow bottom of the Gulf of Finland from Cronstadt to St. Petersburg, and runs in a north-west, south-easterly direction, about three miles from the shore. The canal enters St. Petersburg at the south-west end, where the Great Neva flows into the gulf, and where there are a number of islands, upon which the new port will be built, it is said. It is a very large harbour, and is in connection with the whole railway system of Russia. The whole length of the canal is about 18 miles. The open channel is 350 feet wide, and the depth of water about 22 feet. The cost of the undertaking has been £1,150,000. A view of the canal is given in *The Illustrated London News*, June 13, and a chart will be found in the Report by Sir Edward Thornton, presented to Parliament, February 1884 [3831].

ASIA.

The Ancient Geography of Afghanistan.—In the *Avesta* or sacred writings of the Pârsîs are some references to the rivers, etc., of the Paropanisos regions, to which M. Aurél Stein has just drawn attention (*Academy*, May 16, 1885, p. 348). "Within the limits of Afghânistân and its former dependencies," he remarks, "we recognise the 'powerful, faithful Môurva' as the modern Merv[1]—little deserving the epithets; the 'beautiful Bâkhdhi' as Balkh, Haraêva" (or Haróyu) "as Herât, the mountain Vâitigaêça as the Bâdhgês of recent notoriety. The river Harahvaiti (etymologically corresponding to Sanskrit Sarasvatî) has been known in successive ages as Ἀράχωτος and Arghand-âb (near Qandahâr); but more important for Avestic geography is the large stream, of which it is a tributary, 'the beautiful, glorious Haêtumañt,' the Ἑτύμανδρος and Hermandus of classic authors, the modern Helmand. It waters the country of Seistân (Σακαστάνη), where, since time immemorial, the epic tradition of Iran has localised its greatest national heroes, and where, even in our days, one of the indigenous families proudly claims as Kayânians, to be descended from the legendary kings of Iran." The Haêtumañt is elsewhere described

[1] Darmsteter's *Zend-Avesta*, pt. i. p. 6.

(*Yasht*, xix., 66) as running, "increasing towards the lake (*zrayô*) Kãçava or Kâçaya, from where the mountain Ushidâo stands, round about whose foot mountain streams gather in abundance." This lake Kãçava is identified with the Seistân or Hâmun Sea, often called simply Zirrah or Zarah (from the Zand *zrayô*), *i.e.* 'lake.' The Ushidâo must refer to the Kôh-i Baba, and its continuation towards the west, the Siâh Kôh Range, from which the Helmand and all its northern tributaries take their rise.

M. Stein translates the verse just referred to thus:—"At its (Mt. Ushidâo's) foot gushes and flows forth the Hvâçtra and the Hvaçpa, the Fradatha and the beautiful Hvarenañhaiti, and Ustavaiti the mighty, and Urvadha rich in pastures, and the Erezi and Zarenumaiti; at its foot gushes and flows forth the bountiful, glorious Helmand,[1] swelling its white waves (?), rolling down it copious floods."

Now, Pliny (vi. 23, 25) "speaking of the districts to the south of Aria (Herât), mentions the rivers Pharnacotis and Ophradus (*i.e.* ὁ Φράδος), which Tomaschek, in his exhaustive treatise on the corresponding portion of the *Tabula Peutingerana* (*Akad. der Wissensch.*, Wien, 1883), has recognised as the modern Harrût Rûd and Farâh Rûd. They both flow from the western part of the Siâh Kôh into the lake of Seistân. The form Farnahvati, which is suggested by Tomaschek as the original and native one for Pharnacotis, represents exactly the Zand Hvarenañhaiti in Persian pronunciation. The substantive *hvarenah*, 'glory,' as contained in Hvarenañhaiti, assumes in the Old Persian dialect the form of *farna*: thus the Old Persian Vindafarna, Ἰνταφέρνης, is the exact equivalent of the Zand Viñda-hvarenah 'winning glory.'"

To shew the identity of the Fradatha and (O)Phradus (Farâh Rûd); we have the old town of Farâh on the left bank of the Farâh Rûd, called by Isidoros of Kharax Φρά; and Stephanos Byzant. says,—Φράδα πόλις ἐν Δράγγαις ἣν Ἀλέξανδρος Προφθασίαν μετωνόμασιν. Prophthasia is, in fact, a literal rendering of the Zand *fradatha*, which, in common use as neuter, means (literally "proficiency") "progress," "increase."

The Farâh Rûd is the next independent affluent of the Hamûn to the east of the Harrût Rûd. Further to the east we find the Khuspâs Rûd, and the Khâsh Rûd, whose names remind us of the Hvaçpa and Hvâçtra of the *Avesta*. Coming from the southern slope of the Siâh Kôh, they both reach the eastern side of the swamp in which the Helmand is lost. In Khuspâs, a town on the right bank of the Khuspâs Rûd, we may recognise the Χοάσπα mentioned by Ptolemy (vi. 20, 4) in Arakhosia. "The word *hvaçpa*, means 'having good horses,' and seems to have been a favourite designation for rivers in Iran. Besides the famous Χοάσπης near Susa, whose water was supplied to the 'Great King' wherever he moved (Herod. i. 188), we hear of another Χοάσπης" (Strabo, xv. i. 26; Curt. viii. 10), a tributary of the Kâbul river.

The station Cosata, given by the *Anonymous Ravennas*, but missing in the *Tab. Peuting.*, refers evidently to the town Khâsh, mentioned by the older Arab geographers, on the Khâsh Rûd, and supplies a welcome link between the Zand form Hvâçtra and the modern name of the river.

In the *Bundahish* (West's translation, ch. xx. 34), we read,—"Regarding, Frâsîyâv, they say that a thousand springs were conducted away by him into the sea Kyânsîh (the Kãçava of the *Avesta*), . . . and he conducted the spring Zarînman, which is the Hêtûmand River, they say, into the same sea; and he conducted the seven navigable waters of the source of the Vachaêni river into the same sea and made men settle there." The connection with the Hêtûmand here shows that

[1] The name of the Helmand is here introduced in accordance with an emendation by Prof. Geldner (*Drei Yasht*, Stuttgart, 1884).

the Zarînman of the *Bundahish* is the Zarenumaiti of the Yasht above translated; but nothing more can at present be made of this isolated statement.

Russian Colonisation in Central Asia.—The *Journal des Débats*, in a recent article on this subject, says:—Since their entry into Turkestan, that is since 1851-54, the Russians have been continuously colonising the country. Wherever they have found an oasis suitable for cultivation they have set about founding a town or village. As cultivable land in Central Asia is found only at the base of the mountains, it has resulted that the colonies are ranged along the great chains. The Government fosters this settlement by ceding to the colonists suitable locations at its disposal, without payment, but on condition that the soil be immediately cultivated. After ten years the occupant becomes the proprietor of his domain; but if he should relinquish it before the expiry of that term, it reverts to the State, and may be at once ceded to another colonist, of Russian origin. In this manner numerous colonies have been established, not only in the steppes of the Kirghiz nomads, who do not carry on agricultural pursuits, but also in that part of the country inhabited by the Tajiks and Usbegs, who have been settled and civilised for centuries. Thus, in the province of Syr Daria, there is found a series of colonies which give a solid foundation to the Russian power in this region. The largest is, naturally, that of Tashkend, "the Russian town," containing more than 12,000 inhabitants. It is, however, only the merchants and government officials, with their servants, who reside there; for the agricultural community, the village of Nikolaevka, near Tashkend, has been built on the battle-field where Chernaieff was defeated in 1865. More than 7400 acres of fertile land, previously covered with brushwood have been transformed into flourishing plantations, belonging to 300 families of Russian peasants. An administrative Commission, charged to search for land suitable for cultivation and not occupied by the natives, has found in the province of Syr Daria some 500 square miles, upon which it has been decided to install 6500 families. Immigrants have not failed to arrive in considerable numbers, and they have formed, besides Nikolaevka, seven other settlements, all more or less prosperous. These are Sary Komar, founded in 1875 (30 families, with 5800 acres); Chaldavar (40 families, with 3000 acres); Atchi, founded in 1878 (50 families, with 3000 acres); Pokrovsk, founded in 1881 (55 families, with 3700 acres); four hamlets of Mennonites, also founded in 1881, consisting of 95 families, upon 5000 acres; and two villages of Dungans, comprising 120 families upon 2500 acres. These last are of Chinese origin, from the neighbourhood of Kuldja, which they quitted in 1882, rather than submit to the domination of the Chinese Mandarins. In the province of Semirechensk, where Russian colonisation dates from 1854, the number of Russian towns and villages is much more considerable, and the total colonists exceed 30,000 individuals, who enjoy in their new abode a certain independence. Among these there are some thousands of Cossacks. In the valley of the Zerafshan, where the native population is very dense, Russian colonisation has been nearly impossible; nevertheless, at Samarkand itself there are more than 2000 colonists, who form the settled inhabitants of the European quarter of this famous town. There are also many thousands forming the floating population, soldiers, Government officials, commercial agents, etc. In the delta of the Oxus there have been established some colonies of Ural Cossacks, suffering exile for a revolt, who are chiefly occupied in fishing and agriculture. Finally, in the Trans-Caspian deserts we find an important Russian colony at Askhabad, and others of less importance at Mikhailovsk, Kizil Arvat, Merv, etc. In these localities many Armenians merchants from Moscow, and other traders are met with, but on account of the restricted extent of cultivable land this colonisation must ever remain very limited."

AFRICA.

British Protectorate over the Niger Districts.—It is hereby notified for public information that under and by virtue of certain treaties concluded between the month of July last and the present date, and by other lawful means, the territories on the West Coast of Africa, hereinafter referred to as the Niger districts, were placed under the protectorate of Her Majesty the Queen from the date of the said treaties respectively. The British protectorate of the Niger districts comprises the territories on the line of coast between the British protectorate of Lagos and the right or western river-bank of the mouth of the Rio del Rey. It further comprises the territories on both banks of the Niger from its confluence with the river Benue at Lokoja to the sea, as well as the territories on both banks of the river Benue from the confluence up to and including Ibo. The measures in course of preparation for the administration of justice, and the maintenance of peace and good order in the Niger district, will be duly notified and published.—*London Gazette.*

England and Germany in Africa.—A Parliamentary paper has been issued containing the correspondence relating to an "Agreement between Great Britain and Germany relative to their respective spheres of action in portions of Africa." On the 29th of April Lord Granville writes to Count Münster proposing the following arrangement:—"Great Britain engages not to make acquisitions of territory, accept protectorates, or interfere with the extension of German influences in that part of the coast of the Gulf of Guinea, or in the interior districts to the east of the following line—that is, on the coast, the right river bank of the Rio del Rey entering the sea between 8° 42′ and 8° 46′ longitude east of Greenwich; in the interior a line following the right river bank of the Rio del Rey from the said mouth to its source, then striking direct to the left river bank of the Old Calabar or Cross River, and terminating after crossing that river at the point about 9° 8′ of longitude east of Greenwich, marked "Rapids" on the English Admiralty Chart. Germany engages not to make acquisitions, accept protectorates, or interfere with the extension of British influence in that part of the coast of the Gulf of Guinea lying between the right river bank of the mouth of the Rio del Rey, as above described, and the British Colony of Lagos; nor in the interior to the west of the line traced in the preceding paragraph. Both Powers agree to withdraw any protectorates already established within the limits thus assigned to the other, a reservation being specially made as to the settlement of Victoria, Ambas Bay, which will continue to be a British possession. Germany engages to withdraw her protest against the hoisting of the British flag at Santa Lucia Bay, and to refrain from making acquisitions of territory or establishing protectorates on the coast between the Colony of Natal and Delagoa Bay." In a subsequent despatch of the same date, Lord Granville explains to Count Münster:—"I made an express exception as regards Ambas Bay on account of the rights there of a settlement of Baptist missionaries whom her Majesty's Government could not undertake to transfer against their will to German jurisdiction. If the German Government should be able themselves to come to a satisfactory arrangement with the missionaries, there being no political necessity involved, the difficulty as to the cession of Ambas Bay would disappear, and Her Majesty's Government would be ready to agree to its being included in the territories to be placed, in accordance with the arrangement, under German protection." On May 7, Count Münster replied, accepting the arrangement proposed by Lord Granville in his first despatch, and taking note of the contents of the second. Subsequently it was agreed that, in regard to trade in the respective protectorates of the two countries, such customs and duties only should be levied as were required to

defray necessary expenses, and that there should be no differential treatment of the subjects or goods of either nationality.

Exploration of the River Ogôwé.—On the 24th of April last Dr. Ballay, at a meeting of the Geographical Society of Paris, gave an account of his expedition from the Ogôwé to the Congo, undertaken at the instance and at the expense of the French Government. He reached the Coast of Africa early in 1882, just at the time when M. de Brazza was returning in ill-health from his journey to the Congo. The river Ogôwé was at the time in full flood, but the preparations which he had to make, in the way of recruiting his staff and collecting boats, delayed his starting for the interior till the season had arrived when the waters in the river are at their lowest and the natives have usually suspended all navigation. He had, therefore, to prosecute his voyage under new and special conditions, which rendered it particularly difficult. The Ogôwé had dwindled down to a small current, which ran in a bed full of enormous rocks with sharp protruding points. The stream was both narrow and deep, and at the same time tortuous and rapid as a torrent, and, being thus thrown with violence from one side to the other, formed whirlpools in which everything borne down by the current was engulfed and shattered. The boats (*pirogues*), of which twenty-eight had been collected, were in constant risk of destruction, and one of them, which carried a great many of the pieces from which a steam-sloop was to be constructed, was, soon after starting, upset and sunk. These pieces were carried a considerable way down the stream, but were eventually all recovered. The fear that such disasters might any minute occur, and ruin the whole enterprise, kept the minds of the party in a constant state of excitement. The rocks sometimes entirely barred the route, and then it became necessary to drag the boats and the cargoes amidst banks of rocks bristling with sharp points. One of these barriers forced the expedition to halt for a time in the country of the Okandas. While detained here, the Doctor, accompanied by some of the Okandas, made his way to a village of the race of dwarfs, called the Akkos or Okoas. He was the first white man they had ever seen, and such was the terror he inspired that he could not get nearer than within a dozen yards of any of them. Their encampment was a collection of low huts, open on all sides round, and filled with implements of the chase, nets, lances, sagaies. The chief was a little man, still young, adorned with a long beard, and hairy all over his person. He seemed to be about 4½ feet in height. The other men were all of the same diminutive stature, and the women seemed to be as tall as the men. These Okoas live in a sort of subjection to their more powerful neighbours. They are exclusively hunters, and obtain from those who till the soil a little vegetable food in exchange for plentiful supplies of game.

The Doctor arrived at the Upper Ogôwé towards the middle of November 1882, and immediately took up his quarters in some cottages prepared for his reception by M. de Brazza in the neighbourhood of Ondoumbo de Nguimi, a village lying on the route to the country of the Bateke. He describes the country of this people as presenting but little diversity of aspect. It is gently undulating, sandy and dry, and covered, though but thinly, with short grass, interspersed here and there with trees of stunted growth. Water is scarce, and the pools, which occur at wide intervals, are muddy and stagnant. There are, however, thickets on the hill-tops, and verdant oases, which form the seats of neat and pretty villages. The Bateke are agriculturists, and, in spite of the poverty of their soil, are abundantly supplied with the means of subsistence. They cultivate chiefly *manioc* (tapioca), millet, the ground-nut, and various kinds of herbs that have edible leaves. The labour of the fields is mostly done by women. The men work little, and pass their

time mostly in sleeping and smoking, and visiting neighbouring villages. Game is very scarce, but they eat with relish rats, locusts, and winged ants. The villages are generally situated in groups. One of the most important is that found near the river Nconi, then those of Acon and Osika, between which you pass from the basin of the Ogôwé into the basin of the Congo. Here occur marshy flats and deep depressions, whence such rivers issue as the Lekila, the Obia, and the Ankola, affluents of the Alima.

At Osika a station was founded by the expedition on the banks of the river Lekila, and hither the steam-sloop was with much difficulty transported. It was quickly put together, and launched. The party was, however, detained here for three months, owing to the long hesitation on the part of a native chief, who had reluctantly consented to act as guide to the Congo. It was at this juncture that M. de Brazza and the first members of his mission and two French missionaries arrived at the Alima. The caravan finally started at the beginning of October. It accompanied a convoy of ten pirogues, laden with manioc belonging to the chief Ndoumbi.

The Alima, called Mbossi by the inhabitants of the Congo, is a fine river, varying in width from 150 to 300 metres (164 to 328 yards), and running on a bottom of sand without being ever obstructed either by rock or sand-bank. Its depth is never below 16 feet, and the rate of its current is about two knots. Its course is, however, very tortuous, and at every angle a deposit of sand accumulates, which in course of time is covered with vegetation consisting of herbage and gigantic arums. The trees which adorn the banks are chiefly palms of different kinds, and plants that yield oils and perfumes. The Alima receives only two important affluents, both on the right bank, the Leketi and the Mpama. The villages along the upper part of the course, which are extremely numerous, are of the most wretched description. Their great trade is in manioc, which is despatched to the Congo. They get supplies of this commodity from the Bateke, who give it in exchange for smoked fish, pottery, and some European wares. This trade decreases beyond the northern bend of the river, and is replaced by the trade in ivory, and sometimes in slaves.

The Bafrus are much more civilised than their neighbours who inhabit the interior. Fishing is their chief occupation, but they prepare oil and a palm-wine, for which they find a market on the banks of the Congo. On reaching this river Ndoumbi and his men left the Doctor, who had now to pursue his way alone without a guide.

The Congo at this particular point runs in a multitude of channels amidst innumerable islands, and is consequently here difficult to navigate. But soon after, towards Chumbiri, the islands disappear, the immense sheet of water reunites, and the Congo becomes a majestic river, two miles in width, of enormous depth, and running between banks covered with verdant hills. After descending the stream for four days, the Doctor arrived at a village, where he was well received, and where he founded a French station. Some days afterwards he visited a chief called Makoko, who received him with great pomp, and assured him of his fidelity to France. He then returned to the station which he had just founded, to await there the arrival of M. de Brazza, and establish good relations with the chiefs in the neighbourhood. He proceeded thereafter to Brazzaville, where the native chief apologised to him for having expelled the French missionaries. These had been reinstated, and they have now a very prosperous mission and superb plantations. In the end of March, M. de Chavannes and the first members of the Brazza Mission arrived at Brazzaville, and soon after they were joined by the head of the Mission, himself. Here all the chiefs presented themselves, and with due solemnity recognised the French authority.

At the end of May our traveller left Brazzaville, and retraced his way to the coast. About the middle of August he arrived at the Gaboon, and here the expedition terminated. The Ogôwé, in his opinion, will never be rendered navigable, though the route can be improved. The basin is generally fertile, and rich in natural productions. On the other hand, the region which extends from the Ogôwé to the banks of the Congo is not generally fertile. Ivory is almost the only product. The region of the Licona, at least towards its sources, is rich and fertile. Finally, there is reason to believe, judging from the reports of those who have visited the Niari-Quillon, that this basin is worth more than the Bateke plateau. It can perhaps be compared to the Ogôwé; it is rich in caoutchouc, and all the districts bordering on the sea are fertile. All the natural products, however, said the Doctor, will soon disappear; and it is necessary that we should be ready to replace them by the products of that cultivation which is neither exclusively conducted by Blacks nor by European emigrants, but of that cultivation in which the labour of the natives shall be directed by the intelligence of civilised man. The attempts of this nature, made up to the present time, have given good results.

Eastern Equatorial Africa.—According to despatches from Zanzibar and a letter received from Karema, the East African Expedition, under Dr. Böhm and Reichard, which seemed to be progressing so favourably, has been totally wrecked. Böhm himself died at Mua (?) 27th March, 1884; Reichard was saved; but the whole of the equipment and stores of the expedition were lost. It is not yet known whether the calamity was caused by an accident or was the result of a fight with the natives. —*Petermann's Mitteilungen*, No. vi.

New British Protectorate in South Africa.—The proclamation of the British protectorate over Bechuanaland is without doubt the most notable event which has taken place in South Africa for some considerable time. It arrests attention both from its far-reaching political importance and from the vast extent of the country concerned. First of all, a provisional protectorate was proclaimed by Sir Charles Warren over a territory about as large as Spain, bounded on the south by Cape Colony, on the east by the Transvaal, on the north by the line of the 22nd degree of south latitude, and on the west by the line of the 20th degree of east longitude. This includes the rather notorious Stellaland and Goschen, the lands of several minor chiefs, and part of the lands of Khama, whose dominions extend in one direction as far as Lake Ngami, and in another as far as the Zambesi. Room is left, as will be seen, for German expansion eastward through Great Namaqualand and Damaraland up to the line of the 20th degree of east longitude. This, however, is not the whole of Sir Charles Warren's doings. The latest intelligence from the district is to the effect that, on the 12th May, the British protectorate was established over the *whole* of *Khama's country*. The importance of this act cannot well be exaggerated, as it puts the trade route from Cape Colony to the interior entirely under British jurisdiction. The chief Khama is well spoken of by all who have had dealings with him, being reported as a well-educated man, exceedingly desirous to benefit his country by a just and tolerant rule. Mr. Baden Powell, according to a Reuter's despatch, has undertaken to report on the resources and condition of the country.

Bad News of Serpa Pinto.—*L'Afrique*, for June, states that, according to letters received from Mozambique, Major Serpa Pinto's expedition met with a severe check on its first attempt to penetrate into the interior. On the 14th February he arrived, with his escort of Zulus, at Kisango, on the coast, in a most deplorable condition, the rainy season having supervened during his march northwards. For five days they were absolutely without food, and the Portuguese explorer him-

self had an attack of fever. Major Pinto's object in returning to Kisango was to procure 250 fresh porters; and he hoped to make another start for Lake Bangweolo in about six weeks.

AMERICA.

Population of Newfoundland and Labrador.—Information giving the result of the recent census here came to hand by the last mail. According to this, the total population of Newfoundland and Labrador is at present 196,411. Of these, 4,211 reside on the coast of Labrador, of whom 1,347 are Eskimo, under the charge of Moravian missionaries, and 2864 are whites. The population of the island itself is now 192,200. In 1874, when the last census was taken, the population of Newfoundland and Labrador was 161,380, so that the increase in ten years has been 35,031 or 21·70 per cent. The slight immigration has been more than counterbalanced by the emigration, so that the increase of nearly 22 per cent. has arisen from natural causes. In 1832 the population was 60,000; in 1845, 98,703; in 1857, 124,288; in 1869, 146,536. The population of St. John's in 1800 was but 3420; in 1809, 5000; in 1812, 7075; in 1835, 15,000. At present it is probably over 31,000, but the abstract does not show the exact population of the city as distinct from the eastern and western districts. The rate of increase during the last decade—21·70 per cent.—has been higher than in any previous decade. It appears that there are in the colony 74,651 Roman Catholics, and that the various Protestant bodies number altogether 120,411, the majority of Protestants being at present 45,760. During the decade the Roman Catholics have increased at the rate of 16 per cent.; Protestants have increased at the rate of 24 per cent.—*Canadian Gazette*, May 28.

Sailing of the "Alert."—The *Scotsman*, June 15, publishes the following intelligence from Ottawa:—The Arctic steamer *Alert* sailed from Halifax on the 27th ultimo for Hudson's Bay, Dr. Bell, of the Canadian Geological Survey Staff, accompanying the expedition as chief scientific officer, his assistant being Mr. M'Naughton, late of the United States Geological Survey. After visiting the various stations at which observation parties were stationed during the past winter, and landing fresh parties to relieve those whom they take off, further surveys in the vicinity of the stations are to be made, magnetic observations taken, and all the information possible will be obtained regarding the resources of this unknown land. Beacons are to be erected where practicable on prominent points of danger, and all harbours in Hudson Bay will be examined and surveyed. A channel has been for many years laid down on the maps parallel with Hudson's Straits, supposed to be 200 miles long, and no record exists of its ever having been sailed through. Lieutenant Gordon, R.N., in command of the *Alert* will make an effort to ascertain whether this channel really exists and is navigable, or if it is only a myth reported by the Esquimaux. If found to be a reality and feasible for navigation, it will go a long way to solve the problem of a short route to Europe from the far North-West. Captain Adams, the Arctic navigator of Dundee, was to have accompanied the expedition, but has now made other arrangements.

Italian Colonies in Rio Grande do Sul.—That the Germans have established some successful colonies in South Brazil is pretty well known. But it is not so well known that the Italians have flourishing settlements in the same districts, viz., the provinces Rio Grande do Sul and Santa Catharina. Italian emigration to the former province began in 1875 with the founding of Caxias, Conde d'Eu, and Donna Isabel, to which was added, later, Silviera Martins. According to the census taken in 1884 by Dr. Pascale Corte, Italian Consul at Porto Alegre, the number of Italians in South Brazil amounted to 37,101 souls—Caxias, 13,680;

Conde d'Eu, 6287 ; Donna Isabel, 9595 ; Silviera Martins, 6001 ; and the rest in German settlements. Further statistics are contained in the following table :—

Colony.	Number of Claims.	Unoccupied Claims.	Houses.	Live Stock.					Products.					
				Mules.	Horses.	Cattle.	Pigs.	Goats.	Rye.	Oats.	Beans.	Maize.	Rice.	Wine.
									bush.	bush.	bush.	bush.	bush.	gallons.
Caxias, . .	3866	193	3373	4800	5900	3500	12,000	1500	755,863	377,932	1,007,817	2,015,634	..	638,000
Conde d'Eu,	819	none	1395	1046	686	701	8,422	547	498,558	902,626	1,013,234	2,240,125	26,455	607,112
Donna Isabel,	1323	40	..	5700	6000	3800	12,000	8000	910,058	826,332	1,093,734	1,896,586	37,714	1,096,920
Silviera Martins,	991	none	750	500	1500	1000	10,000	..	755,863	377,932	1,007,817	2,015,634	125,977	638,000

Twelve thousand more Italians are expected at Rio Grande do Sul in the course of the present year, which will bring up the number of Italian immigrants to 50,000 in ten years. In sixty years there have immigrated into the same province not many more than 25,000 Germans. The latter have most of the import and export commerce in their own hands ; but the rapid growth of the Italian settlements will soon become a serious source of danger to their commercial supremacy. And this is all the more likely since the Italians who arrive come from the northern districts of Italy and the Italian districts of the Tyrol. They are very industrious and persevering, and very soon succeed in getting into pretty comfortable circumstances. They possess several industrial establishments, such as mills, breweries, saw-mills, etc. They suffer from means of transport to the coast ; the roads to Porto Alegre are very inconvenient as well as bad. Besides the cultivation of the vine, which promises to yield an important item among the productive resources of the province, the people also carry on sericulture and plant tobacco. An Italian newspaper has appeared for some time at Porto Alegre ; and the home Government appears to take great interest in the success of the colony. Hence, taking all the circumstances into consideration, Dr. Wilhelm Breitenbach fears that they will prove very formidable rivals to the colonies of his countrymen.—Dr. Breitenbach, in *Globus* (vol. xlvii., No. 21, 1885).

Mexico.—By a recent decree, the President of the Republic of Mexico has declared the following ports open to foreign commerce :—Matamoras, Tampico, Tuxpan, Vera Cruz, Coatzacoalco, Frontera de Tabasco, Carmen, Campeachy, and Progreso, on the Gulf of Mexico ; and Soconusco, Tonala, Salina Cruz, Puerto Angel, Acapulco, Manzanilla, San Blas, Mazatlan, Altaya, Guaymas, La Paz, Cape St. Lucas, Magdalena Bay and the Bay of Todos los Santos, on the Pacific Ocean. —*La Gazette Géographique*.

AUSTRALASIA.

Anglo-German Boundary in New Guinea.—We are authorised to state that Lord Derby, on the 25th inst., cabled to the Governors of the Australian colonies that the following boundary-line had been agreed upon by the Governments of Great Britain and Germany in respect to the interior of New Guinea :—Starting on the coast near Mitre Rock on the 8th parallel, following this parallel to 147° E. long. ; thence by a straight line N.W. to where the 6th parallel cuts 144° ; thence W.N.W. to where 5th parallel cuts 141°. The territory unclaimed by the Dutch is thus divided nearly equally between Great Britain and Germany. The British possessions do not include Long Island, Rook Island, or any adjacent island northward of latitude 8°.

German New Guinea and Dependencies.—The Emperor of Germany has granted to Baron von Hansemann, of the Disconto Bank, Berlin, on behalf of the New Guinea Company, a letter of protection, bearing date May 17, in which it is stated that the territories under the control of the Company, and to which this protection extends, are as follows:—1. That part of the mainland of New Guinea which is not under British or Dutch sovereignty, this having been named Kaiser Wilhelms-land. 2. The islands lying before this part of the coast of New Guinea, as well as the islands of the Archipelago, which have hitherto been known as New Britain, but which, at the request of the Company, the Emperor agrees to call Bismarck Islands, and all other islands lying east of New Guinea, between the Equator and the 8th degree of latitude S., and between the 141st and 154th degrees of longitude E. —*The Colonies and India*, 5th June.

The Kimberley Exploring Party.—Mr. W. J. O'Donnell, the leader of the Kimberley exploring party, thus reports to a contemporary:—"I am sorry that I cannot give you the particulars of the trip, which I must first report in Melbourne. During the trip I discovered splendid pastoral country near the north-east coast, crossed with numerous creeks and rivers. Daily rains set in during the month of December—heavy floods, which stopped us. The blacks are not numerous, but they showed hostility near the coast, and compelled us to fire in self-defence. I did not see Mr. Stockdale's tracks west of Cambridge Gulf, and neither saw nor heard anything of the two men who remained behind from Mr. Stockdale's party. There are little hopes of their being found alive, for if they made back to Cambridge Gulf, the blacks there are very treacherous. While on the Ord River cattle station, I heard a report from the natives that three men had been killed by blacks to the south of that place, but that was before the two men could have left. I cannot understand how Mr. Stockdale could have crossed the Ord River without knowing it, as the river is very wide, and well defined for over 300 miles. The country on the Victoria River, and from thence to the north-west coast, is looking splendid, and the cattle and horses on the Victoria and Ord Rivers are in splendid condition. The climate is very healthy, and not a member of our party suffered a day's illness during the trip, but, owing to our being much longer than had been expected, we suffered more or less from hunger, though we killed only one horse for food. We found that game was very scarce when we wanted it most. I will take a few days' spell here, and will proceed to Port Darwin, where I will camp until I dispose of the horses and plant, and will then proceed to Palmerston."—*Colonies and India*, 22d May.

Western Australia.—On the 21st March, the steamer *Otway* conveyed three important expeditionary survey parties to the north. Within a short period, the whole vast stretch of coast country, from Israelite Bay on the south, to Cambridge Gulf on the north, will be connected by triangulation. One of the parties which left Freemantle on the date above-mentioned, in charge of a young Victorian, Mr. H. S. King, lands at Carnarvon with thirteen men and twenty-three horses for the traverse and triangulation of the rivers and country in the neighbourhood of the Ashburton, Lyons, Hardy, Fortescue, etc. Another, under Mr. F. S. Brookman, will be employed on the country to the eastward of Roeburne. The party in which interest chiefly centres is in command of a rising young West Australian, Mr. H. F. Johnstone, with a Victorian (Mr. Nyulassy) second in command, and is destined for Cambridge Gulf. This is Mr. Johnstone's third season at Kimberley survey work, and he now has before him a more arduous trip even than the two which preceded it. The party will land from the *Otway* at Cambridge Gulf, and connect the mouths of the Ord with the triangulation of last year, near its junction with the Negri. After-

wards, it is proposed to traverse some of the rivers lying between the Ord and the Leopold Range, the return being made again by sea, seven months after landing. Another party proceeds in a fortnight's time for field work in Eucla.—*The Melbourne Argus*, April 20.

Borneo.—Letters received from the Rev. J. E. Tenison Wood announce his speedy return to Australia. After exploring in the Malay Peninsula, he had proceeded to Borneo, where he had thoroughly examined the coal beds at Labuan, Brunei, Gaya, and Sandakan. This has led to important discoveries as to the age of the Borneo coal fossils, which are the same as those of New South Wales. He had then examined some of the volcanic islands of the Philippines.—*The British North Borneo Herald* (published at Sandakan), 1st May.

Sakit Latah.—Readers who have noticed Mr. H. O. Forbes's curious observations (p. 69, *A Naturalist's Wanderings*) on what he calls the curious cerebral affection, known to the natives as *lata*, will be interested in the following details contributed by Herr Emil Metzger to the *Globus* in 1882 :—Sakit Latah is the name given in Java to a peculiar species of nervous disorder. The person who is afflicted with it loses all power of self-control, and can be wrought upon by an operator to extraordinary feats of imitation. *Sakit* means sick or ill ; but *latah* appears to be a descriptive term, defining the disease itself. The native population do not look upon those who are *sakit latah* as being in any way insane ; for whilst they treat persons in the latter condition with the care and attention—and even reverence—that prevail amongst so many peoples for such unfortunates, they are in the habit of deriding and mocking the *orang latah* (the sufferer), and they even wantonly provoke a display of the symptoms of the affliction in order to make them an object of jest. A loud shout unexpectedly addressed to one who is subject to the disease, or a sudden violent movement or gesture made within the range of her immediate attention—for only women are subject to be *sakit latah*—will suffice to throw her into a condition for being experimented upon. Being thus startled, the patient fixes her eyes upon those of the operator (as he may be called), and she is unable to move them from his face. Although she may at first struggle against the influence, yet she loses control over herself more and more in proportion as the words and actions of the operator increase their hold upon her attention. She is then a passive instrument, and cannot help repeating whatever words or sounds are spoken to her, or imitating whatever gestures or movements are dictated to her.

Herr Emil Metzger quotes two instances of the disease, illustrating the entirely involuntary nature of the patient's actions. The first case is that of a young servant-girl, living in a family with which Herr Metzger was acquainted. Visitors had called, and were being entertained in the *Pandoppo* or verandah, at the back of the house (where meals are also taken). The girl entered with several plates in her hands, and was suddenly addressed by her mistress (with the express view of calling forth an exhibition of the disease), who at the same time made a quick gesture with her arm. The patient having been thus set in the proper condition, the lady, out of consideration for the safety of the plates, confined herself to speaking, uttering her words with continually increasing quickness, the girl meanwhile faithfully repeating every word after her. At length the lady cried warningly, "*Djangan djatoh—djangan djatoh piring*" ("Don't let the plates fall"), at the same time unconsciously stretching out her hand, as if to prevent the accident. The girl repeated her words exactly, and also her gesture—and down went the plates on the floor.

In the other instance, Herr Metzger experimented upon his own native cook.

Her restless bodily movements and peculiar behaviour—persistent avoidance of her master's eyes, nervous movements of the fingers, wringing the hands, twisting the entire body, curious manner of laughing to herself—when she appeared before him in the morning to receive her commands for the day, attracted his attention, since such behaviour formed a striking contrast to the behaviour of native servants in general. He learned she was *sakit latah*. One morning, after giving his orders in the low tone of voice that was usual with him, he all at once addressed her in a louder key, and suddenly started to his feet. At first the woman tried to withstand the attack: she cried, "*Djangan tuwan djangan*" ("No, don't, sir"); but then she too started up, and imitated the violent movements of the arms which Herr Metzger was going through before her. Again she made an effort to escape from the fascination that was upon her; but a sudden stop and a loud shout, which she was obliged to imitate, deprived her completely of self-control. Her eyes were set and half-closed, and fixed unchangeably on those of her master. In this condition she imitated every movement he made, which was *visible to her*, at once. Changes were effected in articles of dress, various postures assumed, and she even sat on a chair in European fashion—which was something very unusual in a native Sundanese (for she was of this nationality); glasses were thrown to the ground and water drunk, etc. In nearly all cases the imitation followed the action immediately, without loss of time. But the most remarkable part of the experiment was that the woman repeated accurately several words of languages unknown to her. Words, containing letters which do not occur in the Sundanese tongue, had been picked out beforehand, among them words with the German *ö* and *z*, and the Italian *ci*. Herr Metzger then requested a European who was present—a born Slav—to utter a few Slavonic words pretty heavily interlarded with sibilants. These also the woman repeated accurately, since the new experimenter, by speaking in a loud tone of voice, easily attracted her attention to himself.

At length, to put an end to the cruel game, as he calls it, Herr Metzger sat down; the woman followed his example. After he had remained quiet and motionless for a few minutes, she came to herself again, and, having sat a moment with her eyes wide open, she jumped up and ran away as fast as she was able, muttering what was doubtless a curse between her lips. She afterwards remembered quite well the orders that had been given to her before the experiment. Some days later, having appeased the woman by a present, and by the promise not to make any further experiments upon her, Herr Metzger sought to ascertain whether she was conscious of her actions during the attack, and whether she remembered what she had done whilst in that state. But the only answer that could be got out of her was a curt "*stan*" ("I don't know"). The writer states that the only persons subject to this disease, whom he himself met with, are old and worn-out women, and they were all characterised more or less by a certain peculiarity in appearance, their features being flabby, their eyes dull, and they showed a certain carelessness in their dress.

A Dutch military doctor, who spent twenty years in the East Indies, states that the disease belongs to the large class of hysteric nervous disorders, and might quite well occur in young girls as well as in old women. He adds that, so far as he knows, it is a form which has never been observed in Europe, although cognate forms occur. It seems to be closely related to those racial peculiarities which distinguish the normal Malay from Europeans, the condition of *sakit latah* amongst the women having its parallels amongst the men in *mata glap* (the "darkened" eye) and running *amok*.

MISCELLANEOUS.

Report on Geographical Education by Mr. J. Scott Keltie.—Though not formally issued by the Royal Geographical Society, this Report, based on a series of careful inquiries on the Continent as well as in our own country, has already done good service by calling the attention of the newspaper press to the question of geographical education in our Universities and Higher Schools. If the result of special inquiry justifies the statement that "the Universities of England at present exercise no influence except through their local examinations—and these scarcely touch the higher schools"—it is surely high time that University reformers were giving attention to this matter. We shall return to the subject of this Report on a future occasion, and, meanwhile, we refer our readers to the *résumés* given in the *Times* and the *Pall Mall Gazette*, June 9.

The Proposed International Geographical Society.—In reference to the reports published some time ago by the newspapers that the King of the Belgians was interesting himself in the formation of an International Geographical Society, Count de Borchgrave d'Altena, Private Secretary to his Majesty, writes to us as follows:—"The King has nothing to do with the formation of an International Geographical Society; the project is totally unknown to his Majesty."

Estimated Number of the Jews.—The *Bulletin de la Société de Géographie de Marseille* for June contains an article on the Jewish population in the world. It produces figures which are supposed to represent the nearest approximation which has as yet been arrived at:—

EUROPE.

Germany,	561,612	Luxemburg,	600
England,	60,000	Portugal,	200
Austria-Hungary,	1,643,708	Roumania,	260,000
Belgium,	3,000	Russia,	2,552,145
Denmark,	3,946	Servia,	3,492
Spain,	1,900	Sweden and Norway,	3,000
France,	70,000	Switzerland,	7,373
Greece,	2,652	Turkey in Europe,	116,000
Holland,	81,693		
Italy,	36,289		5,407,610

ASIA.

Turkey (Palestine, Syria, Asia Minor, Arabia),	150,000	Turkestan, Afghanistan,	14,000
Persia,	15,000	India and China,	19,000
Russia in Asia,	47,000		245,000

AFRICA.

Algeria,	35,000	Cape of Good Hope,	1,000
Morocco,	100,000	Egypt,	8,000
Sahara,	8,000	Tunis,	55,000
Tripoli,	6,000		
Abyssinia,	200,000		413,000

AMERICA,	300,000
OCEANIA,	12,000

We thus have :—

In Europe,	5,407,000
„ Asia,	245,000
„ Africa,	413,000
„ America,	300,000
„ Oceania,	12,000
Total,	6,377,000

Perhaps never in the most brilliant epochs of their history as a nation, were the Jews so numerous. In an article in the *Journal of the Society of Biblical Archæology*, 1876, a similar summation was attempted, the result being 5,226,858.

NEW BOOKS.

Under the Rays of the Aurora Borealis: in the Land of the Lapps and Kvæns. By Sophus Tromholt. Original Edition, with a Map, and 150 Illustrations, Portraits, Diagrams, etc., from Photographs and Drawings by the Author. Edited by Carl Siewers. In two volumes. London : Sampson Low, Marston, and Co. 1885. 30*s*.

Few volumes of travel and scientific observation are calculated to give so much pleasure as these of Dr. Sophus Tromholt. They are written in the most lively style, full of adventure, anecdote, and interesting observation, and are got up and illustrated in the most attractive style. To the English reader they present a picture —not available elsewhere in such moderate compass and vivid colours—of the home-life, habits, and feelings of almost the only remaining savage people in Europe,— and that picture is full of the most varied interest. The Lapps are an interesting people, and the sketches given of them in many aspects are well drawn. "No ladies' tea-party," says Dr. Tromholt, "can be gayer and more animated than some Lapps who have just met round a friendly hearth. If a stranger be present, they may at first be a little reticent ; but if the former be kind and communicative, or particularly fond of joking, they soon change their front. They are never backward in replying. The Lapp is a keen humorist, and sharp in repartee and chaff." And he sums up their character in the sentence : the Lapp "is a savage, endowed with a mixture of goodness and vice, simplicity and cunning, sensitiveness and cruelty, indolence and energy ; indeed, a true child of Nature."

The author's duty in Lapland was specially to make scientific observations on the Aurora Borealis, and the last chapter of the first volume is devoted to that subject, and the results of his observations upon it. This is written in the best style of popular scientific exposition. The heights obtained for the lower edge of the strange "wavering fires" range from 47 to 102 miles, and the average may be taken as from 70 to 90 miles.

One very remarkable chapter in the second volume is that on "The Reign of Terror in Lapland," a record of one of the most remarkable events in the religious history of our age, which reads like that of the ravings of a diseased mind, or of a people possessed of demons in the most terrible form. The rest of the work describes chiefly the author's journeyings and adventures—often amusing—in Lapland and Finland, with notices of many a curious old-world custom.

Manual of Modern Geography. By the Rev. Alex. Mackay, LL.D., F.R.G.S., Author of *Facts and Dates*, etc. William Blackwood and Sons, Edinburgh and London, 1885.

This is the eleventh edition of a handy book of reference (Pp. 676 with the index) on geography, interpreted so as to include a deal of geology, astronomy, climatology, botany, zoology, ethnology, literature, and history: a monument to one man's industry and intelligence.

According to the title-page, this edition has been "thoroughly revised." To revise such a work is a more tremendous task than to compile it. Many a man is learned enough to excerpt wisely from the best and latest authorities; but hardly any man knows all the several subjects well enough to eliminate from the excerpts originally made whatever in them may have lost validity, and to substitute what is both new and true. To employ a number of specialists in the work of revision is a precaution that does not seem to have been taken.

From a list of about seventy errors, inconsistencies, and omissions noted in the course of a cursory perusal of the strictly geographical paragraphs, let the following instances suffice:—

It is no longer true that Wadai and Darfur are tributary to Egypt (p. 473); or that at Salt Lake City "the notorious Brigham Young sets the law of the United States and of morality at defiance" (p. 540); or that Bolivia has a sea-board, and Cobija for its seaport (pp. 588-9); and it never was true that Kafiristan formed part of West Turkistan (p. 425).

The Universities of Belgium cannot count four (p. 215) and three (p. 218) at the same time.

To substantiate an omission is toilsome; for a supposed omission may be supplied in an unlikely place. Thus, the Panama Canal is not mentioned along with the Panama Railway, but the omission is supplied further on under the heading "Ethnography." The reviewer has noted over twenty grave omissions. By way of example, neither in index nor in text is the island of Staffa mentioned, nor the now important town of Barrow-in-Furness.

The classification of towns according to river-basins does not, surely, require that Gretna-Green, Langholm, and Newcastleton should head the list of English towns, as they do at p. 138; and that without any indication of their true nationality such as is given in connection with Berwick-on-Tweed, which heads the list of Scotch towns at p. 158.

It is hard for a "Scotch Reviewer" to point out blemishes in a book which gives to his countrymen the following certificate of saintship:—"The divine code of moral law is observed by all classes of the community" (p. 161). But Dr. Mackay indulges in rhetoric whenever a glade opens in the thicket of *Facts and Dates*.

Through Egypt, Palestine, and Syria. By Rev. John Kerr Campbell. London: S. W. Partridge and Co. 4*s.* 6*d.*

We strongly object to publishers omitting the year of publication from the title-pages of books; and we like to have a "rule," tail-piece, or "finis" at the end of the work to assure us that it is bound entire; but at the end of the last line at the bottom of page 220 of this volume we have indeed a period, but nothing else to indicate that a page or more has not been left out in binding.

For the rest, the minister of Marykirk, Stirling, has written a chatty account of his visit as a member of a party of Gaze's tourists to Egypt and Palestine. For those who have no inclination to read larger and better books, the perusal of this small volume may not be altogether unprofitable. Of its accuracy in details readers

may judge for themselves. We unfortunately learn from it such information as that the Sea of Galilee "was one of the principal highways from Damascus and Syria to Europe" (p. 64); and that "from the material grandeur of the Bay" of Naples Homer and others "must have drawn not a little of their inspiration" (p. 18); both statements need correction.

Aux Pays du Soudan. By Denis de Rivoyre. Map and Illustrations. Paris: Plon, Nourrit et Cie. 1885.

M. de Rivoyre has given us a very entertaining book on a trip he made into the Sûdan some years back. His narrative has something of the charm of an *Arabian Nights* story. It is a veritable romance, told in the true Parisian style. However, one does not quite know where to take him seriously, or where history begins and romance ends. When the story lags, his faithful servant Gœrgius steps in, and "tells a tale."

Mehr Licht im Dunklen Welttheil. Betrachtungen über die Kolonisation des tropischen Afrika unter besonderer Berücksichtigung des Sansibar Gebiets. Von Dr. G. A. Fischer, praks.-Arzt in Sansibar. Hamburg: L. Friederichsen und Cie., 1885. *Price, M.* 2.50.

The author, a medical man, practising in Zanzibar, calls his book a recipe against "African fever." We must confess he has written a very good prescription: at least, it should in a great measure allay the great expectations formed of African colonisation. Dr. Fischer, who will be remembered for his journey into Masai Land, is a good observer, and writes well. A perusal of his book will be both entertaining and instructive.

Nos Petites Colonies: Sainte Pierre et Miquelon, le Gabon, la Côte d'Or, Obock, Mayotte, Nossi-bé, Sainte Marie de Madagascar; établissements français dans l'Inde, Taïti et ses dépendances, les Marquises, les Tuamotu, les Gambiers. Par Fernand Hue et Georges Haurigot. Paris: H. Oudin. 1885. Pp. 351, and 6 Maps. *Price, francs* 3.50.

The small colonies are almost unknown to the French public, and it is the object of this little book to introduce a series of works on this subject which are to appear in the *Bibliothèque de Géographie et des Voyages.* The book under notice gives a general view of the subject from a popular standpoint, and is worth reading.

Das Antlitz der Erde, von Eduard Süss. 1 Theil, erste Abtheilung, Seiten 1-310; 2 Theil, zweite Abtheilung, Seiten 311-778. Prague und Leipzig: F. Tempsky und G. Freytag.

Only the first part of this work has, as yet, appeared (1 Theil, erste Abtheilung: Die Bewegung in dem äusseren Fels-Gerüste der Erde; 10 Mark, 1883). From the aspect which the earth's surface would have to a spectator suspended in space, the author points out that all continents are wedge-shaped in their southern extremities, and he endeavours to give reasons for this peculiarity. He then examines the different accounts of the Deluge, as chronicled by various peoples, and refers to the phenomena apparent in our own day at the mouths of the Ganges and Indus. Earthquakes in the Eastern Alps, the south of Italy, Central America, and Chili are enumerated and described, and an inquiry made into the connection between earthquakes, volcanoes, and the earth's crust.

1 Theil, 2 Abtheilung: Die Gebirge der Erde; 16 Mark, 1885.—This part opens with a valuable description of the Alps and the basin of the Mediterranean, and an outline of the structures of the principal ranges of the Old and New World are then given. Finally, the author summarises his conclusions.

The first part of the second volume, which is to appear this year, will contain "Die Veränderungen der Gestalt der Meeresoberfläche;" and the second part of the second volume, "Das Antlitz der Erde," a summary of the whole work, dealing, also, with the propagation of organic life over the earth's surface.

NEW MAPS.

EUROPE.

UNITED KINGDOM, New Electorate Map of—, showing the Electoral Divisions and Boroughs which return Members to Parliament under the Redistribution of Seats Act, 1885. By RUDDIMAN JOHNSTON, F.R.G.S. *Edinburgh: Ruddiman Johnston. Price* 1*s.*

FRANCE, Carte de —, du Dépôt de la Guerre, à l'échelle du 200,000. By Colonel F. PERRIER.

Six sheets have appeared—Metz, Nancy, Vesoul, Troyes, Dijon, and Châlons-sur-Marne. The military character and object of this work is evident; the new fortresses are given, and the topographical features of the country are clearly delineated.

ASIA.

INDO-CHINE, Esquisse de Carte pour servir à l'intelligence des Voyages en—, du Dr. NEIS, et d'autres Voyageurs Modernes. Echelle au 1:5,000,000. *Bulletin de la Société de Géographie Commerciale. Mars*, 1885.

This is of value mainly on the principle that no map leaves a clear impression on the memory if it contains too much.

AFRICA.

AFRICA, East Coast.—Sketch Survey of Ports Nakala and Kisima-Julu, by Mr. H. E. O'NEILL, F.R.G.S., Her Majesty's Consul at Mozambique. *Proceedings of the Royal Geographical Society, June* 1885.

Cape Melamo (Ras Kulumlomu) is placed in lat. 14° 25′ S., long. 40° 49′ E., to the south of Fernão Veloso Bay (Mazazima), of which Port Nakala, with depths varying from 20 to 10 and 6 to 5 fathoms, is a S.W. branch. North-westward trends the much less important Belmore Harbour (Nihegebe). Kisimi-Julu is south of Cape Melamo, and has a depth of 3-4 fathoms, with an entrance 100-200 yards wide.

CONGO, Nouveau tracé hydrographique du—septentrional et des affluents. Dressé d'après l'exploration de M. GRENFELL et l'hypothèse de M. A. J. WAUTERS.

This map illustrates the paper by M. Wauters, the editor of *Le Mouvement Géographique*, in the issue of that paper for 31st May 1885.

OASE, Originalkarte von Paul Ascherson's Reise nach der Kleinen—, März-Mai 1876. Nach seinen Tagebüchern construirt von RICHARD KIEPERT. Maassstab 1:500,000. *Berlin: Zeitschrift der Gesellschaft für Erdkunde.*

This map shows the whole district from the Nile valley and the Fayum west and south-west to Wah-el-Beharie, or the Lesser Oasis (28° N. lat. and 29° E. long.), indicating the extent of land under cultivation, and the limited areas where the desert vegetation is luxuriant. One inset gives the northern portion of the oasis on a scale of 1:145,000, and another the neighbourhood of Bawīti, on thrice the scale of the main map; in both cases the area occupied by rice fields being separately coloured.

SKLAVENKÜSTE, Karte des Deutschen Gebietes an der—, auf Grundlage deutscher und englischer Aufnahmen, und nach Dr. H. Zöllers Berichten. 1:250,000. *Petermann's Mitteilungen, VI.*

This is the best map which has come under our notice of the newly-acquired German territory on the slave coast, Togo-land, and its connections; which, besides showing the routes of Dr. Zöller and previous explorers, has an inset map indicating the territory near Togo as yet unexplored.

AMERICA.

CANADA, Map of the Dominion of—, geologically coloured. From Surveys made by the Geological Corps, 1842 to 1882. Two sheets. By A. R. Selwyn and G. M. Dawson. *Montreal: Dawson Brothers*, 1884.

FLORIDA, State of—. Two sheets. 1:760,000. *Washington: Department of the Interior*, 1883. Florida, State of—, New Sectional Map. 1:633,000. *Chicago: Rand, M'Nally, & Co.*, 1885.

PANAMA, Specialkarte des — Kanales. 1:120,000. This map, founded on the official Report of Lieutenant Rodgers, though not showing the physical features of the country, will be found most serviceable to civil engineers, for whom it is evidently prepared. *Petermann's Mitteilungen, VI.*, 1885.

NORTH ATLANTIC OCEAN, Pilot Chart of the —. Prepared by order of the Bureau of Navigation, U.S. June 1885.

This monthly chart, issued by the United States Bureau of Navigation, is invaluable to mariners on the North Atlantic, and an evidence of the very thorough way in which the United States Government makes the information at its disposal useful to the general public, instead of, as is the practice of some Governments, allowing the material gathered at great public expense to lie shelved, firmly bound up with "red tape." They show storm-tracks, points where icebergs or ice-fields have been reported, and their limits, wrecks buoyed off or sunk, limits of Gulf Stream or other ocean currents, direction and force of wind, etc.—in fact, the freshest *data* for the direction of navigators on the North Atlantic.

OCEANIA.

SÜDSEE, Karte des Westlichen Theiles der—zur Veranschaulichung des unter Verwaltung der Neu-Guinea Compagnie gestellten Deutschen Schutzgebietes, u. s. w. *L. Friederichsen u. Cie.: Hamburg*, 1885.

This map shows the area covered by the German protectorate, which extends from the Equator to 8° S. lat., and from 141° to 154° E. long. The portion of New Guinea annexed (of which we have given the boundaries in the Geographical Notes in this number of the *Magazine*) is to be known henceforth as Kaiser Wilhelms-Land, and has an area of 178,200 square miles. The protectorate embraces the islands of New Britain and New Ireland, which, with the adjacent islands and the Admiralty Group, now constitute the Bismarck Archipelago. The map contains recent surveys of York Island (between New Britain and New Ireland), and of some harbours on the New Guinea Coast.

ATLASES.

HISTORISCHER HAND-ATLAS, Professor G. Droysen's Allgemeiner—In sechsundneunzig Karten, mit erläuterndem Text. 2 Lief., May 1885. *Bielefeld und Leipzig: Verlag von Velhagen und Klasing. Price, 2M.*

This is the second part of Dr. Andree's Historical Atlas, the first part of which was mentioned in the *Magazine* for June.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

EAST AFRICA, BETWEEN THE ZAMBEZI AND THE ROVUMA RIVERS: ITS PEOPLE, RICHES, AND DEVELOPMENT.

Delivered before the Scottish Geographical Society at Edinburgh, 9th July 1885.

By Henry E. O'Neill, Esq., F.R.A.S., H.M. Consul, Mozambique,
Gold Medallist of the Royal Geographical Society, London.

I must first tell you I deem it a very high compliment to be permitted to speak upon Africa before the Geographical Society of Scotland. Africa has always seemed to me to be essentially the field of Scottish exploration. When the history of that continent comes to be fully and comprehensibly written, and the efforts made by all civilised nations to develop it stand fairly side by side, the deeds of three will, I think, stand out in marked prominence above the rest. These are the Phœnicians, who not only in Northern Africa established the powerful and enlightened empire of Carthage, but sent out from it fleets and emigrants to explore and settle upon both African coasts, and who founded cities, traces of which, I am of opinion, may be seen in Eastern Africa at the present day. Then the Portuguese, whose history in the fifteenth and sixteenth centuries is, as you well know, mainly a brilliant record of daring deeds of discovery and exploration; who fought their way, against adverse wind and current, around the African coast, and marked with their "padrões de descoberta," or crosses of discovery, every conspicuous point, revealing to us the first outlines of a then unknown world. And, lastly, the Scottish, whose long roll of distinguished African travellers exceeds that of any other people, and to whom Central Africa owes more in the discoveries of one noble man—Livingstone—than to the united efforts of the explorers of any

other single nation. No wonder, then, that Scotland has always intimately associated itself with, and taken the keenest interest in, the progress of discovery and civilisation in Africa, or that Scotsmen watch critically, if indulgently, the work of those whose fortune it is to follow in the footsteps of men who have stamped the name of their country so indelibly and honourably, upon that continent.

I naturally, therefore—though extremely gratified—hesitated before I accepted the kind invitation sent me through your President to give some account of my very limited discoveries in Eastern Africa; but I have thought that ten years' residence there may perhaps enable and entitle me to give you something more than a mere description of travel. In the performance of my official duties I have been led to look into many matters of which it is necessary we should have some knowledge before we can properly weigh and judge the best means for developing the resources of that country. Upon my journeys I have examined its physical aspects, laying down, as best I could, the most conspicuous natural features, and inquiring into the nature, condition, and habits of its people. But when resident in Mozambique I have been also constantly employed, in furtherance of our commercial interests, to look into more than this—to look carefully into the commercial riches and agricultural capabilities of the country; and to reflect a little upon the best means by which its products may be extracted, and the labour and energy which lie fallow in the country utilised to the mutual benefit of the native races and that of civilised peoples. I have watched with the keenest interest the growth of the Scottish Nyassa and Shiré missions ever since their foundation, and have always had the liveliest interest in their progress. Constant service upon the East African Coast since the year 1870 in the Royal Navy, as well as in the Consular service, has brought me much in contact with that degradation and curse of Africa—the slave-trade; and every scene in that fearful panorama—the burning village, the terrible coast march, with its dread accompaniments of hardships, famine, and fatigue; the slave-market, with its pictures of callous cruelty and brutal degradation; the slave-dhow, packed with reckless disregard to life, with the inevitable result of disease, suffocation, and death; the severity also upon plantations denuded of labour by the vigilance of our cruisers, driving even the mild African to despair, and at times to desperate retaliation—all these are scenes, not gathered by me from books, but of which I have been a personal and often a horrified spectator. Therefore, I say, I may perhaps be entitled to speak to you upon some other points than that of my own travels.

First, however, you may wish to know something of them. My earliest personal impressions of the East African coast were gathered, as I have already told you, in 1870, when, as a young lieutenant of the flagship—then under the command of one who bears a name of historical interest to Scotsmen, Admiral Fairfax—I visited Zanzibar, Mozambique, and some other of the scenes of my late labours. Sir Bartle Frere had not

then visited the coast; no treaty had yet been concluded for the suppression of the sea-borne slave-traffic, and scores of dhows landed their human cargoes, during what was called the "close season," under the very guns of our men-of-war, upon the harbour beach. The slave-market—the site of which is now occupied by our English Cathedral Church—was then in full swing, and it was amidst the scenes daily to be witnessed in it that I first felt a desire to take part in the work of the suppression of the slave-traffic. In 1875 I was appointed to H.M.S. *London*, and for over three years took an active part in the blockade effected by her boats in the Zanzibar and Pemba Channels, acquiring during that period a knowledge of the coast language, and a practical experience of the working of the slave trade, which afterwards proved invaluable to me. In 1879 I succeeded Captain Elton in the post left vacant by his death at Mozambique, and there it was that I began the journeys you see laid down upon the diagram before you.

I remember well, shortly after I had settled down at my post, sending for the best map obtainable of that portion of Eastern Africa which lay behind the coast-line of the Portuguese province of Mozambique. A geographical friend sent me that by Keith Johnston, and, full of enthusiastic schemes for the suppression of the slave-trade, I eagerly turned to see what I could learn from it. Across the whole tract which stretches from the Rovuma down to the Zambezi, and between Lake Shirwa and the coast, I found three words written—"The Makua Country." Your great cartographer evidently had not had much faith in the journeys or records of the *Pombeiros* of João Baptista, who, in the sixteenth century, was said to have crossed Africa from Angola to Ibo, and had laid down some lakes in the heart of the Makua country; for the space occupied by them on most maps had been left by him a blank. Seeing, then, this great blank space in Eastern Africa, lying, as it were, at my very feet, will you be surprised when I say I placed my hand upon it and determined that, God helping me, I would do my best to find out what it contained—to fill up this blank by discovering its mountain ranges, rivers, lakes, and other natural features? You will rather say, and rightly, that I should have been foolishly, criminally blind to the opportunity placed before me had I been neglectful of this work. And had I needed any other incentive, it would have been provided me by the fact that the coast-line had been in the possession of a European Power for four centuries, and none of that nation had ever passed beyond it.

Now, I will tell you something of the result of those journeys. You will, I am sure, willingly relieve me from entering into any details regarding them. I have spoken of them so often before that I could not do it now without repeating myself, nor should I have time to speak to you upon other matters of more general interest if I occupied myself much with them. You see before you the ground I have passed over. The work has been done in twelve journeys, and has occupied me nearly six years. If I include my coasting voyages, which were all performed in

small native boats, I have covered about 4000 miles, and nearly one-half of these has been over previously unbroken ground. Briefly, the chief results of those journeys have been to open up three new routes between the Nyassa district and the coast—(1) Between Mozambique and Lake Shirwa and Blantyre; (2) from Blantyre to the Portuguese coast settlements of Angoche and Parapato; (3) from Quillimane to Blantyre. You know the length of time it formerly took to get overland to Lake Nyassa from the East Coast, for all of you have read the tale of delay and difficulty told by Livingstone when describing in his *Last Journals* his journey from Lindi up the valley of the Rovuma and Lujenda to that lake. Many of you, doubtless, also remember the hardships encountered by Bishop Steere when going over the same ground. Neither of these accomplished the journey in less than forty or forty-five days, and both experienced terrible trouble from famine, desertion, and fatigue. The Nyassa may now be reached by the longest of the three routes opened up by me in thirty days, and by that from Quillimane to Blantyre in fourteen. None of these present the difficulties which Livingstone and Steere had to contend with. The country you pass over is well populated, food is fairly abundant, and the people are peaceable, helpful, and industrious. You will have your difficulties, of course—African travel is never without them; but, provided your party be a well-conducted one, there is no reason whatever that any or all of the three routes I have laid down may not be constantly traversed by Europeans, and become most valuable channels for the development of the trade and agricultural riches of the country. As a means of approaching the lake district, they will never supersede the great waterway of the Zambezi and Shiré; but they may, and will, I hope, serve as most useful handmaids to it.

In my journeys I have been fortunate enough, also, to discover three minor lakes—one, Lake Lidedi, which, you see, is just south of the Rovuma, and close to the Lake Nangadi, of which Livingstone first heard as he passed up north of that river when upon his last travels. The others are Lake Amaramba and Cheuta, which have their outlet in the river Lujenda. When in the neighbourhood of these lakes, I closely investigated the question of the supposed connection of Lake Shirwa with the Lujenda drainage system, and satisfied myself that there was no point of junction between them. Lake Shirwa is divided from the Lakes Cheuta and Amaramba by a broad elevated ridge of sandy soil. This ridge lies with unbroken regularity across its northern extremity. It is lightly wooded and covered with thick undergrowth, and, though I have crossed and recrossed it, I have nowhere detected a trace of inundation or seen any evidence of the rising of Lake Shirwa above the level at the foot. It is possible, however, that a subterranean junction exists, and I know this view is held by many of the natives.

I should like to read to you a few remarks made upon this point by the Rev. Alex. Hetherwick, a minister of the Scottish Established Church at Blantyre. Writing to me from his new station of Domasi, upon the

eastern slope of Zomba Hill, whence he commands a fine view of the lake, he says:—"Since I saw you I have been upon the large island in Shirwa, and had a good view of the lake all round. Nothing could be more plain than the comparatively high bank that forms the north shore. From Chikala it sweeps round to the east in a fine curve. Another point which I have gathered from native testimony is of considerable importance. All here, without exception, assert that the waters of Lake Shirwa drain through the sand into Lake Cheuta and thence to the Lujenda. Seeing the extensive river system upon the western shore, and the small extent of evaporating surface, I have always held that there must be an outflow from Shirwa in some way."

Mr. Hetherwick is a close and sound observer, and I am not prepared to dispute this view. I must rest satisfied with having corrected the the erroneous impression previously held, that the Lujenda river issued from Lake Shirwa—an impression unfortunately strengthened by the mistake of a missionary, who in 1882 believed he had traced the source of the river to that lake. My observations, taken along the high bank referred to by Mr. Hetherwick, also show that this lake had been carried up on our maps 14′ too far to the northward, and that its most northern extremity must be placed in latitude 14° 59′ S. Feeling sure that—although Portuguese indifference had left to me a great tract of country to explore—once the land was shown to be penetrable, others would quickly follow and sharply criticise the work I had done, I have endeavoured to meet that criticism by care and accuracy of work. About 5000 observations have been taken by me to fix the positions of fifty-seven of the most conspicuous points and principal features of this country, and I am glad to be able to say that nearly all these observations have been reported to be completely satisfactory by the scientific staff of the London Geographical Society.[1] Seeing at once the importance of your mission station of Blantyre as a convenient base for the exploration of the Lake region, I have endeavoured to establish there an accurate meridian to which chronometrical observations taken in the neighbourhood might be referred. When all these observations, which number over a thousand, are worked, I hope the meridian of Blantyre will be accepted by you as fixed with sufficient accuracy to permit the error of chronometers upon Greenwich mean time to be obtained at that place, and thus the necessity of returning to the coast for this purpose will be avoided, as well as the disturbance to the rates now experienced in the long journey from the coast to the interior. The immense advantages of a really reliable meridian in the interior are already beginning to be recognised, and a traveller employed by the Royal Geographical Society of London, to explore the country around the Namuli Hills, has just received instructions to make the meridian of Blantyre his base for the correction and rating of his chronometers.

[1] These observations will be published *in extenso* in this *Magazine* for September.

But I am dwelling far longer than I intended to do upon my own work. We will now glance at one or two points in the physical aspects of the country, which are, I think, of much general interest. There is no point of greater interest than the evidence that meets us upon every side, of the important part that glacial action has taken in the formation of the mountain groups, with their deep sharp-cut sides, or isolated hills with their smooth dome-shaped tops; or, again, in the masses of detached rocks frequently to be seen suspended across the summits of peaks—masses which could only have been carried there by means of the powerful agency of ice. Remarkable instances of the latter are to be seen upon the Mwakwa Peak, the Inagu Hills, Tugwi, and others I could name. Again, I think you see it in the deep square-cut beds which form the valleys of some of the rivers of the country. Their slopes do not suggest pluvial or atmospheric denudation. The natural slope of a valley laid down solely by denudation would be easier and more gradual than is characteristic of those of which I am speaking.

If we take a comprehensive view of this country, we shall see one grand group of mountains rising above all the rest, and occupying a great central position in the drainage system of the country. I ask you specially to notice how well marked that position is, and how curiously the greatest rivers of this part of the coast diverge from it, taking up from hence their primary and principal feeding streams. I mean that group or block immediately surrounding the Namuli Peaks. Well, upon the summit of that group I believe the glaciers were formed, which, in their passages downwards and oceanwards, scored out the valleys, deposited the moraines, cut the sharp smooth sides and polished tops of many of the hills now to be seen in this country.

Let me illustrate my meaning by tracing for a short distance the course of the glacier to which, I am of opinion, the Malema Valley or Plain owes its formation. Formed on the summit of the Namuli Hills, it has descended its south-eastern extremity, scoring out the mountain valley down which the head-waters of this river now take their course. At the very commencement of its journey, it receives the minor glaciers which pass down the valleys that now give birth to the Baroni, Ludia, and Losi rivers successively. The pressure of these minor glaciers, descending from the west, gives the main mass a north-easterly direction, the exact direction that the Malema river now takes. The glacier carries everything before it, but drops here and there from its side a moraine, which remains as one of the curious isolated hills or immense boulders that are now to be seen scattered about the sides of the plain. In the Inagu Hills it meets with a mass too powerful to be cut away; impinging close upon its western face, which it shaves and leaves sharply precipitous, it bursts through some fault or weakness at what is now their northern end, giving that extremity the clean, rounded form which is now its most striking characteristic. To such action, I believe, most of the valleys of this country owe their original formation, and the denudation of ages has

not, in many cases, sufficed to obliterate the marks that point to the glacial epoch as having been one of the most recent in the history of this portion of the African continent. Thence, too, were shed the glacial streams, which formed the head-waters of the rivers of that era. The glacial period has passed away, but the mountain group remains, the culminating point of the mountains, and, as you are able to see, the centre and water-parting of two vast drainage systems of the country.

Whether volcanic action afterwards had any part in the formation of the features of this country, I am unable to say. I have never myself seen any traces of volcanic deposit, but we should remember that Mr. Joseph Thomson tells us that volcanic disturbance has largely contributed towards the formation of the hilly range which shuts in Nyassa on the north-east, and that the rocks of which that range is composed give the most decisive proof of this. It will be interesting to know if the line of volcanic disturbance may be traced southward from Kenia and Kilima-njaro, as well as south-eastwards, through the Comoro Isles, to the innumerable craters of the mountain range of Madagascar. It will also be practically useful, for it may afford us some data for judging whether the area of weakness of the earth's crust due to volcanic action is to be looked for westward from the Comoros, where the craters are still alive; and whether the earth tremors caused by that action have had anything to do with the frequent interruption of the cable communication upon the Mozambique coast. This view is held by some, I know. I am, myself, inclined to doubt it; believing that the terrific force with which the current runs past Mozambique, together with what sailors call the "steep-to" nature of the coast, has been the true cause of a loosening of submarine rocks, and then an avalanche, under which the cable has been broken, and remained buried in such a manner that upon one occasion the ends were not recovered for several months.

But although the glacial epoch may have been the last, do not let me give you the impression that the country is one in any way wanting in fertility of soil or wealth, and variety of natural products. We may not have in Eastern Africa the exuberant vegetation of the Brazilian deltas, or the magnificent timber forests of the plains of the Lower Mississippi, or even of the Congo; but if the vegetation be less rich, the air is drier, and there is less malaria; if less fertile, the country is healthier, and more fitted for the residence of Europeans. Still, it is by no means wanting in agricultural wealth.

Let us glance for a moment at some of its chief products, and you will see what variety is obtainable here from the coast plains, raised but a little above sea-level, and rich in tropical vegetation, to altitudes of 3000 to 5000 feet on the Namuli Hills and Shirwa Highlands, where almost every home fruit and vegetable mixes with the orange, lemon, and other plants of a temperate clime. It is difficult for me to tell you which of these products are really indigenous to the soil of Mozambique, and which have been introduced. Now, those most widely grown are perhaps

the oil-seed amendoin (*Arachis hypogæa*), the gingelly seed or *sesamum orientale*, cotton, sugar, coffee, and tobacco. The culture of the first two, indeed, forms the oldest and perhaps the only firmly established agricultural industry of the coast. Both grow in great luxuriance, and they might be supposed to be indigenous. But if the author of the *Periplus of the Erythræan Sea* may be depended upon, we find the oil of sesamum, raw cotton, and "honey from the cane called sugar"—I quote his words—forming, nearly two thousand years ago, articles of import from India, and being carried in Arabian dhows from that country to the Arab settlements on the East African Coast. The oil may have been only manufactured in India, although it is difficult to think that the Arabs were ignorant of so simple a process; but raw cotton would certainly not have been imported if it had been then, as now, a cultivated product of the country.

It is probable that coffee is truly an indigenous plant, and that it was grown, and used as a stimulating beverage, by the earliest of the Arab settlers on the coast. You know Arabian tradition tells us that the first home of this plant was the land of Kaffa, south of Abyssinia; and the general adoption of a name so similar to that, used in all European languages, gives an air of truth to the tradition. But there is no reason to suppose that its growth was confined to the Kaffa country, and it is probable that it grew also upon the highlands of East Africa in latitudes further south, and that it was brought thence to the coast by the earliest Arab settlers. Coffee will probably take a prominent place amongst the products raised by the Scottish settlers of the interior. It is cultivated in considerable quantities upon the slopes of Zomba Hill by the firm of Buchanan Brothers, west of Lake Shirwa; at the Blantyre Mission also; and by the African Lakes Company, upon their Mandala estates. At all these places its growth has been a success. In my last journey in the interior I had an opportunity of seeing and tasting the Blantyre coffee, and I find that in size the berry is larger, and in flavour it is much superior to that grown upon the coast.

Another valuable product, and one truly indigenous, is calumba (*Menispermum palmatum*). The root of this plant, from which, as you know, a tonic and antiseptic is extracted, is brought down to the coast at many points by the natives for sale. The great fluctuations in the market price of this article have, however, operated against its regular supply. The native naturally hesitates to collect in large quantities that which may be refused upon arrival at the coast. I have known the market price of this article shoot up from 25s. to 90s. and 100s. per cwt., and then as rapidly fall to the first price. The great fluctuation in the demand appears to be due to the fact that it is often mixed with, and sometimes, I believe I am right in saying, takes the place of hops in the making of beer. A few years ago there was a general failure in the hop gardens throughout Europe, hence the high prices offered for this root.

I do not wish to hold out much encouragement with respect to the growing of tobacco, although the country in many parts is eminently adapted

for its cultivation, and a leaf of excellent quality is grown by the natives. The difficulty is to induce the native to take sufficient care in drying, pressing, and preparing the leaf for export, a process which in tobacco-exporting countries has been carried to perfection under skilled European supervision; and until this is done here, we cannot hope that tobacco will rank amongst the exports of the country.

Commercially speaking, perhaps, the most important of all the natural productions of the country is india-rubber, and, though the commencement of its collection dates but a short time back, it already forms the largest and most valuable export of the colony. The returns of the custom-house of Mozambique show that the export of india-rubber in 1873 was only of the value of £443. In 1876 it had amounted to £22,198, and in 1883 its value exceeded £60,000. I should tell you that this return is only for the custom-house of Mozambique, and that it by no means represents the whole quantity drawn from the Makua and Lomwe countries. I regret that the incompleteness of the customs returns of the minor settlements of the coast prevents me from giving the total amount, which probably exceeds £100,000 per annum in value. The rapid extension of the rubber industry is due entirely to the natives, and in its working they have followed their own devices from the very commencement. Untaught and clumsy in their method of collection, it is only a natural consequence that an enormous number of these valuable trees should have been destroyed by them. In proof of this I may mention that there comes to the market an inferior quality of this rubber, extracted from the roots of the tree. When the natives see that no more juice can be drawn from the stems, and believe the tree to be dead, it is their custom to pull up the roots, and, by pounding and boiling, to extract the last trace of rubber from them. As far as I have been able to discover, the india-rubber exported from the northern portion of this province is drawn from only one species of plant, of the genus *Landolphia*, whereas I believe a very little research will show that two, if not three species exist in the same locality. One of them, called by the natives *mbungu*, is to be found upon the mainland about Mozambique. I have often met with it upon my wanderings, but nowhere do the natives appear to be aware of its value. Growing upon more humid soil than the species from which the rubber of commerce is extracted, it yields a more watery juice, which the natives have not yet discovered a method of congealing. Asking them if they never attempted to collect it, they have replied, "It is impossible; it is too watery: we only use it for making bird-traps." Smeared over and about the traps, it adheres to the feathers of the birds, and, retarding their flight, makes them easy captives. Experimenting upon this, I find that it may be congealed by the application of the juice of the lime, as is done, I believe, in the collection of a similiar species of rubber in Madagascar. The market value of the rubber drawn from this plant will always be less than that which is wound off upon the hand, for in congealing it carries

with it a certain amount of water, and it loses weight for some months after collection. But the collection is easier, and in the untouched forests that exist of this distinct species of the rubber plant, there lies, I think I may venture to say, an additional source of wealth to the province.

There are many other products which I have only time to name—such as indigo; the castor-oil plant; the senna plant; a species of sarsaparilla; the capsicum, or common red pepper, used by the natives for their food, but as yet not gathered by them for sale, in spite of the efforts of some merchants to induce its collection; the pine-apple, the fibre of which has lately proved a valuable substitute for flax; and doubtless very many others of which nothing whatever is known.

I have now told you a few of the agricultural products of the country. You will naturally ask me, "How are they best to be extracted?"—"By what means?" "By whose labour?" and "Through what channels are they to be conveyed to the coast?" I reply, briefly, by means of the labour that lies unutilised or misdirected in the country, and through the channel which nature herself has granted us—*i.e.* through the magnificent waterway that opens up Central Africa to the eastern seaboard.

And first, let us look at the question of labour. It is very probable that many of you are saying—"Of what use are the native races for the vigorous development of the country?—has not the history of the uncultivated tracts of the world rather shown them, except where enslaved, to be hindrances opposing the advent of the white and working man; consuming little, and by idle or warlike and predatory habits rendering themselves and their country unattractive, if not dangerous? Has not the history of British South Africa and its five Kaffir wars shown this? Is it not also proved by the check the warlike disposition of the Zulus has given to English colonial enterprise north of the Tugela; by the vast tracts of country that remain even unexplored in the Masai, Galla, and Somali countries?" I can only reply that this is unhappily the case in most countries of Eastern and perhaps Central Africa. But it is not so—and upon this point I wish to lay particular stress—in the country of which we are now speaking. There is no powerful military organisation here like that of the "man-slaying-celibate Zulu;" no barbarous predatory tribe with customs which Mr. Thomson has fitly defined as indescribable,—like the Masai. In the Makua, Lomwe, Yao, and Anyanja tribes, who inhabit the country between Nyassa and the coast, you have a people by disposition and habit peaceable and industrious, struggling even now in rudimentary and primitive fashion to excel in the arts of peace, and ready enough to turn their hands to labour, if clearly shown that it is their material interest to do so, and that they will receive at the hands of those who employ them just and fair dealing.

I feel so strongly upon this point that it has seemed to me little doubtful that this country will be the first of the countries of Eastern Africa to be agriculturally developed. I have been astonished to see how far the spontaneous efforts of native industry will go, and how

much they have already done for the development of the country. I told you before that the only firmly-established industries of the country consisted in the culture of oil seeds and the collection of india-rubber. These industries are, however, largely developed; and I think it is a remarkable fact that their expansion is entirely due to spontaneous native industry. They get no assistance or scientific aid whatever from the whites of the coast. Their own instincts and experience—if it can be so called that has had the growth of only a few years—are their sole guides, and it is only a natural consequence, therefore, that every phase of these agricultural operations should be of a most rude and primitive kind.

I am tempted to describe to you the progress of their chief industries, so that you may judge for yourselves the loss of time, of power, and therefore, of course, of money, which this want of skill or wise direction entails. The hundreds of thousands of acres which are now under cultivation in this country have been in the first place cleared with an axe actually of native make, of tomahawk shape, and with an edge hardly two inches in length, a tool that a backwoodsman would laugh at; and yet I have seen large trees being felled by it only, for want of a better. Around the European coast settlements, the Makua forest-clearer may use a species of bill-hook for cutting away the undergrowth, but those two are his only tools. The vast area of country cleared is then turned over, by both men and women, with a rough and clumsy hoe, also of native manufacture, the slow working of which entails an enormous and unnecessary expenditure of labour. In the sowing of amendoin, holes are made in the ground some little distance apart, in order to allow space for the creeper to radiate. This is usually done with a hard-pointed stick. One seed (care is taken that it be only one, as the natives say two or three will strangulate each other) is then dropped in each hole and the earth stamped over by the feet. With gingelly, the seed is broadcast, as with grain, and scattered thickly over the ground. The sowers are then followed by others with hoes, who work the seed roughly into the ground, stamping the whole in with their feet. Care, and therefore much labour, is required to keep the ground clear of weeds, which spring up in this climate with astonishing rapidity; and throughout the growth of both these plants the plantations are carefully tended. In the reaping, or rather the collection, of amendoin, the plants are simply pulled up by hand and the tubers taken off, as with the potato. They are then laid out to dry in the sun, and, when thoroughly dried, are shelled by hand for the extraction of the seed, an operation requiring considerable time and patience. With gingelly, the plant is in some districts literally reaped, but singly, and with an ordinary knife. In others, the plant is simply pulled out of the ground. In the latter case they are then cut about a foot down the stem. The plants are now tied into small bundles, which are stuck into the ground till thoroughly dried, when the seed will drop readily off. Large mats are then spread on the ground, and the bundles taken up and vigorously shaken over them till the seeds have all been extracted. With both amendoin and gingelly the

seeds are then packed in baskets of native manufacture and carried on the heads of blacks, in some cases a distance of eighty and a hundred miles, to the house of the coast trader, there to be bartered for cloth, beads, powder, and the rest, and to be stored until an opportunity occurs for shipment. You see, therefore, that the whole working of these industries, from the clearing of the forest to the delivery of the produce into the store of the trader, is of a most rude and antiquated kind.

Is not this description also sufficient to convince you that there lies in this country a great industrial force, capable, under skilled and judicious direction, of being turned into far more productive and lucrative channels? I am fully aware that the development of spontaneous native labour is a question of time. It is necessarily one of slow growth. Evil habits will be found even here, and the customs of an age cannot be altered in a day. But the first question which, to my thinking, has to be faced is that of labour. The climate of the coast will not admit of the labour of the white, except for the purpose of supervision; the laws of Portugal, as well as of England, will not allow of coercion, or of compulsory labour in any shape or degree. Precisely the same question has met us in Natal, where we have been compelled to seek foreign coolie labour, for the Zulu Kaffir will not turn his hand to agriculture. The introduction of the coolie is, however, a very unsatisfactory solution of the labour problem, for the native will rarely, if ever, work with him, and is thus driven out of the pale of the working community, by whom he is looked upon as an outcast and encumbrance. The inevitable consequence of this is that he retires to his kraal, and feeling himself regarded as a pariah, excluded from the chief industries of the country, he too often imbibes the most destructive of our vices, and we are presented in a few generations with that spectacle so painful to our boasted superior civilisation—a native race diminished, demoralised, and in a fair way to extinction by contact with a people whose first duty it was to elevate them.

And before I leave this question of labour, I will venture upon a small suggestion, by which I think the industry of the race under discussion may be both spurred and profitably directed. In every mission school let there be a class of elementary agriculture. Let the native youth be taught practically the most valuable productions of which his country is capable, and let the substantial advantages of turning his knowledge to account be distinctly laid before him. Many are of opinion that Christianity will never gain a really wide and firm hold upon the people until there be raised up a class of native pastors and catechists capable of associating themselves more intimately than a white can do with the people, and entering more closely and sympathetically into their lives and peculiarities of thought. Let there also, I say, be bred up a class of teachers—it does not follow that they should be wholly secular—whose chief duty it shall be to encourage, by example as well as precept, and wisely direct the valuable tendencies of which I have spoken into the most useful and profitable channels. I have visited many mission schools in Eastern Africa; have

seen the proficiency which native children often will attain in a knowledge of "the three R's;" have heard them answer intelligently many questions in the world's history and geography; have heard many hymns prettily sung—even poetry recited; but have never seen a class for imparting to the native a knowledge of the material resources of his country, and the best means of developing them. Who is it that tells us that a knowledge of only the three R's is apt to induce a proficiency in one other—in that of Rascaldom? I speak here, doubtless, to many closely interested in mission work as well as in the material progress of the country, and to them respectfully, and in no spirit of interference, I throw out this thought, earnestly hoping that it may be found possible to give it some practical shape.

I have little time left me to speak of either the people or of the work of the Scottish Established and Free Church and English Universities missions in the interior. That work is not, I think, even in Scotland, sufficiently well known. Your only means of gaining a knowledge of it is from mission records, written by the workers themselves, and you may be quite sure, from the class of men you have sent there, that those records are simply the barest statements which duty and instructions compel them to send you. From travellers you may sometimes hear of the beauty or comfort of the mission homestead, and the hospitality of its occupants; but it needs one who has lived in the country for years, and known it as I have done in the past; who has come much in contact with the people, and had opportunities of noticing their usual unsettled intertribal relationship, to thoroughly realise and understand the transformation that is being wrought by your missions, not only in the face of the country, but also in the habits and modes of thought of the people.

More valuable, however, than a dozen general statements is one practical proof, and I will give it you. Towards the end of last year a quarrel arose between the Angoni, or Zulus, west of the Shiré river, and the Yao or Ajawa, who live upon the highlands around the Blantyre Mission. This brought a detachment of about a thousand Zulus across the river, whose leaders had received the usual barbarous instructions to destroy everything, and kill or capture every human being in the country of their enemies. These instructions were carried out with Zulu thoroughness, and the country in many parts was completely devastated, men killed, and women and children carried into captivity. But they had received other instructions, which were equally thoroughly carried out, and those were—not to touch the persons or property of any one of your mission community, or to lay a finger upon any one of their dependants. More than this, over a thousand hunted and terror-stricken wretches took shelter at the mission station of Blantyre and that of the African Lakes Company at Mandala, and the protecting hand there spread over them was sufficient to preserve them from harm. Even more than this, the Zulu camp was visited by two noble-hearted men from the mission, and, wonderful to say, in answer to their appeals, the slaughter was stayed, and the marauders returned to

their country. Could I give you any more striking and perfect proof of the manner in which your settlers have won the affection and esteem of the people. There was no fear here, no shot was fired, no threat even made, and none knew better than the Zulu leaders the completely defenceless state of your mission station at Blantyre. Only a few weeks before this raid, their country had been visited by the head of your mission and a Scottish lady, his wife, unarmed and unescorted, and even Zulu bloodthirstiness revolted against any abuse of the perfect and, may I say, heroic confidence which had been placed in them. Years, too, of just dealing and kind treatment had convinced them of the rectitude and high aims of the Scottish settlers in that country.

And now, ladies and gentlemen, before I conclude, I want you to take, with me, a wide and comprehensive view of the whole East African question. We have seen how, in the region surrounding the Nyassa, the Scottish missions and trading companies have founded a colony already firmly established and fairly advanced in prosperity. Let us now also look northward and southward. Upon the Tanganyika we find British interests again predominating. British missions have stations upon that lake; the only steamer upon it flies the British colours, and a Scottish trading company now includes it within the sphere of its operations. Through the generosity of a Scottish capitalist, a superior wagon road is now being constructed between the two lakes. Let the eye travel further north, and you see the Victoria Nyanza taken up by the most wealthy and influential of English missions, and their position upon it is daily strengthening.

Your minds are too full of recent events in Egypt for it to be necessary for me to review the extraordinary growth of our influence in that country within the past few years; you have seen the efforts, which happily will not be abandoned, for developing the great resources of the Sûdan, and you all know how absolutely essential it is to our commercial prosperity that British influence shall continue to predominate in the countries bordering our great Indian highway. I am no politician, and belong to no party—no Government servant is or does; but I am not wrong, I think, in saying that, no matter what Government, and no matter what party is in power, British influence will not decline in Egypt, but will steadily continue to advance up the valley of the Nile.

Now, let us turn southward from our central point, the Scottish colony upon the Nyassa. All of you have read the history of our South African colonies, and many of you are, doubtless, old enough to have personally watched the progress of events in those colonies from their very foundation. You know, then, that their history has been one of steady advance; of an advance which no error, no retrogressive policy has been able to check. I need not tell you that in no case has that advance been initiated by our Government. It is an advance that has been entirely due to what would appear to be irrepressible in the present age—the spirit of British Colonial enterprise, supported by the power of British capital. Whether

across the Fish, across the Kei, or across the Vaal; whether in the absorption of Griqualand West, and the Diamond country, or in the latest move —the extension of our protectorate over a country extending almost up to the Zambezi—British missionaries, traders, miners, and settlers have gone first, to be followed by our Government in no willing spirit, and only when the maintenance of law and order, or protection to life and property, became an absolute necessity. The Lake and other interior settlements which we have glanced at are in truth but great central links that are being forged, under almost every parallel, of a chain which even now stretches to the Zambezi from the south, and bids fair to form a continuous line of British power throughout the whole length of Eastern Central Africa.

And if we turn to the coast, we find that British commerce has woven a web upon it that no competition can displace. It is not too much to say that three-fifths of the trade of all East Africa is in the hands of British traders. Every bay and inlet of the coast is occupied by them, and they command the trade at this day almost as effectually as when, a century and a half ago, the Portuguese Viceroy, the Condé d'Alvor, gave to the Banyan caste of India a monopoly of the East African and Indian trade. Again, the coast is bound by our submarine telegraph cables; its mails are carried in British ships, under contract with the Portuguese Government; its commerce is carried in British bottoms, and at every important port upon the Mozambique coast the landing and shipping are carried on by companies employing British capital. The development of the river navigation is also to be undertaken. I am happy to acknowledge that our chairman to-day, Sir Donald Currie, is largely concerned in these enterprises. In every direction, then, and by all these means, we find our civilising influence increasing, and our interests strengthening, throughout the length and breadth of Eastern Africa.

We must not shirk, we cannot, indeed, escape from, the duties and responsibilities that the enterprise of our race and our vast wealth throw upon us. Let us only take care that civilisation, commerce, and Christianity shall truly and honestly go hand in hand, and strengthen, not contradict and weaken, each other. Let us watch carefully, and let us honestly guard the interests of those native races for whom the greatest of Scottish heroes—David Livingstone—laid down his life, and whom, with his last breath, he bequeathed to our care and keeping. Let the spirit in which he worked and died so guide and govern us in our dealings with them that we may rear up in that country a fit monument to his memory, and one also that shall gain for our great nation an immortal fame.

Yet one word more. You have given me most convincing proof of your feeling in this matter, and I am now going to ask you to give that feeling a more practical expression. I want to ask you all for your support,—and more especially do I address my request to the merchant philanthropists of this country,—to check, and, if possible, to wholly pre-

vent the introduction of ardent spirits into Eastern Africa. As yet we have kept our hands free from this taint, and there is not to be seen that picture—as little flattering to our common sense, as it is indicative of impurity, or at least infirmity of purpose—of Civilisation pressing forward with the Bible in one hand and the brandy bottle in the other. This is the contradiction—the foul and horrible contradiction—to which I have before alluded. Let all honour and support be given to those who, like the African Lakes Company, are endeavouring to develop the trade of this country without flooding it with poisonous and maddening liquors. When native blood is shed, we hear, rightly, a great deal against it, and a thousand condemnatory voices are raised in any case of oppression or cruelty. But I believe slavery, in many forms, is an evil lighter by far than the unrestricted sale of ardent spirits. It is surely less a crime to enslave the body, than to weaken, demoralise, and degrade both body and soul. And this is certainly done when we teach or encourage drunken habits amongst a people. Rather, I say, let us leave the native races alone, and withdraw from them a contact that can only be harmful to them. You will utterly paralyse the efforts of those men you have sent out from this country as missionaries, if you permit the trade in spirits to spring up; and therefore for their sakes, as well as for the people, I earnestly beg of you to oppose, with all the power and influence you possess, any effort that may be made to introduce and establish the liquor trade.

EXPLORATIONS BY A——K IN GREAT TIBET AND MONGOLIA.

THERE are now on the earth's surface comparatively few places that have not been explored by Europeans, and very rapidly the whole world is becoming thoroughly known to the geographer; but one of the few countries still practically unknown is the table-land lying between India and China, usually designated Great Tibet. It is the country in which many of the great Asiatic rivers have their source—the Sutlej, the Indus, the Brahmaputra, the Irawadi, the Hoang-ho, the Yang-tse-kiang, the Salwin, and other rivers well known in their lower waters, but whose origin is still wrapped in uncertainty.

Our ignorance of this district is not owing to any want of enterprise in European geographers, but to the exclusiveness of the Tibetan and Chinese authorities, who, not unnaturally, put every obstacle in the way of European exploration, as only too certain to be followed by European interference.

The capital of Great Tibet is the city of Lhasa, or "God's ground," the seat of the Great Lama or Living Buddha, the head of the Buddhist religion. Lhasa has only once been visited by an Englishman, and that was more than seventy years ago.

The Government of India, recognising the practical impossibility, at present at least, of despatching Europeans to this district, have been quietly organising and training a staff of native surveyors, who, disguised as traders, can, with comparative safety, penetrate those regions beyond the British frontier inaccessible to Europeans.

In 1865 this system was begun by the late Colonel Montgomerie, then head of the Indian Survey Department, and since then several native Indian explorers have crossed the Himalayan range, and have brought back useful information. In accordance with the rule laid down by the Department, their names are concealed until their work is done, and they are officially known simply by initials, or by such names as "The Pundit," "The Mirza," "The Havildar."

The greatest of these explorers, Nain Singh, in the year 1874-75, travelled from Leh to Lhasa, and thence to the Sangpo river down to Chetang, and on southward to Assam. Nain Singh's name was not divulged until his task was accomplished and he had retired from the service in which he had done so good work.

Following the precedent established by Colonel Montgomerie, General J. T. Walker, then Surveyor-General, despatched a native surveyor, in April 1878, from Darjiling, with instructions "to strike across the great plateau of Tibet into Mongolia by any route from south to north which he might find practicable, and to return by a parallel route over new ground." This surveyor is officially known as the Pundit A——k. He returned to Darjiling in December 1882. His diary, field-books, and observations have since that time been carefully translated and arranged by Mr. J. B. N. Hennessey, Deputy Surveyor-General, and have lately been issued by the Trigonometrical Branch of the Survey of India. Through the courtesy of General Walker we have been furnished with a copy of Mr. Hennessey's Report.[1]

Before following the Pundit in his remarkable journey, it may be well to give a brief note of some of the former explorers of Tibet.

In the seventeenth and eighteenth centuries Tibet was frequently visited, and even traversed, by Jesuit and Capuchin missionaries. In 1661 two fathers, Grüber and D'Orville, journeyed from Peking to Lhasa, and thence through Nepal to India; and there are records from time to time of other missionary expeditions, whose routes can hardly be identified from the short descriptions left to us. About seventy years later a Dutch explorer, Van der Putte, penetrated from China to Lhasa, and returned by the same route, but the results of his journey too are lost, for on his deathbed he burned all his papers and maps.

Of the English explorers of Tibet, Mr. Clements Markham read an interesting memoir before the Royal Geographical Society ten years ago.[2] Journals had then come to his knowledge that had been overlooked since the journeys were undertaken.

[1] Dehra Dun, 1884.

[2] *Proceedings of the Royal Geographical Society*, April 26, 1875.

In the year 1774, Warren Hastings, then Governor-General of India, having determined to reopen intercourse between Tibet and India, sent a young civilian, George Bogle, on an embassy to the Teshu Lama. He crossed into Tibet by the pass at the head of the Chumbi Valley to the north-east of Darjiling.

Having discovered two lakes, the Ramcho[1] and the Calutzo, he traced the river flowing from them to the Sangpo, near Shigatzo. Here he crossed the Sangpo, and marched up the Shiang-chu to Namling, where he visited the Teshu Lama, with whom he formed a lasting friendship. Mr. Markham tells us that Bogle not only was well received by his Holiness himself, but was on terms of the most intimate friendship with his nephews and his nieces, the nuns, with whom he had a great deal of laughing and merriment. With the nephews he even had shooting and hunting expeditions; but these, which are strongly opposed to the Buddhist religion, were unknown to the Teshu Lama himself, and the culprits had some fear lest they should be mentioned to him.

Bogle returned to India in 1775, but kept up a correspondence with the Teshu Lama till death. Both died in 1782, Bogle in India, and the Lama at Peking, which he was induced by the Chinese Emperor to visit.

In 1783 Warren Hastings sent another officer, Captain Turner, who followed Bogle's route, but did not cross the Sangpo. Turner, however, wrote an account of his journey, which was published in 1800.

On the retirement of Warren Hastings, shortly after Turner's journey, the idea of opening commercial intercourse with Tibet was allowed to drop by his successors in the Government of India.

About this time, too, a change came over the internal Government of Great Tibet.

Towards the latter half of the eighteenth century the Gurkhas, who had become masters of Nepal, became very aggressive towards the Tibetans, and finally endeavoured to pass a debased coinage on them. The Chinese interfered to protect the Tibetans, and having in 1792 finally driven the Gurkhas out of the country, they have ever since been the paramount power in Tibet.

Since 1792 the Chinese spirit of exclusiveness has made it almost impossible for any European, and particularly any Englishman, to cross the frontier. So strict a watch is kept that, when Sir Richard Temple, then Lieutenant-Governor of Bengal, visited Sikkim, he found boundary stones all along the frontier, and Chinese and Tibetan officials watched him to prevent his stepping across the border-line, and even demurred to his sketching scenery on the Tibetan side from his own dominion.

However, since the Chinese domination, one Englishman, Thomas Manning, did penetrate to Lhasa; and in Mr. Markham's paper, already quoted, we have an account of his journey from papers brought to light by Mr. Markham in 1875.

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[1] Shamtzo of Bogle.

Manning was a Cambridge mathematical tutor, who was infatuated with a romantic desire to penetrate the mysteries of China and Tartary. After studying the language at Canton for some years, he went to Calcutta, and there vainly attempted to induce the British authorities to give him an official position as an envoy to Tibet. It would appear that at that time the Chinese authorities were not unwilling to open up commerce with India, but Manning pleaded in vain; he could obtain no credentials, and was obliged to go as a doctor, and in disguise.

He started on his journey in September 1811, taking the route formerly traversed by Bogle and by Turner, as far as Yiangtze; but there he turned in an easterly direction, crossed the inner Himalayan range, and, skirting the ring-shaped lake of Yamdok-chu or Palti, he crossed the Sangpo, and eventually reached Lhasa. He had intended to cross thence into China either by Sining or by Báthang, but he found such a route impossible to attempt, and finally returned to India the way he had come. Thomas Manning is believed to be the only Englishman who ever visited Lhasa.

Here, however, comes in a strange story which will probably never be quite cleared up. About the year 1812 an adventurous English traveller, Moorcroft by name, began a career of exploration in Central Asia. Ostensibly for the purpose of obtaining horses for improving the breed in India, he visited Cashmere, Ladakh, Herat, Bukhara, and other places in Turkestan. He was subsequently officially reported to have died at Andkhui, on his way to Balkh, on 25th August 1825.

The Abbé Huc, who in 1846 visited Lhasa, as will be presently noted, states that he was informed by a Cashmerian named Nisan that he had been Moorcroft's servant at Lhasa. From information collected from the Tibetan Regent at Lhasa, from the Cashmerian Governor, and from Nisan, Huc states that Moorcroft, disguised as a Cashmerian, entered Lhasa in 1826, and lived there for twelve years, making drawings and maps; and that on his way back to Ladakh he was assassinated by brigands. It was only when the murderers were arrested, and the traveller's geographical notes and charts were seized with his other effects, that the Tibetan authorities discovered, to their great alarm, that Moorcroft was an Englishman. Moorcroft's fellow-traveller, Tribeck, who himself died shortly afterwards, distinctly states that Mr. Moorcroft died in 1825. The two stories can never be reconciled.

The next name on the list of Tibetan explorers is that of a Hungarian, Csoma de Köros. Csoma was one of these quiet diffident men, whose work is not showy but real. Believing that possibly traces of the Hungarian race might be found in Central Asia, he determined to make original researches in Tibet or Turkestan. Possessed of little means, but endowed with great enthusiasm, he set off in 1819 from his native Transylvania, travelled through Greece, Egypt, Syria, Persia, Bukhara, Afghanistan, and Cashmere, till he arrived, in June 1823, at the province of Zanskar on the northern frontier of Tibet. Here, for sixteen months exposed to

privations "such as have been seldom endured," he studied the Tibetan language and literature in the monastery of Yangla. Csoma subsequently made two other journeys, with long residences, in the same neighbourhood, never really penetrating into Tibet proper, but confining his researches to Tibetan lore, which he studied with the lamas in the monasteries, and making himself a complete master of the colloquial languages.

In 1842 he determined to attempt to reach Lhasa, but died at Darjiling, while waiting for permission to cross the frontier. An interesting biography of Csoma has lately been compiled by Dr. Theodore Duka.[1]

We now come to the travels of MM. Huc and Gabet, two French Lazarist missionaries, who, early in the year 1844, embued with a desire to spread the Gospel among hitherto unknown regions, started on their adventurous journey, from near Peking, along the Chinese-Mongolian frontier to Tibet. The story of their travels as written by M. Huc, and translated into English by Hazlitt, is a book so well known that it is only necessary briefly to refer to it.[2] The lively French narrative and evident exaggeration, along with the absence of any attempt at geographical work, prevent the book having the scientific value that might be wished, and much that is there stated must be received with caution. But it is the only popular work on Tibet, and as such is of very great interest.

The missionaries went in the religious dress of the lamas or Buddhist priests, and openly proclaimed themselves "Lamas of the Western Heaven," the priests of the religion of the Lord of Heaven. Everywhere they were kindly received. They made their way to the Tibetan frontier at Tang-Keou-Eul, four days' journey from the Koko-Nor Lake, but here they were detained eight months waiting for the caravan of a Tibetan ambassador (then on his return journey from Peking to Lhasa), as the country was so infested by brigands that it was dangerous to travel in small parties. Here they entered a lamasery, and studied the Tibetan language, which was of great subsequent use to them.

They left the plains of Koko-Nor in November 1845, and journeyed, with great privations, over the snowy passes, arriving on the 29th January 1846 at Lhasa, where they remained till March 15th.

At Lhasa they found the Talai Lama, or Grand Lama, a minor, and the country governed by a regent; but besides the native Tibetan Government there were two Chinese envoys, whose mission was ostensibly to present the homage of the Chinese Emperor to the Talai Lama, but in reality to flatter the religious belief of the Buddhists, to watch the movements of the neighbouring nations, and to send information of everything to Peking. A garrison of Chinese soldiers guarded the envoys.

Besides the Chinese there were foreign colonies of several nationalities: the Pebouns, Indians from the vicinity of Bhotan, and Mussulmans from Cashmere, called at Lhasa *Kachi*, who had a government and a mosque

[1] Trübner & Co., 1885.

[2] *Travels in Tartary, Thibet, and China*, by M. Huc. Translated by W. Hazlitt. National Illustrated Library, 227 Strand, London.

of their own, and who ostentatiously expressed their contempt for Buddhist superstitions. These Kachi were the principal merchants of the place. Every year some of them went to Calcutta for trading purposes, but the trade with India was very slight, principally cutlery and a few cotton goods, everything else coming much cheaper by caravan from Peking. The linen goods used were Russian.

There was a large military force of Chinese, but they were chiefly employed in guarding the passes into India. Evidently there was great fear of the English among the Tibetans and great fear of European maps.

When the missionaries first arrived at Lhasa, to their chagrin they were suspected to be Englishmen, and had difficulty in making the authorities realise that they were Frenchmen, missionaries come to proclaim the Christian religion. Everywhere crops up the nervous fear of English explorers. They found not the least restraint among the Tibetans or jealousy of other foreigners, who might come and go and engage in commerce, but the English must be excluded, as their conquest of India had inspired the Talai Lama with a natural terror.

The missionaries did not see the Grand Lama himself, as the Regent was afraid they might have brought the infection of small-pox, but the Regent became their great friend. The Chinese ambassador, however, had them arrested, and their effects seized and examined. Maps were carefully searched for, and three printed ones were found. This led to suspicion, but the Frenchmen maintained that they were none of their making, and adroitly appealed to the superior knowledge of the Chinese envoy, who, being conversant with European matters, would at once see that they were printed maps. Ki-Chang, the envoy, was delighted with the flattery, and pointed out to the Tibetan Regent that they were not the work of the travellers, but had been printed in the kingdom of France. Then follows a delightful piece of human nature which explains, in a nutshell, the reason of the close watching of the passes into India. The Regent asked Calcutta to be pointed out on the map, also Lhasa. "The Pelings (English) of Calcutta are very near our frontier," said the Regent, making a grimace and shaking his head; "no matter," he added, "here are the Himalaya Mountains."

Having come through the ordeal of search, they were treated with great honour, and a fine house assigned to them. They erected a chapel, and openly proclaimed the Christian religion. The Regent was their friend, the people flocked to hear them, and already in their fancy Tibet was won to the Catholic faith. They proposed opening a route to India, which scheme the Regent favoured. But their bright hopes were soon dashed to pieces. The Chinese envoy, jealous of their influence, determined their expulsion from Lhasa. Before they had been there two months he simply told them they must go, and he told them why. Their avowed purpose was to substitute the Christian religion for Buddhism. His duty was to protect the Talai Lama, and what would become of him if the Lama had no worshippers? The Tibetan Government did not like

the peremptory Chinese interference, and pleaded hard for the Frenchmen, but in vain. They were at once hurried off with a Chinese escort by the direct route to China in the worst season of the year. They were the last Europeans to visit Lhasa.

Since their return two Europeans have made determined efforts to penetrate into Tibet. In 1879-80 the great Russian explorer, Colonel Przhevalsky, coming from Mongolia, in the north, *via* Sachu, crossed the Kuen-lun range to a point about 170 miles north of Lhasa, but there he was stopped and turned back.

In the same years the Hungarian traveller, Count Szechenyi, made three attempts to reach Lhasa. Coming from Western China, he reached Sachu, but was there stopped. He then went eastwards, and made the attempt *via* Koko-Nor, but was there turned back by the Tibetans, though the Chinese officials supported him. Undaunted by his failures, he made a third attempt. Returning to China, he travelled from the south to Báthang, but to no purpose; he was not allowed to proceed.

Having thus roughly outlined the principal previous explorers of this region, we return to the journey of the Pundit A——k.

This remarkable journey has formed the subject of a paper contributed to the Royal Geographical Society by General Walker, and published in its *Proceedings* for February 1885.

The Pundit was provided with a 9-inch sextant for taking latitude observations, a Tibetan tea-bowl for a mercury trough, a prismatic compass for taking bearings of distant hill-peaks, a pocket compass for common use in taking his route bearings, a rosary for counting his paces, a Buddhist prayer-barrel for secreting his field-books, an aneroid barometer, which, however, soon became erroneous, and proved useless, and some thermometers. For linear measurement A——k trusted entirely to his own pace or step; and "notwithstanding that in Mongolia he was looked down upon as a particularly inferior individual, because, unlike the Mongols, he persisted in walking, instead of following the custom of the country, which enjoins riding a horse on all possible occasions, he yet manfully strode along his travels, pleading poverty, or otherwise, until at last, on his return journey along the eastern flank of his route, the Lama with whom he had taken service insisted on his riding, if only to promote flight from robbers, especially the mounted bands of the Cheámo-Goloks, of whom travellers are in constant dread. Thus compelled, A——k mounted a horse, but here also he proved equal to the occasion, for he at once set to work counting the beast's paces, as indicated by his stepping with the right foreleg; in this way he reckoned his distances for nearly 230 miles."

Mr. Hennessey, in his very interesting *Summary and Discussion*, prefixed to the published translations of A——k's Diaries and Notes, has collated the most interesting results of the Pundit's journey, and, from the standpoint of intimate knowledge which an officer of his position and experience in the Survey Department of the Indian Government must possess, has

shown how these results affect the chief geographical problems relating to the remote area traversed by A——k. Of this "Summary and Discussion" we do not hesitate largely to avail ourselves. Mr. Hennessey has been able to check A——k's geographical observations as to the latitude and longitude of several of the larger towns passed on the journey, *e.g.* of Sachu, Dárchendo, Báthang, and Sáma, with the recorded values given for these places by other travellers; and his final judgment is that the verifications sufficiently prove the accuracy of A——k's operations, "which are excellent of their kind, and fully equal to what might be expected from the means of surveying at his disposal, and the enormous extent of his traverse."

It should be mentioned that in addition to the equipment described above, A——k was provided with ample funds to purchase merchandise at Lhasa, where he was to commence his explorations in the guise of a travelling merchant.

Following Mr. Hennessey's summary, the first passage of striking interest is that relating to Lhasa, the capital of Tibet, and the residence of that semi-mythical and spiritual head of Buddhism, the Dalai Lama.[1]

"Approaching Lhása from the west along the Daibung road, the view in advance presents Poto La to the north, and Chiákpori to the south as by far the most prominent objects, raised, especially in the former case, well above the foliage, which is not too plentifully interspersed between, of moderate-sized walnut, willow, apricot and other trees. Still further south the Ki Chu river flanks the city running past from east to west in a deep and moderately rapid stream, some 200 feet wide, with banks gradually sloping down to the water's edge; in fact, Lhása is situated in the Ki Chu Valley, which is here some 4 or 5 miles wide.

"The two prominent objects mentioned are on hillocks rising some 300 feet above the Daibung road, which passes between them. Chiákpori, of some three stories or floors, stands on the right hand of the road; it includes a school for instruction in the use of medicines of such young Dábas as evince predilection for the art; and in addition various medicines are compounded on the premises, from drugs imported or otherwise, and prepared, it is said, according to recipes obtained from Hindustan.

"Poto La, further west and to the left, presents an enormous pile of lofty buildings, covering a rectangle of about 400 yards in length by some 200 yards in width, surmounted at intervals by five gilded Gebis,[2] which, sparkling in the sunlight, present a dazzling and gorgeous spectacle visible for miles around.

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[1] This, of course, is the Talai Lama of Huc, as above.

[2] Gebis are erected on the roofs of buildings which contain images for worship, and outwardly serve to indicate the presence of the latter. A Gebi is shaped like a square tent with a single pole, and in section the sloping sides first curve gracefully inwards, and then widen towards the base, which varies in length up to some 30 feet, the corners of the square being ornamented each with the figure of a tiger. The frame for a Gebi is made of wood, which is covered with metal plates, and these are coated with gold.

"This celebrated monastery is not only the residence of the Great Lámas (Dá Lámas) or chief priests of the Buddhists spread over Great Tibet and Mongolia, but it contains the remains of all the Dá Lámas deceased for centuries past. The buildings form one solid block, rising to various heights at different places, representing sometimes so many as seven stories or floors: they contain various images which need not be alluded to here, excepting the monster image to the god Jamba. This monster image is represented as of prodigious dimensions; the figure is internally of clay, and is well gilded externally: it is seated on a platform on the ground floor, and its body, passing successively through the second and third floors, terminates in a jewelled and capped monster head above the latter floor; in all, the figure and platform are said to be 70 or 80 feet high. The essential feature in Tibetan worship is the performance of circuits round an image, and this monster image is circumambulated three times on the three floors which it occupies." It may be noted that the circumambulation of images and temples is an extremely common feature of Hindu worship also.

When the Grand Lama (Dá Láma) dies, his spirit is supposed to transmigrate into some baby in the realm of Tibet, and hence the Dá Láma is said never to die. The process of discovering the new Lama and installing him is described as follows in Huc's *Travels* (vol. ii. p. 197):—

"When the Grand Lama dies, prayers are directed to be offered up, and fasts to be performed in all the lamaseries. Prayer-wheels are turned energetically in the hands of the faithful, the sacred formula of the mani re-echoes day and night, pilgrimages around sacred localities are performed, and perfumes are burnt in profusion everywhere. Those who think that they possess the infant Lama in their family give information to the authorities, and the qualities of the infants are inquired into. When three infants possessing what appear to be indications of 'living Buddhas' are discovered, the election can proceed. The candidates come to Lhása, it may be from a very remote corner of Thibet (a village near Darchendo, and the village of Lithang, 600 or 800 miles from Lhása, have produced Buddhas); the chief Lamas meet in solemn assembly; they shut themselves up in the temple of the Buddha-la, and pass six days in retirement, fasting and praying. On the seventh day they take a golden urn, containing three golden fish, upon which are engraved the names of the three little candidates for the functions of divinity. The urn is shaken, and the oldest Lama present draws out a fish. The child whose name it bears is immediately proclaimed Grand Láma. The two rejected candidates are carried back by their nurses to their families; but to compensate them for not having succeeded, Government makes them a present of 500 ounces of silver." "The Dá Láma," according to Mr. Hennessey's "Summary" of A——k's information, "is installed in Poto La so veritable an infant that his mother necessarily accompanies in order to suckle him; but, being debarred from the sacred premises of the Pota La on account of her sex, she is lodged in the vicinity at

Shyo, and is permitted to visit her son only between the hours of 9 A.M. and 4 P.M. Whatever accomplishments he may acquire, the Dá Láma never needs to exhibit them, for he is taught to be chary of speech, and indeed necessity compels this course, since his worshippers are in thousands, and it is only to those who are wealthy or of high degree that he can afford to address even a brief sentence or two: this is always done in a deep hoarse voice acquired by training, in order to convey the idea that it emanates from maturity and wisdom. Seated cross-legged on a platform some 6 feet high, he is dressed to be worshipped in the usual colours of the priesthood, *i.e.* red and yellow, and with bare arms, as required of all Buddhist priests, and holds a rod, from the end of which hang strips of silk—white, red, yellow, green, and blue. The pilgrim, coming in at the entrance door, advances with folded hands as if in prayer, and resting his head against the edge of the platform above him, mentally and hastily repeats the petitions he would have granted. These unuttered prayers the Dá Láma is understood to comprehend intuitively; he touches the pilgrim's head with the bunch of silk in token of his blessing, and the worshipper is hurried out at the exit door by attendants, only too happy if he has passed, say, half a minute in the vicinity of the great priest. This is the common procedure. Persons of rank or substance are permitted to mount the platform and to perform obeisance there, receiving the required blessing by actual touch of the Dá Láma's hands; subsequently such worshipper may be allowed a seat below the platform, where a few hoarse utterances of inquiry may be addressed to him by the Dá Láma, and he may also be given some food."

To resume the account of the town of Lhasa:—"Passing along the Daibung road, and on approaching the Yutok Jampa, the traveller sees the two monasteries Chomo Ling and Tangia Ling, on his left, and on his right the residence of the two Chinese Ambáns. Before him lies the town of Lhása, and even here the dwelling-houses are interspersed with religious edifices. The lay city of Lhása is composed of houses two or three stories high, touching one another and crowded everywhere by Tibetans (Bodpas and Khampas far in the majority), Chinese, Nepalese, Kashmiris (including a few Mohammedans from Hindustan, chiefly from Patna) and Mongolians. Of all these nationalities, the Tibetans, or natives of the country, alone have their women with them, excepting a few instances of travelling Mongolians, who may be accompanied by their wives between the arrivals and departures of káfilas (caravans). This part of Lhása, or the city proper, covers an area of less than half a square mile. The houses are built two or three stories high, and mostly in blocks, around a quadrangle which is open above and is entered by a side doorway: as said, they touch one another and are crowded with occupants, who live peaceably in contiguous dwellings, differences of race and customs notwithstanding: the roofs are all covered in with earth, and this is a sufficient protection against the small rainfall, which comes down mostly in July and August. The city at all times contains a large number of

traders, with goods from various directions, including Hindustan: the article most largely imported is tea, which is brought almost exclusively from China, and is always made up in the form of bricks: manufactures in Lhása itself are few and only small in amount, the curing of skins being about the most important: there is also a fragrant slow-match, called Poi, made here solely by the Dabas or priests: it emits a perfume in burning, and is in common use by rich and poor alike. The water for the city is brought down from the north in two canals, which, however, in their progress through the city, are subdivided into many streamlets: these rills feed several shallow wells for the use of the people, and eventually discharge their surplus to the south at Yutok Jampa, where, A——k adds with emphasis, the water is no longer nice."

Polyandrism still prevails (though greatly decreased in Lhasa and other *towns*); and gives rise to a large unmarried surplus of Tibetan women, who are taken as concubines by the men of all the other nationalities.

A system of hostelries or sákhángs, where the men eat and drink in common, has been introduced by the Chinese. There are in Lhasa twelve sákhángs, and their number is on the increase. Some of them dine 200 persons at one time.

The people in Lhasa are social and good-humoured: they drink a fermented liquor, but are rarely drunk. Their social gatherings are enlivened by musical performances on the flute, and a kind of guitar with bell accompaniment; men and women dance together; theatrical performances occasionally take place; and "in the summer months the people picnic under the trees the whole day long." Lhasa is nearly 12,000 feet above sea-level.

The Lama, in his secular capacity, governs in a northward direction up to the Maurus or Di-chu River. He has a Prime Minister or Gialbu, and a council of nine. Two Ambáns or officials from China are reckoned of equal authority, and their secretary, called Jagpoche, is a man of influence. "These Ambáns were originally established at Lhása with the professed object of protecting the Dá Láma, who, however, it is said, now finds their presence embarrassing, and of a nature that he could dispense with." These four potentates, the Grand Lama, his Gialbu, and the two Ambáns are alone allowed to ride in a palki; there is an officer of the rank of captain from Nepal, but the privilege of the palki is denied him.

The trade-routes to Lhasa, traversing the district of A——k's explorations, are three in number. Two of them run from Darchendo to Lhasa, one taking a more northerly line than the other. The southerly line is the Junglám, or official road; along it the Chinese Ambáns and the posts travel; and it is continued westward some 340 miles beyond Lhasa to Dingri.

The more northerly line is called Jánglam (northern road). It is shorter, and passes through a colder region; but it is easier for the yáks and jomos ("descendants of the yák") and mules which carry the trade.

Its length is 890 miles. The southerly route, the Junglám, is 935 miles long: the temperature is too high for yáks and jomos, and the carrying is done on horses and mules; it runs more through civilised tracks, where the expenses of the trader are greater. On the Jánglam route the cost of carriage is estimated by Mr. Hennessey at the very low rate of a quarter pie per maund per mile.

After an unavoidable prolonged residence at Lhasa, A——k at last started, with his party of six, northwards, in company of a káfila, which consisted of about 100 individuals. The majority were Mongolians, who were all, men and women, mounted, and who had each a led horse laden with property: "No Mongolian will walk on any occasion when he can contrive to ride." The Tibetans (Bodpas) of the caravan walked, leading their laden horses. All were armed, for fear of robbers. "The dominant thought which governs all procedure in a caravan is how to escape being plundered." The fuel used on the journey was the dung of beasts, "generally plentiful, and the sole fuel procurable." Grass was abundant, and the horses fed within the limits of their tethers. Every Tibetan carries his eating-dish on his person in the form of a small wooden cup, and from this tea was drunk, which was prepared by thoroughly boiling powdered brick-tea, and adding to the strained decoction butter and salt. The principal meal consisted of boiled flesh eaten without bread, for flour is a luxury: "The soup was thickened with a few pinches of flour, and plenty of *chura*, which is abundant, and used by rich and poor." *Chura* is a most valuable article of common consumption in all Tibet and Mongolia, and one of the largest products of these countries where milk is so abundant. It is made by boiling down buttermilk to a thick paste, and drying the latter: in value it is about twice as expensive as corn-flour.

It is noted that to the eastern tribes of the robbers who infest those routes, Mongolia offers a fertile hunting field for horses, which are bred there in large numbers.

One of the most interesting features of A——k's notes is the information they convey regarding the great table-land of Tibet, known as "the Jángtháng." This is the area known to the shawl-wool traders of the Punjab as the source of the *pashm*, or fine shawl wool. We quote the principal parts of Mr. Hennessey's abstract respecting this interesting land, regarding which little information has hitherto been put in a collected form.

"Following now the line of country traversed, and starting from Lhása at a height of about 12,000 feet, it is described as a succession of ascents and descents between precipitous hills, affording passages at all times restricted, and in some places so narrow as to admit only a *single* line of horses: rocks abound, yet at least scanty cultivation is not absent; also, the people live in houses: this continues up to Chiomo Lhákháng, where a change of aspect commences and is fully established at Láni Lá in the Dam. The traveller has now mounted the Jángtháng, a tract so peculiar as to deserve some special notice."

It is a vast expanse of high undulating land, about 100 miles broad

to the west, near Skardo, widest on the meridian of 86°, where it is some 100 miles across, and "to the east it ends in an inclined width of some 350 miles." Its length is about 1500 miles, and its area some 480,000 square miles, or three and a half times the area of the United Kingdom of Great Britain and Ireland. Its eastern and northern tracts are but imperfectly known.

"This enormous tract of high table-land is believed to be generally some 15,000 or 16,000 feet above sea-level, rising to a maximum somewhere in the vicinity of the Mánsarowar Lake; in a word, it stands *above* the perpetual line of snow in Europe, and hence this expanse of land, which otherwise would be invaluable, is utterly unfit for cultivation, or, except under great restrictions, any use by man. It is said to be similar in character *throughout*, and to present a succession of easy undulations, well covered with earth and almost free from stone: the knolls in places form into ridges which sometimes carry high and snow-clad heads, but invariably the inclines are gentle and there are no precipices: water is plentiful and in places there are even large and handsome lakes, as the Mánsarowar, Tingri Núr, etc.; further, the whole Jángtháng is coated by a short succulent grass, which from May to August covers the undulations with the softest of green carpets, extending far away, and visible for even 50 or 60 miles in the clear crisp atmosphere prevailing. But beyond the abundant grass, *nothing* else will grow on this high land; there is no wood or scrub of any kind for fuel; and, in a word, the products of the earth are solely suited for graminivorous animals, which run wild in enormous numbers, as the yák, goat, sheep, deer, etc.; and the weaker of these provide food for the wolf, jackal, and yi (a large wild cat), to which the carnivora are limited. It is said the grass does seed, and most probably is propagated chiefly by that means; but other seeds, as of wheat or barley, though they germinate and produce fodder for cattle, yield only *seedless* ears, and hence no food for man.

"The northern portion of the Jángtháng is *wholly unoccupied* by man; but it is overrun by enormous herds of wild animals, chiefly graminivorous. This northern belt abuts on the north a tract of lower level, consisting of sandy wastes, with oases interspersed, a tract peopled by Mongols, who live in round *white* tents made of felt. On the south it is met by the southerly tract of the Jángtháng, a tract inhabited also by nomads, but of a different race, viz., by Tibetans, who live invariably in rectangular-shaped tents, *black* in colour, made from the hair of the yák. The white and the black tent nomads are ethnologically similar, and all acknowledge the spiritual authority of the Dá Láma, but differ much in character. The Mongol is timid and peaceable; his land produces both corn and animals, and he is content with what he has. The Tibetan nomads (black-tents) are called Dokpas, and are all more or less robbers by profession; to them might gives right, always excepting the recognised law by which the property of a fellow-clansman must be respected, and they roam in mounted bands far and wide in search of plunder."

The abundance of wild animals on the Jángtháng is worthy of remark. Undisturbed by man, they breed and multiply upon the grassy wilds, and a severe winter alone appears to check the indefinite increase of their numbers. Wild yaks were seen by A——k's party in such considerable herds, that 3000 to 4000 beasts were visible at short distances, and *at the same time;* "handsome black brutes, without a single trace of the white which appertains to domestication and bondage, and with long hair trailing so low as to conceal their legs, they presented to view remarkable great dark moving masses of animal life." A wild yák bull, says A——k, will probably weigh one and a half to two tame ones, and his head and horns are a full load for a strong man. The dung of the wild animals, especially of the yák, "provides excellent and abundant fuel, without which no traveller could cook his food, and live to cross the Jángtháng."

"Returning now to the káfila, which was followed to Láni Lá at the commencement of the Jángtháng, it continued its course across that high land, observing every precaution against robbers. The country up to the Dáng Lá range, being occupied more or less by nomads, was so far easy to traverse that the required track was sufficiently worn at intervals to admit of being found readily; but north of that range, the ground showed no track whatever, so that the Mongolian guides, frequently at a loss in which direction to proceed, mounted neighbouring heights, in hopes of recognising some familiar landmarks, and otherwise shaped their course from one prominence to another. It may also be noted that at the Saung Chu (lat. 32° 12′) the direct road *viâ* Di Chu Rab-dun was rejected, and a more westerly course adopted as less likely to be infested by robbers: hence, on crossing the Kuen-lún (or Añgirtákshia) range, the party descended on the northern side into Mongolia Naichi. Here a complete change of aspect presented itself; the travellers now passed along an undulating valley from 1 to 3 miles wide, bounded by hills described as sandy and conglomerate in formation, a description which applies generally to all the hills seen in Mongolia."

The land all over Mongolia is covered with a coat of whitish salt called Bácha. This saline powder was easily raised and driven about in clouds by the wind, which blows persistently, and with considerable force. The skin of the traveller, when not protected by clothing, cracked under the influence of the salt air. "In a word, the grassy carpets and clear, crisp atmosphere of the Jángtháng was replaced by an arid, whitish waste, while the air, generally laden with haze, sometimes became so dense in high wind, that the view around hardly extended beyond 100 paces." But where water appeared on the surface vegetation luxuriated: "the grass grew green and strong," rising to 2 or even 3 feet, and it is to these instances of bountiful provision that Mongolia enjoys its ability to rear the large numbers of horses, camels (useful only in the winter months, when it has a coat of long hair; in the summer it becomes weak as well as sleek

in its coat), sheep, goats, and other graminivorous animals, for which it is celebrated."

"Passing onwards from Naichi, the káfila proceeded along the narrow valley already mentioned, until on arrival about Golmo they debouched into the verdant and wider valley in Thaichinar. The valley has been traced from Shiáng Chaidam (east) by Thingkáli and Golmo, from whence it passes on westwards south of Hazir; several rills of water run in its bed, which is moreover green with grass and foliage and presents a valuable tract for pasturage; but between it and the northern hilly ranges, there runs a dry barren belt of earthy sand, which contrasts the more prominently from its proximity to the green valley below."

At Golmo the dispersion of the káfila began, and A——k proceeded eastward to Thingkáli. Here the explorer rested for a while, and made arrangements for further progress northwards; but, on the eve of his departure, he and his party were attacked by a band of robbers.

The Mongols are *generally* an honest race. They are amiable; they practise monogamy; live on flesh, tea, butter, and milk, including that of sheep, camels, and mares. They read and write in a character different from Tibetan, own spear, matchlock, and sword, but lack the courage to use them efficiently. Their wealth consists principally in horses: no Mongolian so poor that he has not half-a-dozen, and in a few instances there are herds of 500 beasts.

"The losses he incurred at Thingkáli crippled A——k and his two comrades most deplorably; notwithstanding, he collected the remnants of his effects, and, bravely refusing to turn homewards, set his face towards Sachu, resolved on further exploration. But misfortune still followed him, and the facts may be briefly mentioned here. He had progressed some 330 miles towards Sachu, when one of his two comrades, who had shown aversion to further exploration, and partiality for adopting Mongolia as his residence, suddenly decamped with the horses of the party, as well as with nearly all the remnants of property which the robbers had failed to carry away, leaving A——k and his remaining comrade practically paupers. Under these circumstances no one could have reproached the explorer had he now endeavoured to *retrace* his steps, but he once more rose above adversity, gallantly making his way onwards to Sachu, and it was only when detained and turned back from thence, that he at last reluctantly retrograded towards India. Even now he chose a *new* and *far longer* route, which in the end involved his journeying over full 1890 miles, and, though penniless and dependent on charity, he continued his observations to the very end, exercising regularity, care and skill, and unconsciously evincing such unfailing courage, gallantry, and sense of duty as may well be admired."

Before reaching the town of Sachu,[1] A——k had passed through the

[1] Sa-chu is the Mongolian form of the name already recorded by Przhevalsky; Sai-tu is the Tibetan.

district of Saitang, whose hills are well known as being inhabited by a few wild human beings, and some herds of wild Bactrian camels. These latter are an object of sport, and their flesh finds a ready sale at Sachu and elsewhere.

The town of Sachu is quadrangular, $1\frac{1}{2}$ miles long, $1\frac{1}{8}$ miles wide. It is fortified. It was the most northern place visited by A——k. "On the whole," says Mr. Hennessey, "Sachu cannot be compared with Lhása in point of interest, wealth, or population; its people are nearly all of a single nationality—the Chinese—and its trade is mostly with the north and west, the traffic being carried in carts drawn by two to five horses. To A——k the people proved inhospitable and ungenerous, and, like others who are in poverty and friendless, he was regarded here with distrust, so that the further progress northwards which he contemplated was prohibited: nor was he even able to retrace his steps towards India: eventually a Láma from Thuden Gomba, with whom he was acquainted, happened to visit Sachu, and, recognising A——k, obtained leave to take him back with his party. In this company the explorer was *obliged* to ride on a horse down to Chákángnamaga, from whence the track which bifurcates eastward (new to A——k) was followed: here he became bullock-driver to the party, and walking by these beasts was able to reckon his own paces as usual to Bárong Chaidam: for the remaining distance to Thuden Gomba, the track runs in the vicinity of the Chiámo Golok and Bánákhásum robber clans, and by way of provision for escape, if necessary, from these marauders, every individual of the party was required to ride; hence for this portion the explorer with commendable ingenuity reckoned the paces taken by the right foreleg of his steed, and the result shows that a horse steps quite as equably as a man."

Bidding grateful farewells to the Lama who had befriended him, and who was master of Thuden Gomba (monastery), A——k continued his journey towards Dárchendo, and entered on the tea-track at Kegudo, from whence the continuation of this track trends south-westerly, and, passing through the Hor possessions, strikes the line from Siling to Lhasa at Chomora Lake.

At the town of Dárchendo, which formed the south-eastern angle of his route, and from whence he turned westward to Lhasa, he was generously helped with money and advice as to his further progress. Dárchendo is well known as the emporium for all the Chinese tea from the gardens to the east. It is from this place that the two tea routes to Lhasa diverge—the Jánglam and Junglám routes already described.

From Dárchendo, A——k travelled along the official road, *i.e.* the southern or Junglám route. He, however, had occasion to leave this road at Gárthok, proceeding south-westerly to Sáma. Only some 30 miles now divided him from British territory, but he soon found to his great disappointment that those few miles presented a barrier impenetrable not only to himself, but to the people of Zayul themselves: in a word, none of the latter dare venture to cross into Assam through any of the neighbouring tribes. Nevertheless, but for this very disappointment, which

compelled him to perform a circuitous route round the Sangpo,[1] he would not have solved one of the most interesting geographical problems of modern times.

"Reluctantly turning his steps from home, A——k gallantly faced northerly once more, and at the Átá Gáng Lá crossed over from the Rong: here he came across the only glaciers in his journey, and these at the pass *united*, so as to slope contrary ways; the height of 14,690 feet which he determined was probably some 2000 feet below the glacial ridge.

"With the Rong left behind, the explorer was once more in country similar to that already described, such as he had passed through before reaching Láo village and yielding only one harvest annually: these features, with but little variation, continued along the remainder of the exploration. At Lho Jong he rejoined the Junglám (southern road) and again met bands of traders between Lhása and Dárchendo: leaving the road at Chomoráwa Giachug, he turned southerly to Chetáng, and eventually closed his work at Khamba-barji."

To geographers, perhaps, the most interesting results of A——k's observations are those which throw light upon two geographical questions —one regarding the north-western watershed of the Irawadi, and the other concerning the course of the Sangpo or Cháng Chú River, after it passes Gya-la-Sindong, below Lhasa. Mr. Hennessey says:—

"I first dispose of the question as to the north-western watershed of the Irawadi. It will be seen from the map that the Zayul district is peculiar, in that it is locked in right round by a high and continuous watershed, which is cut through only at one place, *i.e.* by the Zayul Chu in about lat. 28° and long. 97° 5′. The district is made up of two valleys; in the eastern runs the Zayul Chu proper, rising at Tila Lá; the western is the bed of the Rong Thod Chu, rising at Átá Gáng Lá; the two streams unite near Shíkha, and then cut through the range, which in absence of other designation may be called the Rong Thod-Mishmi Range. Now points on these ranges, and mostly the ranges themselves, were actually seen and visually followed out by A——k, and his verbal account in addition leaves no doubt that, apart from minor defects, which only an actual topographical survey could elicit, his delineation is in the main correct. On this evidence it now stands determined that the watershed of the Irawadi is the Zayul-Khanung range."

A reviewer in the *Mitteilungen*, 31 Band, 1885, says:—"Whereas the river sources south of the Tanla range, up till now, and following the Chinese-Tibetan notions about them since the beginning of the seventeenth century, were held to be tributary to the Salwin (Lu-tze-kiang), on A—k's map they are attributed to the Mekong (Lan-Tsang Chian). Of importance, too, is the considerable transposition from ¾ to ½ a degree to the east for the course and the district of the Lu-tze-kiang; for thus does

[1] Sangpo means large river, and is equally applicable to *all* large rivers. The proper name of the river south of Lhása is Cháng Chú, or Nári Chú.

the Irawadi gain a more comprehensive 'source region' by several thousand square kilomètres, and this goes towards the explanation of the water-masses of this river."

"This also," says Mr. Hennessey, " makes it almost impossible for the Sangpo to run down the Mishmi country, and carrying the Zayul Chu with it to discharge into the Irawadi, as has sometimes been imagined. A——k ascertained by local inquiry, that a small stream (not a large one) does run down part of the Mishmi country, and joins the Zayul Chu on its way to India, *i.e.* to the Brahmaputra; but in reply to further inquiry, as to whether this small stream could be the Lhasa river (*i.e.* the Sangpo), the people ridiculed the idea.

"Now, following the explorer from Átá Gáng Lá onwards, it will be seen in Sheet No. 1 that the watershed lay to his left, *i.e.* south, all the way up to Shiár (*i.e.* east) Gáng Lá where he crossed it, so that it now fell on his right up to Nub (*i.e.* west) Gáng Lá: in fact the district of Arig (like Zayul) is ringed by a watershed, which is pierced only at one place, and that at Aládo Giachug by the Daksong Chu. It is needless for my present purpose to follow the watershed further west, for I have already arrived *west* of Gya-la-Sindong (the place down to which the Sangpo has been traced), and the question immediately in hand is, whether the Sangpo runs *east* from Gya-la-Sindong. I have shown already that the Sangpo does not cut through the watersheds up northwards from the Zayul-Khanung Range to Átá Gáng Lá, and attention has been called to the continuation of this watershed which runs round Gya-la-Sindong to east and north from Átá Gáng Lá. Further, A——k positively affirms that this watershed was nowhere cut through by any river whatever; least of all by a river so large as the Sangpo; and I am confident that this statement is quite reliable. Thus taking Gya-la-Sindong as a centre, the Sangpo has no exit all the way round north and east, nor along the Rong Thod-Pomedh Range, or the range at the head of the Mishmi Valley; *i.e.* it has no exit right round Gya-la-Sindong from north down to a point (call it X) somewhere in latitude $28\frac{2}{3}°$ and longitude $95\frac{1}{2}°$.

"Having stated this much, I come to the geographical problem that has hitherto awaited an answer. The Sangpo rises near the Mánsarowar Lake, and from thence it has been traced, practically continuously, for some 850 miles to Gya-la-Sindong, where exploration downwards is barred by savages: what is the further course of this river? As already shown it has no exit anywhere north or east, down to the point here called X; hence, unless it disappears in the bowels of the earth, it *must* feed the Brahmaputra. The tributaries here of the latter and their discharges, are as follows:—

Discharge of	Cubic feet per second.	Proportional part.
Dihang	55,500	1
Lohit+Tenga	33,800	0·6
Dibang+Sesiri	27,200	0·5
Subansiri	16,900	0·3

Also of the Sangpo we are told by A——k, that at Chetáng the stream was some 400 feet wide; subsequently we know that it received the Daksong Chu, which, even at Aládo Giachug, before receiving the Kongbo Giámda Chu, was (the explorer adds) *not* fordable: as to depth of the Sangpo at Chetáng, it is described as 'very deep;' no measurements were made, but a depth of 25 or 30 feet A——k thinks certainly existed; moreover the water deepened rapidly from the banks, and in point of velocity a man walking fast on the shore could not keep up with a boat floating down the stream; under these circumstances the discharge per second was probably full 40,000 cubic feet at Chetáng, and this was more likely to be increased than decreased in progress to British territory.

"Now since the Sangpo discharges into the Brahmaputra west of X, we have to select a recipient from the four tributaries mentioned in a former place. I put the (Lohit+Tenga) out of consideration, because to reach it the Sangpo must, so to speak, run through the Dihang and (Dibang +Sesiri), and of the remaining three, the Dihang alone is of the estimated volume of the Sangpo, the other two being only $\frac{1}{2}$ or $\frac{1}{3}$rd the required volume. Hence the conclusion I arrive at is, that the Sangpo and Dihang are identical; and in fact, if this is not the case, there appears no answer to the question, How comes the large discharge of 55,500 cubic feet to be created in the Dihang? Believing that geographers will coincide in the identity above indicated, I conclude my remarks by pointing out that the solution thus afforded by A——k gives additional value to his remarkable explorations."

In an addendum to his "Summary," Mr. Hennessey collects the information regarding the trade routes and tea trade to be found in A——k's diaries. It appears that the Chinese gardens east of Dárchendo supply the whole of the tea consumed in Eastern Tibet, besides furnishing enormous quantities to Lhasa for local use and for despatch westward and southward, including Bhotán. These gardens are said to commence 140 miles east of Dárchendo, and must be very extensive. The process of making bricks of tea is described, and also the method of packing the the bricks into "khotús" or packages of four. The tea when delivered at Dárchendo is stripped of its wickerwork packing, and the khotú is sewed up in leather. It is now fit to be transported on yáks, jomos, mules, or horses. The yák will carry 4 khotús, or from 1 to $1\frac{1}{2}$ maunds,[1] and travels under 10 miles daily; the jomo or mule carries 8 khotús, or about double the weight of the yák, and travels (say) 15 miles per day. *The* currency of the country is *brick-tea*. "Even the lawless Dokpa, or black tent nomad, will accept payment in brick-tea for anything he possesses; and, in a word, any person in Eastern Tibet, if not drinking his native malt liquor, drinks tea every day and all day; he scorns a water-drinker, and will take none of that element himself. As a common usage, a strong decoction of tea

[1] It may be well to remind the general reader that an anna is the sixteenth part of a rupee, which is equal to two shillings, and that the maund (of 40 sers) represents 82 lbs. A pie is $\frac{1}{2}$-farthing.

is always ready to hand in most households, so that diluting this with hot water a Tibetan can obtain the required draught at short notice. A——k thinks a married couple with two or three children, *if economical*, will consume about a ser of tea monthly, that is about 2 lbs.

The teas sold at Dárchendo vary in price from 8 annas per pound to $1\frac{1}{4}$ annas per pound. Mr. Hennessey enters into a calculation (but he allows it is a rough one), showing the cost of carriage from Dárchendo to Lhasa to be 1 rupee per maund for 890 miles, or under $1\frac{1}{4}$ pie per maund per mile. On data, which are however uncertain, the population of the area under discussion is guessed to be about 2,315,000 souls; and the "annual consumption of tea is most probably more than $11\frac{1}{2}$ millions of pounds annually, . . . a result so considerable, that India would possibly benefit by sharing in it to the extent of even a moderate fraction."

Mr. Hennessey has some interesting remarks about the competition of Indian and Dárchendo teas; and the question, he considers, resolves itself into their comparative cost *at Lhasa*. He does not enter into the question of cost of *manufacture*, but only of carriage. The principal factor in the cost of China tea is the difficulty of carriage between the Chinese gardens and Dárchendo, where the road is very bad, and where the tea is all carried by human beings. The data for an opinion are most uncertain, but Mr. Hennessey concludes that the cost of carriage will be about 4 rupees per maund from the gardens to Dárchendo, and 1 rupee more on to Lhasa, *i.e.* that China tea at Lhasa has paid 5 rupees per maund for carriage alone. As regards Indian tea, he estimates the carriage from Darjiling to Lhasa to be about Rs. 4/9 per maund, leaving 7 annas only as a set-off against any carriage which had to be paid before the Indian tea reached Darjiling (of course some tea is grown at or near Darjiling).

Mr. Hennessey's last two paragraphs on tea and pashm are most important in their commercial bearing, and deserve quotation in full:—

"There are many hundreds of acres under tea cultivation in Dehra Dun (near Mussoorie), but, so far as I am aware, no one *there* at least has ever attempted to imitate the Chinese brick tea: and yet, if India is to compete with Tibet, there is no manner of doubt she must do so with the self-same article Tibet is accustomed to, that is, tea in *bricks*. Moreover, it is easy to see that the hard compact brick is a box in itself, and offers resistance to degeneration from atmospheric causes by means both effectual and economical. Nothing but failure can result from trying to force leaf-tea on people, who, like the semi-civilised Tibetans, are accustomed to tea in brick: and in a word it is difficult to imagine any form so portable and exactly suited to the circumstances, in Tibet as well as elsewhere, than tea in brick."

"But beside the subject dealt with in the foregoing, there is another, if possible, of even greater importance, which is almost wholly neglected. I allude to trade in the soft costly wool, called Pashm, or shawl-wool. Whatever else the Jángtháng may fail to grow, there can be no doubt that hundreds, or even thousands of maunds of pashm are necessarily produced

there every year and *wasted*. Pashm can grow only in cold countries, and otherwise the conditions prevailing in the Jángtháng are exactly suited to its production by means of the herds of all kinds of innumerable animals bred there; but Tibetans neither know its value nor how to collect it; and in fact the industry has yet to be taught them, as has already been done in a few localities, including Mánsarowar Lake, which feed Kashmir. The conclusion is obvious: if Tibetan tea could be exchanged for Pashm, if not for coin, the advantages accruing to both Tibet and to India would be very considerable indeed."

We do not apologise for laying before our readers this long account of A——k's valuable exploration, as abstracted by Mr. Hennessey, nor Mr. Hennessey's own most valuable observations. The problem of commerce between India, and Tibet, Mongolia, and South-Western China is in its infancy, and is a great question which will certainly occupy the attention of the commercial world and of statesmen in an increasing degree. The present contribution to our knowledge of the subject by the determined and patient efforts of A——k is an important one, and the Government of India has done well to lay it before the public; while Mr. Hennessey deserves credit for his clear and intelligible account of the results of the explorations, and the successful conclusion of the task committed to him by General Walker, who, as Surveyor-General of India, designed this much-needed exploration, and had it carried into effect.

THE SCOT ABROAD.

From books of travel one is apt to gather an impression that in various countries of the world, and our own colonies in particular, persons of Scottish birth or origin positively outnumber the representatives of the other sections of the United Kingdom; and either direct statements or playful allusions to the "ubiquitous Scotsman" suggest that over the world one finds, on all hands, the numbers of Caledonians very greatly in excess of what might be expected from the slight population of the Land of Cakes. The *perfervidum ingenium Scotorum* has, as we all know, been for centuries carrying large numbers of Scotsmen into all habitable lands. In Sweden, we find Hamiltons; in remote parts of Germany there are Douglases, and the great German philosopher insisted on the Scottish origin of the Kant family. Russian statesmen own the name of Barclay, and a great Slavonic poet showed his Scottish descent in his name of Lermontoff (Learmonth-off). Of the number of persons of "Scottish extract" who have settled abroad, and lost direct contact with the old country, it is of course impossible to make any estimate. It is even difficult to distinguish in the fullest population returns of European lands how many of those entered as "natives of Great Britain" are Scottish—a very considerable total, no doubt. But it seems possible to make an approximate guess at

the numbers of Scotsmen and Scotswomen in some of the countries outside of Scotland where the Scot Abroad has made himself most entirely at home—in England, Ireland, the British Colonies, and the United States. In some cases the figures are definitely ascertainable, in some only approximately.

First, in England and Ireland. At the census of 1881, without taking any account of the incalculable number of persons of Scottish descent born in the south, there were in England and Wales upwards of 253,500 persons of Scottish birth, and in Ireland 22,300. In the London district alone there were 49,554 persons born in Scotland. By way of compensation it should be noted that at the same date there were in Scotland 90,000 English-born men and women, and more than 218,700 natives of Ireland, besides 950 Manxmen, 12,850 colonials, and 64,000 foreigners.

The figures available for the colonies do not bear out the popular impression as to the very large proportion of Scottish settlers; though the numbers are no doubt in many cases disproportionately large if we consider the small population of Scotland as compared with that of England and of Ireland. In 1881 the population of England was 24,613,926; of Wales, 1,360,513; of Ireland, 5,174,836; and of Scotland, 3,735,573. Thus the inhabitants of Scotland are little more than one-seventh of the joint population of England and Wales; so that even when the numbers of Scotsmen are positively fewer than those of Englishmen and Irishmen, they are in many cases comparatively and proportionately more numerous, though not to the remarkable degree often assumed.

The Canadian census returns for 1881 give comparative figures of the population "on the basis of origin," as well as according to birthplace. The total population of the Dominion was 4,324,810; of whom more than four-fifths were natives of British North America, amongst the alien-born being 470,000 natives of the United Kingdom; but of the total population 1,298,929 are classified as of French origin, 881,301 of English origin, 957,403 Irish, 669,863 Scottish—so that in Canada, by this classification, for 100 persons of Irish descent, there are about 90 of English stock, and 70 of Scottish. In certain districts, of course, the proportions of Scotsmen are very much higher; and on the whole, while absolutely the Scottish folk are less numerous than their English and Irish kin, they are relatively very strong in numbers.

In New Zealand, while, of about 490,000 inhabitants in 1881, 223,000 were natives of New Zealand and 172,000 of the Australian Colonies, 120,000 were born in England, 50,000 in Ireland, and 53,000 in Scotland.

In all the Australian colonies Scotsmen and their descendants abound, but the statistics do not in every case distinguish precisely between English, Scotch, and Irish. In 1881, Victoria, 58 per cent. of whose population were home-born, had become the residence of 147,500 natives of England and Wales, of 86,750 Irish, and of rather more than 48,000 Scots. Queensland has less than 10,000 Scots, against 37,400 of English

birth and 21,300 Irish; and Western Australia contained 732 settlers from Scotland, while over 6700 were English and near 3000 were Irish. The statistics at hand for New South Wales, South Australia, and Tasmania do not give the comparative figures; the Scottish-born may perhaps be presumed to vary from a fifth (as in Victoria) to a seventh (as in Queensland) of the total number born in the United Kingdom, and be as many as 50,000 in all.

For South Africa, India, the West Indies, and the other British possessions, precise figures are not to be had. But the total number of Scottish settlers, though not inconsiderable, is small compared with those in the great Australasian colonies.

In the United States there were, at the census of 1880, 1,855,000 persons of Irish birth, 662,700 English, and 170,200 Scottish. And during the period 1820-1879, while 3,065,700 emigrants from Ireland established themselves in the United States, and 895,000 from England, hardly 170,000 arrived from Scotland.

The reports of the last census deal with 2,881,167 natives of the United Kingdom living in 1881 in the dominions of foreign Powers; of these 2,772,169 were in the United States. We may presume that at least one-seventh of the remaining 109,000 were Scottish.

If we look at the matter from the point of view of our own statistics of emigration for the United Kingdom, we find that in the 32 years 1853-1884, 5,648,096 emigrants of British origin left the United Kingdom; of these 2,664,016 were English, 2,436,657 were Irish, 547,423 were Scotch. Thus, in a long and busy period of constant emigration from Great Britain and Ireland, the Scots numbered almost one-tenth of the vast crowd of emigrants, and were more than a fifth of the number that left England and Wales.

Of the total numbers of Scotsmen outside Scotland, it is, as we have said, impossible to speak precisely; still more difficult to estimate the amount of Scottish blood that runs in the veins of the English-speaking race at home or abroad, wherever it is found. Probably greater and more incalculable still is the influence exerted by Scottish blood, Scottish character, Scottish habits, and Scottish education on national and colonial development. With the standing of Scotsmen in arms, arts, literature, and the other departments of life in the history of the home countries, the present paper has nothing to do. Certainly it does seem as if the Scots have done a good deal more than their share in building up "Greater Britain." The eminence of Scotsmen in the administration of the Indian Empire is notorious. It was lately pointed out that, of our seven Australasian colonies, four had about the same time Scotsmen for their premier ministers; and in Canada, alternate Governments are headed by rivals with markedly Scottish names. Still, from our imperfect survey, it appears that there must surely be some exaggeration in such statements as those of Sir Charles Dilke in his *Greater Britain* (ii. p. 353):—"In British settlements from Canada to Ceylon, from Dunedin to Bombay, for

every Englishman that you meet who has worked himself up to wealth from small beginnings without external aid, you find ten Scotsmen. It is strange indeed that Scotland has not become the popular name for the United Kingdom."

John Hill Burton feared that "to go abroad merely for the purpose of dealing with one's countrymen dispersed in foreign lands," might appear an "egregious instance of nationality;" but pleaded his *History of Scotland* as a valid excuse for writing his entertaining *Scot Abroad*. *The Scottish Geographical Magazine* may surely claim, in its name and its scope, a similar justification, if it should be thought to need one. Apology is rather due for dealing with an important and interesting subject in a meagre and imperfect manner. Possibly the readers of the *Magazine* may be able to complete and improve the statements of this brief statistical sketch.

D. P.

ORTHOGRAPHY FOR NATIVE NAMES OF PLACES.[1]

THE Council of the Royal Geographical Society have adopted the following rules for such geographical names as are not, in the countries to which they belong, written in the Roman character. These rules are identical with those adopted for the Admiralty charts, and will henceforth be used in all publications of the Society:—

1. No change will be made in the orthography of foreign names in countries which use Roman letters: thus Spanish, Portuguese, Dutch, etc., names will be spelt as by the respective nations.

2. Neither will any change be made in the spelling of such names in languages as are not written in the Roman character, as have become by long usage familiar to English readers; thus Calcutta, Cutch,[2] Celebes, Mecca, etc., will be retained in their present form.

3. The true sound of the word, as locally pronounced, will be taken as the basis of the spelling.

4. An approximation, however, to the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself.

5. The broad features of the system are—that vowels are pronounced as in Italian and consonants as in English.

6. One accent only is used, the acute, to denote the syllable on which stress is laid.

7. Every letter is pronounced. When two vowels come together each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai*, *au*, *ei*.

[1] To avoid the inconvenience of foot-notes, we enclose such other remarks as appear called for in square brackets.

[2] This example seems somewhat unfortunate; for, in India at least, "Cutch" is as rapidly giving place to the approximately more phonetic "Kach" or "Kachh," as "Cattywar," long since yielded to "Kathiawar."

8. Indian names are accepted as spelt in Hunter's *Gazetteer*. The amplification of the rules is as follows :—

Letters.	*Pronunciation, with Remarks and Examples.*
a	*ah*, *a*, as in *father:* Java, Banána.
e	*eh*, *e*, as in *benefit:* Tel-el-Kebír, Oléleh, Yezo, Medina, Levúka, Peru.
i	English *e*; *i* as in *ravine*; the sound of *ee* in *beet*. Thus, not *Feejee*, but Fiji, Hindi.
o	as in *mote:* Tokio.
u	long *u* as in *flute*; the sound of *oo* in *boot*. Thus, not *Zooloo*, but Zulu, Sumatra.
	All vowels are shortened in sound by doubling the following consonant: Yarra, Tanna, Mecca, Jidda, Bonny.
	[It may here be noted that the sound of the *e* in Medina (Mădinah), given above, and that in Mecca (Măkkah) are identical, each being the shut sound of *a*, as in the first syllable of America.]
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound: Nuulúa, Oosima.
ai	English *i* in *ice:* Shanghai.
au	*ow* as in *how*. Thus, not *Foochow*, but Fuchau.
ao	is slightly different from the above : Macao.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from *ey* in English *they:* Beirút, Beilúl.
b	English *b*.
c	is always soft, but is so nearly the sound of *s* that it should be seldom used. If Celebes were not already recognised, it would be written *Selebes*.
ch	is always soft, as in *church:* Chingchin.
d	English *d*.
f	English *f*; *ph* should not be used for the sound of *f*. Thus, not *Haiphong*, but Haifong, Nafa.
	[Here there is some danger of mistakes: in many Asiatic words the sound of the aspirated *p* is often mistaken by the untrained English ear for that of *f*, as in Phalgu, Niphar, etc.]
g	is always hard; soft *g* is given by *j:* Galápagos.
h	is always pronounced when inserted.
j	English *j*. *Dj* should never be put for this sound : Japan, Jinchuen.
k	English *k*. It should always be put for the hard *c*. Thus, not *Corea*, but Korea.
kh	The Oriental guttural: Khan.
gh	is another guttural, as in the Turkish: Dagh, Ghazi.
l, m, n	as in English.

Letters.	*Pronunciation, with Remarks and Examples.*
ng	has two separate sounds, the one hard as in the English word *finger*, the other as in *singer*. As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.
p	as in English.
q	should never be employed; *qu* is given as *kw*: Kwangtung.
r, s, t, v, w, x	as in English: Sawákin.
y	is always a consonant, as in *yard*, and therefore should never be used as a terminal, *i* or *e* being substituted: Kikúyu. Thus, not *Mikindány*, but Mikindáni; not *Kwaly*, but Kwale.
z	English *z*: Zulu.

Accents should not generally be used, but where there is a very decided emphatic syllable or stress, which affects the sound of the word, it should be marked by an *acute* accent: Tongatábu, Galápagos, Paláwan, Saráwak.

[Without further explanation than this, it will sometimes be doubtful whether syllables so marked are simply long but unaccented, or are to receive an *accent* or *stress* of the voice. It seems much better to retain the *acute* accent for a stress or emphasis, and to use the *circumflex* or the *long* to mark the lengthening of a vowel; the long vowel is not necessarily the accented sound, and it is quite as important to mark the quantity as the syllable on which the stress falls: Bagh'dâd, Kâshân, Bukhârâ, Thânâ. Then, to make this system fully available for our maps and geographical papers, the above ought to be accompanied by tables of the principal foreign alphabets—specially the Slavonic and Arabic—with the proposed equivalents, so that transliterations by different individuals would be consistent with one another.

It is rather curious that no notice is taken of that simplest Slavonic sound (almost identical with *z* in *azure*), which can be fairly expressed in English by *zh* in analogy with the compounds *th*, *dh*, *sh*, but which has caused great confusion in geographical nomenclature, sometimes being represented by the French *j*, sometimes by the quite inappropriate German *sch*. Something ought also to have been said about the treatment of the *ts* sound, which is initial in the title of the Russian Autocrat and the capital of Montenegro. The whole question, indeed, of the transliteration of Slavonic names seems to have been left over for further judgment.

Rule No. 1 suggests a difficulty which it does not solve. In the colonial territories of European powers in Asia, for example, ought the preference to be given to the transliteration of native names adopted by the respective governments, or to a transliteration in harmony with English methods?]

The rules, as they stand, will certainly, if steadily applied, help very considerably to the attainment of their object; and are happily characterised by common sense instead of philological finicalness.

PROCEEDINGS OF THE SCOTTISH GEOGRAPHICAL SOCIETY.

An Extraordinary Meeting of the Society was held in the Merchants' Hall, Edinburgh, on July 9, Sir Donald Currie, K.C.M.G., M.P., Vice-President, presiding. Mr. Henry O'Neill, H.B.M.'s Consul at Mozambique, read a paper on *East Africa, between the Zambezi and Rovuma Rivers*, which we print as our first article. Sir Donald Currie, in introducing the lecturer, alluded to his valuable public services, and to the distinction that had been conferred upon him by the Royal Geographical Society by presenting him with the Patron's Medal.

After the paper, Dr. Felkin moved, and Mr. John Cowan of Beeslack seconded, a cordial vote of thanks to the lecturer, which the President conveyed in the name of the meeting, adding that he hoped to have something to do before long with the opening up of the Zambezi, in which work the Portuguese Government, but not our own, had taken an active interest. Dr. George Smith moved a vote of thanks to the President.

QUERIES AND REPLIES.

Maryport.—I remember to have seen it stated in a History of Scotland that Maryport, on the coast of Cumberland, received its name from the fact that Mary Queen of Scots landed there in 1568, when she fled from Scotland into England. Is this the correct explanation? If it were, the fact would be interesting that she sailed from Port Mary in Scotland and landed at Maryport in England. N. L.

[**Reply.**—The name is not connected with Mary Queen of Scots. It was given to the place so late as 1756, in honour of "Mary Senhouse," the wife of a lord of the manor, and the founder of the modern town, the building of which did not begin until 1748 or 1749. I believe the name was confirmed by Act of Parliament in 1794. Previously to 1756 the village was called "Elvefoot." There seems no reason to doubt that Mary landed at Workington, five miles south-west of Maryport. On landing, she went to Workington Hall, and lived there. W. M.]

GEOGRAPHICAL NOTES.

EUROPE.

Ancient Geography of Tunis. — In the *Bulletin Trimestriel des Antiquités Africaines*, tome iii. (Jan.-Mars, 1885), pp. 16-44, M. Jul. Poinssot, one of the editors, gives a very interesting account of a "Voyage archéologique en Tunisie," performed in 1882-83 by order of the Minister of Public Instruction. The routes along which the investigation lay were the ancient roads from Carthage to Sicca Veneria, and from Carthage to Theveste, and it throws some interesting light on the ancient geography of the district which may be worth noting.

The great route from Carthage to Sicca Veneria (Ptol. iv. 3. 30; Pliny, v. 3. 2) on the Bagradas, which extended towards Cirta, Sitifis, Cæsarea, Tingis, was the principal artery of the routes of Roman Africa. From it numerous branches led off to Hadrumetum, to Thysdrus, to Capsa, to Theveste, to Lambæsa, to Hippo Regius, and to all the more important towns of the African provinces.

M. Poinssot found, near the ruins of Musti, the most remote yet discovered of

the milestones set up when the road was repaired in A.D. 237, in the reign of Maximin. It marked the LXXXXth mile of the "Via a Karthagine usque ad fines Numidiæ Provinciæ." This was near the ancient frontier of Africa and proconsular Numidia, and this frontier, he holds, is fixed by an inscription he found some kilomètres further on at Henshir Awitta.

In A.D. 129 Publius Metilius Secundus, Hadrian's legate, commanding the third Augustan legion, constructed the road from Carthage to Theveste, called on the milestones "Via a Karthagine Thevestem usque." For part of the way these two routes have a number of stations in common. Thus they are given in the Peutinger Tables and the Antonine Itinerary as follows :—

ROAD FROM CARTHAGE TO SICCA VENERIA.

Peutinger Table.	Miles.	*Antonine Itinerary.*	Miles.
Ad Pertusa,	14	Pertusa,	4
Ad Mercurium,	4		
Inuca,	2	Unuca,	7
Sicilliba,	13	Silicibba,	13
Thurris,	5		
Chisiduo,	4		
Membrissa,	7	Membressa,	17
Tichilla,	16		
Tignica,	12		
Agbia,	6		
Musti,	7	Musti,	35
Thacia,	7		
Drusillana,	7		
Siguese,	7		
Sicca Veneria,	30	Sicca Veneria,	34 or 32

ROAD FROM CARTHAGE TO THEVESTE.

Peutinger Table.	Miles.	*Antonine Itinerary.*	Miles.
Ad Pertusa,	14		
Ad Mercurium,	4		
Inuca,	2	Unuca,	22
Sicilliba,	13	Silicibba,	7
Thurris,	5		
Vallis,	6	Vallis,	15
Ad Aticille,	10		
Coreva,	10	Coreva,	20
Aquis,	7		
Tignica,	6		
Agbia,	6		
Musti,	7	Musti,	28
Thacia,	7		
Drusillana,	7		
Larabus,	12	Laribus Colonia,	30
Orba,	7		
Altiburos,	16	Altiburos,	16
Mutia,	16		
Admedœra,	16	Admædera Colonia,	35
Ad Mercurium,	14		
Theveste,	11	Theveste,	25

The first five stations are here common to both routes, but their positions are as yet unfixed. Between the fifth and sixth stations the roads separate. Following the Sicca route, we ascend the right bank of the Mejerda, and then follow the valley of the Wed Kralled, which leads to Agbia, where the road rejoins that to Theveste. Chisiduo is placed on the right hand of the Majerda, at the junction of that river with the Wed el Ahmar, where the Arab village of Krish el Wed is built from its ruins. Ancient blocks, capitals, and shafts are seen built into the walls of the houses. Among these M. Guérin found one bearing a dedicatory inscription addressed to a procurator of imperial domains in the district of Carthage by the "*decuriones c(ives) R(omani) et municipes Chisiduenses.*" Chisiduo was then, about the second century of our era, a city possessing the *jus Latii*.

Two leagues further up the right side of the Majerda is Mejez el Bab, said to have been founded by Moors from Andalusia in the seventh century, and which takes its name (Passage of the Gate) from an old gateway, now a crumbling ruin. This M. Poinssot identifies with Membresa, which Procopius (*B. V.* ii. 15) places at 350 stadia from Carthage, on the Bagradas. Belisarius defeated the rebel Stodzas under its walls. He admits, however, that as the distance between Mejez el Bab and Krish el Wed is only eight kilomètres while the table gives eight miles between Membresa and Chisiduo, this distance will be too great if Mejez el Bab is admitted to correspond to Membresa.

According to some the village of Testur occupies the place of Tichilla ; others, trusting to an inscription copied there by Peyssonnel, think it was rather Colonia

Bisica Lucana. But the distances of Testur from Mejez el Bab, which the writer thinks is probably Membresa, and from Aïn Tuga, where the ruins of Tignica are found, do not agree with those of the table, being much less. Others remark that under the name of Risca the Peutinger Table places Bisica between Coreva and Avitta, on the road which leads to Thuburbo Majus. At Enshir Bijga, in the direction indicated, he finds its ruins, identified by inscriptions on the spot. This implies either two places called Bisica, as well as two Zamas, two Thuburbos, etc., or that the stone has been transported. The latter position he is prepared to allow. Bisica, at the end of the third or beginning of the fourth century, had received a colony of Lucanians, which had given it the surname of Lucana.

The position of Tignica or Thignica and its former importance are fixed by numerous inscriptions at Aïn Tunga. During the first and second centuries the *Civitas Thignicensis* was divided into two parts; later it became *municipium Septimium Aurelium Antoninianum Alexandrianum Herculeum frugiferum Thignica*. It has still extensive ancient remains. On leaving Thignica the route follows the valley of the Wed Kralled to Agbia, and leaves about a mile to the right Thubursicum Bure (Ptol. iv. 3. 29), now Tebursuk, where are the remains of a citadel built in the sixth century by the prefect Thomas. In the third century it is styled *municipium Severianum Antoninianum*, or, later, *Septimium Aurelium Severianum liberum Thibursicensium Bure*, and it received towards the end of the fourth century a colony, of which the surname Augusta connects it with the third legion.

Several roads part from this point; one towards the north, following the present road to Beja, passes the foot of Maâtria, of which an inscription gives the ancient name as Juxtalaca. Two kilomètres short of this a road joins from the west. This road follows the valley along the spurs of Jebel Gorrâ, and eight kilomètres further are the ruins of Kushbatia. Eight kilomètres west of this is Jebba, on a beautiful site overlooking the immense plain of Dakla, and near it is a lead mine. Here also are the vestiges of a large ancient city.

Another Roman road going westwards passes through the valley of the Wed Arko, where are many small ruins, and a Roman milestone whose inscription, in about nine lines, is obliterated except a few letters. A little further, at Henshir bent el Arian, are the ruins of a temple; on a fragment of the architrave M. Poinssot found the inscription :—FORTUNAE · AUG · SACRUM.

At Henshir Duameus (the ruin of the cisterns) are the vestiges of Uchi Majus, the *Colonia Mariana Augusta Alexandriana Uchitanorum Majorum*, one of the five "oppida civium Romanorum" enumerated by Pliny (v. 4. 4). An inscription indicates that the *civitas Bencennensis* was near Uchi. Many inscriptions have been found here.

Eight kilomètres south-west from Tebursuk is Dugga, the ancient Thugga, with the fine remains of a temple of Jupiter and Minerva, built in honour of Antoninus Pius and Lucius Verus, by Lucius Marcius Simplex Regillianus and Lucius Mercius Simplex. It measures about 46 feet by 35¾, and the façade is intact. There are also here a triumphal arch, circus, and aqueduct with several inscriptions.

A New Commercial Route to Siberia.—The *Eastern Review* (*Vostochnoe Obozrenie*) of the current year publishes, says the *Globus*, in Nos. 1 and 8, two letters from A. Sibiriakoff. The first is to this effect :—

"With reference to the different reports about the voyage which I made with the steamer *Nordenskjöld*, in the summer of 1884, to Siberia, I have the honour to make the following communication. After I had dismissed the steamer

Nordenskjöld at the mouth of the Petchora, near the bar at Archangel, I went on board the steamer *Ob*, and ascended the river. I here noticed that the bar at the mouth has no mark to indicate its presence, thus rendering the passage difficult even for small craft. If a boat, going in advance of the *Ob*, had not constantly shown us the way, we could scarcely have escaped striking on some sand-bank. Although all the cargo had been discharged, we could not so much as have reached Ust-Tsylma,—not because there was too little water in the river, but because of the numerous sand-banks, against which there was no mark to warn us. On the 30th of August, at the distance of 13 miles from Ust-Tsylma, the ship grounded on a sand-bank, but was set afloat again after a few hours' delay. I therefore had the *Ob* laid up for the winter at Khabarikha, a place 26½ miles below Ust-Tsylma, while as for myself I got into a small boat, which brought me, on the 8th of September, to the village of Oranetz (somewhat south of the 65th degree of latitude). I started from this place for the Ural on the 15th of September, drawn by reindeer. On the following day I met in with Herr Nosiloff, and travelled in company with him over the Ural. The road used in winter for crossing the Pass of Shchekurinsk has already been described by Herr Nosiloff in the second number of the *Reports of the Russian Geographical Society* for 1884. The road used in summer is not very different. It goes from Oranetz over a marshy plain as far as Mount Zoblya (more than 26½ miles), then turns towards the river Patek (about 13¼ miles), and follows this up to its source, which is a small lake about ¾ of a mile in length. This lake—which, in reality, consists of two lakelets connected by a small stream—lies just at the watershed. The road, after passing a height with a steep slope, which represents the watershed of the two basins of the Ob and the Petchora, and from which both the lake and also the river Shchekurya are visible, sinks to the latter, which comes from the foot of the mountain, and follows the same as far as the so-called Ostyak road, which is well constructed, and in such good order that I resolved to make the journey next time with horses. The Ostyak road leads to the source of the small river called the Polya (a neighbour stream of the Shchekurya), which it follows as far as to the house of Herr Shishkin, who once had a gold-washing location on the Polya. The house lies at a distance of from 16½ miles to 18½ miles from the village of Shchekurinsk, immediately beyond which the summer road joins the winter road. The road leaves the Polya and comes upon a swampy plain at a distance of from 10 miles to 11 miles from the village. In winter, the swamps can be easily passed, but it is very difficult to pass them in summer ; it is therefore better, after leaving Shishkin's house, to turn into another path—viz., to follow the small river Polya as far as its confluence with the river Shchekurya, near the village. Here also an Ostyak road is said to be constructed. I reached the village of Shchekurinsk on the 27th of September, twelve days after I had left Oranetz, taking, however, a three days' rest in the course of the journey. On the same day I started in a boat for the Zyryan Yurts, and further to Berezoff on the Ob, which I reached on the 1st of October. On the 18th of October I was in Tobolsk. As regards the communication by steamboat on the Petchora on the one side, and on the Zygva and Zosva on the other side, there is on the Petchora, as far as Oranetz, no hindrance to the passage of flat-bottomed steamers. Already three steamers navigate the Petchora from the Yakshi harbour (398 miles above Oranetz) to the very mouth of the river. The Zosva and Zygva are both navigable throughout ; my wares have, this summer, been forwarded thither in a steamer from Tobolsk. I am of opinion that the Ural Pass from Shchekurinsk, which is only 113 miles in length, and through which the construction of a summer road for the transport of goods between Siberia and Europe presents no manner of difficulty, is likely to rise in importance. Goods,

which were shipped at the mouth of the Petchora, could still reach Siberia in the same sailing season.

"With regard to the sea voyage as far as the mouth of the Petchora, it is quite beyond doubt that the passage is open every summer. Even in the present year (1884), when so great a quantity of ice had accumulated on the southern shores of the Murman Sea, there was free access to the Petchora. All one had to do was to keep as much as possible to the Petchora Gulf, away from the island of Kolguyeff. An inexperienced captain might readily recoil in terror from the masses of ice floating about in the Gulf or lodged on the sand-banks; still the masses of ice are so scattered, and offer so much sea-room for handling a ship, that they may be considered as quite free from danger."

The second letter is as follows:—

"The successful transport of goods through the mouth of the Petchora to Archangel during the foregoing sailing season (1884) has impressed me with the idea of establishing a trade communication between Europe and Siberia exclusively through the Petchora. Of the practicability of this I am well aware, as also of its great utility, especially for the inhabitants of the Petchora region; because, with that means of communication, the formation of a convenient land route over the Ural fits in, and thereby a greater portion can be procured from Siberia of such provisions as at present reach the Petchora from the Kama; although I adhere to my conviction, which I have so often expressed, that a direct sea-voyage through the Kara Sea to Siberia is practicable,—for the Kara Sea is beyond doubt navigable at a particular season of the year, though, unfortunately, under conditions which, up to this time, have been too little investigated. A matter of no small importance to the direct communication with Siberia by sea is the establishment of stations where the steamer in special cases can winter, or where, at least, it could possibly wait until the masses of ice under the influence of the currents, and the winds, and the process of melting, so arrange themselves as to leave a free passage to the vessel through the sea. Such stations could be established perhaps at the Yukorski Shar (Yukor or Yugar Strait), for ships going from Europe to Siberia, and on the west side of the peninsula Yalmal, for ships on the return voyage. As regards the first-named station, the Bay of Lyemtchin has long been known as a convenient anchorage for ships. On the west side, on the contrary, no suitable harbour has as yet been discovered, though at an earlier period, as Professor Nordenskjöld states, a convenient harbour under the name of Port Nassau is said to have existed, and yet no one now knows where Port Nassau was situated. If a supply of coals and provisions were laid down, and buildings erected at these stations, they would not only afford a very good place of refuge for ships, but would also serve for winter quarters. The conditions of the direct sea communication with Siberia would be thereby improved, and the voyages would not appear so fraught with danger as they do at present."

ASIA.

The Eruption of Smeru (Java) in 1885.—Our honorary corresponding member, Herr Emil Metzger, favours us with the following:—Smeru or Mahameru is the loftiest summit of the island of Java, rising to a height of 3672 mètres, or 12,047 feet, according to the trigonometrical survey. Properly speaking, there are three summits, which together form the gigantic cone; the first, to the N.E., has been quiet within the memory of man; from the second, to the S.E., clouds of smoke were continually being ejected even before the eruption of 1885; and the third, to the S.W., is the highest of the three. Severe eruptions are known to have occurred

in 1818 and 1831 ; and from the formation of the sides of the cone, it was evident that on several occasions streams of lava had poured out and hardened into ridges separated from each other by deep clefts. In 1828 an attempt was made to open a road round the base of Mount Smeru, between the districts of Malang and Lumadjang ; but the enterprise was abandoned as impossible owing to the number of ravines, each with a stream or (in the rainy season) torrent of its own, and the denseness of the bamboo thickets growing luxuriantly in the volcanic soil. The ruins of a Hindu temple, discovered about fifty years ago, and a beautiful statue of Ganesa, at the foot of Mount Smeru, on the S.W. side, suggest the idea that at an early period the spot was occupied by a numerous population, which was perhaps driven away or destroyed by an eruption. For other particulars in regard to Smeru, the reader may consult Professor Veth's *Java*, or Junghuhn's description (which is the most accurate, as far as I know, though there are others of more recent date, one for instance estimating the height at 13,000 feet !). The great eruption of Krakatoa naturally drew a larger amount of public attention to the volcanic phenomena of Java ; and prophecies, such as those made known by Mr. Delaunay in 1883, got abroad among the people. Mount Merapi especially showed signs of increased activity, which were repeatedly examined by men of science ; and it was even, it is said, proposed to blow up the summit with dynamite ! Mount Slamat belched forth dense clouds of smoke ; a well of hot mud spouted out of the ground in Western Java at the foot of Mount Salak ; and in the island of Ratti a torrent of boiling mud, bursting from the side of the cone, overflowed a large area. In the latter half of April two eruptions of Mount Smeru occurred rather unexpectedly, though signs of increased activity had been observed of late. By the first a coffee plantation was devastated, and a few European officers and several hundred coolies destroyed. Mr. Fennema, a mining engineer, employed to examine what had taken place, reported as follows :—"Mount Smeru consists of a solid wall of lava and other eruptive rocks, which is covered by a stratum or 'mantle' of loose material. The lava rising in the shaft of the crater pushed the wall outward, and then, flowing down, drove the 'mantle' before it. Part of the wall and the 'mantle' became almost red-hot, through contact with the lava, and, rushing down the steep slope, buried an area at the foot of the mountain about a mile in breadth. The fluid lava did not descend so far, but it is still slowly moving forward, and a new overflow would cause a new avalanche of stones and dust. Danger is not to be apprehended at present, until the pressure of the lava become strong enough to push out another part of the wall."

AFRICA.

The New British Colony in South Africa.—We briefly alluded, in the July number of the *Magazine*, to the importance of the new British Protectorate in South Africa, and in this number we give a map showing its boundaries. This new colony, equal in size to Spain, is admirably adapted for agricultural and pastoral purposes, and, it may be interesting to remember, was a chief scene of Livingstone's work. It lies in the heart of temperate Africa, and is, for the most part, a plateau of from 4000 feet to 6000 feet above the sea-level. So far as has been ascertained by the medical records of General Warren's expedition, Europeans stand the climate well,—in fact, find it extremely healthy. The great treeless plains have long been the home of pastoral farmers, and as a great trade route to the vast interior it has special claims to the attention of the British public.

The Rise of the Nile.—Lieutenant-Colonel P. D. Trotter, commandant at Kajbar, on the Nile (lat. about 19° 56′ N.), writing on the 2d July, sends us the following

register of his Nilometer for the month of June. At the time of writing the strength of the current was very great, but the water not much discoloured, having still very little mud or other matter in suspension. The river, at the point where the Nilometer is fixed, is very broad; in the cataract just below, the rise must be much greater.

Date.	Height and Variation. ft.	in.	Date.	Height and Variation. ft.	in.	Date.	Height and Variation. ft.	in.
June 1.	* 10	0	June 11.	9	9	June 21.	12	3
,, 2.	10	1	,, 12.	† 9	10	,, 22.	12	6
,, 3.	10	1	,, 13.	9	11	,, 23.	12	9
,, 4.	10	0	,, 14.	10	1	,, 24.	13	0
,, 5.	10	0	,, 15.	10	4	,, 25.	13	4
,, 6.	9	11	,, 16.	10	8	,, 26.	13	8
,, 7.	9	11	,, 17.	11	1	,, 27.	14	0
,, 8.	10	0	,, 18.	11	6	,, 28.	14	3
,, 9.	9	11	,, 19.	11	9	,, 29.	14	5
,, 10.	9	10	,, 20.	12	0	,, 30.	14	8

* 10′ assumed for convenience. † Permanent rise.

Another Great African Waterway.—Since the discovery of the course of the Congo itself, no more important addition to our knowledge of the hydrography of the region has (says the *Times*) been made than that from which the Rev. G. Grenfell has recently returned. Mr. Grenfell's colleague, Mr. Bentley, briefly announced this discovery in our columns the other day. Details are now to hand from Mr. Grenfell himself, which prove what an admirable piece of exploring work he has done. He has proved that the Mobangi [Ubangi], which enters the right bank of the Congo, forming a great delta, between 0° 26′ and 0° 42′ S. lat., nearly opposite Equator Station, is probably its greatest tributary. Certainly, so far as yet known, it offers a much longer waterway than any affluent that has been explored. Mr. Grenfell navigated the Mobangi in the little steamer *Peace*, on a mean course of north by east, from the Equator to 4° 30′ N. lat., and left it still in an open waterway. At 4° 23′ N., just below the second rapids, he found it 673 yards wide; at no point lower was it less in width. Its mean depth is 25 feet, and although there the current runs not more than 80 to 100 feet per minute, it means an immense volume of water to find running south at a point, as Mr. Grenfell puts it, so near the supposed sources of the Binué, the great affluent of the Niger. Where does it all come from? he asks. The "trumbashes" of the Chad basin (Schweinfurth) are common, while they are not known on the Congo. The opinion of Mr. Grenfell and of his Congo colleagues, we believe, is that the Mobangi is probably the lower part of the Welle, a river whose course is one of the unsolved problems of African geography. This is certainly a more likely solution than to connect the Welle with the useless Aruwimi, as Stanley is inclined to do. Dr. Junker, the Russian explorer, now in refuge at Lado, did not follow the Welle in his recent journey so far west as either to confirm or disprove Mr. Grenfell's conjecture. However, with such enterprising explorers as these Baptist missionaries in the field, this and other problems are not likely to wait much longer for solution. From the notes sent home by Mr. Grenfell, it would seem that the Mobangi is navigable the whole way from the Congo to 4° 30′ N., a distance of probably 400 to 450 miles, taking account of the bends. A large map, in ten sheets, of the explored part of the river has just been received at the Royal Geographical Society. This map will appear in an early number of the Society's proceedings, and a long narrative of Mr. Grenfell's

recent work will probably be published in the next number of the *Baptist Missionary Herald*. It is hoped, moreover, that a full narrative of Mr. Grenfell's explorations will reach England in time to be read at the Aberdeen meeting of the British Association. The Mobangi, Mr. Grenfell writes, is far more populous than any equal length of the Congo, and to his mind the country is more promising. True, the people are wild, but then his visit was that of the first white man they had seen. In ascending the river (and his wife and fifteen months' old baby were on board) Mr. Grenfell met with not a few difficulties from the hostility of the natives, and had it not been for his energetic action on one occasion, he and his party would probably have come to grief. His way down the river was, however, most encouraging; plenty of food, and not a sign of hostility. He hopes to make the trip again, and has no doubt that he will be able to report peaceable and friendly receptions everywhere. He may also be able to penetrate further towards the valley of the Shari, the great tributary of Lake Chad. Unfortunately, Mr. Grenfell states, the confluence of the Mobangi with the Congo is just within French territory, though it is not so represented either on the map in Mr. Stanley's last book, or on the latest map of the Royal Geographical Society. At all events, immediately after Mr. Grenfell's return to Stanley Pool, M. de Brazza left Brazzaville, very probably to examine for himself the great waterway discovered by the English missionary, and possibly to follow it further. If so, we are sure to hear of his "great journey of discovery," with the usual flourish of trumpets. The commercial importance of Mr. Grenfell's discovery cannot be exaggerated. Whether the Mobangi is the Welle or not, it must form an important connecting link between the basin of the Congo and the basins of the Niger, the Shari, and the Nile. Mr. Stanley has always maintained that the region lying between the Congo and the Nile is probably the richest and most promising in Africa, and his belief seems likely to be amply confirmed. Besides the Mobangi, Mr. Grenfell has explored 300 miles of river-courses debouching into the Congo, and, as he is a trained and careful surveyor, he will be able to plot them with precision. The most northerly point of the Congo bend he found to be 2° 11′ N. lat., near the mouth of the Ukere or Dujangi.

The For Tribe of Central Africa.—Dr. Robert W. Felkin, F.R.S.E., F.R.G.S., read a most interesting paper, or rather series of extracts from a paper, on this subject, at a meeting of the Royal Society of Edinburgh, July 6. The Fors, who are pure Negroes, are the most northerly tribe in the eastern part of Central Africa. They form one of the three great Negro-Mohammedan kingdoms,—Darfur, or Darfor, the land of the Fors,—the whole population of which may be roughly estimated at from three to five millions, about half that number being Fors. As regards the social condition of the people, Dr. Felkin's remarks, founded upon personal observation, are of considerable importance and interest. We have space only to note a few of the most striking; but these are sufficient to indicate a more advanced state of civilisation than is generally supposed to exist in this country. Having said that they are pure Negroes, we need scarcely refer to the personal appearance of the Fors; but it is noticeable that they never deform themselves, nor do they extract the incisor teeth, which is almost the universal custom among the tribes living further south. Speaking of their daily life, Dr. Felkin drew a picture almost idyllic in its simple domestic routine; but notwithstanding that the women associate with the men constantly in all their daily pursuits, they are by no means considered their equals, and are obliged to pay very great respect and absolute obedience to their husbands. The principle of "women's rights" could never come up for judgment in Darfur, for women are not supposed to possess souls, and do not receive any education; when they die they are buried without prayers. We are therefore scarcely surprised

when we are told that they make fairly good mothers, but indifferent wives. Children are under the strongest discipline from their earliest age ; the well-known sayings of "Spare the rod and spoil the child," and "Little boys should be seen and not heard," seem to have taken root in the parental mind. Porridge, our readers will be glad to hear, forms a staple article of diet. Food is always taken with the fingers, and such is the relative force of custom—which even Negro *etiquette* respects —that it is considered very unbecoming for all the fingers to be put into the mouth, the first and second and thumb being "the correct thing." It may interest diners-out to hear that it is thought the height of impropriety for a woman to convey anything to her mouth when in the presence of her husband or of any grown-up man, and that *bon viveurs* like their food high. There are no traditions that cannibalism has ever existed in this country. The Fors are wise in their generation ; their word *Kilma*, corresponding to our idea of "soul," means "the power of the liver," for they believe that the liver is the seat of the soul. Altogether, their religion is not a very elevated one ; but there appears to be no idolatry in Darfur, and the powers of Nature are not associated in any manner with various gods. The one god, *Molu*, who lives in the sky, is believed in and worshipped, and their attitude towards him is that of the fatalist.

Their marriage customs are worthy of notice, but we have only space to refer to the nuptial ceremony. After their marriage, the bride and bridegroom do not see one another for the space of a week. The bride is engaged in perfuming herself, dressing her hair, and in other mysteries ; whilst the bridegroom is occupied in counting over and over the dowry which he will have to pay for his wife. On the sixth day after the wedding the bridegroom sends the dowry to his father-in-law, and, if it be found correct, he receives a message to say that he may come to claim his bride next day. He lives with his wife at his father-in-law's until his first child is born, when he is permitted to take his wife away and set up housekeeping on his own account. During the whole of this time the father-in-law has to pay all expenses for the young couple, and the husband is entitled to three meals during each night.

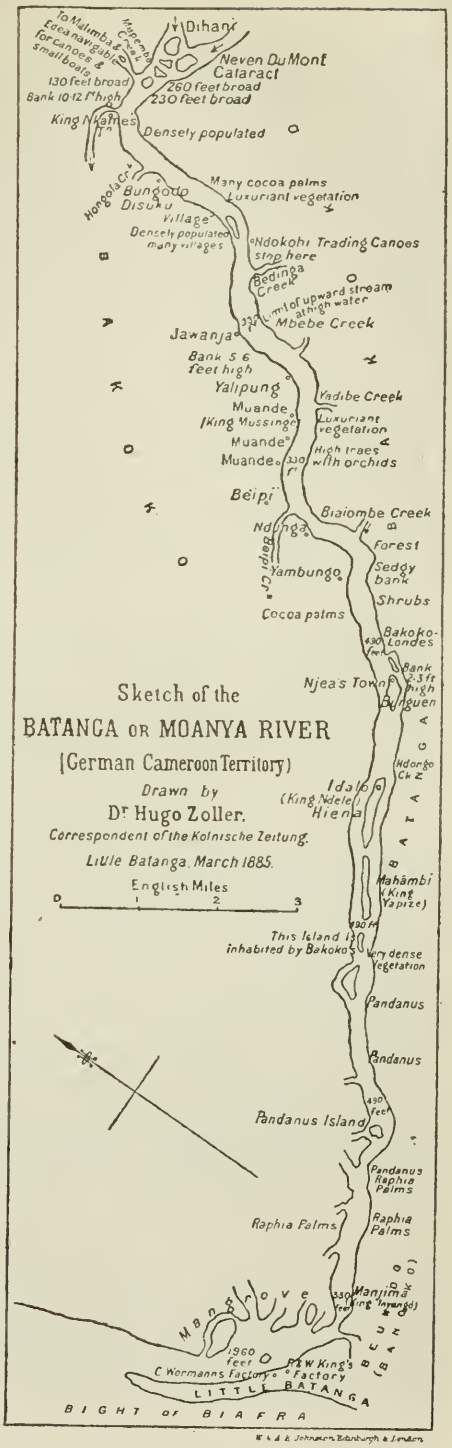
As regards crime, wilful homicide is invariably punished with death, and suicide is unknown. Lying is held to be a great crime, and even the youngest children are severely beaten for it. Any one over fifteen or sixteen, who is an habitual liar, suffers the loss of one lip as a penalty. Of their "morals," the less said the better ; the virtuous side of the Fors' character seems to consist in their industry and love of truth.

The Failure of Serpa Pinto's Mission.—Further information received by us from a correspondent at Ibo states that, owing to the ill-health of its leader, the Portuguese expedition, after costing already £6000, will probably be unable to proceed into the interior. Our correspondent is of opinion that the object of this expedition was to explore the whole of the territory from the coast to Nyassa, which had previously only been visited by an English explorer, Consul O'Neill ; and that the failure of the expedition is in a great measure owing to its cumbrous over-equipment, the large bodyguard of Zulus frightening natives from acting as porters.

Dr. Schulz's recent Journey.—Dr. Aurel Schulz, the son of a German colonist in Natal, has not long ago returned from a successful journey into the interior, and has contributed a lengthy account of his expedition to the Natal *Mercantile Advertiser*. He advanced up the Chobe for a considerable distance, proceeded thence to the Kubango, and returned to Natal by way of Lake Ngami and the Transvaal. On the Kubango he discovered a very strange tribe, the Makubas.

They are well-built, strapping fellows of the Zulu type, strongly aquatic, and the established corn-growers of the country-side; they have such a horror of shedding human blood, that a man of the outside warlike tribes is always "open to back himself to give battle to fifty Makubas any day." A most interesting account is likewise given of the chief Khama, perfectly confirmatory of what was said in our last month's number regarding him. Alcohol in any shape he does not allow in his dominions. Any white trader selling liquor is fined: any subject who brews is expelled from the country. All, from the chief down, are staunch teetotallers. The same district has recently been visited by Dr. P. Lösche. A message from him reports curious changes in the physical geography. The words are, "Lake Ngami is dried up: the game has died or gone away: vegetation exists no longer: both the Kubango and the Tamakan (?) flow into the Zambesi."

Batanga River, West Africa.—A letter from Dr. Hugo Zöller, recently printed in the *Kölnische Zeitung* (see Weekly Edition, No. 21, Thursday, 21st May), contains an account of his ascent of the Batanga or Moanya River, which falls into the Bight of Biafra, about 3° 16′ 35″ N. lat. On arriving at Little Batanga, the traveller was surprised to find himself at the mouth of a really considerable stream, which had never been explored higher than King Yapite's town. In the accompanying sketch-map, reproduced from the *Kölnische Zeitung*, are given the results of his investigations. "From King Yapite's town," he writes, "where we spent the night, we took with us the king's son as guide and interpreter. When the chief Njea, who dwells on an island, at-



tempted to throw difficulties in our way, as he had formerly prevented the advance of the Englishman, Stone, we persuaded him by a promise of presents to accompany us. We now left the district of the Beundo and Batanga tribes, and entered the territory of the Bakoko, which had never been visited by white men before. According to the local method of speech, the Bakoko are the "bush people" of the Beundo and the Batanga. At Jawanja, two war-canoes, each manned with eighteen Bakokos, annoyed us for several hours, but were prevented from actual hostilities by presents, fair speech, and the sight of our weapons fully prepared. The report of the arrival of white men must have travelled upthe river with the swiftness of the wind, for all along both banks were occupied by crowds of people. At Mahumbi, King Yapite's town, we had heard a vague rumour about the existence of a waterfall beyond which canoes could not ascend; and on the second day of our voyage we reached a point, about 32 kilomètres (20 miles) N.E., where the whole mass of water rushed down over three terraces of rock with a total height of 30 feet. The volume was then, at the close of the dry season, apparently equal to two-thirds of the Rhine at Schaffhausen; in the rainy season all the rivers of this region are twice or thrice as large. The principal sorts of rock were quartz and yellowish-grey sandstone, and the shingle in the river-bed had a great abundance of friable pieces not unlike anthracite. The waterfall I have named the Neven-Du Mont Falls. Further up, the river is reported to run far inland in an east-north-east direction. We saw no mountains, and the Guerava mountain marked in the English Admiralty Charts is mythical. One of the most interesting facts we learned was that the Batanga River is connected with the Malimba or Edea River by a creek, the mouth of which lies immediately below the falls. It takes the natives three days to go to Malimba by this route. A short distance above Mayambi, another creek breaks off from the Batanga, and joins the Lokunje River, which forms the boundary between Little Batanga and Plantation. The whole territory between Malimba and the lower course of the Moanya lies low, and is uninhabited."

AMERICA.

Canadian Pacific Railway.—Mr. John Bartholomew, F.R.G.S., writing on June 25th from Canmore, a station on the Canadian Pacific Railway, at the foot of the Rocky Mountains, gives the following account of the railway which was prematurely announced two months ago as being open for traffic:—

The railway, which, like all the other transcontinental routes, is a single line, is at present open from Port Arthur on Lake Superior to Donald on the Columbia River, in British Columbia, the present terminus of the line for passenger traffic, although the track is laid for some 18 miles further, to the second crossing of the Columbia River, on the other side of the Selkirk Range. There still, however, remains a gap of 120 miles, to be laid through wild country, before a connection is made with the line which is being constructed from Port Moody on the Pacific side, and which is finished for about 300 miles; so that, at the earliest, it will be autumn before the through-connection can be opened for passenger traffic. The bridges will probably be the most serious cause of delay, as there are still several large ones to complete—one over Stoney Creek, 452 feet long and 276 feet high, and another over Mountain Creek, 1100 feet long and 153 feet high, requiring for their construction about 1,270,000 feet of timber. Besides the creek at the Rockies, it must be remembered that the line from Ottawa to Port Arthur, although constructed, is not yet opened: that connection is, however, made at present by the Lake Superior steamers. Starting from Port Arthur at 9.15 on Monday morning, and travelling continuously night and day, it took us until 4 P.M. on Friday to reach Donald in British Columbia, a distance of 1452 miles.

Travelling eastward from Montreal to British Columbia, there is a gain of three hours in time. The first change is made at Port Arthur, being the alteration from Eastern to Central Standard time, which holds good as far as Brandon, where it is altered another hour to Mountain time; then again, another hour at Canmore, when we change to Pacific Standard time.

From Port Arthur, at a height of 620 feet above the sea-level, the line travels through the great flat prairies, gradually ascending by terraces until it reaches a height of 4000 feet at Kananaskis station, at the foot of the Rockies. Here the mountains tower up right in front, and the railway passes in among them by a narrow gorge winding along the Bow River, and then opening into a large flat valley about 18 miles long by 5 broad, and 4300 feet above the sea-level. This valley may be described as quite a second "Yosemité"—quite wild and alone among the mountains, by which it is completely surrounded, their fantastic rocky peaks rising 5000 and 6000 feet above the level of the Bow River, which winds along the bottom; their sides are thickly covered with forests of pines creeping up as far as they can get a footing; above that there is nothing but bare rock, with patches of snow and glaciers. At present there is a total want of any comfortable accommodation for the traveller—nothing but rough wooden sheds, only fit for the railway workmen; if a good hotel were placed here, the valley, with its grand mountain scenery, would certainly become a most attractive resort for tourists. Hot mineral springs have also been discovered some 15 miles further up, and they may possibly prove of some value as a watering-place.

From Canmore the railway ascends the valley, running alongside of the Bow River for about 50 miles to its source at the summit, 5210 feet high, where a stake marks the boundary with British Columbia. Passing into British Columbia, it strikes the Kicking Horse River, rushing over a fall into the Kicking Horse Lake, a beautiful sheet of water surrounded by wild rocky mountains. Descending the Kicking Horse Pass, it runs along the entire course of the river to its junction with the Columbia, a distance of 55 miles, the whole length of which is a series of roaring rapids and waterfalls. The Pass itself is a narrow gorge running between those grand high mountains; at times it seems so narrow and deep that one can scarcely imagine how it is possible for the river or railway to find a way out of it, but the river dashes along among the rocks, turning abruptly round sharp corners, while the train slips through the short tunnels, again and again meeting the river still pursuing the same wild and tortuous course. The mountains above are great rocks of every conceivable shape and form; one called Castle Mountain is quite like a gigantic turreted castle; another, Mount Stephen, had a great glacier creeping down the side, and said by one of the railway engineers to be 200 feet deep. The rather peculiar name of the pass is said to have originated in Captain Palliser having been kicked here by his horse while surveying the district. The distance travelled by rail through the Rockies, from the foot of the mountains on the east side to the Columbia River, is 112 miles. At the Columbia River the valley opens out into a great plain, bounded on the east by the Rockies and on the west by the Selkirk Range—a magnificent stretch of mountains, through which the railway passes at a height of 3610 feet.

AUSTRALASIA.

British North Borneo.—The *British North Borneo Gazette* for June 1 contains the following announcement:—Her Majesty's Government having signified that there is no objection to the acquisition by the British North Borneo Company of the Pada-i-Kalias district, recently ceded by the Sultan of Brunei, it is hereby

notified that the district extending from the Sipitong river to the Kwala Penyu river, inclusive of both rivers, as well as the river and district of Bangawan, and the river and district of Tuwaran, are hereby incorporated in the territory of British North Borneo. It is further notified that the west coast district has been divided into the following provinces, viz.:—

Alcock Province.—From Sampan Mangaiou Point to the Sugut river, including the latter river and the islands off the coast.

Keppel Province.—From Sampan Mangaiou Point to Bangawan, including the latter river and the islands off the coast.

Dent Province.—From Kwala Panyu river to the Sipitong river, both rivers included.

Onin District, New Guinea.—The *Tijdschrift van het Nederlandsch Aardrijkskundig Genootschap* contains among its "Meer uitgebreide Artikelen" (No. 1), a paper on the Onin District of New Guinea, by W. F. Versteeg, in which, by a careful comparison of the reports of recent voyagers, the coast-line has been laid down with more accuracy than before, and several new names of villages, islands, and bays added. The writer discusses the question whether the great tract known as Onin is not really an island, cut off from the mainland by M'Cluer Inlet and another gulf (Arguni) running up from the south, and possibly communicating with the head of M'Cluer Inlet. He thinks this communication—like that which has been supposed to exist between one of these inlets and the northern coast—improbable, but the character of the vegetation on these inland creeks, as well as of the climate and the population, makes exploration difficult.

Papuan and Melanesian Affinities.—Mr. Robidé van der Aa, in the same number, has an important paper on the relation of the Papuans and Melanesians to the Malayo-Polynesian race. Agreeing with Bacon that "citius emergit veritas ex error, quam ex confusioni," he first put aside the conclusions arrived at by Windsor Earl and Hæckel, which were founded on the supposition, now known to be erroneous, that the hair of the Papuan grows in tufts like the bristles of a brush. He then states his own theory, admitting it to be merely a speculation. This is shortly, as follows :—From the fact that people with a dark skin and frizzled hair were found everywhere in New Guinea, and especially at the earliest known western end, these features were assumed to be the distinguishing characters of a "Papuan" race; and as the same characters were found, though with many modifications and exceptions, as far as New Caledonia to the south, and Fiji to the east—*i.e.* throughout Melanesia—many writers have considered Papuan and Melanesian as synonymous and interchangeable. Mr. Van der Aa, however, rightly as we think, would keep them apart, not merely for the geographical convenience of restricting the term "Papuan" to New Guinea and its immediate neighbourhood, but provisionally for ethnological reasons. Practically, however, the above-mentioned characters are by no means confined to the inhabitants of Papua or of Melanesia, inasmuch as (1) the dark skin and frizzled hair are found scattered throughout the Pacific as far as Marquesas and Hawaii, and (2) tribes as fair as Polynesians have been found in various parts of New Guinea. As regards the languages, great resemblance between the Papuan and the Polynesian was observed even long ago by the elder Von der Gabelentz; and Dr. Kern, from more extended data, confirms this. Peculiarities of the Papuan seem to show that it is an older and less disintegrated form of the Malayan and Polynesian languages. Again, certain customs are, or have been, common to all, as tabu, tattooing, head-hunting (represented in Polynesia by keeping the skull of an enemy). (We could show, but it would be beside

our purpose, how the last two, at all events, of these three customs have a range far beyond the islands, up to the N. E. frontier of India.) The writer then considers New Guinea as the starting-point of the common race. Westwards, by contact with the sub-Mongolic peoples of Further India, and with the Chinese, it became modified into the Malay, and the modern Malay is accordingly often taken for a Chinese. The Malay language, though softened and modified, like the race, by this contact, still resembles the Papuan rather than the Chinese. But that the race was originally insular is proved, according to the author, by the improbability that the numerous and comparatively civilised Asiatic race would have overrun the islands and yet left the language and customs which they found there fundamentally unchanged. After this contact with Asia came the spread of the race to Madagascar, and to Micronesia and Polynesia, and this again must have taken place before the Indian invasion of the islands, which has left its traces throughout the archipelago, but not in the more distant Micronesia or Polynesia, or in Madagascar.

The Truth about Samoa.—A recent communication to the *Pall Mall Gazette* professes to give us "the truth about Samoa," by "One who Knows." "One who Knows" is a resident of over forty years' standing, and should be in a position to speak authoritatively; his narration, however, dates back only to the year 1870.

Samoa, the vernacular name of a group of islands in the South Pacific Ocean, marked on the chart as the "Navigators'," and consisting of ten inhabited and two uninhabited islands, with 35,000 inhabitants, has been in a state of political and social unrest for the past fifteen years, owing, chiefly, to the intermeddling of foreigners. In 1870, the rival dynasties of Malietoa and Tupua were fighting against each other for supremacy, and during the three years that followed carried on a vigorous and disastrous civil war. In 1873, the missionaries intervened, the fighting ceased, and terms of peace were settled. The two parties united, and, with the help of the European residents, formed a Constitution, not unlike our own, consisting of a House of Representatives (Faipule) and a House of Nobles (Taimua), with the two kings Malietoa and Tupua at their head. The new form of government was recognised by the representatives of Great Britain and America, and the country enjoyed rest and peace.

The "villain" of the story is undoubtedly Colonel Steinberger, who, representing himself as the "special agent of the United States Government, to make observations upon the character and condition of the islands and their inhabitants," entered into an alliance with a German and an American firm with a view to getting complete control over the islands. Like all "villains," he was at first eminently successful:—"Steinberger now endeavoured to carry out his mercenary agreement. He represented himself as sent by the American Government to form a Government in Samoa preliminary to a more definite alliance with the United States, and succeeded in deceiving not only the native chiefs, but also the missionaries and other European residents. So great was his political power that in the following May he insisted upon the chiefs accepting a change in the Constitution, by which Malietoa was to occupy the throne for four years, to be succeeded by Tupua for a similar period. Nothing, however, was to prevent the regal form of government being altered to a republic at the end of seven years." Steinberger was appointed Prime Minister, with extreme arbitrary power, but his evil machinations were discovered and the "villain" was unmasked. A Consular Meeting was called by the representatives of Great Britain, America, and Germany, and the Prime Minister was summoned to appear and produce his credentials. Notwithstanding strenuous efforts on his part to maintain the deception, it became evident

that he had no such commission from the United States as he had represented. Whereupon King Malietoa was "wroth," and at once made an official application to the American Consul to have his recreant Prime Minister removed. "The American Consul having no force at his command, applied for aid to Captain Stevens, commanding her Majesty's ship *Barracouta*, then lying in the harbour at Apia, who at once arrested Steinberger and kept him a prisoner on board his ship. The arrest of Steinberger much incensed those members of the Government who had been appointed by him. They espoused his cause, and drove away King Malietoa." Civil war broke out again, and continued till May 31, 1879, when the Malietoa party became sufficiently strong to take possession of the seat of Government once more; but in the following October hostilities recommenced, and the war was carried on with fluctuating success on both sides. "In November, acting under telegraphic instructions from Europe, the German man-of-war *Bismarck* seized Tupua's fleet and put an end to the fighting. Both parties were then summoned to a meeting on board the *Bismarck*, and there signed a treaty by which it was agreed that the Malietoa family should occupy the throne subject to reconsideration in seven years. Malietoa Talavou was elected king in place of his nephew Laupapa, and the Government was recognised by Great Britain, America, and Germany."

"Previous to the intervention of the *Bismarck*, Germany had effected a treaty of reciprocity in which it was stipulated that no greater privileges were to be accorded to any other nation than those allowed to Germany. After the arrangement made on board the *Bismarck*, and while Talavou was king, first America, then Great Britain, effected similar treaties with the Samoan Government." Captain Zempsch, the German Consul, now sought to have his previous treaty ratified by the new king, but Talavou objected, much to the exasperation of the Consul, who incited Talavou's rival, Masua, to rebel. For this action, but not until 1883, Captain Zempsch was removed by his Government, on the representation of King Talavou, and the present Consul, Dr. Stübel, was appointed. War immediately broke out again, and during the period of anarchy that followed, much more land passed from the natives into the possession of the Germans.

"Early in July, 1881, the U.S. steamer *Lackawanna* arrived at Samoa, and Captain Willis, who was in command, put an end to the rebellion. A compulsory peace was proclaimed, and on July 12, 1881, the two hostile parties—namely, Malietoa and Tupua—signed an agreement or treaty on board the *Lackawanna*, in Apia Harbour, in which it was mutually agreed that the following resolutions should be adopted:—(1) That all Samoa should be amicably united from this day; (2) that each of the armies should disperse at once, and every man return to his own home; (3) that Malietoa should be King; (4) that Tupua should be Vice-King; (5) that these arrangements should not in any way affect any existing treaties previously made with any one of the Great Powers." This treaty was signed by the Samoan chiefs and dignitaries, and attested by the signatures of the Consuls of the Great Powers. However, "this arrangement did not at all suit the Tupua party, and Tamasese, although no longer able to oppose Laupapa by force, at once set to work stealthily to retard every step made to establish a good Government and make beneficial laws. Annexation by one of the Great Powers was thought by many to be the best way out of the difficulty, and the only method to maintain law and order. The majority of the natives again wanted to be annexed by Great Britain, but no definite steps were taken."

With regard to the annexation of the islands to New Zealand, "One who Knows" states that the natives never at any time desired such a step. He goes on to say:—"The desire for British annexation has lately received a new impetus by

the action of Dr. Stübel, the German Consul, who has made no secret of his determination that Germany shall be paramount in Samoa. On November 10, 1884, the King and Government were forced into signing an agreement with the German Consul to allow the latter to organise a Council composed of three Germans and two Samoans to protect German interests. A prison was to be built, and officials appointed by the German Consul to manage it; and all offences against Germans to be punished by imprisonment with hard labour. The hard labour to be work on German plantations." In December 1884, King Malietoa Talavou sent a letter to the Emperor of Germany protesting against the action of Dr. Stübel and Mr. Weber, another German schemer and a "breeder of strife."

Alarmed by Dr. Stübel's despotic action, a petition for British protection, signed by the King, Vice-King, and all the members but two of both "Houses," was sent to England by Sir William Jervois, the Governor of New Zealand. On hearing of this, Dr. Stübel, "exasperated beyond measure at the step taken," hoisted the German flag at the seat of Government, and had a fort erected round it to protect it from violence. At the same time he refused to allow the native flag to be hoisted, and, backed by Mr. Weber, began to break up the Government. "In January, Captain Acland arrived in H.M.S. *Miranda* to make official inquiries as to the actual state of affairs, but did nothing to stop the rebellion, nor did he take any steps to haul down the German flag that was still flying. An application was made to him by the Consuls of Great Britain and America to suppress the rebellion, but he refused to do so unless the German Consul also joined in the request. This Dr. Stübel refused to do, and so nothing was done in the matter, and the *Miranda* soon steamed away." It will thus be seen that Samoan affairs are still in a very unsettled state. "European residents and natives wait anxiously an official reply to the petition sent to England, praying for annexation by Great Britain. Meanwhile, and notwithstanding the treaties that exist between Samoa, Germany, America, and Great Britain, the German flag still remains floating and fortified where it was placed by Dr. Stübel last November, in open violation of all constitutional law."

NEW BOOKS.

Ordnance Gazetteer of Scotland: A Survey of Scottish Topography, Statistical, Biographical, and Historical. Edited by Francis H. Groome. 3 vols. Edinburgh: Thomas C. Jack. 1885.

The *Ordnance Gazetteer of Scotland* is a credit at once to Scottish literary and publishing enterprise, and to the ability, skill, and varied equipment of the editor, to whom several of its most valuable features are directly due. Its information is full and well condensed, well arranged, and accurate. The physical descriptions of parishes and counties are well done; and history, biography, antiquities, and statistics are all deftly woven into the geographical fabric. The literary quality of the writing is also worthy of praise—a great advance having been made on previous Gazetteers of Scotland, some of which are regular quarries of solecisms and ill-placed grandiloquence. It is a pity, perhaps, that the latitude and longitude are not more frequently given, even for important places. They are given for Edinburgh, Glasgow, and Aberdeen; but not for Dundee, Perth, and Dumfries. On the other hand, care is taken uniformly to give the relations of places to one another according to the compass, and also their distances from important

centres in miles. The populations are entered on a uniform plan, at intervals of twenty and of ten years, from 1841 (in some cases from 1801) to 1881. The rental, the municipal revenue and expenditure, the rate of burgh assessments, and the statistics of churches, schools, and shipping, where applicable, are all carefully noted. Information under these heads makes the work valuable for the purposes of reference and of instituting comparisons. Another useful feature of the work is seen in its references to the sheets of the Ordnance Survey maps, in which the several counties, parishes, towns and villages, are contained. All such works as are published progressively labour under the disadvantage that their earlier portions pass out of date, to some extent, before their later portions appear, and before the works are published as a whole. The error is magnified when, as in the present instance, each volume of the completed work bears on the title-page the date of the last issue. It is right to observe, however, that in the *Ordnance Gazetteer* care is taken, wherever possible, to supplement or correct the statements made in the earlier portions. Thus, under "Ecclefechan," we are told that "no stone as yet marks his [Carlyle's] grave;" which was true in 1881. In "Hoddam," however, we learn that a tombstone was erected over Carlyle's grave in 1882. In connection with the latter place, the Tower of Repentance is referred to as a beacon-tower. Might not some notice have been taken of the tragic incident with which its name is locally associated? We miss, also, under "Abbey St. Bathan's," a reference to St. Bothan of Scott's *Marmion*. The allusion there leaves little doubt that Scott deemed St. Bothan and St. Bathan the same:—

> "For here be some have pricked as far,
> On Scottish ground, as to Dunbar;
> Have drunk the monks of St. Bothan's ale,
> And driven the beeves of Lauderdale."

The same saint figures in Bell-the-Cat's doxology:—

> "Thanks to St. Bothan, son of mine,
> Save Gawain, ne'er could pen a line."

The omission is the more surprising that the *Gazetteer* is particularly rich in its literary allusions, which frequently throw a halo of interest and charm around places which seem to the ordinary reader to be common and bare. The articles on the great towns extend to a considerable length, and are full of interesting particulars. Those on Edinburgh and Glasgow occupy about eighty pages each, and are supplemented with special indices. The county maps which accompanied the first issue of the work in parts have disappeared from the volumes sent to us for review, and we hope from every copy of the work now being issued. Reproduced from antiquated plates, these maps were quite unworthy of a work claiming to be an *Ordnance Gazetteer*. It would have been more satisfactory if modern county maps had taken their place; though the defect is to some extent remedied by excellent maps of sections of the country, by Mr. Bartholomew. These include the mineral district of Ayrshire, the firths of Beauly, Cromarty, and Moray, the estuary of the Clyde, the estuary of the Forth, the mineral districts of Lanarkshire and Linlithgowshire, the Firth of Tay, and the Tweed manufacturing districts. The large scale Orographical Map of Scotland, a reduction of which appeared in the first number of this *Magazine*, is an admirable specimen of cartography, and is of great value. The supplementary treatises appended to the third volume, under the title of "General Survey," are very important and valuable. They are eighteen in number, and they treat of such matters as "Position and Boundaries," "Leading Physical

Features," "Geology," "Meteorology," "Agriculture," "Zoology," "Fisheries," "Administration," "Education," "History," and "Language," and "Literature." Among the contributors are Professor James Geikie, Messrs. B. N. Peach and J. Horne, Mr. Alexander Buchan, Mr. W. Scott Dalgleish, Mr. William Melven, and the late Dr. John M. Ross. The work, as a whole, is a valuable contribution to geographical and topographical knowledge, and as such we wish it all success.

'Twixt Ben Nevis and Glencoe: The Natural History, Legends, and Folk-lore of the West Highlands. By the Rev. Alexander Stewart, LL.D., F.S.A. Scot.; Author of *Nether Lochaber*. Edinburgh: William Paterson. 1885. Pp. xvi. and 384.

In spite of the fine geographical flavour of its title-page, this volume has hardly any claim to be noticed in a geographical magazine; and had it been less valuable than it is, we should have simply warned our readers not to be taken in by the almost misnomer. But a geographer is as likely at least as his neighbours to be interested in natural history, legends and folk-lore, and there are so many excellent, if gossippy, passages in Dr. Stewart's "careless-ordered," essays, that the severest stickler for consistency will not grudge the breach of limits we are committing. But why, when his pack contains such a variety of odds and ends—and things come up in the most unmethodic style—did not Dr. Stewart provide his readers with a proper inventory? We are sure to refer to his pages on many future occasions to verify our recollection of this and that, and we are equally sure to lose our time and temper in hunting for what an index would have given us in a minute. A few more dates for such phrases as "this winter," "last spring," etc., would also be of advantage. Chapter xlvii. gives an account of the oval brochs of the island of Luing and the Hiding Craigs near Easdale, and at p. 300 there is a warm defence of the pre-eminence of Ben Nevis.

Revue Coloniale Internationale (Fondée par l'Association Coloniale Néerlandaise à Amsterdam). Direction: le Dr. C. M. Kan, Professeur à l'Université d'Amsterdam, le Dr. P. A. van der Lith, Professeur à l'Université de Leide, et le Dr. D. Josephus Jitta, Avocat et Conseiller Communal à Amsterdam. Amsterdam: J. H. de Bussy, 60 Rokin.

This first number of the *International Colonial Review* deserves a hearty welcome not only for what it is and for what it promises, but because it indicates the existence and will aid the diffusion of a healthy spirit of co-operation among the thinking—that is, rightly understood, the governing—classes of the leading nations of Europe. The field of Colonial enterprise has witnessed no small part of that internecine struggle of the European Powers, which forms nine-tenths of what is popularly known as European history. Whatever tends to make the rancorous jealousies of the past give place to righteous rivalry, or, where it is possible, to generous recognition of the right of other competitors, is surely worth a word of encouragement and a helping hand from every one who believes that as hostile clans and tribes have grown into peaceful nations, hostile nations will develop into a peaceful world-confederation. And those whose faith in humanity is too weak to allow them thus to forecast the future, may be glad to assist in that international interchange of opinion in which every nation is in turn teacher and taught.

This first number contains a paper on *Imperial Federation*, by Sir Richard Temple, Bart., G.C.S.I., in which he decides that none of the schemes hitherto proposed are immediately practicable, but that affairs are moving smoothly for the Empire, while there already exists a moral federation in mind and heart between the mother-country and her colonies. In treating of *Deutsche Colonial-politik*

Friedrich Fabri emphatically denies that Prince Bismarck took any initiative in the recent colonial movement in Germany, and maintains it was the product of social and economic conditions, such as the growth of population (6,000,000 added to the Empire in 1872-82), etc. A paper in French, by E. Levasseur, on the *Forces productives de l'Australasie britannique*, is a very careful study, in which the leading facts of Australian demography are brought home to the mind by various graphic methods.

Dr. C. M. Kan, one of the editors of the *Review*, is responsible for a most valuable bibliographical survey of works relating to the Dutch colonies, which have appeared since 1883. To those who are ignorant of what our Dutch cousins are accustomed to do for the illustration of their Indian possessions, this chapter will afford food for reflection.

Commander Cameron's review of Mr. Stanley's *Congo* is a cordial appreciation of the man and his work, which does as much credit to Commander Cameron as to Mr. Stanley.

The list of "collaborators" already contains a large number of men of eminence in Germany and Austria, England and Scotland, Belgium, Spain, France, Italy, the Netherlands and Russia; and the ranks, we have no doubt, will be rapidly recruited in the course of the year.

Lehrbuch der Geophysik u. Physikalischen Geographie von Dr. Siegmund Günther. Band i., x. + 418 pp; Band ii. xii. + 670 pp. Enke: Stuttgart. 1884, 1885.

The contents of these volumes are as follows:—

I. Geschichtlich litterarische Einleitung. Kosmische Stellung der Erde. Allgemeine mathematische und physikalische Verhältnisse des Erdkörpers. Geophysik im engeren Sinn: dynamische Geologie.

II. Magnetische und elektrische Erdkräfte. Atmosphärologie, Oceanographie und oceanische Physik. Dynamische Wechselbeziehungen zwischen Land und Meer. Das Festland mit seiner Süsswasserbedeckung. Anhang: Biologie und physische Erdkunde in Wechselwirkung.

The aim of the author is to give a systematic account of the various departments of Physical Geography, devoting more space than is generally given to the mathematical side of the subject, both as regards its substance and its historical development. Though the author is known as a mathematical writer, we cannot say that mathematics is given too prominent a place: those who think so must at the same time confess that the mathematical portions are skilfully dealt with, and, after all, it must be remembered that mathematics and mathematical physics are at the least as necessary to scientific geography as the natural sciences are.

The reputation which Dr. Günther has for painstaking and methodical work will be much enhanced by these volumes. Before proceeding to write, he not only does his utmost to master his subject, but makes every effort to ascertain the best way of bringing it before the reader. Even were this not the case, he would deserve our gratitude and respect for the immense storehouse of facts and historical references he has brought together. His work, in a word, is both a well-written text-book and a valuable book of reference.

The Chinese, Painted by themselves. By Colonel Tcheng-ki-tong, Military Attaché of China at Paris. London: Field & Tuer.

Colonel Tcheng is an *homme d'ésprit* and an intelligent critic, but, above all, he is a patriot. We are therefore not surprised that, in speaking of the institutions

of his country, he speaks as a Chinaman. His motive in writing this book, he tells us, was to disabuse the Western world of the "travellers' tales" which are generally credited as true descriptions of China and the Chinese; and we agree with him that many such books are recklessly written to fill a given number of pages, rather for their marketable value than from a love for research and truth. With politics he has nothing to do; he is, happily, forbidden them both by his official position and by his citizenship.

In reviewing European civilisation, and contrasting it with that of his own country, he advances many forcible arguments to maintain the position he takes up, that our ideas of progress are not always borne out by results, and that the patriarchal system of China has much to commend itself. Without going to the length of believing, with a great English writer, that the Chinese are the people of the future, we cannot help thinking that, if the greatness of a nation is in direct ratio to the number of its virtuous—*i.e. natural*—homes, the Chinese have a great future before them. On almost every page of Colonel Tcheng's book, we read of the high ideal of family life which seems to govern all classes of the community, and we are struck with the apparently good results of the patriarchal system as exercised by the State and the head of the family.

Their system of education—which is really a *system*, and not, like our own makeshift, only a "dose of instruction" to make humanity happy (?)—is well graduated and liberal. Their women are trained as "bearers of children," and are—we cannot do better than employ the author's own figure—as the moon, which receives the illumination of the sun (husband), and itself illuminates, though with a softer and more poetical radiance.

The author's reflections on European manners, though departing from his topic, are among the most interesting portions of his book. We come now and then upon quaint turns of thought and felicitous expressions which afford delightful reading. We can (almost) understand his distaste for *soirées* and *fêtes*, and some of the pastimes which the "Empire of Extremes" has discovered as antidotes for *ennui*, but are not quite prepared to hear that Chinese society, which, owing to the vigorous exactions of family life, does not seek distraction in promiscuous assemblies, is founded on such a healthy basis that only intellectual feasts are provided for its entertainment. Fancy the disgust of London society if it were invited, as the Chinese, to "admire a rare plant," or a "beautiful view"! Colonel Tcheng, himself, infinitely prefers the society of artists (especially female, he says); but surely he overrates the sublime fire of their genius, and the disinterestedness of their motives, when he says, "Is it the number of bank-notes that excites the artist's passion, as it flames the lawyer's zeal? No. The only thing that escapes the fascination of gold is art." To "lawyers" he seems to have the most rooted dislike: he tells us proudly that throughout all China, with its four hundred millions of inhabitants, there is no single lawyer or notary; but then it must be remembered that the heads of families transact lawyer's business.

In spite of its partiality, however, Colonel Tcheng's book is a valuable contribution to our knowledge of the subject; and his publishers deserve the highest credit for the excellent style in which they have produced it.

La Chine. Par Victor Tissot. Paris: Jouvet et Cie. 1885.

M. Tissot is evidently not geographical, but he has a talent for describing, in good journalistic language, what others have seen. He has given us a fair account of Canton, Shanghai, and Pekin, from the descriptions of travellers and others, but of the vast territory which his somewhat pretentious title includes, we learn next to

nothing. As far as he has gone, however, he has given us an interesting and intelligent summary of information, such as may be found in any popular book on the subject, but the chief attraction will be found in the well-chosen and beautifully-executed woodcuts which adorn his pages.

Central Asian Questions. By DEMETRIUS C. BOULGER. With Portrait and Maps. Pp. 457. London : F. Fisher Unwin, 1885.

This volume is political and controversial rather than scientific. But the author is entitled to the merit, as a follower of our honorary corresponding member, M. Vambéry, of keeping the subject of the relation of Russia to the interests of Great Britain and China in Asia before the English-reading public. The book is a reprint of articles on Afghanistan, Central Asia, and China, contributed to newspapers and reviews in London and Calcutta, from the year 1878 to the present time. The description of Russia's military province of Turkestan is clear, and Messrs. W. & A. K. Johnston's map, showing the acquisitions of Russia towards India, is the best we have seen on a small scale. There is a useful sketch-map of the valleys of the Murg-ab and Heri-rud, on the scale of 33 miles to one inch ; also a crowded map of the Chinese Empire.

Voyage au Mexique : Par JULES LECLERCQ. Paris : Hachette et Cie. 1885. 36 Illustrations and a Map. *Price 4 francs.*

M. Jules Leclercq, President of the Belgian Society of Geography, has written a very interesting and scholarly account of a journey he made by land from New York to Vera Cruz. In the space of 446 pages he has amassed an amount of information which is as varied as it is reliable and instructive. It is not often that one has the opportunity of reading such an intelligent book of travels, and M. Leclercq is to be congratulated on his energy and the good use to which he put his holiday.

Advance Australia ! An account of Eight Years' Work, Wandering, and Amusement in Queensland, New South Wales, and Victoria. By the Hon. HAROLD FINCH-HATTON. London : W. H. Allen & Co. 1885.

This book is pretty accurately described by the sub-title. The voyage out to Queensland, life there on a cattle station, life at the gold-diggings, and visits to Brisbane, Sydney, and Melbourne, are all given with considerable fulness of detail. The last chapter deals with the question of Imperial Confederation. Though the matter is a little thin, there is a breezy freshness and healthy air about the volume, which makes it very pleasant reading. To any one unfamiliar with bush and other out-door life in Australia, it will also prove entertaining and instructive. Indirectly it shows what splendid opportunities Australia offers to a man of capital, fair education, and good health and spirits.

The map is very poor. One wonders how a publisher of any intelligence can bear to see such a thing associated with his name. A railway company would issue a much better map as part of a gratis advertisement.

Meyer's Konversations-Lexicon. Eine Encyclopädie des allgemeinen Wissens. Vierte, gänzlich umgearbeitete Auflage. Erster Band. A—Atlantiden. Leipzig : Verlag des Bibliographischen Instituts, 1885.

This first volume of the fourth edition of *Meyer's Encyclopädie* is an excellent illustration of the saying that nothing succeeds like success. It is only a work which had been abundantly successful in the past that the publishers could afford to re-issue in so complete a style at so cheap a rate. Great as Scotland

is in the art of Encyclopædia-making, the present volume must, in some respects, be the despair as well as the admiration of Scottish encyclopædists. We make bold to say that, as a strictly popular compendium of universal knowledge, no volume of an encyclopædia has yet been offered to the public in either French, German, or English, in presence of which this would have to take the second place. If it be service to humanity to make two blades of grass grow where one grew before, it is surely no less a service, in this age of accumulating knowledge, to express two facts in the space formerly employed in the expression of one. In this art of condensation, the editors of *Meyer's Encyclopädie* are passed masters. The feeling that the "world is all before them where to choose" is apt to take possession of encyclopædists at the letter A ; and then, when they approach the letter Z, they find a difficulty of procuring space for a surplus population. Of this natural error of judgment there is less evidence in *Meyer's Encyclopädie* than in any other we know. To geographical subjects a large amount of space is assigned in the volume before us, which, of course, contains articles on Africa, America, and Asia. In such cases it is quite the custom of encyclopædists to provide a map ; but the editors of *Meyer* have for Africa provided three maps—a physical or altitude map, a political map, and an explorational map ; for each of the Americas a physical and a political map, and so on. The explorational map of Africa is an extremely clear and complete register of all the most important travellers' routes, and it is accompanied with an alphabetical index which enables the reader at once to find out the territory in which any individual traveller has been at work. Besides the maps, several of which appeared in the third edition, a new feature has been added to the fourth in the shape of admirable lithographic conspectuses of the physiognomies of the leading races of the three continents already mentioned. Into the details of the work we have not room to enter. We must, however, call attention to the fact that the editors evidently attach importance to being up to date with their information, and that they include living men of eminence in their multifarious programme. Whoever has a smattering of German, and wishes a really learned and popular book of everyday reference, cannot do better than purchase *Meyer's Lexicon*. He who has no German might spend his time worse than in learning it for the purpose of using such a book.

NEW MAPS.

EUROPE.

BELGIQUE—Carte Administrative des Regions Agricoles de la—, à l'échelle du 1 : 500,000, d'après André Dumont, M. C. Malaise, et M. T. Verstraeten. *Bulletin de la Société Royale Belge de Géographic. Mars-Avril* 1885, *Bruxelles.*

This interesting map shows the agricultural geology of Belgium. It would be most instructive and useful if we had similar maps for Britain.

LOCH LOMOND.—The Tourist's Pocket Map of Loch Lomond, Loch Katrine, and the Trossachs, by John Bartholomew, F.R.G.S., revised by M. J. B. Baddeley. Scale, 2 miles to an inch. *London : Dulau & Co. Edinburgh : J. Menzies & Co. Price* 6*d.*

This is a pretty little map coloured into contours. It shows all the roads and footpaths.

LAKE DISTRICT, Coventry's Cyclist's and general Tourist's Map of the—. Reduced from the Ordnance Survey by J. Bartholomew, F.R.G.S., to a scale of 4 miles to an inch. All main roads coloured.

NORTH WALES, Coventry's Cyclist's and general Tourist's Map of—. Reduced from the Ordnance Survey by J. Bartholomew, F.R.G.S., to a scale of 4 miles to an inch. All main roads coloured. *J. Coventry & Co., Manchester. Price, in cloth case,* 1*s.* 6*d.*

AFRICA.

AFRIKA, Kultur-und Staatenkarte von—. Von Prof. Dr. Fr. Ratzel. Scale, 1 : 45,000,000.—Skizze einer Kulturkarte. Skizze der Staatenbildenden Völker und Eingebornenstaaten. *Petermann's Mitteilungen, Jahrgang* 1885, *Tafel* 13. *Gotha : Justus Perthes.*

EAST AFRICA, between the Zambesi and Rovuma Rivers, based upon Astronomical Observations and Topographical Sketches of H. E. O'Neill, F.R.G.S., H.B.M. Consul at Mozambique. Scale, 17 miles to an inch. *Proceedings of the Royal Geographical Society, July* 1885. *London: E. Stanford.*

Mr. O'Neill in this map fills up with rivers, mountains, and plains what was formerly almost a blank in the map of Africa. He gives several new routes to Lake Nyassa and the interior, which will no doubt prove of great importance in the development of that region.

AMERICA.

NORTH ATLANTIC OCEAN, Pilot Chart of the —. Prepared by order of the Bureau of Navigation, U.S.N. July 1885.

Icebergs will be found east of the Banks of Newfoundland, and as far south as latitude 41°, between 45° and 50° west longitude, but they do not extend so far as this in June.

NIEUW GUINEA, Schetskaartje van een gedeelte der Westkust van—, door W. F. Versteeg. Scale, 17 miles to an inch. *Tijdschrift van het Nederlandsch Aardrijkskundig Genootschap. Jaargang* 1885. *Kaart No.* 1. *Amsterdam : C. E. Brinkman.*

This is a new map of the isthmus at Geelvink Bay in Dutch New Guinea, showing the results of recent exploration there.

ATLASES.

HISTORISCHER HAND-ATLAS, Professor G. Droysen's Allgemeiner — In sechsundneunzig Karten, mit erläuterndem Text. Ausgegeben von der Geographischen Anstalt von Velhagen & Klasing in Leipzig unter Leitung von Dr. Richard Andree. 3 Lief., 1885. *Bielefeld und Leipzig: Verlag von Velhagen & Klasing. Price,* 2*M.*

LETTS'S POPULAR ATLAS.—A complete series of Maps delineating the whole surface of the Globe. New edition, 1885. Parts 1 to 6. *London: Letts, Son, & Co., Limited. Price, each part,* 1*s.*

We have received several of the parts of yet another new edition of this atlas. Some publishers have unfortunately come to know the geographical ignorance of the British public. Finding that an old map, engraved before the days of ordnance surveys, if only energetically published, will sell almost as well as a new one, they will not be at the expense of original engraving. As we mentioned in a former review, the *Popular Atlas* is simply an old one re-christened. As publishers, Messrs. Letts are, however, by no means the worst offenders in this respect, and in many cases one regrets that they should put their new wine of political and statistical information, in itself of good marketable value, into the old bottles of antiquated cartography.

OUR SOUTH AFRICAN EMPIRE.

The accompanying Map shows the British Possessions in South Africa. The following Notes illustrate the gradual growth of these dependencies, by indicating the date at which the several territories came under British authority:—

		SQUARE MILES
1806.	CAPE COLONY, a Dutch possession, was taken by the British, to whom it was finally ceded in 1815. The Colony extended from the Buffalo River, south of the Orange River, to the Great Fish River on the east, and had an area of probably	120,000
1843.	NATAL, put under British authority	21,150
1846.	After the Kaffir War of that year, the Colony proper was extended to the Orange River on the north, and to the Keiskamma on the east; while the Coast territory between the Keiskamma and the Kei became British Kaffraria (The latter was incorporated with Cape Colony in 1865.) The British area was thus increased by about	80,000
1871.	BASUTOLAND, inland from Kaffraria, annexed	10,300
1871.	GRIQUALAND WEST, north of the Orange River, added	17,800
1876-79.	Three large Districts of Kaffraria Proper beyond the Kei River) taken over, viz., FINGOLAND, the IDUTYWA RESERVE, and NOMANSLAND	
1881.	TEMBULAND, EMIGRANT TAMBOOKIELAND, BOMVANALAND, and GEALEKALAND absorbed	15,000
1884.	FONDOLAND, the last remaining part of Kaffraria Proper (or Independent Kaffraria), taken over	
1885.	BECHUANALAND PROPER (40,000 sq. miles?), and a large additional territory, including part of the Kalahari Desert, with a total area said to be more than	150,000
		414,250

The District formerly known as Kaffraria Proper, between the Kei side and the Natal frontier, is sometimes spoken of as the Transkeian Territories, or the Transkei. The latter name is however, sometimes specially reserved for one of the three main divisions under which these territories have now been organised—namely, for that comprising Fingoland, the Idutywa Reserve, and Gealekaland. The other divisions are—Griqualand East and Tembuland. The small detailed District of Walvisch Bay, on the Atlantic coast, was proclaimed British in 1878.

An area of 414,000 sq. miles is more than twice the size of France, about equal to twice the size of Germany, and much more than three times the extent of the British Islands. Without taking account of the inhabitants of Bechuanaland and the newly annexed domains, there is in the Cape Colony and its dependencies a population of about 1,500,000, and in Natal 418,000; say, with Bechuanaland, the population must therefore be well over 2,000,000. Of these, some 300,000 are of European stock.—Dutch, English, French, and German, mainly. The others include Kaffirs, Fingos, and Bechuanas; Hottentots and Griquas or Bastards, Bushmen, and Malays.

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SKETCH MAP OF
SOUTH AFRICA
SHOWING
BRITISH POSSESSIONS
JULY 1885

British Possessions coloured **Red**
German **Brown**
Portuguese **Purple**

Scottish Geographical Magazine, 1885.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

RAPIDS AND WATERFALLS.

By George G. Chisholm, M.A., B.Sc., F.R.G.S.

The study of rivers is little fitted to support the idea that the earth was made for the comfort and convenience of man. Much as man owes to rivers, there is no physical feature that causes him more trouble, no gift of nature perhaps is clogged with so many and so various drawbacks. The mouths of rivers get silted up and encumbered with bars; their beds are often full of shifting shallows; in summer they may even dry up to such an extent as to be useless for navigation, or they may flow in regions so arid that they are useless for that purpose all the year round. Even where they are sufficiently full-flooded to be capable of carrying at all times richly-laden argosies, they may wind about with a course so tortuous as greatly to impair their value as channels of communication; their current may be so swift that they are of no value, at least for up-stream navigation, or they may end in an inland sea and furnish no assistance to intercourse with the outside world. They overflow their banks, and, though they then sometimes fertilise, they more frequently devastate the country round. They require to be tamed, but even when placed in chains they are often unruly; they will sometimes burst their bonds asunder and work all the greater havoc on account of the bondage in which they have been kept. In cold countries the escaped waters create a sodden soil, in which nothing useful to man will grow. In warm countries they breed fever and pestilence. Not for the convenience of man do rivers flow, but, like all other gifts of nature, they must be used—they must be carefully applied so as to serve man's ends. The true lesson to be derived from the study of rivers is the great lesson taught by the study of all nature and all history—the necessity for constant labour to subdue nature, the lesson that Virgil so earnestly taught in his song of the husbandman:

"*Improbus labor omnia vincit.*" The rivers that would otherwise devastate the fields can be made to carry corn, wine, and oil with undeviating faithfulness, and those which might stagnate in pestiferous swamps can be led to trickle along in myriads of fertilising rills.

Of the hindrances requiring to be overcome by man in utilising rivers, none are more deserving of examination than those which form the subject of the present paper, and these are more likely to be all the more interesting just now in consequence of the attention which recent events have drawn to two of the most celebrated series of rapids in the world—those of the Nile, and those of the Congo. It is our purpose in the present paper to consider some of the conditions under which waterfalls and rapids occur, and their effects upon human civilisation and development.

The conditions of their occurrence bring into prominence in many ways the correspondences which an attentive study of geography is sure to discover between different geographical features, and between these and geological structure. The broad fact on which the presence of a waterfall or rapid usually depends, is that a river-bed is composed of rocks of various degrees of hardness, in consequence of which the bed is eroded at different rates at different parts, and inequalities are thus presented in its level. Where the hard rocks occur in the upper part of a stream, there is a step from the harder beds above to the softer ones below, producing a waterfall; where the harder rocks occur in the middle course of the river they give rise to a rapid. At these harder parts the river-bed is, as a rule, eaten out to a less depth, and the water hurries over the rocky shallow with tumultuous haste. It may not always be the river itself that was the first cause of the difference in level where a waterfall occurs. The softness and hardness of rocks affect the rate of denudation, whatever be the agent by which it is brought about. Ice, frost, or rain, or all together, may have been the first producers of an escarpment over which a river leaps; but where the succession of the rocks in a river-bed is of the nature indicated, the work of the river itself will tend to preserve the waterfall or rapid that may occur in its course, until the hard rock is entirely worn through.

Such being the great fact on which the occurrence of waterfalls and rapids most commonly depends, it is easy to guess the kind of country in which such obstructions to navigation should be most plentifully found. We should naturally look for them where hard rocks are most abundant at the surface. Some rocks are characteristically hard, such as granite, and other crystalline rocks, and limestone; and it is probable that the great majority of waterfalls and rapids are situated where rocks of these kinds are to be found in the bed of the river. Granite, however, is to be found near the surface chiefly in those parts of the world in which the deeper layers of the earth's crust have been upheaved in the process of mountain-building. Moreover, that process is one that tends to harden rocks that are naturally soft. The extreme pressure, which is one of the elements in that process, converts shales into slates, and helps to consoli-

date sand into sandstones. Hence it is mostly, though by no means solely, in mountainous countries that we meet with those alternations of hard and soft rock to which rapids and waterfalls owe their origin. Especially is this true of those mountainous regions in which the rivers cut right across the mountains, as they do in favourable circumstances with what might seem a contemptuous defiance of such barriers. It is true, for example, of the rivers of the east and west of North America—of those, namely, which intersect the ranges of the Rocky Mountains, and those which traverse the Alleghanies. It is true in South America of those tributary streams which cross the highlands on the north, east, and west, to join the great rivers of the plains, the Amazon and the Paraguay; true also of the great rivers of Africa, most of which, in making their way from the interior plateaux to the ocean, have to pierce a barrier of mountains.

On the other hand, the regions where both rapids and waterfalls are least numerous are those great plains which lie between two or more mountain areas, or between mountains and the sea, and which for ages have had the products of the waste of the higher regions spread over them. On these wide areas, wind and rain, and frost and massive ice, have all contributed to lay down deep deposits of softer rock, through which great rivers wind about in unimpeded channels. It is to this physical conformation that North America owes its great waterways of the Mississippi and its tributaries; South America, those of the Amazon and Paraguay; Eastern Europe and Siberia, those of the Volga, Northern Dwina, and Petchora, the Obi, Yenisei, and Lena; Northern India, those of the Ganges system. In the rivers of Mesopotamia the contrast in this respect between the mountains and the plains is strikingly exhibited, especially in the case of the Euphrates, which, before entering on the plain, has its course interrupted by about thirty rapids in piercing the mountains of Kurdistan.

Even in mountainous regions, however, rivers may flow long distances unimpeded by rapids or any similar obstruction where the course of the stream follows the general trend of mountains. It is instructive, for instance, under this point of view, to compare the course of the Amur, which is navigable for more than half its length, and that of the Yang-tse-Kiang, which is probably the most important natural waterway in the world, with the general lie of the mountains in the region to which they belong; and no less instructive to observe the contrast presented by Southern China. There the general trend of the mountains is no longer east and west, but north-east and south-west. So that the east and west rivers, such as the Si-Kiang or West River, and Song-Ka or Red River, have to cross their axis. These rivers accordingly have their course frequently interrupted by waterfalls and rapids;[1] whereas the tributaries of the east and west rivers, following as they do the general trend of the

[1] Colquhoun, *Across Chrysê*, i. 79, 85-6, 114-16, 136, 216, 294, etc.; ii. 227-8.

mountains, are unobstructed, and are often important channels of communication. One of the affluents of the Si-Kiang, for example, rising in the north-east corner of the province of Kwang-Si, is navigable throughout its entire length, and being connected by a canal with the head-waters of the Siang-Kiang, a navigable tributary of the Yang-tse-Kiang having the same relation to the general lie of the mountains, helps to provide uninterrupted water carriage between the north and the south of China.[1]

Further interest is added to this general survey when we take the geological structure into consideration. Under this aspect of the subject South America presents a peculiarly instructive illustration. According to Wallace,[2] granite seems to be more extensively developed in South America than in any other part of the world. It was observed, he says, by Darwin and Gardner in every part of Brazil; by Humboldt it was found over all Venezuela and New Grenada; by Prince Adalbert up the Xingu; by himself over the whole of the upper part of the Rio Negro, and far up the Uaupes to the slopes of the Andes. It seems, he adds, to form all the mountains in the interior of Surinam; and it was, moreover, found abundantly by Schomburgk in British Guiana; while in Southern Brazil, between Paraguay and Bolivia and the coast, Spix and Martius describe the rocks observed by them in their routes as mainly mica-slate and gneiss,[3] adding that all the rocks of the district, so far as they could learn by inquiry, are of the same character. Azara describes the rocks in the beds of the streams in the same region as all hard and primitive.[4] The highlands of South America are thus mainly composed of hard crystalline rocks. At one time these regions formed great islands. Then the plain lying between the highlands of the north and those of the south (Eastern Brazil), now traversed by the Amazon, was occupied by one sea; that stretching north and south between the Andes and the mountains of Brazil, now traversed by the Paraguay, by another. Gradually these depressions have got filled up by alluvial and other deposits, which offer no obstructions to the course of the rivers by which they are drained. The Marañon or Amazon quits the Andes at the Pongo de Manseriche, in lat. 4° 29′ S., long. 77° 33′ W.,[5] where its waters leap over a low barrier formed by a coarse breccia of red sandstone, which is rapidly wearing away. This is the last obstruction to navigation in descending the river, and, occurring as it does almost exactly where the Andes recede furthest from the Atlantic, it leaves a waterway of more than 2500 miles on the main stream alone. So, too, the Paraguay and lower Paraná have an unobstructed course from the estuary of the La Plata upwards to 16° S., a distance of 1600 miles or more. It is otherwise, however, with the

[1] See a paper by the Rev. A. Williamson, on the Physical Geography of China, in the *Proc. Phil. Soc. Glasgow*, vol. xv. (1883-84), p. 125.

[2] *Travels on the Amazon and Rio Negro*, p. 422.

[3] *Travels in Brazil* (Lond., 1824), ii. 145.

[4] *Voyages dans l'Amérique Méridionale* (Paris, 1809), i. 85.

[5] See *Zeitschrift für Erdkunde*, xv. Pl. v.

tributaries of these great streams. These, as already indicated, have to cross the crystalline regions in the north, east, and west, and almost all of them have their course more or less impeded by rapids. On the left bank both the great tributaries, the Yapura[1] and the Rio Negro, have numerous obstructions of this nature; the Uaupes, an important affluent of the former, is described by Wallace[2] as a river perhaps unsurpassed for the difficulties and dangers of its navigation. On the right bank the most important tributary is the Madeira, which is navigable as far as the falls of San Antonio in the Brazilian province of Matto Grosso. Unfortunately, however, for Bolivia there here begins a series of waterfalls, rapids, and cataracts,[3] which extends for about 200 miles up the river. The navigation of the Madeira may indeed be resumed above the rapids (where the stream receives the name of the Mamore), and may be continued up the Chimore to within a short distance of Cochabamba; but almost all the numerous affluents of the Madeira above San Antonio have their navigation hindered by rapids, waterfalls, or some other obstruction.[4] The Tapajos, the Xingu, and the Tocantins, the most important tributaries of the Amazon below the Madeira, all have their navigation obstructed by interruptions of the same kind.

Turning now to the system of the Paraguay and the Paraná, we find precisely the same thing, and even in a more marked degree. Till recently it was hoped that an outlet for the commerce of Bolivia might be found by way of the Pilcomayo, but it has now been ascertained that this outlet is closed in the same way as that by way of the Madeira.[5] On the left bank of the great north and south artery of South America almost all the rivers are rendered useless for navigation by the same kind of obstructions. The Paraná itself, the upper course of which is through the region of mica-slate and granite, is navigable indeed as far up as the mouth of the Iguassu, notwithstanding the existence of a rapid in lat. 27° 27′ S. and long. 59° W.;[6] but above the influx of the tributary just mentioned navigation is stopped by one of the most remarkable rapids in the world—a rapid extending for thirty-three leagues in a straight line up the river between ranges of frowning cliffs, which confine the stream to a narrow rocky bed, along which its waters plunge with tumultuous fury. The tumult and the fury are fully explained on ascending to the upper end of the rapid, for there it is found that this remarkable rapid has its origin in a cataract quite as remarkable. The Salto of Guayra, as this cataract is called, occurs in lat. 24° S. At that point the Paraná is a mighty river $2\frac{1}{2}$ miles broad, and, rushing down an inclined plain 52 Paris feet in height, and sloping at an angle of fifty degrees to the horizon, it precipi-

[1] Crevaux, *Bull. Soc. Géog.* (Paris, 1879), pp. 410-15.

[2] *Travels on the Amazon and Rio Negro*, p. 356.

[3] See Keller-Leutzinger, *The Amazon and Madeira Rivers* (Eng. ed., Lond., 1874).

[4] See Hermann von Holten, *Die Flüsse Boliviens und deren Nützbarkeit für den inneren Verkehr* in *Mitt. der Geog. Ges. Hamburg*, 1876. pp. 39-43.

[5] *Proceedings of the Royal Geographical Society*, 1885, p. 399.

[6] Azara, *Voyages dans l'Amérique Méridionale* (Paris, 1809), i. 84.

tates itself into the upper end of the gorge just mentioned, where its waters are tossed and churned in a channel only 65 yards wide.[1]

Two leagues above the confluence of the Iguassu with the Paraná the former stream has a series of cataracts extending over a length of 1400 yards, in the course of which the river falls 182 feet, the highest perpendicular fall being 19 feet.[2] In short, according to Azara, all the rivers, great or small, in this region from lat. 27° S. northwards, have rapids, cascades, or rocky shallows; or, if there are any exceptions, there are, on the other hand, some rivers which have numerous obstructions of this nature in their course. The Tiete has no fewer than fourteen.[3]

In Guiana the conditions are similar to those found on the east of the Paraná. The falls and rapids on the Oyapock,[4] Corentyn, Demerara, and Essequibo[5] are chiefly over granite, and so too are the *raudales* of the Orinoco.

In Europe, also, the relations between geological structure and the occurrence of falls and rapids are extremely interesting. The crystalline plateaux of Scandinavia and Finland are, as is well known, full of waterfalls. A large number of the waterfalls of Switzerland are over either limestone or gneiss or granite.[6] The Falls of the Rhine below Schaffhausen, the greatest fall in Europe in respect of the body of water precipitated, are over masses of limestone (the so-called *Lächen*), and Von Decken's map of the Geology of Central Europe shows that they occur just where the Rhine touches the Jura Limestone before re-entering on the rocks of Post-Pliocene date (overlying Miocene), which it had just before quitted. The rapids lower down between Laufen and Basel occur where the gneiss of the Black Forest reaches to the Swiss shore of the river.[7] The Danube, flowing for the most part in the low land, which has on the one side the Carpathians and the mountains of Central Germany, and on the other side the Alps and the mountains of the Balkan Peninsula, is, as a rule, unobstructed; but in its course there occur several remarkable defiles in which the river is constricted within a narrower bed, and the current is greatly accelerated, even though the navigation is not always seriously impeded thereby. One of these defiles extends from Grein to Dürrenstein, where the river crosses the crystalline plateau which forms the bulk of Bohemia and Moravia, and here reaches to Lower Austria.[8] In this part of the course of the Danube rocks and islets are frequent obstructions, and in 1859 the rock of the Wirbel was removed from this reach in order to facilitate the traffic. The second defile, known as the Carpathian Gate, occurs where the granite range called the Little Carpathians comes

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[1] Azara, *Voyages dans l'Amérique Méridionale* (Paris, 1809), i. 70-71.
[2] *Ibid.* i. 74-5; and Niederlein in *Verhandl. Ges. für Erdk. Berlin*, 1883.
[3] Azara, p. 85.
[4] Crevaux, *Bull. Soc. Géog.*, 1879, pp. 388-90.
[5] See Schomburgk, *Reisen in Guiana und am Orinoko.*
[6] Meyer, *Physik der Schweiz*, p. 334.
[7] *Ibid.* p. 332.
[8] See Von Hauer's Geological Map of Austria, or the Geological Map of Europe in Stanford's *Compendium.*

close up to the left bank of the river; and the third between Gran and Waitzen, where the stream pierces a short range with a trachytic core belonging geologically to the Carpathians, although it is referred orographically partly to that system, partly to that of the Alps. The next obstruction is the most important of all—the celebrated Iron Gate, which is situated just where the Danube leaves the wide plain of Hungary and pierces the crystalline rocks and limestones of the Carpathians.

In the south-west of Russia we meet with another illustration of the same relation between geological structure and the character of the river-bed. The three principal rivers of that region, the Dnieper, the Dniester, and the Bug, are all vexed with rapids, which are a serious impediment to commerce. They thus form a notable exception to the rule already stated as to the general freedom of wide plains from obstructions of this nature; but it is an exception as instructive as it is notable; for in the area where the rapids occur, the fruitful soil which Russia here enjoys is spread over a basis of limestone and granite, which come to the surface in the river-beds, and mostly also in the parts immediately adjacent. Somewhat similar conditions seem to be found in the course of the Nile, and in the northern plains of the Canadian Dominion. All the rapids of the Nile occur in crystalline areas, while the smooth parts of the river belong to the system indicated in Russegger's map as Nubian Sandstone. All students of geology are aware that a particular kind of granite, called *syenite*, takes its name from a town anciently called Syene, situated at the lowest of these celebrated cataracts. In North America, Archæan rocks, which are everywhere thoroughly crystalline, cover a large part of the continent, from the Arctic Circle southwards to the great lakes. Probably no region in the world is so full of rapids as precisely this. The Great Fish River has upwards of eighty. The Peace, the Mackenzie, the Athabasca, are all encumbered in the same way.

The connection between geological structure and the occurrence of obstructions in the river-bed is likewise significantly exhibited in many other cases, by the fact of rapids and waterfalls occurring just at the transition from one geological formation to another, or being confined to a particular formation in the course of the stream. In our own country, the Falls of the Clyde all occur in an outlier of Old Red Sandstone. The Delaware has a series of rapids, which extend from Easton to Trenton, where they terminate with a waterfall. The geological map of the United States shows that exactly between the towns mentioned the Delaware crosses a strip of Triassic and Jurassic rocks before it rounds the end of an Eozoic band, and then flows south-west between rocks of Eozoic and Cretaceous age.[1] The Columbia River has its gorges, waterfalls, and rapids, in passing through the granitic axis of the Cascade Range and the basalts of a later date. The great fall of the Missouri occurs just at the transition from the Red Beds of arenaceous texture, believed

[1] See the Geological Map of the United States in Stanford's *Compendium of Geography and Travel* (North America).

to be of Triassic age, to those belonging to Jurassic times.[1] The lowermost rapids of the Godavari, those of Dumagudiem, are situated at the line of contact of the Lower Gondwana series with the metamorphic rocks of Southern India.[2]

But, to appreciate all the interest connected with this subject, it will be necessary to make a more particular examination of certain waterfalls and rapids. While the general fact that the alternation of more and less destructible rocks is the usual condition of their occurrence is thus brought more clearly into view, it will be seen at the same time that there is a variety of ways in which this alternation is brought about, and also a variety in the effects, according to different circumstances. The first example to which we will refer is the classical one of the Falls of Niagara, which has often been appealed to since the time of Sir Charles Lyell.[3] As is well known, this is a case of the alternation from beds of hard limestone above to soft shales below. Since the example is so familiar, we need not go into it in detail, but it will be worth while to indicate three aspects under which the case is interesting and illustrative.

In the first place, the succession here found is a very common one, as might naturally be expected from the mode in which the two kinds of rock named are formed. Shales are merely hardened, and indeed imperfectly hardened, muds, the deposit of a shallow sea; limestone is the deposit of seas and other waters that have obtained a greater depth. Accordingly, in a gradually sinking area, a shale is the deposit that would first be formed, a limestone next or uppermost.

But, secondly, the case is interesting as illustrating the process by which waterfalls generally are gradually caused to recede in position. An examination of the ground where the falls are situated, has left no doubt on the mind of any beholder that they have actually receded from the edge of the cliff to which the limestone belongs, a distance of seven miles. The process is a peculiarly rapid one in the case of the alternation presented by the rocks to which the Falls of Niagara owe their existence. The soft shales supporting the limestone behind the waterfall get speedily worn away under the action of the driving spray, the moisture, and the frost. The limestone above is thus steadily undermined, and from time to time it falls in larger or smaller masses, which are broken up by the force of the water, and gradually carried down stream. The breaking of the limestone is further promoted by the numerous joints which generally run through this kind of rock, the water getting into the cracks where these joints occur, and helping to force off the masses which have been more or less deprived of support underneath.

Now this process brings into light the third point of view under which the case of Niagara is specially interesting as an illustration of the history

[1] See Map of the Yellowstone and Missouri Rivers, issued by the U. S. War Department, to illustrate Hayden's *Yellowstone and Missouri* (1869).

[2] See Map belonging to Blanford and Medlicott's *Manual of the Geology of India*.

[3] See *Principles of Geology*, ch. xiv.

of waterfalls generally. It is evident that the process may go on until the hard rock to which the fall owes its existence is completely worn through; the waterfall will then soon be brought to an end. It follows that the existence of such a waterfall is not indefinite in duration; geologically it must be quite recent. In the case of the Falls of Niagara there is reason to believe that they can date no further back than the Glacial Epoch, and it has been contended that in the northern area of the United States the gorges and waterfalls are in most, if not in all, cases posterior to that date, and were in fact brought about by changes in the course of streams due in some way to the ice-mass that then covered the area in question.[1]

In particular, this has been shown with regard to another American waterfall which is worthy of notice on other grounds—the Falls of St. Anthony, on the Mississippi. The rock succession to which the falls in this case are due is a little different from that in the case of Niagara. Here a sandstone, known as St. Peter's Sandstone, is overlaid by a Secondary (Trenton) limestone. The sandstone is of an extremely crumbling texture; the cement which holds the particles together is so slight that it is very difficult to get a solid specimen. The limestone above is schistose, and only 15 or 20 feet in thickness; under these circumstances the rate of recession is peculiarly rapid. Confused heaps of disjointed masses of limestone piled together below the falls indicate the undermining action in progress. From data furnished by various visitors to the falls between 1680 and 1856 (just before the erection of permanent mills, by which the rate of recession was greatly accelerated), Winchell has estimated that the average rate of recession during these 176 years was about 5·15 feet per year,[2] or more than five times the rate calculated by Lyell for the Falls of Niagara in the early part of the present century.[3] The point from which the Falls of St. Anthony have receded is the edge of the limestone cliff at Fort Snelling, a distance of nine miles. According to Winchell the configuration of the Mississippi valley above and below the limestone gorge in which the falls occur, together with that of the Lower Minnesota, a tributary which joins the Mississippi on the right bank at Fort Snelling, shows that at one time the Mississippi cannot have flowed over the Trenton Limestone at all, but must have joined the present valley of the Minnesota a few miles above Fort Snelling, while the disposition of the glacial drift in this district makes it plain that this change must have taken place when the last Ice Period was at its height. Upon the facts and views just mentioned Mr. Winchell

[1] See a Paper on *Gorges and Waterfalls* by W. M. Davis, in *Amer. Jour. Sci.*, 3d ser., xxviii. (1884), pp. 123-32.

[2] See *Geological Survey of Minnesota*, Fifth Annual Report (1876), by N. H. Winchell, pp. 175-189.

[3] Since Lyell's time more satisfactory data have been accumulated for estimating the rate of recession of these falls, and from these it appears that the fall on the Canadian side of Goat Island receded during the forty-one years, 1842 to 1883, at the average rate of $2\frac{3}{4}$ feet in each year. See *Nat.*, vol. xxxii. p. 229.

bases a calculation as to the date of the last Ice Age; but it is evident that there must be too many doubtful factors in the calculation to allow of the estimate being a very trustworthy one.[1]

Though the navigation of the Mississippi is now unimpeded from St. Anthony's Falls to the sea, there is a point lower down in the course of this stream which is of interest with reference to our present subject. Where the Mississippi traverses the Ozark Mountains it passes through a gorge with walls 300 feet high. At this place it appears to have at one time formed a waterfall, and drained a vast lake, which lay to the north.[2] The barrier has now, however, been completely sawn through; the waterfall has come to an end in the way in which, as has already been indicated, all waterfalls are destined to do, and the lake is entirely drained. According to Owen, who surveyed the district round the Falls of St. Anthony previously to Winchell, these falls will have become converted into rapids when the recession has reached a point about six or seven miles back from their present position—that is, after cutting their way back a shorter distance than they have already done from Fort Snelling.[3]

But it is time for us to turn to some other examples; and here we may mention that there are in our own island a number of miniature waterfalls exactly analogous to that of Niagara. There is the same succession of rocks giving rise to the fall, the same evidence of recession in the position of the fall, the same process of undermining and breaking down the overlying limestone through the erosion of a shale beneath, assisted by the action of the water and frost in the joints of the upper rock. Instances of this kind occur most abundantly where the Carboniferous Limestone is so largely developed in the north of England. One of the best illustrations is that of Ashgill Force on the Ashgill, a tributary of the Tyne. After flowing with a gentle current from the south-east, the stream suddenly precipitates itself over the Scar Limestone in a cascade some 70 feet in height, and the increased velocity of the water has enabled it to cut a passage for itself of not less than 90 or 100 feet in depth for a considerable distance through the limestone. As at Niagara there is a terrace behind the fall, the terrace resting in this case on some grey beds of soft sandstone, interposed between the limestone and the shale.[4]

In Yorkshire similar examples are very common, and above all in the Yoredale series of rocks, the essential character of which, according to Professor Phillips,[5] consists in an alternation of limestones, gritstones, and

[1] Mr. Winchell himself mentions only two doubtful factors, namely, the amount of variation in the volume of the river, and the actual length of the gorge above Fort Snelling; but it is obvious that there is another element of uncertainty in the effect of frost and other sub-aërial agents of denudation in bringing about a recession of the edge of the escarpment, over which the river was originally precipitated.

[2] See Rütimeyer, *Thal. und Seebildung*, p. 91, *n.*

[3] *Report on the Geological Survey of Wisconsin, Iowa, and Minnesota*, p. 76.

[4] See William Wallace, *Mineral Deposits*, p. 41.

[5] *Illustrations of the Geology of Yorkshire*, Pt. ii. pp. 170-71. In the same author's *Rivers, Mountains, and Sea-Coasts of Yorkshire* will be found a plate showing Hardra

"plates" (a local name for beds of shale). The consequence of this structure is, that waterfalls are found in all the dales, and nearly all the lateral valleys, where that series occurs. They occur, that is to say, in the course of the Tees, the Swale, the Yore, and the Wharfe, and many other streams flowing more or less east to west from the backbone of England; but it is in Wensleydale, where the Yoredale series is most complicated, that the waterfalls are "most frequent, varied, and interesting." In that dale, for example, occurs the Hardra Force, an instance very similar to the Ashgill Force, with this difference, however, that in the former a tolerably thick bed of sandstone intervenes between the shale and the limestone.

Lower down in the same dale we meet with another interesting illustration of waterfall structure in the Aysgarth Force, which occurs in the beds at the top of the mountain limestone below the Yoredale rocks. Here the stream descends over a series of stepped cascades, caused by the interposition of a series of thin beds of shale between a succession of limestone beds. It must be noted, however, that the mere interposition of bands of shale between successive beds of limestone is not in itself enough to bring about a series of stepped cascades of this nature. When there is this arrangement of different kinds of rock, the breaking up of the fall into a series of steps may be brought about in two ways. In the first place, it may happen that the successive beds of limestone are each more destructible than the one lying next beneath. In that case the upper beds become more rapidly worn away than the lower, the intervening shale being washed away entirely. But the same result may be brought about in another manner, where the limestones are all of equal hardness, for it is obvious that if the beds dip gently up stream, there will be an outcrop of shale of considerable breadth between each of the beds of limestone, and from the nature of the case that shale will be removed more or less completely between the successive outcrops of the limestone. A case of this kind is presented at Rochester on the Genesee, a tributary of the Susquehanna (State of New York). Here the Medina Sandstone, the rocks of the Clinton group, and those of the Niagara group, have each produced a distinct fall. The rocks of the two latter groups consist of alternate beds of limestones and shales, and all the beds, except the highest, dip gently up stream. Between the lowest and the middle, and between the middle and the upper fall, the shale crops out obliquely, and has been for the most part worn away. Doubtless, says Mr. Hall, the geologist who examined the district, there was at one time but one fall here, but the shale wearing away faster than the rocks below, allowed the upper sections to travel backwards till arrested by the limestones. Mr. Hall adds, however, that at the present time the falls seem

Force, and representing the difference between the limestone and shale in a very distinct manner. The same work likewise furnishes other plates representing similar waterfalls. Plate xii. shows Millgill Force, near Ashrigg, which is one of the few instances in which the fall is over gritstone.

to be in process of being re-united, inasmuch as the lowest fall has got to a part of the sandstone more destructible than the limestones, at which the upper falls occur, while the middle limestone is more destructible than the higher, so that the lower falls are gaining on the upper.[1]

Lower down on the same stream, Mr. Hall points to an instance which is of peculiar value, as illustrating the rapidity with which, under favourable conditions, the position of a waterfall can be worn back. The case referred to is that of the lower falls of the Genesee at Portage. The bed of the stream is here bounded by cliffs 300 feet high. Within the memory of the oldest observers, the stream precipitated itself over a platform composed of a firm sandstone of less than two feet in thickness, resting on softer rocks beneath, and occupying more than half of the width between the opposite cliffs. Now a portion of this shelf is worn through, and the stream is confined, except during freshets, to a narrow channel on the right, and the fall occurs about an eighth of a mile above the edge of the remainder of the shelf. For the whole of this distance the river forms a violent rapid, and the dimensions of the channel in which this rapid occurs are constantly increasing. Within five years the period of Mr. Hall's own observation, the depth has increased in some places by 5 or 6 feet, and the southern termination of the channel has extended several rods.[2]

In Esthonia, in Russia, we meet with a state of things curiously similar to what is found in Yorkshire, both as regards the geological structure and the occurrence of waterfalls. There a terrace of Silurian age, known as the Glint, runs from east to west, parallel to the south coast of the Gulf of Finland, and is traversed by rivers flowing from south to north into the gulf just named. The upper members of this terrace are composed of limestones, the lower ones of shales or clays and loose sandstones. In crossing the terrace the rivers make waterfalls in the limestone, and here, as in the other cases already adduced, there is evidence of a greater or less amount of recession having taken place in the position of the waterfall, in the shape of a gorge extending downwards from the present position of the fall to the edge of the terrace. The falls of the Narova, above Narva, are one example of this series. Where the fall occurs, the bed of the river is divided by an island into two parts, and there is a fall on each side of the island. The greater fall occurs on the right bank, and has this peculiarity, that it strikes obliquely across the stream, which changes its course just below the fall, so as to flow in a direction at right angles to that which it has above. The smaller fall on the left side of the island is broken up into a series of cascades, no doubt in consequence of the presence of a blue clay interbedded with the limestone. The cascade of the Wolfsschlucht, near Revel, that of the Jaggoval, about 18 miles east of Revel, and that of Fahl, about 15 miles west of Revel, all belong to the same terrace, and illustrate similar con-

[1] See *Natural History of New York*, pt. iv., *Geology of the Fourth District*, by James Hall (Albany, 1843), p. 381, where a diagram is given.

[2] *Geology of the Fourth District*, by James Hall (Albany, 1843), pp. 369-71.

ditions. In the case of the last-mentioned fall, the more destructible rock which underlies the limestone, is a Glauconite Sandstone, which is converted by the action of water into a loose clayey mass easily worn away. In the case of the Jaggoval cascade, there are two beds of limestone, a harder and more compact one above, and a more friable one below. From various estimates it would appear that this fall has receded about 10 mètres (or about 33 feet) during the last 100 years.[1]

Before proceeding to describe some waterfalls and rapids which owe their origin to some other cause than the original bedding of the rocks in the river course, we may refer to a magnificent example of a waterfall in British Guiana, which has been produced in exactly the same way as the Falls of Niagara, with this difference only, that the upper rock, instead of being a limestone, is a sandstone conglomerate, and the lower one, instead of being a shale, is a softer sandstone.[2] The fall referred to is the Kaieteur Fall on the Potaro River, a tributary of the Essequibo. It was discovered by Mr. C. B. Brown, a member of the Geological Survey of Guiana, on the 16th of July 1870, and, according to the discoverer, its total height is 822 feet. For the first 741 feet the water falls as a perpendicular column into a basin below, and then it continues its course over a sloping cataract in front, 81 feet in height, and through the interstices of great blocks of rock to the river-bed below.[3] Lieut.-Colonel Webber, a subsequent visitor, describes this fall as at least rivalling, if not surpassing, Niagara in grandeur. The first impression produced upon him by the fall—when he was fortunate enough to see it in its full glory, lit up by a brilliant sun, whose rays, piercing the mist rising from the depths below, created a rainbow, every line of which was reflected in the torrent—caused him to burst out with the exclamation, "This is far grander than Niagara." "What," he says, "the Kaieteur loses from a comparison with Niagara in width and in magnitude of the descending flood, it gains in height, while the surrounding scenery is far lovelier."[4]

As the first example of a fall due to some other cause than the original disposition of hard and soft rocks, we will notice the Glen Falls, near Saratoga, on the Hudson River, New York. These, which are about 50 feet in height, and stop the navigation on the important river on which they occur, are due, according to Dr. Eb. Emmons, the Geological Surveyor of the district, to an uplift or fault which has raised three limestone rocks above the level of those next below in the bed of the river.[5] This

[1] See a Paper by Venukoff on some of the waterfalls on Northern Esthonia, in the *Memoirs of the St. Petersburg Society of Naturalists*, tome xiii., 1883; and for details regarding the falls of the Narova, see a Paper by G. Helmersen in the *Bull. Acad. Sci. St. Petersburg*, tome iii., 1861, cols. 12-15. For an abstract of the former Paper, and a reference to the latter, I am indebted to the kindness of M. Kropotkine.

[2] See Webber, *The Kaieteur Falls*, p. 73.

[3] See *Proceedings of the Royal Geographical Society*, xv. p. 130.

[4] Webber, *Kaieteur Falls*, p. 42.

[5] See *Natural History of New York*, pt. iv., *Geology of the Second District*, by Eben. Emmons, M.D., p. 181.

cause, it may safely be asserted, is a very rare one for the production of a waterfall. When we consider how seldom a fault reveals itself at the surface by any marked effect on the level of the ground, the ordinary agents of aërial denudation being sufficient to obliterate any inequality as it is produced, and when we also take into account the fact that where a waterfall occurs in a river bed the rate of erosion is necessarily much increased, we cannot help concluding that a waterfall can be due to this cause only where the rise at a fault is an exceptionally rapid one, or where the nature of the rocks at the place favours its production. This latter case is indeed not an unlikely one, for it may often happen that by means of a fault, hard rocks up stream are brought down against softer ones below; and when that results we have exactly the conditions for the production of a waterfall by the action of the river itself. Such seems to be the case in the Hudson River at the falls now under consideration, for the geological map of the district shows that the river here passes from a narrow strip of Trenton Limestone to the rocks of the Hudson River group, which are described as composed of slates and thinly bedded shaly sandstones.[1] Still there are, no doubt, some waterfalls directly due to an upthrow at a line of fault. The Yosemité Waterfall in California, the highest waterfall in the world, is likewise ascribed to this cause.[2]

The explorers of the Colorado River, in the Rocky Mountain region, met with several examples of falls and rapids due to other causes than those already mentioned. With regard to Mr. Powell's report of this exploration, however, we may note, first of all, how expressly it states that the character of the current varies with the texture of the rocks. In softer strata we have a quiet river, in harder we find rapids and falls.[3] But Mr. Powell points out another factor that frequently affects the nature of the stream. Where, he says, the strata dip up stream, and the river cuts obliquely across the upturned edges of the formations, with harder rocks above and softer below, then rapids and falls are all the more certain to occur. Rapids due to this cause are not indeed uncommon. I am indebted to Mr. Goodchild, of the English Geological Survey, for drawing my attention to one of this kind in England, occurring on a gill just above Ewebank Scar, Kirkby Stephen. Numerous other examples could, I am assured, be furnished from our own islands.

To return to the Colorado, however, it is worth while to note another kind of waterfall which the explorers met with on that river. Passing through a granitic district, where the river was harassed by obstructions of all kinds, the party passed a place where a creek came in from the left, and just below they found the channel of the Colorado choked with boulders, which had been washed down this lateral cañon, and formed a

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[1] See Map belonging to Mr. Hall's *Report on the Geol. of the Fourth District*, and p. 30 of text.

[2] See Davies on *Gorges and Waterfalls*, *Amer. Jour. Sci.*, 3d series, xxviii.

[3] *Exploration of the Colorado River of the West*, under the direction of the Smithsonian Institution (Washington, 1875), under date, August 5.

dam, over which the river precipitated itself in a fall of 30 or 40 feet. A little lower down three more such dams were encountered.[1] It need hardly be said that this kind of fall also is not confined to the Colorado. For instance, the Coles Falls on the Sturgeon River, a tributary of the Saskatchewan, are of this nature,[2] the boulders here consisting of limestone, gneiss, and granite. Falls due to this cause are found in England also. One example, I am told, is to be seen in the Vale of Neath, Monmouthshire.[3]

Not uncommonly a dam of another kind is the cause of a waterfall or rapid. A dyke runs right athwart a stream, and, being as a rule of harder material than the rock composing the general bed of the river, presents the usual condition for the establishment of a break in the current. The map attached to the Report of Progress of the Geological Survey of Canada for 1880-82, shows that the Mattagami, a tributary of the Moose River, has eleven dykes across it between $81\frac{1}{2}°$ and $82\frac{1}{3}°$ W., and $47\frac{1}{2}°$ and $50\frac{1}{2}°$ N., and that almost all of these are accompanied by waterfalls varying in height from 3 to 190 feet, or by rapids. Below the Kaieteur Fall on the Potaro River, about 5 or 6 miles before this stream joins the Essequibo, the Tumatamari Cataract, about 20 feet in height, is formed in the same way;[4] and, among other examples of the same kind of fall in England, may be mentioned one at Armathwaite, above Carlisle, where a basaltic dyke of Eocene age intersects the Lower New Red Sandstone.

In some cases rapids are due to the fact that the course of a river is interrupted by numerous islands, producing a great many channels with conflicting currents. The rapids of the St. Lawrence between Kingston and Montreal are an instance of this kind, and so too are those on the Yenisei, between Vorogovo and Osinovka, in about lat. $61\frac{1}{2}°$ N.[5] In neither of these instances do the rapids form an absolute interruption to navigation.

Very frequently a rapid—meaning by that term a part of a river where the current is greatly accelerated—is not due to the shallowing of the stream, but, on the contrary, occurs where the depth of the water is exceptionally great. A river, in passing through a region of hard rock, may contract its bed and make up for its reduced width by increased depth and velocity. Of this nature are the defiles in the Irawadi at Mandalay, Bhamo, and, higher up,[6] those of the Brahmaputra above Kund,[7] and those of the Whang-ho between "the huge granite columns of Ta-wha-shan and Föng-tian-shan," at the great bend where it receives the

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[1] *Exploration of the Colorado River of the West*, pp. 81-2.

[2] See Map, p. 180, of *Report of Progress of Geol. Surv., Canada*, 1875-76.

[3] My authority is again Mr. Goodchild.

[4] Webber, *The Kaieteur Falls*, p. 67.

[5] See Middendorf, *Reise in den Aussersten Norden und Osten Sibiriens*, pt. iv. vol. i. p. 86.

[6] See Hunter's *Imp. Gaz. Ind.*, Art. Irawadi.

[7] *Proceedings of the Royal Geographical Society*, 1885, p. 325.

Wei-ho.[1] The Mississippi now passes through a similar defile in traversing the Ozark Mountains, and we have already seen that there is reason to believe that this defile, through which the Mississippi now sweeps with a swift current, is the last result of a process by which a waterfall has been obliterated, while higher up, where the Falls of St. Anthony occur, the same process is still in progress. In many other cases, no doubt, a defile with a deep, swift stream is the final stage in the history of a waterfall or a rapid with a shallow bed. The banks of a stream in the stretches of hard rock, where such obstructions occur, are more stable than among those of a more destructible character. Between these stable banks the river carries on its sawing action with unchanging steadiness age after age, while amidst the softer rocks the river may gradually change its bed first to one side and then to another. Moreover, the obstruction to the current, where the river meets with the harder rocks, increases the energy of the erosion, and thus helps in overcoming the greater resistance. The erosion is most rapid where the current is swiftest and the water most turbid. In those parts the channel is deepened more speedily than elsewhere. Along a channel so deepened a greater volume of water sweeps, and the erosive energy is rendered greater still. The deepening thus advances even more quickly than before, and so the river in process of time comes to flow through a narrow defile, where there is no obstruction of the nature of a waterfall or rocky rapid, but where only the depth and the swiftness of the current tell of the history that the river has passed through.

For the last instance of a waterfall, which we mean to mention in treating of the conditions under which such phenomena occur, we have reserved a striking example, in which the fall—one of the grandest in the world—seems to be unquestionably not due to the action of the river itself, but to a convulsion of nature which has occurred in its course. The case we refer to is that of the Victoria Falls, on the Zambesi. These falls, says Livingstone, "have been formed by a crack right across the river in the hard, black, basaltic rock which there formed the bed of the Zambesi. The lips of the crack are still quite sharp, save about three feet of the edge over which the river rolls. The walls go sheer down from the lips without any projecting crag or symptom of stratification or dislocation. When the mighty rift occurred no change of level took place in the two parts of the bed of the river thus rent asunder. Consequently, in coming down the river to Garden Island [in the middle of the stream just at the brink of the falls], the water suddenly disappears, and we see the opposite side of the cleft, with grass and trees growing where once the river ran, on the same level as that part of its bed on which we sail. The first crack is in length a few yards more than the breadth of the Zambesi, which, by measurement, we found to be a little over 1860 yards. . . . The depth of the rift was measured by lowering a line, to the end of

[1] Richthofen, *China*, ii. p. 23.

which a few bullets and a foot of white cotton cloth were tied. One of us lay with his head over a projecting crag, and watched the descending calico, till, after his companions had paid out 310 feet, the weight rested on a sloping projection, probably 50 feet from the water below, the actual bottom being still further down. . . . On measuring the width of this deep cleft by sextant, it was found at Garden Island, its narrowest part, to be eighty yards, and at its broadest somewhat more. Into this chasm, of twice the depth of Niagara Fall, the river, a full mile wide, rolls with a deafening roar; and this is Mosioa-Tunya or the Victoria Falls.

"Looking from Garden Island down to the bottom of the abyss, nearly half a mile of water, which has fallen over that portion of the falls to our right, or west of our point of view, is seen collected in a narrow channel twenty or thirty yards wide, and flowing at exactly right angles to its previous course, to our left; while the other half, or that which fell over the eastern portion of the falls, is seen to the left of the narrow channel below, coming towards our right. Both waters unite midway, in a fearful boiling whirlpool, and find an outlet by a crack situated at right angles to the fissure of the falls. . . . The Zambesi, now apparently not more than twenty or thirty yards wide, rushes and surges through this narrow escape-channel," and then flows tumultuously onwards through a succession of similar narrow chasms, arranged in a sharply angular zigzag line.[1]

Another remarkable feature of this great waterfall is the columns of spray rising like steam to such a height as to be visible at a village twenty-one miles distant. These Livingstone explains as due to the large volume of air forced into the cleft to an unknown depth, owing to the manner in which the water descends, and then rebounding and rushing up loaded with vapour. And here we may note one peculiar effect of waterfalls not yet mentioned. It has been observed, in some cases, that a lowering of the temperature takes place in the neighbourhood of a waterfall, and this is no doubt rightly ascribed to the loss of heat by evaporation which is promoted by the finely divided state of the water when torn into spray. In the immediate vicinity of the Staubbach, which, as is well known, owes its name to the fact that it is often completely converted into a fine dust-like spray before it reaches the bottom of the precipice over which it falls, the temperature has been observed to be lowered by $4\frac{1}{2}^{\circ}$ Fahr.[2]

Having now considered some of the principal conditions under which waterfalls and rapids occur, we wish in the remainder of this paper to glance at a few of the more striking illustrations of the effects of these obstructions on human intercourse and civilisation. Their effect will obviously be great in proportion to the value which the rivers obstructed by them would otherwise have for commerce. For various reasons many streams of considerable length are of little use for this purpose, even apart from the existence of obstructions of this nature. In dry countries rivers

[1] Livingstone, *Zambesi*, pp. 252-5.

[2] Meyer, *Physik der Schweiz*, p. 333.

are thought of more as sources of moisture and fertility than as means of communication. It is in them that one understands the full force of the words of Ezekiel, "Everything shall live whither the river cometh." But in other parts of the world the life of the people is no less dependent on rivers as highways of commerce. Villages and busy towns crowd their banks, and the traffic on their waters is the mainstay of industry for a wide district round. Often, too, they are the means of opening up the more backward regions of the earth to the light of a civilisation developed elsewhere. "As soon," says Humboldt, "as the great cataracts of the Orinoco are passed, we find ourselves, as it were, in a new world. We feel that we have crossed the barrier that nature has raised between the civilised countries of the coast and the barbarous and unknown regions of the interior."[1] The contrast between the higher and lower parts of a stream barred to commerce in this way is not always as great, but there are many parts of the world in which the presence of barriers of this nature is keenly felt, and it will not be without interest to devote a little attention to a few of these cases.

In Europe the most noteworthy instances of this kind are undoubtedly the rapids of the Danube and those of the Dnieper. The Iron Gate of the Danube, in the wider application of the name, is a defile 75 miles in length, extending from the village of Bazias in Hungary to Orsova in Bulgaria. In this stretch there are several places where the occurrence of reefs and whirlpools causes more or less difficulty to shipping, but the Iron Gate proper is the lowest and most dangerous of all. It is situated just above Orsova, where the river gets constricted to two-thirds of its previous width between towering rocky precipices on the one side and two gigantic mounds of torrential *débris* on the other. Here a shelf of rock, succeeded by a jagged reef lying athwart the stream, with teeth rising above the surface of the river, compels most of the water to take the left bank, where it dashes with numerous swirls and backwaters, at the rate of from 10 to 15 feet per second, into a channel 158 feet in depth and only 360 feet in breadth. This last barrier can be crossed only when the pillar-gauge at Orsova indicates a depth of at least 6 feet 6 inches, while those higher up the stream are passable when there is a depth at the same point varying from 3 to 5 feet. At times the traffic is completely interrupted, and the harvests of the valley of the Theiss and the Banat wait in vain for the means of reaching a market, or have to find another outlet. From July to March a large number of the vessels belonging to the Danube Steamboat Company are sometimes condemned to absolute idleness. Before the introduction of steam only a few vessels ventured to cross the dangerous barrier at all. In 1834 the Danube Steamboat Company placed the first steamer on the river below Orsova, and twelve years later the Iron Gate itself was first passed by steam.[2]

[1] *Voyage aux Régions équinoxiales*, ii. 377.

[2] See Kanitz, *Das eiserne Thor*, in *Mitteilungen der k. k. geog. Gesellschaft zu Wien*, pp. 49-58.

Not less serious as an obstruction to navigation are the rapids of the Dnieper. From the very dawn of history this river has been used as a highway of commerce, and it is all the more important in this respect, since it traverses a region in which the making of roads is difficult from the want of material; but the highway is impeded to such an extent as to deprive it of more than half its value. A little below the influx of the Desna, granite rocks in the bed of the river begin to make it dangerous for shipping; but the rapids proper, or *porogi*, occur on a stretch of about 23 miles, between Yekaterinoslaf and Alexandrovsk, or, more precisely, between Kaidak and Khortizkaia.[1] This stretch of the river is navigable only for small craft for eight weeks in the year, larger vessels having to unload at Alexandrovsk below and Yekaterinoslaf above. Since 1833 large sums of money have been expended on the removal of these obstructions, and it is expected that they will now soon cease to exist.

In Asia the region that suffers most from rapids and waterfalls as impediments to navigation are Southern China and the Eastern Peninsula. In no part of the world is the importance of rivers as channels of commerce more appreciated. "The Tongkinese, like the Chinese," says J. G. Scott, "judge of the importance of a river not by its size, but by the amount of traffic which goes on upon it."[2] Now, for a long time the eyes of European merchants have been directed to the rich province of Yun-nan, in the south-west of China, as a market likely to yield a most profitable trade if it could only be "tapped," as the saying is; but the tapping is rendered difficult precisely by this, that all the great rivers issuing from it are so seriously obstructed by falls and rapids, that they are found to be useless for navigation long before the fertile districts of the Yun-nan are reached. We have already seen that the Si-kiang, in southern China, is almost an unbroken succession of rapids. For some time the French cherished the hope that the tapping might be effected without difficulty, by means of the Song-ka or Red River, and hence their eagerness in the matter of Tonquin. The assertion by M. Depuis that this river is navigable, was such as to excite the most brilliant expectations. But this assertion has proved to be somewhat deceptive. By Colquhoun we are informed that this river above Manhao (a short distance within the Yun-nan frontier) is impracticable even for canoes.[3] As a waterway, according to the expression of J. G. Scott, the river is a delusion;[4] and all the rivers of Yun-nan, Mr. Colquhoun adds, are of the same character —in the wet season too violent for navigation, in dry weather too much impeded by shallows and rapids for even the shallowest craft.[5]

Of the great rivers of the Eastern Peninsula the Me-kong and the Salwin are almost useless for navigation except in their lower course. Above the delta of the former river a long series of rapids and cascades

[1] *Das Russiche Reich in Europa, eine Studie.*
[2] *The French in Tongkin*, p. 16.
[3] *Across Chrysê*, ii. pp. 227-8.
[4] *The French in Tongkin*, p. 223.
[5] *L.c.*, ii. p. 73.

cuts off China from Saigon.[1] The Salwin, again, might be navigated by shallow-draft steamers as high as lat. 17° 12′ N., but no higher.[2] The Irawadi indeed is an important navigable stream as high as Bhamo; but above that the rapids begin. Hence it is that Mr. Colquhoun believes that if Yun-nan is to be tapped at all, it must be by railway.

In India the rivers most impeded by rapids are those of the triangular peninsula in the south; but there the rivers are, as a rule, more valued as means of irrigation than as means of communication. That on which the injury to commerce, through the occurrence of rapids, is most serious is the Godavari. At one time the Government of Madras made an attempt to establish communication between the upper and lower parts of this stream by means of dams or anicuts; but in October 1871, after ten years of labour, and the expenditure of more than a million sterling, the works were abandoned as unremunerative.

The most signal example of the effect of waterfalls and rapids in retarding the development of civilisation is undoubtedly presented by the continent of Africa, the "darkness" of which is almost entirely due to this cause. What will be the future of the Congo region no one can foresee, but, beyond question, great results must ensue from bringing the 1000 miles of uninterrupted navigation between Stanley Pool and Stanley Falls into connection with the commerce of Europe and America. The rapids and falls which occur on the stretch of 200 miles between Stanley Pool and Vivi are what prevented this from being brought about long ago. Only a railway can effectually make up for the defects in the river itself, and the supplying of this want is now contemplated. In all 147 miles of railway will be needed to fill up the gaps in the navigation of the river, 52 miles being required for the interval between Vivi and Isangila, and 95 for that between Manyanga and Leopoldville, on Stanley Pool.

The Senegal and the Niger admit us a shorter distance into the heart of Africa than the Congo, and both of these, moreover, are interrupted by falls or rapids. The continuous navigation of the Niger is stopped at the Falls of Boussa, in about lat. 10½° N., but above the falls navigation may be resumed, and the recent French expedition under Gallieni seems to have shown that this river might be made in its upper reaches a much more important highway of commerce than it is. It is stated that steamers of light draft could ascend as high as Kankan (in the Mandingo country, about lat. 10° N.), while below that it seems there are probably few impediments down to the falls already mentioned.[3] On the Senegal the permanent navigation of the French despatch-boats reaches only as high as Mafu; but for three months in the year naviga-

[1] On the Mekong there are numerous rapids due to local constrictions of the river-bed through the protrusion inwards of rocky banks on either side. On p. 258, vol. i. of Garnier's *Voyage en Indo-Chine*, a sketch is given from memory of the appearance of one such rapid. The same cut is repeated in Colquhoun, *Among the Shans* (*opp.* p. 17). See also Plates viii., ix., and x. in Garnier (vol. i.)

[2] Colquhoun, *Among the Shans*, p. 29.

[3] Gallieni, *Voyage au Soudan inférieur*, pp. 547-8.

tion can be continued as far as Medina, where a fall of about 30 feet occurs. Even below Medina, however, navigation is rendered so difficult by the rapids of Kippes, that the limit of high-water navigation has been fixed at the village of Kayes, and it is from that point that the proposed railway from the Upper Senegal to the Upper Niger is intended to start.[1]

The Nile would be of more service for the commerce of the heart of Africa than either of the last-mentioned rivers, were it not for the rapids, of the difficulty of passing which we have heard so much in recent times. The lowest of these occurs at about lat. 24° N., and thus leaves a stretch of unimpeded navigation only in the lower part of the course of the river, where it flows in a narrow hollow between two deserts. The Zambesi is another river that reaches far into the heart of Africa, but the Victoria Falls (in about long. 27° E.) are not the only obstruction to its navigation. In ascending the river large craft are stopped in 33° 15′ E., where the rapids of Kebrabasa occur, in consequence of the hills of that name crossing the river, and filling its bed with blocks of syenite and granite.[2]

In South America, the chief obstructions to river navigation—namely, the rapids and falls of the Orinoco, the Madeira, and the Paraná—have all been already referred to. The *raudales* of the Orinoco obstruct almost the whole of its northerly course. Those of Madeira, as already mentioned, are the chief obstacle to the establishment of important commercial relations between Bolivia and Brazil, and, through Brazil, with trans-oceanic countries. A few years ago a project was entertained for the avoidance of these rapids by the construction of a railway 175 miles in length, but the scheme was ultimately abandoned. A striking illustration of the effect of rapids on the distribution of population may be seen by comparing the course of the Paraguay with that of the Paraná, on Hutchinson's map.[3] The former river, it will be observed, has its banks pretty plentifully dotted with the names of villages almost the whole way up, while the latter has none above Encarnacion and Candeleria, in $27\frac{1}{2}$° S., 56° W.

The more temperate parts of North America are, as already explained, peculiarly favoured in respect of the navigability of the rivers. Those in which the obstruction to navigation is most serious are perhaps the Columbia and Fraser. The former, a magnificent stream so far as regards length and volume of water, can be ascended by steamers only 165 miles from its mouth, the navigation being stopped at that point by a series of rapids. A railway 6 miles in length surrounds these, and then navigation can be resumed for 40 miles further. At the end of this stretch, however, another obstruction occurs, called the Dalles. Here the river bends to the south in the shape of a horse-shoe, and sweeps with a rapid current through a basaltic trough with vertical walls 200 yards apart,

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[1] Gallieni, *Voyage au Soudan inférieur*, p. 546.

[2] Livingstone, *Zambesi*, p. 54.

[3] Hutchinson, *The Parana* (Lond. 1868).

Still higher, other falls and rapids occur with navigable stretches between. Navigation on the Fraser River is stopped at Yale, 90 miles above its mouth; rapids here occurring during the passage through the Cascade Range, just as on the Columbia. On the plateau beyond this range, the Fraser has considerable stretches of navigable water during its diagonal course across it.

As already mentioned, the rapids of the St. Lawrence, between Kingston and Montreal, do not completely interrupt shipping, vessels being able to shoot them in descending, but their presence has necessitated the construction of a series of canals, with an aggregate length of 70 miles between the places mentioned, to enable vessels to ascend from the St. Lawrence to Lake Ontario. Another canal, the Welland, avoids the Niagara Falls and Rapids, and enables vessels to continue their course between Lakes Ontario and Erie.

The numerous rapids on the Nelson River are of importance in view of the possibility of developing an ocean trade between Liverpool and the Canadian North-West by way of Hudson's Bay, rendering a railway from the mouth of the Nelson to Lake Winnipeg a necessary part of any project for the establishment of such a trade-route. A charter to a railway company, founded for that purpose, was granted by the Canadian Parliament in 1880, and the scheme still finds support.

THE PRESENT POSITION OF GEOGRAPHICAL ONOMATOLOGY.

[The following paper, from the pen of Professor J. J. Egli of Zürich, appeared in Behm's *Geographisches Jahrbuch*, vol. ix., 1882, and is here reproduced as showing how the study of place-names is regarded by one who may be considered the leading European authority on the subject.]

THOUGHTFUL minds have at all times bestowed attention upon the meanings of names. We get glimpses of this interest in Homer; and Herodotus and Strabo are fond of dwelling upon the explanation of geographical names. Among the Romans, whose attention is said to have been directed to the study by the Greek Crates, the first systematic work was produced by M. Terentius Varro.[1] Other writers also played with the etymologies of words; for instance Pliny, in large part with Greek names, and Pomponius Mela, to a yet greater extent. Arabic geographers, from Masudi to the celebrated Ibn Batuta, were fond of patronymic derivations after the Semitic fashion. Marco Polo offers explanations of some of the East Asiatic names that he mentions.[2] The works of the cosmographers derive

[1] The fifth book of his *De lingua latina* treats exclusively "De vocabulis locorum et quæ in his sunt."

[2] Aug. Pfizmaier publishes under the rubric "Ueber japanische geographische Namen," in the *Sitzungsber. d. phil.-hist. Kl. d. Kais. Akad. d. Wissensch. Wien* (lxxx. p. 769 *sq.*, July 1875, and lxxxii. 7 *sq.*, January 1876), the geographical part of a Japanese lexicon of names, compiled about the year 930 by Ziû-toku, the daughter of an Emperor, and entitled *Wa-mei-ruï-riû-seô*.

a peculiar interest from their attempts at onomatology; and at the present day there is hardly a local history published which does not make a more or less serious endeavour to explain the place-names of the district of which it treats.

When the Latin races, animated by the Crusading spirit, made their way along the West Coast of Africa, opened up the wonders of Hindustan, and lifted the curtain from the New World—vast regions all awaiting the ingenuity of the ecclesiastical name-maker—the names that were attached to geographical features were due partly to the discoverers, as Columbus, Amerigo Vespucci, etc., and partly to their historians, as Barros, for instance, and the poet Camoens. The Teutonic races then introduced a new element into geographical nomenclature; the Polar regions and Australia became dotted with names in consequence of the voyages of Barents and Tasman, of Baffin, Cook, Parry, Sir J. Franklin, etc. The desert tracts of Northern Asia were likewise enriched with geographical designations from the expeditions of the Cossacks. In short, as fast as exploration increased our knowledge of the planet, the materials for a scientific onomatology, or science of place-names, accumulated.

Meanwhile the science of Philology, established on a purer basis, and amplified by the accession of many new and important elements, was paving the way for serious work. Investigations were made in the materials belonging to home (Germany) by examining, under the light of the comparative method, the forms used in antique documents. Not only did the conviction then begin to gain ground that the clue to the explanation of place-names must often be traced back to historical circumstances, but history also began to reap advantage from the new inquiries. Indeed these inquiries at times yielded information for which no other evidence was obtainable. And now, at the present time, the science of onomatology is being gradually built up by the labours of a body of philologists who have devoted themselves especially to the elucidation of the meaning of place-names. The scientific study of place-names has a double claim to be regarded as a real branch of geographical discipline; it is based upon comparative folk-psychology, or the psychology of peoples as distinct from the psychology of individuals, and it has a most intimate connection with scientific geographical nomenclature.

What we have to say on the subject more especially will fall under three heads—(1) general onomatological lexicons, (2) onomatology as an educative agent, and (3) the proper method to be used for geographical nomenclature.

(1.) *Lexicons.*—The science of which we are treating is obviously a science of the future, since as yet there exists no complete collection of materials, and until there is a sufficient mass of materials to work upon no scientific principles can be laid down. Nevertheless that does not seem to afford any reason why a good deal of useful preliminary work may not be accomplished. Zoology, Botany, Physics, Chemistry, and other sciences, even Geography itself, have now been in existence a long time, some of

them for centuries, yet their fundamental principles have not been wholly and exhaustively explored, ascertained, and understood. In fact, every science grows up out of foundations to which its own developed conditions have to supply the shape and ultimate structure. The only claim that geographical onomatology sets up is to be placed upon the same footing—the claim to begin with the seed and grow up into the tree with wide-spreading branches.

Agreeably to the embryonic condition of the science, it can only be treated in this brief survey in a disconnected fashion: wide gaps have necessarily to be leaped over in order to connect the principal points of interest.

In November 1867 there appeared in the *Journal*[1] of the Imperial Russian Ministry of Education, a striking essay in Russian—*Notes on Geographical Names*—from the pen of the distinguished member of the Russian Academy, J. Grot. The author was led to offer some general remarks on the study of onomatology in consequence of a paper in the October number of the same publication, written by MM. Erben and Lamanski. "Beyond all doubt," he wrote, "geography, by illustrating in a more complete manner than has hitherto been the case, the meanings of prominent names, will derive an immense advantage both with respect to matter and the interest men take in the subject. Geographical names are almost never meaningless or due to chance circumstances. Sometimes the name indicates a characteristic of the place, sometimes a prominent feature of the neighbourhood, or it furnishes a hint as to the origin of the place or object itself, or at any rate it will possess something that can arrest and engage the imagination or the understanding." These views he supported by a series of examples. At the same time he did not conceal from himself that there exist many names which can no longer with certainty, if in some cases at all, be explained; yet, from the great bulk of them, philology, ethnography, and history will, there is every reason to believe, extract something useful and valuable. Besides, great gain will accrue to these sciences in return, from the labours devoted to the etymological explanations of place-names. He also pointed out the urgent need that existed for a geographical lexicon, bearing something of the character of Th. Grässe's *Orbis Latinus*[2] (Dresden, 1861). He called attention to an English attempt in the right direction in Edward Adams's *Word Expositor; or, Names and Terms occurring in the Science of Geography, etymologically and otherwise explained* (London, second edition, 1856); but pointed out that it is incomplete and unreliable, and that its chief claim to notice

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[1] Vol. cxxxvi. pp. 617-628, St. Petersburg.

[2] This excellent work contains, as the second title states, "an alphabetical list of the Latin names of the best-known towns, seas, lakes, mountains, and rivers in all parts of the earth;" but it offers no explanation of their meanings. The same may be said of A. Müller's *Allgemeines Wörterbuch der Aussprache ausländischer Eigennamen*, third edition, Dresden and Leipsic, 1849; and M. J. A. Voelkel and A. Thomas's *Taschenwörterbuch der Aussprache geogr. und hist. Namen*, Heidelberg, 1876.

lies in the fact of its being a pioneer work. A beginning had also been made with Slavonic place-names, in Nos. 6 to 15 of the *Nordische Biene* (1849), by the above-mentioned M. Erben. The Russian Baltic provinces —where Finnish, Swedish, and Slavonic elements of population have successively settled side by side—not only offer a very interesting field of study to the philologist, the ethnographer, and the historian, but also hold out a promising opportunity to the circumspect student to show, by concrete illustration, to what manifold changes geographical names in those regions have been subject, being adopted by a newly-arrived people, in the one case, according to their sounds, in another, according to their meanings.

The Russian scholar may certainly claim the merit of having initiated a useful stimulus to the study of onomatology. Yet it is curious to note how at the very moment when he penned his challenge to the learned, a work of the kind that he called for had already been preparing for some years, and was then approaching completion for the press; and it was a work with just pretensions to be considered something more than a mere lexicon, since the materials collected were turned to account on behalf of an attempt to frame a "general geographical onomatology." This was Dr. J. J. Egli's *Nomina Geographica* (Leipsic, 1870-72), the first, and up to the present [1882] the only attempt of the kind indicated, consisting of two separate parts,—Part I. being a Lexicon,[1] and Part II. a Dissertation. The former part—the basis of the entire work—contains, alphabetically arranged, the etymological explanations of more than 17,000 geographical proper names, gathered from the best sources, for the most part original writings, in various civilised languages. The treatment in every case covers, besides the explanation of the meaning of the name, an account of the position and, so to say, environment of the object, together with a quotation of the particular passage from the source whence it is taken. Special attention is devoted to the discovery of the motives which have given rise to the name, whether they have sprung from Nature or from the history of the object.

A particularly fruitful field was found in the original accounts of the travels of explorers of all nations—Portuguese and Spanish, English and Dutch, German and Swedish, Russian and North American, etc.—since these writings contain authentic statements explanatory of the circumstances to which hundreds of names, that would be otherwise strange and incomprehensible, owe their existence. These works of travel are a real mine of information, the importance of which cannot be exaggerated. The most desolate island cliff, the most remote brackish spring, the loneliest recess of the Polar solitudes, if only an intelligible motive underlies their respective geographical designations, are of more real value than hundreds of German place-names, over the meaning of which Germanists and Celtic scholars squabble and fight.

[1] Published also separately under the title *Etymologisch-geographisches Lexikon* (1880).

The second part of the work is based upon the onomatological materials collected in the first part. Dr. Egli distinguishes two classes of names—(1) those derived from purely natural sources (*Naturnamen*), and (2) those which owe their origin to a civilised people (*Kulturnamen*). Much of the geographical nomenclature of uncivilised races (*e.g.*, *Mosioatunja*, *Winipeg*) surprises us by its fidelity to Nature; whilst, on the other hand, the nomenclature of civilised peoples is connected with a multiplicity of relations reflecting the higher stages of intellectual culture, so that in these instances the objects appear to wear their names as something that does not belong to them fundamentally, but has been affixed to them outwardly. Each of these divisions, on closer scrutiny, splits up into various special groups, according to the linguistic nature and tendency of the various onomatological families. The consideration of these minor groups gave occasion to the drawing up of over 200 statistical tables based upon a linguistic arrangement, with special reference to classes of geographical objects. All these tables are accompanied by explanatory text, which in every case converges in a remarkably uniform manner upon one axiomatic principle. This is, that "Geographical onomatology, regarded as the outcome of the intellectual character of a people or an epoch, represents both the stage and direction of culture specially characteristic of that onomatological family." Here we get the first glimpse of a law calculated to raise the study of place-names out of its empirical position to the level of a proper science.

(2.) *Onomatology as an Educative Agent.*—In 1880 Dr. J. J. Egli published in Seibert's *Zeitschrift für Schulgeographie* (pp. 243–252) an essay—"Der Dienst der geographischen Namen im Unterrichte," in which he advocated the advantages to be derived from an interesting study of geographical nomenclature. "Geographical names readily adapt themselves to the purposes of instruction. They can be put to better uses than those of a merely formal mnemonic. They can be made to live and rise up as eloquent witnesses to human intelligence. These hieroglyphs—strange forms to the eye and strange sounds to the ear, often introduced into the memory only by strong coercion—can be made like pleasant lights and musical sounds, and be established as life-long friends at our side. From an experience extending over many years, I am enabled to affirm that we have here a rich store of fruitful stimuli to education—a store for the most part untouched, nay, not even suspected to exist." This appeal met with a friendly reception. W. Wolkenhauer writes to pretty much the same effect in his paper "Die geographischen Eigennamen im Unterrichte" (*ibid.*, 1881, pp. 54–62). "Following the good example set by Dr. Egli," he writes, "in his *Praktische Erdkunde* and his *Nomina Geographica*, other pædagogic writers—for instance Ruge, Volz, Seydlitz, and particularly Hess—have paid attention to this branch of geographical instruction."[1]

[1] He might also have added A. E. Seibert's new school-book and A. Kirchoff's *Schulgeographie*.

(3.) *Nomenclatural Method.*—On the present occasion we will only mention two publications dealing with this subject:[1]—

(α.) *Publicaciones de la Sociedad Geográfica de Madrid.*[2] In Spain there seems to reign a truly Babylonian confusion in geographical orthography. The newspapers, telegrams, and maps which pour into the country generally present foreign names in a French form, and also, but less frequently, in an English dress, so that they are practically unreadable. But the Geographical Society of Madrid, founded in February 1876, inaugurated its work by introducing order into this confusion: it laid down the principle that in its publications geographical nomenclature was to retain, as far as possible, its distinctively national forms. To render the execution of this rule feasible, the Spanish language had to be supplemented by signs for several letters which it does not possess. The method adopted is to underline the letters, at the same time stating their equivalent value. Thus—*e* stands for the German *ö*; *u* for German *ü*; *h* for the aspirated *h*; *x* for the German *sch*; *v* for the French *v*; *y* for the German *dsch*; *ll* for double *l* (the Spanish *ll* is something quite different of course from double *l*); *z* for the German *z*. This was further improved by a simple system of accentuation.

(β.) H. Wauwermans, *L'Orthographie et les Dénominations Géographiques au Congrès de Venise.*[3] The subject of a reform in geographical nomenclature was introduced and discussed at the Geographical Congress held at Venice in 1881, as it had been discussed at previous congresses, and urged by D'Anville in the preceding century. The writer (the President of the Antwerp Geographical Society) presents a report of the proceedings; and he adds that the Germans, in their more artistic cartography, have strictly adopted the rule which Maltebrun urged should be enforced, viz., to leave names in their national forms. This rule was adopted by the Congress on 19th September. The author then dwells upon the difficulties that have to be encountered, and suggests, though not always happily,[4] in what way these may be surmounted. He does not advocate the inductive method which follows the lines of etymological investigation and makes use of the histories of discovery and exploration. He urges

[1] In 1866 a careful little monograph was published at Copenhagen by E. Madsen, *Om Retskrivning af Stednavne* (Saerskilt Aftryk af *Tidskrift for Philologi og Pædagogik*). He shows, by means of numerous examples, what varied and extraordinary changes many place-names have undergone in the course of time. The conclusion to which his study brings him is, that in order to establish a *correct* nomenclature of Danish towns, etc., on a satisfactory footing, it is necessary to go back to the forms they had in the fourteenth and fifteenth centuries; and that, on the other hand, at that period the language of the country underwent some radical changes, assuming eventually much the form that it presents at the present day.

[2] *Boletin de la Sociedad de Madrid*, No. 1, July 1876, pp. 80-95.

[3] Extracted from the *Bull. de la Soc. de Géogr. d'Anvers*, 1882.

[4] One reads with very great surprise the statements on p. 12:—"La Géographie est avant tout une science de faits positifs, et à ce titre ne peut s'engager dans les hypothèses historiques où l'entraînerait l'étude des étymologies. Son domaine est déjà assez vaste sans y introduire des faits dont l'importance et l'exactitude seraient toujours contestables; elle doit accepter, *ne varietur*, les noms officiels reconnus par les divers gouvernements."

that the proper arbiter in the matter is the Government, and that the fixing of geographical nomenclature should be intrusted to a Government official, which runs directly counter to the method adopted in his own country of Holland.[1]

ASTRONOMICAL OBSERVATIONS BETWEEN MOZAMBIQUE COAST AND LAKE NYASSA.

Taken by Henry E. O'Neill, F.R.A.S., F.R.G.S.

I need hardly point out to any reader of this *Magazine* the extreme difficulty, even under favourable conditions, of accurately fixing the longitude of any place upon the earth's surface. This difficulty is, of course, especially felt by the traveller in an uncivilised and unexplored country. He has with him instruments which, however perfect of their class, have, perforce, been selected for other considerations beyond those of extreme and delicate accuracy. They have had to be portable, as simple as possible in design, and capable to a certain degree of adjustment in other hands besides those of their makers, and capable also of withstanding great variations of temperature and atmospheric humidity, and sustaining a certain amount of rough usage. He has left far behind him all well-determined points—such as those connected by electricity with Greenwich or other great observatories, or, if unconnected with such by electricity, fixed by observations taken through many years, and by skilled observers, and with the best of instruments, by which means all personal and instrumental errors have been, as far as possible, eliminated.

The traveller in Africa has constantly to bear in mind that the probabilities of accuracy in the results of his observations decrease in direct ratio to the time and distance that lie between himself and the coast, and that it is only by the closest attention to his instruments, and careful judgment in the choice of the bodies he selects for observation, that even a moderate degree of accuracy can be attained.

The sextant must not only be carefully handled, but its numerous and varying errors closely watched and noted. A mistake of 5″ in the index error will produce perhaps twenty times that error in his longitude by lunar distance; a careless and indiscriminate use of his shades may throw out his result in a far greater degree still; and the slightest defect in the parallelism of the axis of the telescope to the plane of the instrument will cause a rapidly increasing error in the larger angles measured. I say nothing of the instrumental defects which are beyond his power to rectify.

His chronometers must not only be carefully carried and subjected to uniform treatment, both when in motion and at rest, but their rates verified and checked by repeated observations for time. If this be not done,

[1] See "Geschiedkundig Onderzoek der Nederlandsche Aardrijkskundige Namen," in *Tijdschrift van het Aardrijksk. Genootschap*, vi., Amsterdam, 1882.

all chronometrical observations for longitude may be worse than useless. Again, the slightest film upon his artificial horizon may cause such a difference in his altitudes and time, that these rates may be erroneously computed; and, if this be the case, every chronometrical observation thenceforward taken increases in error.

There is no better means of eliminating the numerous errors—personal as well as instrumental—inseparable from work under such conditions, than by the careful accumulation of a mass of observations of different class which should be absolutely independent of one another. Thus your chronometer observations should be checked by lunars, and these again by star occultations, eclipses of Jupiter's satellites, or lunar altitudes.

The exceptionally large number of observations—over 1500—that I have taken at Blantyre appear to require a word of explanation. My desire has been to establish there a meridian that shall be considered sufficiently reliably fixed to be classed amongst the "secondary meridians" of the globe. That is, a meridian to which, at the point determined, chronometrical observations may be referred in so far that their error upon Greenwich mean time may be obtained at it, and which may serve as a base for a trigonometrical survey, or—if that be for the present impossible—as a base for the mapping of the surrounding country by astronomical observations.

I have elsewhere pointed out the exceptional advantages Blantyre possesses for such a point. The development of steam navigation upon the Zambezi and Shiré rivers has placed the Scottish settlement of Blantyre on the Shiré Highlands upon the very threshold of the unknown country bordering the great central lakes. It is the centre of a large and important mission station—that of the Scottish Established Church—branches from which are spreading in every direction; and a flourishing trading company—that of the African Lakes—have made it their headquarters. Goods of almost every description required by the traveller are stored here, and any moderate-sized expedition could be equipped without returning to the coast. Lastly, these highlands enjoy so temperate a climate that travellers may benefit more by a short residence upon them than by returning to the more unhealthy settlements of the coast.

The Council of the Royal Geographical Society of London have now formally decided to admit the meridian of Blantyre as a "secondary meridian;" and notice of this decision is given in the August number of the *Proceedings* of that Society in the following words:—"Special attention may be directed to the position, in longitude, which has been definitely assigned to Blantyre, and its acceptance by the Council of the Royal Geographical Society as a secondary meridian. This most important step has been made possible owing to the number and excellence of Mr. O'Neill's lunar observations, taken specially for the determination of the longitude of this important station with the greatest amount of accuracy of which such a class of observation is capable." I trust this decision will be accepted by the Councils of other European Geographical Societies.

It is possible that some reader unaccustomed to this class of observation may be surprised at the difference in the results of the lunar observations by bodies east and west of the Moon. I will only say that with such observations this difference is inevitable, and is due, in my opinion, to an error—always in some degree existent—in the line of collimation of the sextant. This difference does not exist, however, in so great a degree in the following as in most lunar observations. If any doubt be felt upon this point, I refer the reader to the lunar observations of such well-known observers as Captain Parry, R.N., and Captain Toynbee, Indian Navy, where it will be seen that the difference between the results of observations of bodies east and west of the Moon is greater than in the following tables.

In the computation of longitude by lunar distances I have used Inman's method, correcting altitudes and auxiliary angle A, for barometric and thermometric correction of mean refraction, and applying the correction for second differences to reduced lunar distances.

All observations of this class, worked under direction of Mr. Coles of the Royal Geographical Society, have been computed by Lieutenant S. S. Sugden, R.N., the well-known computer of the observations of Mr. H. M. Stanley, Captain Gill, R.E., Mr. J. Thomson, and others; and Raper's rigorous method has been used by him.

A Chronometer Journal was strictly kept upon every journey, but want of space will not permit its insertion here. A few results of observations taken at different periods for rating are given, in order to show that the exceptionally perfect time kept by the half-chronometer watches justifies the acceptance of the observations dependent upon them.

Instruments used.

1. Sextant, $8\frac{1}{2}$ inch radius: Casella, London.
2. Two half chronometer watches: Lund and Blockley, Nos. $\frac{2}{9}\frac{2}{7}\frac{}{9}$ and $\frac{2}{9}\frac{2}{7}\frac{}{5}$.
3. Artificial horizon; Captain George Cary, London.
4. Aneroid barometer, compensated, Cary, London, No. 755.
5. Boiling-point thermometers, 976, 977, Cary, London.
6. Prismatic compass: Cary, London.

An error in the line of collimation of sextant was suspected shortly after leaving the coast. No good opportunity occurred for examination of this adjustment until August 23, when, at a distance of 103° between ☉ and ☾, a very slight, but distinct error was discovered and rectified. A subsequent examination on September 12, at a distance of 124° failed to show any error. It is hoped that this error in the optical axis of the instrument has been in great part neutralised by the care taken to avoid long distances and to secure that the bodies be equidistant from the moon. This avoidance of long distances has prevented me, at times, from selecting those ☼s most favourable for observation, viz., those whose proportional numbers were least.

Frequent examination for the parallelism of shades, by the measurement of ⊙'s horizontal diameter and comparison with four times ⊙'s semi-diameter, taken from the *Nautical Almanac*, and almost daily observations for index error, showed an average difference of 10″ between No. 2 and 4 shades before movable reflector, the increased index error being when the latter or light-green shade was used.

Date of Rating.

By means of double sets of A.M. and P.M. observations of sun, taken at the British Consulate, Mozambique, on the 8th June, the error of the watch on Greenwich mean time was found to be fast 2h. 40m. 1s. This error is dependent upon the longitude of the British Consulate being 40° 43′ 30″ E.

Rate.—June 1st to 8th, Mozambique.—By comparison with chronometer of mail steamer *Mecca*, on voyage from Zanzibar to Mozambique, May 1883—Rate shown 0·80 seconds daily losing. By observation of the sun taken at British Consulate, Mozambique, upon 1st and 8th June—Rate obtained 0·74 seconds per day losing. The latter rate was acccepted.

		H.	M.	S.
July 16-26. Namūrola.	Mean of 3 sets of observations of ⊙, A.M. July 16th, gave error in M.T. place as . .	0	7	26·87
	Do. 4 sets on July 26th gave do., . .	0	7	19·8
			SEC.	
	Result—Losing rate per day, .		0·707	
		H.	M.	S.
Aug. 21st-Sept. 6th. Mwedederi.	(α) Mean of 5 sets ⁂s' alts., 22 Aug., gave error on M.T. place, ...	0	12	9·75
	Mean of 4 sets, 6th Sept., gave do. . .	0	12	18·87
			SEC.	
	Result—Gaining rate per day, .		0·608	
		H.	M.	S.
	(β) Mean 6 sets ⁂s' alts., 25 Aug., 3 E. and 3 W. of meridian, gave error on M.T. place, .	0	12	11·18
	Mean 4 sets, 6th Sept., gave do. . .	0	12	18·87
			SEC.	
	Result—Gaining rate per day, .		0·640	
		H.	M.	S.
	(γ) Mean of 3 sets of alts. of ⊙, 29 Aug., gave error on M.T. place, ...	0	12	13·8
	Mean 3 sets of alts. of ⊙, 6th Sept., gave, .	0	12	17·97
			SEC.	
	Result—Gaining rate per day, .		0·521	

			SEC.
∴ Rate by	α	=	0·608 gaining.
,,	β	=	0·640
,,	γ	=	0·521
Mean rate by obs. of ⊙ and ⁂s,			0·554

The rate having changed from a losing to a gaining, it was assumed that the change had been a regular one, and the following gradual rates were therefore given between July 30th and Aug. 20th :—

From 30 July to 10 Aug.	rate	=	0·35 second per day	losing.
„ 10 Aug. „ 20	„	=	*Nil.*	
„ 20 Aug. „ 15	„	=	0·55 „	gaining.

Between 30th July and 21st August an ascent was made of about 2000 feet, and to this difference of altitude above sea-level the change in the chronometer's rate is partly attributed.

The rate of "A" chron. watch during the journeys taken in 1884 was larger but steadier, and therefore equally satisfactory. Before leaving the coast at Quilimane, on April 8th, the rate by comparison was found to be 2·16 seconds gaining. During the months of June and July, at Blantyre, time observations were almost daily taken, lunar distances being constantly measured; and the mean of 17 pairs of observations (each of these consisting of 3 sets) gave a daily rate of 2·153 seconds. This rate was preserved during the month of August, in which my journeys terminated.

Although want of space has compelled me to omit the Chronometer Journal, the above remarks will suffice to show that the watches used have kept, throughout the whole period in question, reliable time, and that their rates have been constantly and carefully tested by observation. The longitudes by chronometer may therefore be considered reliable, subject of course to any change that may be made in the longitude of Mozambique and the East African coast-line.

The following report upon the subjoined observations has been made by Mr. John Coles, F.R.A.S., map-curator of the Royal Geographical Society, London :—

"As by far the greater portion of Mr. O'Neill's observations have passed through my hands, I am enabled to form an accurate estimate of their value. The lunar observations are extremely good, not only as regards the accuracy with which they have been taken, but also with reference to the choice made in the objects between which and the moon the distances were measured, so as to obtain distances of nearly the same actual value, east and west; thus to a very considerable degree eliminating the effects of collimation error in the mean results. Time observations were frequently taken for rating the watches, a practice too little followed, and in many cases altogether neglected by travellers; but, by paying close attention to this matter, Mr. O'Neill has obtained most satisfactory longitudes.

"Speaking generally of these observations, it is not too much to say that no traveller in Africa has ever taken such an extended series of good observations, and were I asked advice on this subject by an intending traveller, I do not think I could do better than recommend him to closely follow the example set by Mr. O'Neill, both in the number and class of observations."

TABLE I.—

TABLE I.

LONGITUDES.

Observations marked thus (*) have not been included in the Mean.

Date.	Place.	No. of single observations. East.	No. of single observations. West	Heavenly Body Observed.	Longitude by Chronometer.	Longitude by Lunar East. °	′	″	Longitude by Lunar West. °	′	″	Longitude by Mean of East and West.
1884. June 28 to July 19.	Blantyre Mission Station (the Manse). . .	30	...	✳ Antares, ☽ E.	.....	34	34	15	35	31	30	
						34	46	15	35	23	30	
		...	24	✳ Regulus, ☽ W.	.....	34	44	45	35	28	30	
						34	36	45	35	25	45	
						34	43	15	35	36	00	
						34	48	45	35	30	15	
						34	40	30	35	29	30	
						34	35	45	35	33	30	
						34	39	30				
						34	45	45				
,,	,, ,,	30	...	✳ Fomalhaut, ☽ E.	.....	34	44	30	35	39	15	
		...	30	✳ Spica, ☽ W.	.....	34	40	15	35	40	15	
						34	35	30	35	33	15	
						34	26	45	35	27	30	
						34	39	45	35	36	30	
						35	12	15	35	34	00	
,,	,, ,,	27	...	⊙ and ☽ E.	.....	34	26	30	35	4	30	
						34	24	15	35	2	00	
		...	30	✳ Antares, ☽ W.	.....	34	46	30	35	18	30	
						34	20	00	35	14	15	

Date.	Place.	No. of single observations. East.	No. of single observations. West.	Heavenly Body Observed.	Longitude by Chronometer.	Longitude by Lunar East.	Longitude by Lunar West.	Longitude by Mean of East and West.
						° ′ ″	° ′ ″	
1884. June 28 to July 19.	Blantyre Mission Station (the Manse), . .	...	30	✳ Antares, ☽ W.	.....	34 24 15	35 17 30	
						34 32 30	35 14 45	
						34 42 15	35 18 30	
						34 27 30	35 15 45	
						34 41 00	35 19 00	
							35 13 45	° ′ ″
								35 5 15[1]
,,	,, ,,	27	...	☉ and ☽ E.	.....	34 23 00	35 22 30	
						34 36 00	35 30 00	
		...	27	✳ Antares, ☽ W.	.....	34 42 45	35 24 00	
						34 31 45	35 33 00	
						34 35 00	35 24 45	
						34 31 15	35 29 30	
						34 36 45	35 22 15	
						34 43 30	35 29 45	
						34 29 00	35 32 00	
,,	,, ,,	27	...	☉ and ☽ E.	.....	34 47 45	35 31 30	
						34 44 15	35 37 30	
		...	27	✳ Antares, ☽ W.	.....	34 50 30	35 21 00	
						34 37 45	35 33 15	
						34 39 15	35 26 45	
						34 45 30	35 25 45	
						34 29 45	35 24 30	
						34 38 00	35 32 45	
						34 44 15	35 32 00	
,,	,, ,,	30	...	✳ Antares, ☽ E.	.....	35 12 50	35 38 15	
		...	27	✳ Antares, ☽ W.	.....	35 8 00	35 47 9	
						35 8 45	35 21 00	
						35 8 15	35 39 30	

									35	3	45	35	42	30	
									35	56	45	35	41	45	
									35	5	30	35	44	45	
									34	55	15	35	41	30	
									34	54	45	35	47	00	
									34	58	00				
,,	,,	,,	...	24	Planet Mars, ☽ w.	.....		.....				35	18	45	
												35	19	00	
												35	10	45	
												35	15	45	
												35	15	15	
												35	20	15	
												35	13	30	
												35	15	15	
												35	17	30	
												35	8	00	
												35	8	45	
												35	17	15	
1883.						°	′	″							
June 9.	Ngambo Village (right bank of Ngambo River).		6	...	⊙ E.	40	31	22							
,, 12.	Koeni Village,		6	...	⊙ E.	40	27	00							
	Umlaban Camp,		6	...	⊙ E.	40	19	30							
,, 13.	Namume Swamp,		6	...	⊙ E.	40	14	52							
June 16 and 17.	Mbadu Mountain Village,		12	12	⊙ E. and W.	40	3	56							
June 22.	Nagulue Hill,		...	6	⊙ W.	39	45	45							
,, 25.	Tugwi Hill,		3	9	⊙ E. and W.	39	23	10							
,, 28.	Ngambo River (left bank),		...	...	...	39	8	40							
,, 29.	Shalawe Village,		6	15	⊙ E. and W.	38	51	52							
			3	...	Saturn, ☽ E.	.....			38	39	57				
			12	...	Venus, ☽ E.	.....			38	54	30				
									38	47	40·5				38 51 8
									38	55	10·5				
									38	58	22·5				

This is the mean of the whole of the observations, and differs only from the accepted Longitude (found by the mean of an equal number of observations East and West) 0° 1′ 21″.

Date.	Place.	No. of single observations. East.	No. of single observations. West.	Heavenly Body Observed.	Longitude by Chronometer.	Longitude by Lunar East.	Longitude by Lunar West.	Longitude by Mean of East and West.
1883.					° ′ ″	° ′ ″	° ′ ″	
June 11 and 12.	Mkubure River (right bank),	6	21	⊙ E. and W.	38 31 23	38 43 3	38 31 51	
			9	⊙ and ☽ W.	.....	38 55 45*	38 34 9	
		18	...	✳ Antares, ☽ E.	.....	38 43 42	38 29 30	° ″
						38 51 00*		38 37 47
						38 44 30		
						38 50 15*		
,, 17 to 19.	Namurula Village (Kunle River),	9	...	✳ Altair, ☽ E.	.....	38 12 15	38 20 24	
			18	✳ Antares, ☽ W.	.....	38 4 51	38 22 19·5	
		12	...	✳ Fomalhaut, ☽ E.	.....	37 1 15*	38 31 9	
						37 52 40·5	38 18 30	38 9 33
		15	33	⊙ W. and E.	38 0 44	37 56 40·5	38 22 25	
						37 46 10·5	38 14 40·5	
						37 52 40		
	Najiwe River and Village (right bank),	12	12	⊙ W. and E.	37 42 05			
,, 30.	Napusa Village (Eastern foot of Inagu Hills),	9	9	⊙ W. and E.	37 20 22			
			6	⊙ and ☽ W.	.....	.....	37 21 40·5	
			9	✳ Spica, ☽ W.	.....	.....	37 20 00	
						37 19 37 5		37 24 9
		12	...	✳ Antares, ☽ E.	.....	37 35 30	37 23 07·5	
						37 20 52·5	37 30 55·5	
						37 21 30	*37 38 22·5	
Aug. 14.	Namlugu Village (right bank of Malema River).	...	...	✳ Fomalhaut, E. ✳ Spica, W.	37 3 38			
		6	...	✳ Fomalhaut, ☽ E.	.....	37 7 45	37 35 00*	37 9 34
			6	✳ Antares, ☽ W.	.....	37 6 48	37 23 45	
,, 17.	Egwoli Village (Eastern foot of Koje Hill), For Long of Inagu Hills, due East 4 miles.	...	9	✳ Spica, W.	36 59 33			

		6	...	✳ Aldebran, ☽ E.	.....		36	59	30*	37	39	24	37	8	58	
			6	✳ Antares, ☽ W.	.....		36	37	15	37	42	00				
„ 29.	Mwedederi Village (North extremity of Namuli Hills, ...	...	6	✳ Spica, W.	36	47	22									
		6	...	✳ Fomalhaut, E.	.....		37	8	30	36	38	45				
		9	...	✳ Arietis, ☽ W.	.....		37	4	15*	36	55	15	36	58	26	
		6	...	P. Mars, ☽ E.	.....		37	11	25	36	48	30				
		6	...	P. Jupiter, ☽ E.	.....		37	8	15							
Sept. 13 to 16.	Yano Valley (West of Namuli Hills), . .	6	...	✳ Fomalhaut, E.												
			3	✳ Altair, W.												
			3	✳ Altair, W.	36	28	56									
Nov. 7.	Makanyera (Mtusi River, right bank), . .	...	9	✳ Altair, ☽ W.	.....		35	58	00	36	16	45				
		9	...	✳ Pegasi, ☽ E.	.....		36	9	30	36	28	30	36	18	12 [2]	
							36	26	45	36	29	45				
„ 13 to 15	Nawaruma (For Long of South extreme of Namuli Hills), ...	...	15	✳ Altair, ☽ W.	.....		36	42	30	37	34	00				
			30	✳ Fomalhaut, ☽ W.	.....		36	50	00	37	41	15				
		24	...	✳ Pollux, ☽ E.	.....		36	44	31	37	45	46				
		12	...	P. Jupiter, ☽ E.	.....		36	46	00	37	25	15				
		12	...	P. Mars, ☽ E.	.....		36	42	16	37	25	31				
		18	...	✳ Pollux, ☽ E.	.....		36	37	45							
		24	...	P Mars, ☽ E.	.....		36	37	16	37	36	31				
							36	35	30	37	32	46				
							36	39	30	37	22	31				
							36	42	00	37	35	30				
							36	41	00	37	35	00				
							36	40	15	37	24	30				
							36	41	00	37	26	30				
							36	48	30	37	26	31				
							36	41	30	37	19	15	37	5	34 [3]	
							36	45	15	37	28	00				
							36	45	45							
							36	38	31							
							36	51	30							

[1] Mean of Chronometers and Lunars.

[2] Mean of all Lunars East and West.

[3] Mean of all Lunars East and West.

Date.	Place.	No. of single observations. East.	No. of single observations. West.	Heavenly Body Observed.	Longitude by Chronometer.	Longitude by Lunar East.	Longitude by Lunar West.	Longitude by Mean of East and West.
						° ′ ″		
1884. Nov. 13 to 15.	Nawaruma (For Long of South extreme of Namuli Hills), ...	24	15	P. Mars, ☽ E.	.....	36 49 31		
						36 42 15		
						36 43 45		
						36 24 15		
						36 27 15		
						36 30 15		
						36 21 15		
						36 22 00		
						36 25 15		
						36 23 30		
						36 35 15		
							° ′ ″	
Oct. 20 to 24.	Chemina Village (West shore of Lake Anaramba),	30	...	P. Jupiter, ☽ E.	.....	36 51 45	35 22 45	
		12	...	✲ Regulus, ☽ E.	.....	36 1 15	35 23 00	
			30	✲ Aldebaran, ☽ W.	.....	35 53 30	35 24 00	
			24	P. Saturn, ☽ W.	.....	35 48 00	35 19 15	
			33	✲ Procyon, ☽ W.	.....	36 19 30	35 45 45	
						36 9 00	35 50 45	
						36 56 00	35 51 15	
						36 18 00	35 37 15	
						36 12 00	35 48 45	
						36 8 30	35 35 00	
								° ′ ″
						35 51 00	35 42 45	35 50 48[1]
						35 47 15	35 42 45	
						35 52 30	35 43 30	
						35 52 00	35 43 15	
							35 44 15	
							35 42 15	

											35	54	15	
											35	57	00	
											35	36	15	
											35	47	15	
											35	46	15	
											35	40	45	
											35	39	30	
											35	48	30	
											35	51	15	
											35	40	00	
											35	42	00	
						°	′	″						
,, 24.	Chinta Camp (East shore of Lake Chinta),	6	...	P. Jupiter, E.		35	47	15						
January 3.	Hosia Village (Right bank Mlela River).[1]													
April 15.	Mopea (Portuguese Settlement and Opium Plantations),	12	...	⊙ E.		35	56	11						
,, 17.	Marurn (African Lakes Company's Station, Left bank of Zambezi),	27	21	⊙ E. and W.		35	57	16						
May 5.	Morambala Mountains (S.W. extremity, Kigumbo),	...	18	⊙ W.		35	30	51						
,, 9.	Chironzi (Portuguese Military Settlement),	15	15	⊙ E. and W.		35	25	9						
,, 13.	Ntundu Village (Stockaded village),	12	15	⊙ E. and W.		35	30	40						
,, 17.	Mongwe (Mlolo Hill),	18	...	⊙ E.		35	42	45						
,, 23.	Manasomba Hill,	18	...	⊙ E.		35	39	59						
,, 25.	Chipoka Village,	...	18	⊙ W.		35	39	47						
,, 28.	Ndima Hill,	12	18	⊙ E. and W.		35	15	7						
Aug. 3.	Chumbusa Village (right bank of Ruo River),	33	...	✳ Pegasi,) E.		.....			35	2	25	36	12	9	
			21	✳ Spica,) W.		.. ...			35	11	37	36	5	30	
									35	36	9	36	10	1	
			12	✳ Antares,) W.		.....			35	20	48	36	11	6	
									35	9	45	36	9	23	
									35	14	55	36	6	57	35 42 18·7[2]
									34	52	1	36	11	39	
									35	8	00				
									35	16	28	35	56	33	
									35	16	39	35	53	49	

[1] Not computed.

[2] Mean of all Lunars East and West.

Date.	Place.	No. of single observations. East.	No. of single observations. West.	Heavenly Body Observed.	Longitude by Chronometer.	Longitude by Lunar East.	Longitude by Lunar West.	Longitude by Mean of East and West.
1884.						° ′ ″	° ′ ″	
Aug. 3.	Chumbusa Village (right bank of Ruo River),	...	12	✳ Antares, ☽ W.	.....	35 29 9	35 55 22	
							36 1 10	
					° ′ ″			
,, 7.	Nalusu, near Machinjiri H. (Eastern extremity of Milanji Mountains),	...	...	☉	35 50 00			
,, 9	Luanza River (left bank),	...	...	☉	35 59 37			
,, 11.	Malopa Village,	...	...	☉	36 12 18			
,, 12.	Mpassu Village,	...	15	✳ Fomalhaut, ☽ W.	.....	35 55 13	36 45 51	° ′ ″
		15	...	☉ and ☽ E.	.....	35 41 6	36 34 7	
						35 42 15	36 37 13	36 19 58·4[1]
				☉ E.	.. ...	36 7 33	36 41 4	
						35 32 25	36 43 19	
,, 18.	Chimbwa Village (near Mwalisi River),	...	21	☉ ✳ E. and W.	36 26 19			
,, 19.	Mriamwendo Village (Tetema River, left bank),	15	27	☉ ✳ E. and W.	36 22 19			
,, 21.	Chilemba Village,	24	36	☉ ✳ E. and W.	36 35 6			
,, 24.	Msuva (confluence of Mlungusi and Likwali Rivers),	21	39	☉ ✳ E. and W.	36 38 46			
,, 27.	Lunani (Praso Buror. Furthest point W. occupied by Portuguese,	24	18	☉ ✳ E. and W.	36 39 31			
	Chimsaka Village,	6	12	☉ and ☽ E.				40 6 32

[1] Mean of all Lunars East and West.

TABLE II.

Lunar Altitudes for Absolute Longitude.

Date.	No. of single observations.	Place.	Observation.	Longitude.	Mean of Longitude.
				° ′ ″	
1884.					
Aug. 23.	3	Msuva[1] (the confluence of the rivers Likwali and Mlungusi).	Lunar Altitudes.	36 6 42 E.	
	3		.....	36 26 46	
	3		.....	36 21 30	
	3		.....	36 23 1	
	3		.....	36 15 0	
	3		.....	36 16 40	
	3		.....	36 26 42	
	3		.....	36 29 34	
	3		.....	36 29 1	
	3		.....	36 24 7	
	3		.....	36 22 24	36° 23′ 37″·8
	3		.....	36 47 12	
	3		.....	36 31 1	
,, 24.	3		.....	36 13 55	
	3		.....	36 23 24	
	3		.....	36 19 49	
	3		.....	36 20 30	
	3		.....	36 27 52	
	3		.....	36 24 4	
	3		.....	36 27 46	
	3		.....	36 19 15	
	60	Machinjiri,[2] . .	,.	.....	21 sets
	141	Blantyre,[2] . .	,,	.....	65 ,,

[1] Lunar altitudes at Msuva were obtained west of the meridian only.
[2] Not yet computed.

Note.—This is an observation of considerable delicacy, from which—unless taken under the most favourable conditions—reliable results can hardly be expected. When another class of observations has been obtainable it has therefore been rarely used. The above, however, have been reported by John Coles, Esq., F.R.A.S., as exceptionally satisfactory.

TABLE III.

TABLE OF LONGITUDE OBSERVATIONS taken at Blantyre with the object of establishing there a Secondary Meridian.

Date.	No. of Sets East.	Object Observed.	Result.			No. of Sets West.	Object Observed.	Result.		
1884.			°	′	″				′	″
June 28 and July 19.	10	✲ Antares.	34	41	46·5	8	✲ Regulus.	35	29	52·5
	5	✲ Fomalhaut.	34	37	28·5	6	✲ Spica.	35	35	10·5
	9	Sun.	34	31	46·5	10	✲ Antares.	35	29	15·0
	9	Sun.	34	34	24·0	9	✲ Antares.	35	27	45·0
	9	Sun.	34	41	57·0	9	✲ Antares.	35	29	34·5
	10	✲ Antares.	35	3	11	9	✲ Antares.	35	40	22·6
						12	Planet Mars.	35	15	0·0[1]
June 4 to 19.	7	✲ Antares.		.....		6	Planet Jupiter.			
	9	✲ Antares.		.....		9	,, Mars.			
	15	Sun.		.....		6	,, Mars.			
	9	Sun.		.....		10	✲ Antares.			
	15	Sun.		.. ...		15	✲ Antares.			
	10	Sun.		.....		6	✲ Altair.			
						9	✲ Antares.[2]			
June 4 to July 11.	54	Sun and Stars.		.....		58	Sun and Stars.[3]			
	65	Moon.		.....		85	Moon.[4]			

Total Number of Observation of all Classes = 1602 single Observations.

[1] The mean of 84 selected sets of Observations, viz., 42 East, and 42 West of the Moon, place Blantyre in Longitude 35° 3′ 54″ East. The mean of the whole of the Observations, viz., 115 sets East and West of Moon, place Blantyre in Longitude 35° 5′ 15″ East.

[2] These 126 sets of Observations have not yet been computed.

[3] The whole of these 112 sets of Observations have been computed for Time and Longitude.

[4] These altitudes of the Moon for Absolute Longitude have not yet been computed.

TABLE IV.

Of Latitudes.

Number.	Date.	Place.	Observations N. and S.	No. of Observations taken.	Latitude.		
	1883.				°	′	″
1	June	Blantyre Mission Station (The Manse),[1]	✳ Meridian Alts.	15	15	47	10 S.
2	June 9	Ngambo Village: Right bank of Ngambo River,	⊙ and ✳ do.	2	15	3	30
3	,, 12	Koeni Village,	⊙ do.	2	15	3	30[2]
4	,, 12	Umlaban Camp,	⊙ ,, ✳ do.	3	15	4	0
5	,, 13	Namume Swamp,	⊙ ,, ✳ do.	2	15	6	30
6	,, 16	Mbadu Village,	✳ do.	4	15	6	45
7	,, 22	Nagulue Hill,	✳ do.	3	15	10	15
8	,, 25	Tugwi Hill,	✳ do.	1	15	3	16
9	,, 28	Ngambo River (left bank),	✳ do.	2	15	2	9
10	,, 29	Shalawe Village,	✳ do.	2	14	55	48
11	July 12	Mkubure River (right bank),	✳ do.	3	14	56	48
12	,, 17	Namurula Village (Kunle River),	✳ do.	2	15	9	14
13	,, 30	Najiwe River and Village (right bank),	✳ do.	1	15	6	32
14	Aug. 7	Napusa Village (Eastern foot of Inagu Hills),	✳ do.	2	14	59	59
15	,, 14	Namlugu Village (right bank of Malema River),	✳ do.	2	15	8	37
16	,, 17	Egwoli Village (Eastern foot of Koje Hill),	✳ do.	8	15	7	44
17	Sept. 6	Mwedederi Village (North extremity of Namuli Hills),	✳ do.	2	15	8	53
18	,, 10	Yano Valley (West of Namuli Hills),	✳ do.	2	15	25	26
19	Nov. 11	Nangoma Village (left bank of Lukotokwa River),	✳ do.	2	15	29	46
20	,, 7	Makenyera (Mtusi River, right bank),	✳ do.	2	15	23	17
21	,, 4	Chigwadu Village (Luasi Hills),	✳ do.	2	15	17	1
22	,, 7	Mkanyea Village (Eastern shore of Lake Shirwa),	✳ do.	1	15	13	14
23	,, 7	Masabango (N.-E. extremity of Lake Shirwa),	✳ do.	1	14	57	26
24	,, 7	Kiromono (North do. do.),	✳ do.	3	14	56	35
25	,, 7	Mikoko River (N.-W. do. do.),	✳ do.	3	14	59	3
26	Oct. 20	Chemina Village (West shore of Lake Amaramba),	✳ do.	8	14	28	4
27	,, 27	Chinta Camp (East shore of Lake Chiuta),	✳ do.	2	14	47	28
28	,, 27	Ananihobe ford (Likugu River),	✳	2	15	54	00
29	Nov. 11	Nawaruma (for Long. of S. extreme of Namuli Hills),	✳ do.	4	15	41	22
	1884						
30	Jan. 3	Hosia Village (right bank of Mlela River),		2	16	30	i
31	April 15	Mopea (Portuguese Settlement and Opium Plantations),		nil.			

[1] As I was closely engaged at Blantyre with Longitude Observations, I owe these Latitudes to the kindness of the Rev. Alex. Hetherwick and Daniel Jas. Rankin, Esq.—H. O'N.

[2] Denotes Observations not obtainable. Latitude by account.

Number.	Date.	Place.	Observations N. and S.	No. of Observations taken.	Latitude.		
	1884.				°	′	″
32	April 17	Maruru (African Lakes Company's Station, left bank of Zambezi),	⊙ Meridian Alts.	2	18	4	56
33	May 3	Shamo Village (left bank of Shire River),	✲ do.	1	17	42	16
34	,, 5	Morambala Mountains (do. do.),	⊙ do.	1	17	35	20
35	,, 8	Chiwangu Village (do. do.),	⊙ do.	1	17	9	45
36	,, 9	Chironzi (Portuguese Military Settlement),	✲ do.	1	16	57	12
37	,, 13	Ntunda Village (stockaded village),	⊙ and ✲ do.	2	16	43	50
38	,, 17	Mlolo Village (summit of Mongwe Hill),	⊙ do.	1	16	22	54
39	,, 23	Mulira Village (Eastern foot of Monasomba Hill),	⊙ do.	1	16	12	25
40	,, 24	Mangasanji Village (north slope of do. do.),	⊙ do.	1	16	8	59
41	,, 25	Chipoka Village (S.-W. extreme of Milanji Mountains),	⊙ and ✲ do.	3	16 16	2 2	8 55
42	,, 28	Ndima Hill,	✲ do.	1	15	50	18
43	Aug. 4	Chumbusa Village (right bank of Ruo River),	⊙ and ✲ do.	4	16	6	24
44	,, 7	Machinjiri (Eastern extremity of Milanji Mountain).	⊙ and ✲ do.	4	16	7	39
45	,, 9	Lnanza River (left bank),	⊙ and ✲ do.	3	16	22	28
46	,, 11	Malopa Village,	✲ do.	2	16	34	59
47	,, 12	Mpassu Village,	⊙ and ✲ do.	3	16	38	43
48	,, 18	Chimbwa Village (Mwalisi River),	✲ do.	2	16	51	12
49	,, 19	Mriamwendo Village (Tetema River, left bank),	✲ do.	2	17	6	41
50	,, 21	Chilemba Village,	⊙ and ✲ do.	4	17	16	54
51	,, 23	Msuva (Confluence of Mlungusi and Likwali Rivers),	✲ do.	2	17	28	47
52	,, 26	Lunani (Praso Buror. Furthest point W. occupied by Portuguese),	✲ do.	3	17	41	29
53	Sept.	Chimsaka Village,	✲ do.	3	10	56	45
54	and	Nangadi Lake (S. extreme),	✲ do.	4	11	3	30
55	Oct.	Natiaka (Lake Lidedi),	✲ do.	3	11	4	0
56		Lishehe Village,	✲ do.	2	11	9	21
57	1882	Mkopoka Village,	✲ do.	4	11	5	30
58							

TABLE V.

Magnetic Variation.

No. of Observation.	Date.	Place.	Time.	Object.	Observation.	Variation.	Remarks.
						°	
1	July 26, 1883.	Namurola,	A.M.	Sun,	Altitude Azimuth,	15 45 West.	In observing for Magnetic Variation, Altitude Azimuths have been taken, where it has been possible, both East and West of the Meridian, and 3 hours distant from it. . . . Time Azimuths have been taken at as low an altitude of the sun as possible.
2	,, ,,	do.	P.M.	,,	do. do.	15 54 ,,	
3	,, ,,	do.	P.M.	,,	Time do.	18 47 ,,	
1	31, ,,	Najiwe,	P.M.	,,	do. do.	17 38 ,,	
2	,, ,,	do	P.M.	,,	do. do,	18 27 ,,	
3	Aug. 1, ,,	do.	A.M.	,,	do. do.	14 31 ,,	
5	,, ,,	do.	A M	,,	Altitude do.	14 9 ,,	
5	2, ,,	do.	P.M.	,,	do. do.	15 34 ,,	
3	9, ,,	Napusa,	A.M.	,,	Time do.	Not yet computed.	
4	,, ,,	do.	P.M.	,,	Altitude do.	do.	
2	11, ,,	do.	P.M.	,,	do. do.	do.	
2	,, ,,	do.	P.M.	,,	Time do.	do.	
5	17, ,,	Egwoli,	A.M.	,,	Altitude do.	do.	
4	,, ,,	do.	P.M.	,,	do. do.	do.	
5	18, ,,	do.	A.M.	,,	Time do.	do.	
5	,, ,,	do.	A.M.	,,	do. do.	do.	
5	25, ,,	Mwedederi,	A.M.	,,	do. do.	15 58 West.	
4	29, ,,	do.	A.M.	,,	Altitude do.	13 48 ,,	
6	Sept. 6, ,,	do.	P.M.	,,	do. do.		

TABLE VI.

Heights above Sea-Level.

Date.	Place.	L.M. Time of Observation.	Temp. Sea Level.	Aneroid Barometer No. 755.	Boiling Point Thermometers.		Height in Feet.
					No. 976.	No. 977.	
1883.				in.			
June 12.	Umlaban Camp, . . .	3 P.M.	79	29.8	211.6	211.7	201 [1]
,, 15.	Mbadu Village, ...	Noon.	80	29.3	211.2	211.2	461
,, 22.	Nagulue Hill (Camp at base of Hill)	11 A.M.	78	29.0	210.45	210.5	903
,, 25.	Tugwi (Base of Hill Tugwi), .	3.30 P.M.	78	29.0	210.4	210.6	863
,, 27.	Ngambo River (flowing south, left bank), ...	4 P.M.	78	28.9	210.4	210.38	926
,, 30.	Shalawe Village, . . .	2.30 P.M.	78	28.25	209.4	209.4	1497
July 9.	Mluli River (right bank), . .	5 P.M.	76	28.18	209.36	209.38	1531
,, 10.	Mkubure River (right bank), .	5 P.M.	76	28.07	209.18	209.20	1610
,, 16.	Namurula Village, . . .	Noon.	80	28.05	209 0	209.0	1735
,, 30.	Najiwe River and Village (right bank), ...	10.30 A.M.	76	27.95	209.0	209.1	1693
Aug. 8.	Napusa (Nisheshe Valley), .	2.30 P.M.	78	27.32	207.9	208.0	2337
,, 12.	Inagu Hills (in ascent of Eastern Ridge), ...	...	...	26.15			
	Inagu Hills (in ascent of Eastern Ridge), ...	...	...	25.75			
	Inagu Hills (highest point reached on Eastern ridge), . . .	...	...	25.55			
,, 13.	Natalea River (just above falls),	7 A.M.	73	26.075	205.7	205.8	3633
,, 8.	Yabala Ridge (the water parting of the rivers Sisiri and Nimeriseen, affluents of Ligonya River, and Natalea, affluent of Malema and Luli Rivers), .	...	...	27.25			
,, 13.	Inagu Hills (highest point reached on Western ridge), .	9.15 A.M.	75	25.00	203.7	203.8	4763
,, 14.	Namlugu (right bank of Malema River), ...	5 P.M.	76	27.22	207.8	207.8	2414
,, 20.	Ludia River (right bank), . .	8 A.M.	73	27.6	208.5	208.5	1998
,, 1	Mwedederi (Camp at base of Nikomani Hill), . . .	2 P.M.	79	26.58	206.7	206.8	3046
Sept. 1.	Mwakwa Hills (banks of Losi River), ...	...	...	26.63			
	Mwakwa Hills (in ascent), . .	...	...	25.50			
	,, do., . . .	...	...	24.75			
	Mwakwa Hills (highest point reached), ...	11.30 A.M.	79	24.3	202.8	202.6	5423
,, 8.	Naluma River (left bank), .	11 A.M.	78	27.07	208.05	208.15	2496
,, 14.	Yano Valley (right bank of river).	5.30 P.M.	75	26.93	207.7	207.8	2437
,, 30.	Luli River (Lurio), (point crossed in Lat. 15° 15 s., Long. 36° 9′ E By account), ...	9 A.M.	77	27.32	209.0	209.0	1723
	Mkanyea Village (¾ to 1 mile east of eastern shore of Lake Kilwa, and on right bank of River Mnembo), ...	12.30 P.M.	82	27.28	208.66	208.68	1941

[1] Although only one reading of each Thermometer has been given in every case, that given is the mean of several readings, and care was always taken to keep the Thermometers several minutes immersed in the steam until the quicksilver was perfectly steady.

Observations by Boiling-point Thermometers have been corrected for estimated temperature of air at Sea-Level.


INDIAN OCEAN
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SKETCH MAP OF THE
SCOTTISH COLONY ON THE SHIRE HIGHLANDS
SHOWING
ROUTES TO THE MOSAMBIK COAST
TAKEN BY
Henry E. O'Neill, F.R.G.S., H.M. Consul, Mozambik.
LAKE TANGANYIKA
LAKE BANGWEOLO
LAKE NYASSA
LAKE SHIRWA
L. Hikwa or L. Leopold
U R U N G U
L O B E M B A
C H I B A L E
M A G W A N G W A R A
W A N G I N D O
U B E N A
M A V I A
M E O O
L O M W E
M A K U A
B A S E N G A
B A T O N G A
B O R O R O
INDIAN OCEAN
River Zambezi
Rovuma R.
Lurio R.
Loangwa R.
Rufiji R.
Zumbo
Tete
Sena
Blantyre
Mandala
Zomba
Livingstonia
Bandawe
Karonga
Mangoche
Kilimane
Kongoni
Delta of the Zambezi
Mozambik
Kilwa Kisiwana
Kilwa Kivinje
Lindi
Cape Delgado
Ibo I.
Pomba Bay
Angoche R.
Primeira Is.
Conducia B.
Mokambo Bay
Barracouta Pt
English Miles
Longitude East 33 of Greenwich
J. Bartholomew, Edinr

GEOGRAPHICAL NOTES.

EUROPE.

Visit of Lieutenant Greely to Scotland.—Lieutenant A. W. Greely, the American Arctic Explorer, will open the new Session of the Society on November 19th, next, with an Address. The Right Honourable the Earl of Rosebery, the President, will occupy the chair.

Iceland.—Our knowledge of the interior of this island, still so imperfect, was considerably advanced last year, during which two expeditions set out,—one from *Nordlandet* (the northern part of the island), and the other from *Sudlandet* (the southern part); their goal being almost identical. The former was under the direction of Thoroddsen, and strictly scientific; the latter, composed of peasants, and led by a peasant, Olafur Pálsson, had a more utilitarian aim—to discover summer pasturages in the neighbouring mountains. M. E. Hansen-Blangstead gives an account of the journey of the Icelandic peasants in the *Compte-Rendu* of the Paris Geographical Society, No. 13; and in the last *Petermann's Mitteilungen*, No. 8, we have from the pen of M. Thoroddsen an account of his own journey, entitled "A Lava-field in the Interior of Iceland," which is illustrated by a map of the lava district of Ódádahraun.

Serajewo.—M. Émile de Lavelaye has been contributing an interesting series of articles to the *Revue des Deux Mondes*, under the title of "*En deçà et au delà du Danube.*" In the number for 1st August we find a sketch of the present state of Serajewo (Serayevo), the capital of Bosnia, which has been feeling the influence of the Austrian occupation. "The Grand Hotel," says M. Lavelaye, "would not be out of place in the Ring at Vienna or in the Radial Strasse at Pest; an imposing three-story building—nothing like it in Constantinople. In the morning I sally forth at random. The June sun shines hot, but the air is keen, for Serajewo is 1750 feet above the sea, or almost at the same altitude as Geneva or Zurich. I am in the main street, which is called Franz Josef Strasse, in honour of the Emperor of Austria. This seems to indicate a permanent annexation. The first thing to meet the eye is a great church with four cupolas in the style of those at Moscow. It is coloured white and blue. The appearance is imposing; it is the cathedral of the Orthodox Greek Church. The bell-tower is unfinished: the Turkish Government had put in force an ancient law forbidding Christians to raise their buildings higher than the mosques. The street is at first lined with houses and shops in the Western style—booksellers, grocers, photographers, outfitters, hairdressers; but we soon reach the Mussulman quarter. In the heart of the town a great space is covered with ruins, the result of the fire of 1878. But already they are building on all sides good brick and stone houses. Only, they tell me, the ground is very dear: 70 to 100 francs per mètre. On the right hand is a fountain. The thin thread of crystal water issues from a great slab of white marble, on which are engraved, in low relief, some verses from the Korán. A young Mussulman girl, not yet veiled, with large yellow pantaloons; an Austrian servant, fair-haired, with bare arms, and a white apron over a pink dress, and a gipsy woman, slightly clothed with a chemise, open at the breast, come to fill jars of an antique shape. At the side are seated, cross-legged, stout porters, *hamals*, dressed like those of Constantinople. The three races are strongly marked; it is quite a picture. I reach the Chartsia: it is the trading quarter. I have never seen anything, even in Cairo, more completely Oriental. Each trade has a lane to itself. The craftsman sells his own wares, and works in sight of the public. The copper-smiths are the

most interesting and the most numerous. In Bosnia, Christians and Mohammedans prefer copper vessels because they do not break ; only the poorest use earthenware. . . . The furriers drive a good trade. As the winter is long and cold, down to 15 or 16 degrees below zero, the Bosniaks all have caftans, or vests, lined and trimmed with fur. The peasants, however, have only sheepskins, dressed by themselves. . . . The trades exercised in the Chartsia are monopolies of the Mohammedans, each of them being a guild with rules which have recently been confirmed. The social state is exactly what it was in Western Europe in the Middle Ages. In the country the feudal system is in force, and in the towns that of the guilds. All the chief towns of Bosnia have their Chartsia. By mutual deference of the sects, there are three days on which no work is done : Friday being sacred to the Mohammedans, Saturday to the Jews, and Sunday to the Christians. To-day (Thursday) the market-place and the neighbouring streets swarm with people—the aspect of the crowd, more completely Oriental than I have seen anywhere, even in Egypt, because here all without distinction wear the Turkish costume. The dominant race is distinguished not by costume, but by gait and manners."

ASIA.

Tibet.—Przhevalski, according to a telegram, dated 8th June, from Kiria, Khotan (*Petermann's Mitteilungen*, No. 8), has made considerable progress in his journey, having traversed the territory between Lob-nor to Kiria. At the latter spot he had erected a depôt, and was preparing to start southwards, with the majority of the expedition, to explore the mountains which separate Khotan from Tibet proper. It was his intention to return to Kiria at the end of August, and from thence to Russian territory by way of Aksu.

Railways in India.—The administration report by Colonel Stanton, R.E., has been lately issued, and, like most Indian Government reports, is full of interesting information compiled in a most concise form. There are now 12,004 miles of railway open in India, of which 1218 miles have been opened during the year 1884-85, while 6000 miles of projected railway have been surveyed or are under survey. The principal additions to open mileage have been an extension towards the Nepal frontier, of the Bengal and N.-W. Railway from Sonepore to Mankapore and Bahraich, in the north of Oudh, about 300 miles. There have also been opened 173 miles in the Bijapur district of the Southern Mahratta country. The Rewari-Ferozepur line has been completed (151 miles), connecting Rajputana with the north ; and the Cawnpore-Achnera line has also been opened, connecting the mètre-gauge lines of the N.W. P. with the Rajputana-Malwa Railway. Sanction has been given for the Sind-Pishin (165 miles) and Sind Sagar (313 miles) frontier lines. The Pishin line has been rapidly pushed on, in spite of cholera and sickness.

During 1884 numerous new coal-fields have been opened up ; and during the year, 436,804 tons of Indian coal have been used, and 197,342 tons of English. The average cost of English coal at Bombay is about $17\frac{1}{6}$ rupees per ton, while Indian coal varies in price from 1 rupee 11 annas to 9 rupees, at the pit-mouth. Petroleum has been successfully bored for in Biluchistan, and it is intended to use it for fuel in some of the engines of the Sind-Pishin Railway. The whole of the Indian railways employ 4069 Europeans, 4250 East Indians, and 197,748 natives. The accident returns show 366 killed and 598 wounded.

The total capital expended on Indian railways up to date is £156,638,508 ; and the estimated net gain to the State for the current year, after paying interest, is £883,500. There is a loss on the guaranteed lines of £277,900 but this is more than compensated by the gain on the East Indian and State railways.

The Indian railways afforded a gain to the State for the first time in 1877-78; the two following years there was again a loss; but since 1880 there has been a yearly gain, which, it is expected, will gradually increase.

AFRICA.

MM. Capello and Ivens, who have arrived safely at Mozambique from their journey west to east across Central Africa, will not be in a position to give the detailed results of their exploration until next September, when they are expected to arrive in Lisbon. The Geographical Society of that city, however, sends us, through M. Cordiero, the Secretary, a *résumé* of what has been accomplished by their explorers. The zone through which they traversed, between 10° and 17° S. latitude, includes many of the principal hydrographic problems of Central Africa. They left Mossamedes in March, 1884, with a small expedition, rapidly organised, and accompanied by a weak escort; reached Huilla, a station in the Portuguese province of Angola; struck S.S.E. to Humbe; followed the river Cunene northwards to 16° 20′ latitude, and reached a country which was almost a desert. Continuing a northerly course they passed through the country of Lobale (Lovale) and penetrated into the region between the Kubango and Upper Zambezi. From Libonta they proceeded southwards down the left bank of the Zambezi, encountering, after six days, a large affluent, flowing from the N.E., called Kabompo; and finally reached Kilimane, having accomplished a journey of 4500 geographical miles, of which at least 1500 may be considered as entirely unexplored. Their researches in hydrography promise to be of the highest importance.

Serpa Pinto's Expedition.—Major Serpa Pinto has, we are glad to say, recovered from his recent illness, and, having received fresh support, has determined to prosecute his mission. He left Quiçanga (Kissanga) on June 16, with his Zulus and about 600 carriers, but, two days after starting, 40 carriers deserted him, and the remainder are by no means to be relied upon. Major Pinto has determined to carry provisions for himself and assistant to last the whole journey—a departure from the ordinary methods of exploration—and it is his intention, after reaching Nyassa, to strike south. He has been taking careful observations at Ibo in order to determine its exact position, and his elaborate results go to show that there is an error of about 7 miles in its position according to present charts. Ibo, our correspondent informs us, is not an island at low water, the Major having walked over to the mainland at ebb-tide.

Benguela.—A piece of good geographical work has recently been done by the Rev. William E. Fay, of the West Central African Mission. In the *Missionary Herald* he publishes three small maps dealing with the route between Benguela and Bihé, which he has traversed four times. In fulness of detail they indicate a marked advance upon Cameron's work. Mr. Fay makes no claim to the accuracy of a trigonometrical survey: he used a prismatic compass, determined the distances by pedometer, and checked the altitudes by observations of the boiling-point. The area dealt with extends over four degrees of longitude, and has a north-to-south breadth of 60 miles. The route first passes along the level and burning sands of the coast; at Katumbella it strikes inland and begins to ascend: it then traverses a high-lying, rocky desert, and then a still higher district with the characteristics of the temperate zone; and finally, begins to descend towards fertile lands rich in tropical verdure. The mountainous region passed through contains peaks from 5000 to 8000 feet above sea-level, and is the source of important rivers, which diverge apparently to almost every point of the compass. Human dwellings are

first met with in the lower lands to the east of this region. The mission village lies in about east longitude 16° and south latitude 12° 15′.

The Country between the Luapula and Lualaba, the two rivers which feed the Congo, has, says *L'Afrique* for August, not yet been traversed by Europeans. Livingstone and Giraud have made the Luapula known to us; Cameron, whose route was for some distance parallel to the Lualaba, has given an imperfect notion of its upper course. The information gained by Dr. Reichard will throw new light upon the orography and hydrography of this part of Central Africa. The river which flows from Lake Moero continues to bear the name of Luapula, which the natives give to it between Bangweolo and Moero, whilst that which empties itself into Lake Kassali bears exclusively the name of Lualaba, which it preserves as far as Nyangwe. Dr. Reichard has seen the latter from the heights of the Mitumba Mountains, south of Lake Upemba, which is situated only about four days' march south of Lake Kassali—therefore at a lesser distance than supposed by Cameron, who, hindered by the native chief from approaching the Upemba, only saw its waters from a distance of about 10 miles. The importance of this lake has been exaggerated in maps. As regards the two large rivers, the Lualaba and Luapula, the latter from its length must be regarded as the chief confluent of the Congo, but the former has a greater volume of water. The length of the Luapula, from the source of the Chambezi to Lake Lanji, might be laid down approximately as 810 miles, whilst that of Lualaba is scarcely 560 miles, though the latter empties a far greater volume of water into Lake Lanji. Respecting the source of the Lualaba, it would appear to be more southerly than supposed by Livingstone, according to whom, all these rivers flowed from the northern side of a chain of mountains shooting from the Lokinga, at the south of Bangweolo. Dr. Reichard's observations lead one to believe that, instead of these mountains, plains should be inserted on the map: according to M. Giraud, the chain indicated to the east of the Lokinga does not exist, and it is probable that the same may be asserted in the west.

The Buffalo River.—From the *Transactions of the South African Philosophical Society*, vol. iii., Cape Town, 1884, we abstract the following :—

"The river Buffalo has its chief sources in the Perie Bush, the fountains issuing from the slopes of the hills at an elevation in some cases of nearly 4000 feet above the level of the sea. It appears probable, though Mr. W. B. Tripp's observations do not enable him to affirm it with certainty, that the destruction of this "bush" is rendering the *régime* of the river more irregular. The total area of the catchment basin is from 450 to 500 square miles, the greatest length being 70 to 80 miles, and the greatest width, 20 to 30. The development length of the river is about 70 miles. King William's Town has, for many years, taken its water supply from that portion of the river which is mainly fed by the Buffalo proper and the Wytela stream, whose junction takes place about 10 miles above the town. Below this point, down to the town-dam, the stream passes through farms occupied by German immigrants, and has its channel cut deep below the level of the adjoining lands down to the rock, the banks on each side exhibiting a bed of rich soil resting on a deep loamy deposit. Marks of floods may be distinguished by *débris* washed up in places some 30 feet above the present bed. The annual rainfall at King William's Town—from observations made at the Grey Hospital since the year 1868 by Dr. Edgar—may be taken at 27 inches. Rather more than 3 inches of the whole quantity falls in the summer months from January to March. The wettest observed year was 1876 with 37 inches, and the driest 1878 with less than 15 inches. A great flow occurred on the river in 1876; since 1877 a succession of dry years has ensued. The ordinary flow may be taken at from 4½ million gallons per day in dry

seasons to 21½ million gallons per day in wet seasons. The minimum is from 2,000,000 to 900,000 gallons per day. When the stream falls to this point it appears, even in dry seasons, to be invariably replenished by small freshets, raising the flow for the time to from 13½ to 18 million gallons. A flood raising the level only 2½ feet at the town-dam would carry down at the rate of more than 750 million gallons per day, and a 5-foot flood more than three times that amount. These are floods of a very minor order, of which some three or four occur annually. Every few years a period of heavy freshets is said to occur sufficiently violent to clear out the sand-bed at the river mouth, and for the time to render the harbour accessible to large vessels."

Olifant River.—From the same source we abstract another paper by J. E. Balfour, C.E., "On some South African Rivers":—

The total length of the Olifant River is little more than 150 miles from its source to the sea, and it drains an area of 13,000 square miles. Its perennial waters are derived from its tributaries rising in the Cold Bokveldt and the Cedar Bergen ranges. Some of these streams rise high up in the mountains, which are chiefly composed of sandstone, and bring down water comparatively pure and clear of silt; they maintain a strong perennial flow in spite of extensive loss from absorption, evaporation, and, in some places, irrigation. Comparatively little rain falls in the basin proper of the river itself. The lower tributaries, the Doorn, Troe-Troe, and Holle River, flow only occasionally. Their physical characteristics are dry and torn-up channels with abrupt variations in the inclinations of their beds, flat when passing through level plateaux, steep when rushing through abrupt and narrow passes, high banks in alluvial or soft soil, and often bounded by perpendicular escarpments in mountainous or hilly tracks. These tributaries drain an enormous extent of country from the border of Bushman-land in the north to Vogel Vlei and Calvinia on the east, and the Roggeveldt mountains on the south. When in flood they rush on precipitately, and arrive with a mighty rush at their debouchures; and wherever the river overflows its banks, a rich deposit of Karroo silt is spread over the land, enabling the cultivator to produce almost fabulous crops. Ordinary floods, the results of the winter rains supplying the upper affluents of the main stream, rise from 10 to 12 feet above its bed, and extraordinary floods are produced by heavy rains within the drainage area of the town affluents. The Olifant River has a very safe landlocked harbour, if entrance could be found to it; but the shifting sandbanks stretching across the Channel at intervals, a short way below the surface, prevent all except boat navigation. The tidal wave ascends 25 miles. Fifty years ago overflows were of annual occurrence; now the river has so eroded its banks and deepened its bed that, to the impoverishment of the farmers along its banks, they do not take place at all. Mr. Balfour found the widening had been effected at the rate of 30 feet in 22 years. The surface area of the floods is thus lessened at the expense of their vertical height. By the erosion of the banks the strips of forest are destroyed, which acted as screens to keep the heavier and less fertilising portions of the silt and detritus in the river, and these are consequently allowed to collect on the top of the banks, and to add to their height and aridity.

Mr. Montagu Kerr's Journey.—The *Cape Times*, of March 28, publishes an article on the recent adventurous journey of Mr. Montagu Kerr, who has safely returned to this country. As Mr. Kerr will shortly give an account of his experiences in the pages of this *Magazine*, it is necessary only briefly to allude to them now.

He arrived at the Cape in January of last year for the purpose of engaging on a hunting expedition, or failing this, of undertaking some work of exploration. Hearing that no white man, or at least Englishman, had previously travelled through the country lying between north-eastern Matabele-land and the Portuguese possessions at Tete, on the Zambezi, he determined to adopt this route ; and, in company with the famous hunter, Mr. Selous, first proceeded as far as the King's Kraal, Gubuluwayo, in Matabele-land. Lobengula he found to be a man intellectually far superior to the people whom he ruled over with a rod of iron, and among whom were to be found no traces of civilisation. Here he fitted out his wagon, and trekked to the southern banks of the Hanyane River. Finding the river impassable, owing to there being no "drifts" (fords), he left his wagon behind, and proceeded on foot towards Tete, about 250 miles distant, in company with twenty-five Moshouas, and others, whose services he had engaged. He had to alter his route, in consequence of the dread of the East tribes entertained by his followers, but safely reached Mchesa, a town of the Moshoua tribe, whose chief industry seemed to be the manufacture of assegais, the country being rich in iron (brown hæmatite). After leaving this town, Mr. Kerr became somewhat incredulous as to the dangers he had heard of, and his temerity nearly cost him his life. Chuza, the chief of the Makorikori, received the party very coldly, and their position becoming perilous, they were obliged to effect a forced retreat of over 40 miles. On reaching a town about 140 miles south of the Zambezi, all Mr. Kerr's followers deserted him. With the assistance of a native, however, he managed to reach Tete on 15th September. Steering north, after 20 days' travel, Mr. Kerr reached the high flats—a plateau about 4500 feet above the sea-level—to the west of Lake Nyassa, whence he proceeded, after engaging fresh carriers. Skirting the shores, he reached the station of Livingstonia (Cape Maclear), which had been deserted in consequence of the great sickness, and here his carriers again deserted, leaving him without goods or any means of securing assistance. Fortunately, however, the French expedition, under M. Giraud, put into Livingstonia in the steam launch which had been running on the lake for years in connection with the Livingstonia Mission, and Mr. Kerr was thus enabled to escape from the very awkward dilemma in which he was placed. He and M. Giraud afterwards travelled together, canoeing down the Shiré and Kwakwa Rivers to Kilimane.

The general result of this exploration will be shown in the map which Mr. Kerr will shortly publish with his report.

Kwakwa or Kilimane River.—The African Lakes Company have sent us a sketch chart of this river. The average soundings vary from about 3 fathoms at Mutu—where there is said, however, to be only 18 inches of water during the dry season—to about 4 fathoms at Interra, about fifteen miles further down. Just above Interra, in marshy ground, the breadth of the river contracts ; and from thence to Inyando, about ten miles distant, it flows through a natural canal, 75 feet wide, with dense bush on both sides. The canal has a depth of from 3 to 5 fathoms. From Inyando, where no tide is felt—the current down running from 4 to 5 knots—to the sea, the river gradually broadens, flowing E. by S. to Kilimane, where it makes a sharp turn to the south, and flows into the Indian Ocean through a narrowing mouth. The depths from Inyando to Kilimane vary from 2 to 6 fathoms ; sandbanks occur on either side of the river, but there appears to be a very good fair-way.

Dr. G. A. Fischer's Expedition to Masai-Land.—Dr. Fischer, who for some years resided as a medical practitioner at Zanzibar, undertook an expedition to the Masai country in 1883 on behalf of the Hamburg Geographical Society, from whom we

have received the explorer's Report.[1] Our readers will be aware that Mr. Joseph Thomson explored the same country in the same year for the Royal Geographical Society. Both men accomplished good work in the face of great difficulties, such as rarely fail to fall to the lot of explorers; but their routes, their obstacles, and the results of their labour were different. Dr. Fischer did not make the ascent of Mount Kilima-njaro, but passed close to it on his journey, which extended from Pangani, on the coast north of Zanzibar, to the Naivasha Lake. He was prevented from going further; but we congratulate him very warmly on the successful way in which he has mapped out the country he did traverse. It is some time since we have seen a piece of work evidencing such careful and accurate geographical observations, and done in such a scientific and detailed manner. No doubt much would have been gained if Dr. Fischer's sextant had not been broken and rendered useless by his porters, but, notwithstanding its loss, the map which he has produced, and which accompanies his Report, is too good to be compared with the productions of some recent travellers, who are satisfied with giving a rough description of the country they profess to have explored. Dr. Fischer has proved in this his first journey that he possesses those painstaking qualities which are of such intrinsic value to the explorer who would forward the interests of science.

Dr. Fischer found it most difficult in the Masai country to discover the real native names for places, etc., owing to the fact that the Mohammedan traders, of which there appear to be very many, give new names or alter the pronunciation of the native ones to suit the Suaheli language. This explains the absurd mistakes and concocted names which have appeared on previous maps, and we are glad that Dr. Fischer was most careful to insure as great accuracy as possible on this point. The Masai people possess a very thorough knowledge of their extensive country. They do not live in settled villages, but wander about in search of pasture and water for their cattle during the dry season, and they have copious and varied designations for the slightest variations in the character of the soil and configuration of the land, often calling one and the same object by various names.

The following instance will show what misunderstandings are likely to arise in the case of travellers who have only a partial acquaintance of the Suaheli language. A small river is marked on an English map as "Ku Vukwa" (Elephant River); "ku vukwa" being in reality only the passive form of the verb "ku vuka," to cross over. The traveller had evidently asked for the name of the river, and had been informed "that is a brook which we must cross over"! Similar mistakes are numerous in some recent German maps.

Dr. Fischer describes every detail of his route with accuracy. From Pangani to the Mkomasi River he passed through what may be defined as a coast region; thence to Arusha he traversed a country abounding in acacia woods and other trees; from Arusha to Nguruman the land is characterised by extensive treeless steppes. The ground gradually rises from the coast inland, but between the Snow Mountain and Naivasha Lake are considerable depressions and salt lakes.

The rainy season commences in Masai country at the end of April, while in Zanzibar it begins from the 1st to the 5th April. It is worthy of note that the south-west winds which set in on the coast simultaneously with the rains are felt as far in the interior as the Naivasha Lake, where they blow in May with as much force as in Zanzibar. In the district of Kilima-njaro, however, there blows a constant east wind throughout the year, which takes a more southerly direction during the rainy and more northerly in the dry season. According to Dr. Fischer's experience and observations between Zanzibar and Kilima-njaro, the so-called dry

[1] *Mitteilungen*, 1882-83, Heft ii., Hamburg, 1885.

season, which should occur from December till January or March, is misnamed. This he connects with the fact of an alteration and improvement of climate which has been observed in Zanzibar and the district during the last few years: there has been much less rain there than formerly.

Numerous notes were recorded in regard to the tribes with whom Dr. Fischer came in contact. He tells us that the Kossowa are in the habit of selling their own wives and children to the Mohammedans as slaves. The slave-trade therefore constitutes the chief motive which induces the Arabs to visit this district. The Kavirondo, who live in close proximity to the Victoria Nyanza, are herdsmen and agriculturists. They grow semsem, dhura, maize, sweet potatoes, yams, peas, gourds, and bananas. Brass wire and large beads are the only articles of barter: as they are always naked, cloth goods are of no value. The women, however, wear behind a plaited tail of grass, and the married women have also a small apron. This tribe is noted for its bravery; they often obtain victories over the Masai. Dr. Fischer was unable to reach the Baringo Lake, but he gives an account of the Kuavi tribe, who live near it. The Masai levy an enormous toll on travellers, so that caravans of natives from the coast stay as short a time in the country as possible, in order to escape the never-ending demands, which, if refused, are followed by robbery, and expose their lives to danger. Dr. Fischer gives a vocabulary of the words most in use among the Masai. They call themselves Masai (*pl.* Olmasai), but they are known to some of the natives as Eleungop, which means "the possessors of the land." The Masai count up to 50, and employ a curious finger-language to express the numerals. Dr. Fischer made during his journey several collections of great value, consisting of geological, botanical, ethnographical, and zoological specimens.

From the work Dr. Fischer has already done, we shall look with interest to the results of his present journey to Lado, and we wish him all success in it.

The Position of Emin Bey and Dr. Junker.—German geographers have got their "Gordon" to rescue from the dark continent which has swallowed up so many heroic men, and the German public is rising to the occasion. A subscription has been set on foot to endow a relief expedition under the command of Dr. Fischer, the explorer of Masai-land.

On July 14, the German Foreign Office received a telegram from the Italian missionary, Father Bonomi, at Wady Halfa, stating that Dr. Junker and Captain Casati had safely reached Emin Bey (Dr. Schnitzler) at Lado. The news was spread by the press, and much satisfaction was felt that the three explorers had escaped from the Mahdi's clutches; but a correspondent in *Petermann's Mitteilungen*, No. 8, discredits the intelligence and affirms that there is no safety for them except through a relief expedition. He arrives at this conclusion after carefully going over the arguments for and against. Dr. Junker's brother has induced Dr. Fischer to attempt a rescue starting from Zanzibar. Under favourable circumstances, the expedition could reach Lado in five months. The journey from the coast to the southern shore of the Victoria Nyanza was accomplished by Stanley (1875) in seventy-one days; the English Missions steamer, *Eleanor*, performs the journey from Kagei to Uganda in eight to ten days; and the journey from Rubaga to Lado was accomplished by Dr. Robert Felkin, in 1880, in sixty-five days, including a month's stoppages. Our own impression is that Dr. Fischer will experience the greatest difficulties at Uganda, where neither he nor Emin Bey are court favourites.

M. Révoil's Journey to the Somali country.—M. Révoil recently gave an account of his journey to the Somali country before the Antwerp Geographical Society, a summary of which appears in *Annales de l'Extrême Orient* for July.

He arrived at Zanzibar on February 6, 1884, and, after experiencing some difficulties in organising his caravan, started on May 1 on board a small boat, which he subsequently deserted for a large *bagala* bound for Meurka. Arrived there, May 6, after narrowly escaping shipwreck, he changed his European for Mussulman costume. With an escort provided by the Governor he left immediately for Mogadixo (Mukdishu), at which place he remained until 25th June. Here, after organising his caravan of twenty-five camels, his troubles commenced. In order to reach Guelidi in safety, he secured, after one month's *pourparlers*, 250 men as an escort from the Sheikh Omar Yusuf, Sultan of the province, and brother of the notorious Ahmed Yusuf, who was a sort of modern Nero. Scarcely had he left Mogadixo, however, when his escort mutinied; and his passage was barred at first by the Abgal Bedouins, whom his party eluded, and afterwards by the Wadans, who pillaged and scattered his caravan. Omar Yusuf offered the unfortunate traveller shelter, which he was forced to accept, and for nine weeks of his "captivity" he devoted himself to collecting natural history specimens. During this time his host managed to extort from him about a thousand piastres (£200), and he narrowly escaped assassination. Eventually, on December 9, abandoning all hope of continuing his journey, he and five of his followers, disguised in the Somali costume, effected their escape, and safely reached Mogadixo, returning to Zanzibar on 7th March.

AMERICA.

The Navigation of Hudson's Bay.—Advices from St. John's, Newfoundland, explain the nature of the mishap which recently befell the arctic steamer *Alert*. The vessel, under the command of Lieutenant A. R. Gordon, R.N., sailed from Halifax on May 27th last, and proceeded to Hudson's Strait for the purpose of examining the condition of the ice at that early period of the season, and observing its movements. By June 16, lat. 61° 10′ and long. 64° 45′ was reached (a little to the south-east of Cape Best), and here the *Alert* got tightly jammed in Arctic ice varying from 8 feet to 22 feet in thickness. For twenty-one days the steamer was carried up and down the southern shore of Resolution Island by the tidal currents, which flowed at the rate of five or six miles an hour. It was discovered that a large part of the ship's stern-plate was broken off, and the captain, managing to steam clear of the ice by July 8, decided to proceed to St. John's for repairs. The *Alert* went into dock there on the 15th, and it was expected that the expedition would be able to make a fresh start before the end of the month.

Venezuela.—Professor Aveledo, at the end of last year, ascertained the highest summit of the Silla de Caracas to be 2665 mètres (8744 feet), against A. von Humboldt's measurement of 2630 mètres (8629 feet). The Professor's observations were made with the barometer and boiling-point thermometers, controlled by observations made in Caracas at the same time.—*Petermann's Mitteilungen*, No. 8.

The Kootenay Country.—Mr. William Baillie-Grohman sends to *The Field* a very interesting article on *Two Summers in the Kootenay Country*, from which we extract the following:—

"A word or two on the geographical position of Kootenay may possibly not be out of place here, considering that, with the exception of Palliser's Report, comprised in four Parliamentary Blue Books, issued more than twenty years ago, and now a long-shelved contribution to geographical literature, no systematic exploration of the country has occurred, a want now naturally making itself more felt, owing to the rapid development of the regions west of the Rockies, brought about by the railways to which I have already referred.

"In shape, the Kootenay district is not unlike a huge triangle, with a base line of some 200 miles, resting on the 49th N. latitude, which forms the international boundary line separating this portion of British Columbia from Montana, Idaho, and Washington Territories, in the United States. The western side of the triangle is formed by the rugged Gold Range; while towards the east, the Rocky Mountains form an equally well-defined natural boundary towards Alberta, the newly-created provincial sub-division of the North-West of Canada. The district covers a huge area, the extent of which can best be realised by remembering that, while the base line of the triangle is 200, the sides are 300 miles long. The centre of the district is occupied by the Selkirks, a horse-shoe-shaped range of mountains with the open end towards the south. Inside of this horse-shoe we observe one of the three great depressions to be found in the Kootenay district—namely, the Lower Kootenay Valley; while the two remaining ones—the Upper Kootenay and the Columbia Valley—run round the outside of the horse-shoe, isolating the Selkirks from the Rocky Mountains and from the Gold Range.

"In its topographical appearance, climate, vegetation, and altitude of its valleys, the Kootenay country differs as entirely from the regions east and south-east of it—*i.e.* Alberta and Montana—as were it separated from them by a wide ocean. No doubt its situation on the Pacific slope of the great backbone formed by the Rockies, where more temperate climatic conditions prevail, and the low altitude of its valleys, which vary from 1050 feet to 2650 feet above the sea—while the plains immediately east of the Rockies in the same latitude are from 3000 feet to 5000 feet—are the chief factors in bringing about such contrasting conditions.

"A few miles before we caught the first glimpse of the Kootenay River, our surroundings underwent as abrupt a change as could well be imagined. Packriver Pass hardly deserves the name of a pass, for the elevation of the watershed between Lake Pend d'Oreille and Kootenay River, consists of a long densely forested, swampy valley, at the height of which two streams flowing in opposite directions have their source in close proximity to each other. Lake Pend d'Oreille is 2050 feet above the Pacific, the height of the pass 2190, and Kootenay River 1750 feet (not 1250 feet as marked in some maps); and as this difference is distributed over a distance of some 30 miles, one can judge of the easy slopes, of which the much-expected branch line of the Northern Pacific Railway from Sandpoint to the Kootenay River will, there is little doubt, in the course of a year or two, take advantage. After passing through the densely forested Packriver Valley, one emerges very suddenly into the Lower Kootenay Valley—a sunny open valley of some 60 or 70 miles in length, formed by two parallel ranges of hills, the highest of which, with an altitude of over 5000 feet, deserves almost the name of mountain. The valley, which runs almost due north and south, commences at Bonner's Ferry, where the Kootenay River leaves the narrow rock-bound channel it has delved for itself for upwards of 100 miles through a rugged chain of mountains that separates the Upper Kootenay from the Lower Kootenay Valley. From the moment the river enters the latter valley it assumes majestic proportions—*i.e.* an uniform width of 600 to 700 feet, with a similarly uniform depth of from 45 to 60 feet, unvexed by rapids, eddies, or falls, and navigable, so to speak, for a fleet of *Great Easterns*. In great loops the river winds its way through the perfectly flat valley towards the Kootenay Lake, which terminates the valley, the land gradually merging with the waters of this very beautiful mountain lake, which for scenic beauties is a worthy rival of the most picturesque Swiss lakes I know. To understand the peculiar character of the Lower Kootenay Valley, the fact must be pointed out that at one time—geologically speaking not very long ago—Kootenay Lake extended up the whole trough-like length of the valley to Bonner's Ferry, and that it gradually receded as the depres-

sion became filled up with the alluvial silt-like deposits swept down from the upper country by the river, building up new land, and affording a very good illustration of Lyell's theory, according to which true alluvial deposits may raise themselves by accumulation above their depositing waters. This explains the circumstance, of which I have never seen the like—at least not on such an extensive scale—of a 60 or 65 miles long, and from 3 to 4 miles wide valley, from end to end almost perfectly level, and gradually merging into the lake at one extremity, the land being nearly on the same level with the water of the lake, and overflowed by it when the spring freshets cause the lake to rise. Through the broad extent of this billiard-table-like land—in summer a luxuriant pasturage—the stately river flows on its way to the lake, fringed on both sides by groves of fine elm-like cotton-wood trees and alder thickets, giving the broad level meadows that intervene between the bank of the river and the densely forested slopes of the side hills, a most attractive park-like appearance, which is not lessened if we see it in late summer by the five and six feet high grasses that grow on these flats in almost tropical rankness, betraying the great fertility of the soil.

"The question of soil requires a few words of explanation concerning the annual freshets which, with the regularity of the Nile inundation, turn the valley for a short period into a lake, leaving, when the waters subside, a thin film-like layer of earthy substance on these flats, where these silicious deposits get mixed with the vegetable mould, the natural produce of its luxurious perennial vegetation, rotting every autumn on the site of its growth, and thus producing a soil of quite amazing fertility. These layers have been built up in the course of ages, apparently from a great depth, for, with two or three exceptions, occurring where the river, winding from side to side of the valley, approaches the foothills quite close, there is not in the whole length of the Lower Kootenay River a rock or a stone, or a particle of gravel to be seen, on its steeply-rising banks, which again, when the river is quite low in late autumn, show very distinctly the annual layers of this land-building process. We made some fairly exhaustive soundings, and, with no exception, we found that the bottom of the river consisted of precisely the same silty earth of which the whole body of land filling the depression between the mountains consists.

"Even more interesting to me than the mines on Kootenay Lake—which was our immediate goal—was the problem whether the annual overflow of the otherwise very valuable 'bottom land' forming the valley of Lower Kootenay could not by some means be prevented. It was just as well that I first saw the country at its worst, when the huge volume of water with which one has to deal made itself so impressively apparent, for later on in the summer it is hard to believe the extent of the freshet. The facts, as I gradually discovered them in the course of the several months that I devoted to my examination, are simple but of portentous proportions. Kootenay Lake, a large though narrow sheet of water 90 or 100 miles long, has only one outlet for its waters—a torrent-like stream, with rapids and small falls, making a descent of 700 feet in its short course of 25 miles, when it joins the Columbia River. During the greater part of the year this outlet is sufficiently large to control the considerable inflow into Kootenay Lake, there being, besides the Kootenay River—the size of which can be imagined from the dimensions I have given (600 ft. to 700 ft. wide, 45 ft. deep)—numerous creeks and streams, rising in the mountains that enclose the lake on all sides, that pour their water into this profoundly deep reservoir. In spring, when the snow begins to melt and the rivers and creeks increase to double and treble their ordinary size, the narrow outlet of the lake no longer suffices; and, finding no other place of discharge, the lake rises, and continues to rise, for more than a month, till at last, about the end of

June, its level is from 10 ft. to 20 ft. higher than it is about March. As the whole valley is raised only slightly over the level of the lake at low water, this rise suffices to inundate the vast 'bottoms,' as the flats separated from each other by spurs jutting out from the side hills are called, to a depth varying in different years from 2 ft. to 8 ft. The waters fall much more rapidly than they rise, and in ordinary years the bottoms are high and dry by the latter half of July. Each annual overflow, of course, raises, as I have already said, the surface of the bottoms by a film-like sheet of earthy deposit; and besides, new land is being continually though slowly formed at the mouth of the river, old Hudson Bay Company fur-traders who have lived in the country for twenty or twenty-five years noticing a marked addition to the land where river and lake merge with each other, even in that comparatively short period.

"Examining the whole problem from a geologist's point of view, it becomes patent that this land-forming process is of comparatively recent origin, for in the eyes of a science that regards a million of years as a short day, the process of building up land at the rate of even as little as half an inch per annum is but of yesterday's origin, and probably brought about by some elementary influence disturbing the relative capacity of inflow and outflow. To me it appeared self-evident that were the outlet sufficiently large the lake would not rise and the valley would not be overflowed, or rather, had the outlet continued to remain of the requisite capacity the valley would never have been formed. The discovery I made soon afterwards, when examining the outlet, seemed to corroborate the correctness of the above surmise. I found that at one place at the commencement of the outlet the channel had become contracted by a fan-shaped bar of stones and boulders, washed down from the impending heights by a side torrent. My further and more thorough examination of the conditions brought about by this confining accumulation removed all doubt from my mind concerning the immediate result of removing this bar, thereby restoring to the outlet its original capacity, and thus preventing, it is more than likely, the lake from rising: the solution of the whole difficulty. A work of some magnitude, particularly in so remote a spot, it yet is a feasible one, especially when the short railway is finished, which some Californian capitalists, interested in the mines on Kootenay Lake, propose to build down the 25-miles-long outlet, so as to connect the navigable waters of the Kootenay River and lake with those of the Columbia River, by which the Canada Pacific rail system can be reached, and for which line the surveys were made during the last summer. The cost will then be not out of comparison to the value of the overflowed land in the valley, land that needs no other expenditure or preparation to make it at once available for a high degree of cultivation, the climate, situation, and surroundings being most favourable.

"Considering how few travellers of note have ever penetrated into the Kootenay country, the records of those who have done so evince an uniformity in the praise of it that points to an early development now that the district is being thrown open by the advent of railways and the general westward pressure of civilisation in North America, attracted, in this instance, more by climatic advantages than anything else. From De Smet (who, in his 'Correspondence,' writing in the year 1845, says of the head of the Upper Kootenay Valley, after much general praise: 'The climate is delightful, the extremes of heat and cold are seldom known; the hand of man would transform it into a terrestrial paradise') to the next visitor, the veteran traveller Sir George Simpson (who, in his *Narrative of a Journey round the World*, calls the Lower Kootenay valley 'a little paradise' and 'a spot so soft and lovely that a traveller fresh from the rugged sublimities of the mountains might almost be tempted here to spend the remainder of his days amid the surrounding

beauties of nature')—we hear unstinted praise. Captain Mullan, the explorer of the North-West, in his Report (1854) to the U.S. Senate, speaks of the Upper Kootenay Valley in flattering terms, chiefly drawing the attention to the early springs there, and the very different and much more attractive appearance of the country compared to Western Montana, through which he had made his way. He and his party arrived at the river on April 26, 1854, and found: 'The soil along the Kootenay river is very fertile, and at the point where we struck it, it was carpeted by a beautiful greensward, upon which was growing an exceedingly great number of beautifully-coloured and varied plants. This place is a great resort for the Kootenay Indians when not hunting in the mountains, as here is found at every season an abundance of excellent nutritious grass. The winters are represented as being mild, and the waters of the Kootenay River afford them at all seasons a bountiful supply of salmon trout.' From the next visitors, the International Boundary Commission, under Col. (now Sir J. S.) Hawkins, but little record has been published, for, with the exception of an interesting paper on the Kootenay Indians by one of the assistant Commissioners (Sir Charles Wilson), all the various reports of the Commission, embracing matter that is becoming daily of greater interest and importance, and covering a period of two years, which were spent by the commission in a country upon which authentic information is very desirable, are still buried in the archives of the Foreign Office in their manuscript shape—an unwelcome suppression of public documents that appears all the more regrettable to those who know the beneficial influence the publication of similar matters collected by the various United States Government explorations has had upon the early development of the West, an example that could have been easily followed by the English Government, considering that the Boundary Commission was supplied at the public cost with the necessary staff of geologists, botanists, and astronomers. Palliser's well-equipped expedition, who visited British Columbia about the same time that the Boundary Commission was at work, has left more satisfactory record of its labours in the four Blue Books presented to Parliament in 1863, documents to which I have referred more than once; but, as they do not extend beyond the Kootenay district, a large portion of that province, so far as authentic information comprised in public documents is concerned, is to-day perhaps less known than the interior of Africa, and yet it is a country that, for a multitude of reasons, claims our attention to a high degree."

AUSTRALASIA.

Mr. Forbes's Expedition to New Guinea.—Members of the Scottish Geographical Society will be gratified to learn that letters received from Mr. Forbes, posted between his arrival in Batavia and his departure for Thursday Island, show that his expedition has made a successful start. Mr. Forbes proceeded to Amboina, in the Moluccas, and although, to his regret, the journey occupied a month, he was rewarded by engaging there the very same men who accompanied him in his expedition to Timor-Laut in 1882, described in his recent work, *A Naturalist's Wanderings in the Eastern Archipelago*. One of these men was in New Guinea both with Dr. Beccari, and with the Russian philologist, Baron Miklukho Maklay. These men from Amboina, with bird-skinners from the same place, and coolies taken as carriers, will be Mr. Forbes's servants; and the cost of the expedition may be noted from the fact that, for every man so taken, Mr. Forbes has had to deposit £40 with the authorities in Batavia. Happily, the grant of £500, which was made towards Mr. Forbes's expedition by the Australasian Geographical Society, has enabled him to proceed, after incurring this preliminary expense. Mr. Lawes acts as agent for the Australasian Geographical Society, and pays such sums from this grant as are

required. General Scratchley, too, has sent kind letters to Mr. Forbes, and seems disposed to befriend him. At Amboina Mr. Forbes met the officers of H.M.S. *Merapi*, who had been with Van Braam Morris exploring the Amberno River, and they expressed their opinion that the interior of New Guinea is not inhabited. However, it is impossible as yet to say what may be the condition of the Owen Stanley part of New Guinea, whither Mr. Forbes proceeds, and which is still unexplored.

Mr. Forbes expected to set foot on New Guinea by the 8th or 9th August. His expedition will consist of five-and-twenty men—including four hunters, twenty coolies, with an overseer—which will cost him the sum of £800. In a letter received from him by Mr. Ralph Richardson, honorary secretary, on August 26th, Mr. Forbes says:—"I need not say that all that Scotch perseverance can accomplish will be done to make the expedition a success, were it for nothing but to prove to the Scottish Geographical Society, which has so nobly sustained our part, that its trust has not been misplaced. I hope we shall come back either *with* or *on* our shields. My gratitude to you and the Society cannot adequately be expressed in words. I shall, I think, best try to prove it by endeavouring to make the expedition a success. Mr. Mackinnon had instructed the agents of the Netherlands India Steamboat Company to allow me a reduction of 30 per cent. both on the men's and on my own passage, so that I was able to save something on their transport. Mr. Mackinnon's goodness has, therefore, saved me a good deal. I shall write you from Port Moresby." He was then (25th July) about to embark direct for New Guinea.

The Exploration of New Guinea.—As indicated in our June number, the Geographical Society of Australasia has taken up most vigorously the exploration of British New Guinea. To aid it in this object £2000 has been voted by New South Wales, £1000 by Victoria, £1000 by Queensland; and South Australia is considering the propriety of making a contribution also.

Advices received in Sydney state that, so far, everything had gone on satisfactorily with the expedition, the members of which were reported to be in good health and spirits. It was understood that the Queensland Government had offered to hold frequent communication with the party by means of the steamer *Advance*, with the view of obtaining frequent information of their progress. Mr. J. Maiden, Secretary of the Geographical Society, who accompanied the expedition to Brisbane, was on his way back to Sydney. He had reported that the formation of a branch of the Society in Brisbane had been projected. Steps are also being taken to form in Adelaide another branch of the Society, which is represented in Sydney and Melbourne; and it would be gratifying to hear that others had been formed in each of the seven colonies. The Society, when so completed, would be practically all-powerful, and the "exploitation" of New Guinea might be safely left in its hands.

According to *The Colonies and India*, August 7, Major-General Scratchley had left Sydney for Wellington with the object of conferring with the Government of New Zealand in regard to New Guinea.

New Guinea: Kaiser Wilhelms-Land.—We have received the first two numbers of *Nachrichten für und über Kaiser Wilhelms-Land und den Bismarck-Archipel. Herausgegeben im Auftrage der Neu Guinea Compagnie zu Berlin.* The first number contains the map of the German possessions in New Guinea and the neighbourhood, published by Friederichsen of Hamburg, which we noticed in July.

A strong party of officers, including foresters and other specialists, have already started, with orders to call at Batavia to enlist coolies, and obtain useful advice as to their future proceedings. The most important work done as yet is the discovery and survey of the valuable Friedrich Wilhelm harbour, near the "Archipelago of the Contented," in Astrolabe Bay. The commander of the Samoa,

by means of the vocabulary collected here by Miklukho Maklay, was able to establish intercourse with the natives, and to purchase land,—too often the first step towards a misunderstanding. At other points on the coast this was found to be impossible, owing to the fact that several villages seemed part-owners of a plantation. The country is described as clothed with dense forest from the coast upwards for several thousand feet. Further down the coast the country is more open, with sloping hills, grass lands, and numerous streams. The remarkable terraces which here rise one above the other from the shore, were found on examination to be of coralline limestone, and were therefore in all probability ancient beaches. The contour of the south coast of New Britain is reported to be very different from that given in the charts, for the bold headlands of the map turn out to be islands, more or less united to each other, and to the mainland, by reefs. But the examination made was only superficial.

Area of New Guinea.—The *Mittheilungen der Geographischen Gesellschaft* in Hamburg gives the area of the different territories in New Guinea, according to recent calculations by Mr. L. Friederichsen, as follows :—

	Sq. Kilom.	Engl. Geog. Sq. Miles.
Kaiser Wilhelm's-Land, ...	179,250	52,088
British (including the islands to the south-east, which are estimated at 7575 sq. kil. ; or 2201 sq. m.)	233,038	67,718
Dutch, ...	390,560	114,323

The total area of New Guinea is thus 234,129 Engl. geog. sq. miles, which approximates very closely to the last computation by Perthes' establishment at Gotha.

The "Bismarck Archipelago" (New Britain, New Ireland, New Hanover, Admiralty, and other adjacent islands) is estimated at 52,177·48 sq. kilom., *i.e.* 15,162 Engl. geog. sq. miles.

Palawan Island.—A writer in the *British North Borneo Herald*, of July 1st, gives an account of the little-known island of Palawan, which looks like a long northern extension of Borneo. With a length of 240 miles, and a curiously disproportional width of at most 25 and often only 4 miles, the coast-line affords some valuable anchorages. Its products do not appear to be numerous, consisting chiefly, at present, of rattans, dammar, and one or two varieties of timber. The principal mammalia on the island are pigs, monkeys, and porcupines. It is said that no deer are found there. The inland population is classified by the Spaniards under four divisions, of which two are Negritoes, the other two resembling the Dusuns of Borneo. The northern coasts are inhabited by Bisayan, the southern by Sulu immigrants, the trade of the island being chiefly in the hands of the latter. The sovereignty of the island has always been claimed by the Sultan of Brunei, but the larger or more valuable part of the island, viz., to the north and west, is in the hands of the Spaniards. With the above may be compared the paper by D. Jacobo Alemán in the *Boletin* of the Madrid Geographical Society, 1878.

MISCELLANEOUS.

The International Geographical Congress, whose meeting was postponed last year, owing to the epidemic of cholera in Southern Europe, will hold its third meeting at Berlin on September 28, under the presidency of Professor H. von Dechen. —*The Colonies and India*, Aug. 14.

Rubruquis', or Rubruk's, Travels.—In the *Zeitschrift der Gesellschaft für Erdkunde*, No. 3, 1885, there is an elaborate study of the route followed by this eminent explorer of the 13th century, by Franz Max Schmidt. The accompanying map is on a large scale, and makes matters very clear.

NEW BOOKS.

L'Egypte : son avenir agricole et financier. By Félix Paponot. Paris : Baudry et Cie., 1884.

M. Paponot, one of the engineers engaged in the construction of the Suez Canal, is, from his large experience, well qualified to judge of the agricultural and financial future of Egypt. Napoleon, during his sojourn in Egypt, made use of the now memorable expression, that "every drop of water which flowed from the mouth of the Nile without first nourishing the country was so much money wasted;" and this practically forms the basis of the author's argument, that by developing the irrigation works of the country—at a further outlay of 150 million francs—Egypt might regain some of her former greatness. M. Paponot has made a very careful study of the subject, and has further added an *exposé* dealing with the construction of the Canal, reproducing some of the official documents. The work is illustrated by numerous diagrams and cuts.

The Coming Struggle for India. By Arminius Vambéry. London : Cassell & Company, 1885. *Price* 5*s*.

As in this volume Professor Vambéry goes over much the same ground as in the lectures he recently delivered in this country before the members of the Scottish Geographical Society and elsewhere, we do not require to say more than that, in spite of the objections raised against him as a political controversialist, Professor Vambéry's writings will, or should, always be regarded as important contributions to the subject he has made so entirely his own. We have nothing to do with his politics, further than to express our conviction of the purity of his motives in so vigorously taking up the cause of British interests in Central Asia : those who know the manly independence of his character will be the last to prefer against him the contemptible charge of party spirit. His ardent championship sometimes leads him into inexact, often into intemperate, statements ; but in his present work these failings are not so evident, for, necessarily, in order to bring the book up to date, he has had to rely in a great measure on the testimony of others, of whose authority we are able to judge for ourselves.

The text is illustrated by a map which shows very clearly—what we think should not be called "The Russian Advance towards India," but the *Expansion of Russia*,—the latter phrase better indicating that the movement is only what must happen in the history of every civilised and civilising nation, whatever construction our own individual interests may place upon it. The expansion of the British Empire is the best example of this.

Afghanistan and the Anglo-Russian Dispute. By Brigadier-General T. F. Rodenbough, U.S.A. Maps and Illustrations. New York and London : G. P. Putnam's Sons, 1885. *Price* 50 *cents*.

General Rodenbough has contrived to string together from some sixty acknowledged sources a very readable, though somewhat disconnected, history of the cause of the Anglo-Russian dispute ; a description of Afghanistan, "which is destined to be the arena of a great international duel," and of the armies and military disposition of the rival Powers. The gallant author has a genuine appreciation of the military aspects of his subject ; but as regards the more strictly geographical and ethnographical portion, which mainly concerns us, he is not always up to date. But this serves only as a background for the *Kriegspiel* which he seems to be looking

forward to. The book bears the most evident signs of haste ; we were therefore scarcely surprised to read in the concluding chapter that it was written and printed in a fortnight—a *tour de force* for which both author and publishers deserve considerable credit.

Hundert Tage in Paraguay.—Reise in's Innere. Paraguay im Hinblick auf deutsche Kolonisations-Bestrebungen. Von Dr. Hugo Toeppen. Mit einer Karte von Paraguay. Separat-Abdruck aus den *Mittheilungen der Geographischen Gesellschaft in Hamburg*, 1884. Hamburg: L. Friederichsen & Co., 1885.

This is a very sensible and serviceable volume. Dr. Hugo Toeppen having obtained six months' leave of absence, for the sake of his eyes, determined to turn his holiday to account by learning for himself whether Paraguay was a country suited for European, and more especially for German, colonisation. He seems to have maintained throughout a most impartial frame of mind, ready to accept any fact, good or bad, that proved itself to be a fact. Direct and business-like, with no apparent attempt at being picturesque or amusing, his report is readable throughout, and bespeaks a man of culture and ability. While largely based on the traveller's own observations, it frequently incorporates, for the purpose of confirmation or criticism, the testimony of previous explorers.

The attention of cartographers must be specially directed to the corrections Dr. Toeppen has made on all previous delineations of the Paraguayan river system. Both the maps he had with him—Wisner de Morgenstern's and Keith Johnston's—proved, as was to be expected, inaccurate in many minor details, as well as in some points of considerable importance, such as the position of the principal water-parting. The sub-system of the Jejuí is thus described by Dr. Toeppen (pp. 98-99), who differs not only from the two authorities just mentioned, but also from Rengger, Page, Azara, and Du Graty :—

" The system of the Jejuí is as follows :—At a considerable distance east of Igatimi rise the Jejuí-guazú, and the more northern Jejuí-mi ; under the meridian of Igatimi, they are not more than 3 leagues distant from each other, and they unite 3 to 4 leagues west of Igatimi ; the united stream bears the name Jejuí, but is more seldom called Jejuí-guazú. It receives from the left hand two principal affluents, the Curuguaty, and the Capivari. The former must rise to the east of Curuguaty ; the latter not much to the N. or N.N.W. of San Joaquin. The general direction of each in its lower course must be approximately north-west. The Curuguaty receives from the left hand the Carimbatay, and lower down the Rio Corrientes, whose sources cannot be far distant from those of the Capivarí. On the right side the Jejuí receives three main tributaries—the Paray, the Itanará-mi, and the Aguaray-guazú. The Paray is joined by the Arroyo-guazú from the left, the Itanará-mi, the Upoy, from the right. Both fall into the Jejuí *above* the confluence of the Curuguaty."

With the course of the Aguaray-guazú Dr. Toeppen became intimately acquainted. On February 1, 1884, he started from Panadero (a settlement on the left bank, which dates from the Spanish period, and was one of the places where Lopez encamped for a time), for the purpose of boating down the river. At this point the width from bank to bank was about 45 feet, and the depth enough for large boats, called *chatas*, drawing 2 ft. of water, and carrying at the most about 2000 arrobas. Some miles higher up there is a considerable fall, 40 feet high, which Dr. Toeppen proposes to call the Paoli Fall, after the yerba-grower at Panadero, who discovered its existence in 1879, while seeking to utilise the river as a waterway from the

junction of the Nu-guazú. On the morning of the sixth day, before sunrise, the two canoes from Panadero reached San Pedro, a port on the Paraguay, at the mouth of the Jejuí. The town of San Pedro is described as a dead place, with long grass-grown streets, a dilapidated church, and a small market building, which might be smaller for all the trade carried on in it. On his return to Asunçion by the Paraguay, Dr. Toeppen found himself just in time to attend the sale by auction of the estate and property of Mr. Hopkins, an American from the United States, who had been settled at Patiño-Cué for many years. The estate did not find a purchaser at £300, and all objects of European or North American manufacture went at a high price. Of the German colony at San Bernardino, to which he naturally paid an early visit, our traveller does not give too favourable a report. The district on the north side of Lake Ipacaray, assigned to the colonists, covers 170 square miles, stretching upwards from the shore to the plateau behind. Besides the town proper, or Stadtplatz, in the low grounds, there is a village called, from its position on the heights, Altos, which has sometimes been erroneously described as the seat of a second German colony. The colonists in 1883-4 numbered only 200, and several families proposed to leave after the harvest. Fortunes were not to be made any more rapidly at San Bernardino than in any other undeveloped pastoral-agricultural region, with difficult access to a sufficient market. In summing up his conclusions as to the value of Paraguay as a field for immigration, Dr. Toeppen leans to the prudent side. While acknowledging the extraordinary natural advantages of the country, and pointing out that it may now be said to enjoy a settled government, with satisfactory security for life and property, he expresses his conviction that in the present almost primitive position of agriculture and commerce, great caution ought to be exercised on the part of the intending settler, who need not expect either to secure a livelihood without labour, or, with any possible amount of labour, to realise a fortune in a fortnight. We have not space to refer to one-half of the questions treated of in Dr. Toeppen's volume—to his discussion of climate, population, maté-growing, etc. In conclusion, we simply mention that, in opposition to Page and Johnston, he affirms that the Paraná is not an instance of the so-called Baer's Law, but another proof of the rashness of that generalisation, having bluffs or barrancas on the right bank as well as the left, notably at Villa Formosa, Cerito, Rosario, San Nicolas.

Hunter's Illustrated Guide to Perthshire.
Perth: "Constitutional" Office, 1885. *Price* 1*s.*

The authors of this remarkably cheap volume do not know how to put their best foot foremost. The first thing to meet the eye is a map of the county which must have been originally engraved upwards of a generation ago, to judge by the hideous style in which the mountains and lakes are figured, or, rather, disfigured. If the publishers will take our advice, this will be the last season in which they will associate their guide-book with such a caricature of cartography. Mr. Hunter's text deserves better company. If, at times, he succumbs to the temptation to stilted grandiloquence which seems to be the vice of style most *prochain* to the guide-book writer, one can readily forgive him in consideration of the really interesting material he has collected about his county, and the generally unassuming way in which he presents it. At page 2 the area of the county is not according to the latest measurement by the Ordnance Survey.

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE PORTUGUESE POSSESSIONS IN WEST AFRICA.

Read at Meeting of British Association, Aberdeen, 1885.

By H. H. Johnston, F.Z.S., F.R.G.S., etc.

During the year 1882 and 1883 I visited at various times every Portuguese possession in West Africa, with the exception of the doubtful one of São João de Ajudà, a fortress on the coast of Dahomé. Beginning at the extreme southern limit of Portuguese dominion, in 17° S., on the river Cunéné, I gradually worked my way further and further north on horseback, on foot, by steamer, by hammock-bearers, until I reached the north of the river Congo. Thence I made my journey to Bólóbó, and for a while forgot my interest in the Portuguese colonies in my admiration of Mr. Stanley's great project. Nevertheless, on returning to Angola for a short repose, I resumed my intention, and finally continued my journey northward, stopping at every principal colony of the Portuguese on or off the African coast, until Madeira was reached and I found myself on the threshold of Europe. On my return to England public attention was so engrossed by the Congo questions that I devoted myself to that subject, and put aside my treatise on the Portuguese possessions in West Africa. Then ensued my journey to Mount Kilima-njaro, undertaken at the joint charge of the British Association and the Royal Society; and thus it is that two years have elapsed between the reading of the present paper and my return from the countries I am about to describe.

Starting from the north, the first Portuguese West African possessions to be encountered are the Cape Verde Islands. These consist of an archipelago, stretching over some four degrees of latitude between 18° E. and 14° N., at an average distance of three hundred miles from the coast of Africa. Counting the rocky uninhabited islets, as well as the larger

islands, there are some eighteen in all. The chief, in point of size and population, is Santiago, the capital of which (Porto Praya) is the principal seat of Government and the residence of the Governor.

Santiago, which lies a little to the northward of the fourteenth parallel, has a superficies of about 500 square miles and a population of nearly 37,000. The interior is fertile and well cultivated. It is, moreover, traversed by excellent roads, with strongly-made bridges across the many ravines, that are most creditable to Portuguese engineering. Whatever faults the Portuguese may possess, they are at any rate good road-makers, as any one who has visited Madeira, the Açores, Saint Thomas, Prince's Island, and many parts of Angola, can testify. The mountains in Santiago rise to upwards of 8000 feet, and from their sides gush springs of delicious water, which are carefully husbanded and used to irrigate vast plantations of Indian corn, castor-oil plant, sugar-cane, pine-apples, tobacco, etc. Water is also conveyed in leaden pipes from the distant mountains into the town of Porto Praia, where it is stored in a vast reservoir. Great numbers of date and coco palms are grown in the island. It is a moot question whether the former, viz., the date palm (*Phœnix dactylifera*) is or is not indigenous to the island. Of course it extends naturally into northern Senegambia from the southern borders of the Western Sahara. There is no distinct record of its introduction into the Cape Verde Islands by the Portuguese, who introduced almost every other kind of tree or plant. As a matter of fact, the indigenous fauna and flora of this volcanic archipelago are mainly of an African character intermingled with certain desert forms. There seem to have been a few Negro inhabitants—probably allied to the Wolof of Senegal in the island of Santiago, when the Portuguese first arrived; but this autochthonous population, if it really existed, was soon swallowed up by the numbers of imported slaves from various parts of West Africa. At present the country population of the islands is more or less black and Negroid, and the inhabitants of the towns are of Portuguese blood, slightly tinged with a mulatto intermixture. This, it seems to me, is somewhat dying out, and the later emigration from the home country and the abolition of slavery is rendering the white race whiter and the dark race blacker. In short, the Negro and Caucasian elements are holding themselves more aloof.

Among the other mammals inhabiting these islands there is not one that can properly claim to be truly indigenous, unless it be a species of bat. There are a few genets and ichneumons, and some grivet monkeys run wild, which owe their introduction to man. Guinea-fowls are abundant, and may be self-introduced. Kites, Egyptian vultures, the common crow, the scapulated crow, and other raptorial or carrion birds are common, and their presence as scavengers is encouraged by the Portuguese. The frigate bird frequents the shores of these islands at certain seasons of the year. Quails also visit this archipelago in their migrations. The only bird peculiar to the Cape Verde Islands is a kingfisher belonging to the genus *Halcyon*, closely allied to West African forms. This little

creature, which is very brightly coloured, is more easily tamed and kept in confinement than most of its kind, who are generally inconsolable in captivity. It is fed principally on boiled rice, millet, and chopped-up meat. In a wild state it feeds upon insects, and haunts the fruit trees of the islands for that reason. The inhabitants of Santiago aver that it also eats the fruit.

The few vegetable forms indigenous to this archipelago are mainly African in their affinities, and chiefly consist of dwarf acacias, cucurbits, and aloes. Orchilla lichen (*Usnea*) grows abundantly in many districts, and forms an important article of export. Horses, mules, donkeys, oxen, turkeys, geese, and other live-stock are advantageously reared in certain of the Cape Verde Islands, and exported principally to other Portuguese possessions in Africa, besides supplying the mail-steamers which call at Saint Vincent. The Cape Verde ponies are in much request in São Thomé and Angola, as they seem to stand the climate better than European breeds.

Commercially, the most important of these islands is Saint Vincent, a telegraph station and a calling-place for many South American, West Indian, and African lines of steamers. The English Mediterranean fleet sometimes touches here. There are Consulates of almost every recognised Power, and hotels of every prominent nationality. The little island of St. Vincent is almost utter desert, and is only frequented on account of its position and its magnificent harbour. It is nourished by the large and fertile island of Sant' Antão, or St. Anthony, which lies two or three miles distant. The strait between São Vicente, as the Portuguese call it, and Sant' Antão forms the fine harbour of the former island. The entire population of this archipelago probably does not exceed 90,000.

Originally dependent on the Cape Verde Government were the Portuguese settlements in Senegambia, now constituted a separate colony under the title of "Guiné Portugueza." These consist mainly of Ziguichor on the river Casamança, of various establishments on the rivers Cacheo and Geba, one of which lies at a distance of nearly 200 miles from the coast, and of certain islands in the Bissagos Archipelago, on one of which is situated the thriving town of Bolama, the seat of Government for Portuguese Guinea.

Bolama has a very pretty and inviting appearance from the joint estuary of the rivers Geba and Grande, which it faces. The houses being mostly white with red roofs, or entirely built of red brick, and the whole city embowered in the brightest green vegetation, with fine trees dotted here and there, the general effect of colour is very pleasing and gay. The approach to the shore is rendered a little difficult on account of the half-submerged wrecks of some old river steamers belonging to the Government, but it is to be hoped these will soon be removed. The town is large, and the streets are broad, clean, and lit with oil lamps. Several well-built houses are observable, notably the residence and commercial establishment of the Visconde d'Almeida. Some of the buildings have a

Moorish look, with their long arcades and parterres, their avenues of orange-trees, and their wells or fountains of water in the inner square. Here, in the courtyards of many a residence, may be seen the animal pets, of which a Portuguese is so fond—spur-winged and Egyptian geese, baboons, monkeys, paraquets, and even occasionally a young leopard. There is a handsome church, and there are also extensive barracks in Bolama which have been newly built of a combination of red brick and iron—very pleasing in appearance, but, I am told, rather hot. The natives' houses seem more sensibly adapted for the climate. These are usually provided with immense thatched roofs, stretching right out from the house towards the ground, and forming a kind of sheltered verandah or court all round, wherein the inhabitants sleep in the dry season. This also adds to the privacy of the dwelling, for outsiders cannot see more than the legs and ankles of the inmates, so low does the roof overhang. As Mohammedan influence is prevalent here, and it is the faces of the fair inhabitants that one is desirous of hiding, the legs mattering little, this arrangement of architecture must meet the views of such as keep their women-kind in Oriental seclusion. There is, however, another kind of dwelling in Bolama, and its vicinity, more especially in use among the pagan Negroes. This is a *round* house of clay and wattle, with a thatched roof, of a style which is almost characteristic of the Sudan, prevailing in the Niger basin, Bornu, the valley of the White Nile, Abyssinia, and Gallaland, and re-appearing also among the Bantu races of Southern Africa.

Amidst the native huts stands many a fine tree, especially a species of Bombax, called by the negroes "poïla." They dance round these trees on certain nights with the terpsichorean fervour of their race.

To the anthropological student, Bolama is a very interesting place, as it is the rendezvous of many distinct African peoples. First, there are the indigines of the island, the Papeis, who are black as soot—a good comparison, for their skin is a really dead black without any lustre. They are often fine, tall men, but their faces are low and ugly, exhibiting much prognathism. Their hair is rather tufty—or, as the French would say, *floconné*—in growth. The Papeis seem, according to all accounts, an unintelligent race. The clothing they wear is of the slightest, and does not subserve any purposes of decency. They speak languages which are linguistically very interesting from the approximation in structure which they make towards the Bantu group. The markets of Bolama are resorted to by many Mohammedan races of the mainland—Mandingos, Fulas (or "Fulbe," as they call themselves), and others. These are at once distinguishable by their finer features and picturesque Moorish clothing. The Fula women are quite yellow, and have long crisp hair in plaits. The men are a trifle darker in complexion, and their hair is slightly more frizzly. The Mandingos are altogether darker, and more Negroid, and their hair is shorter and more curly than that of the Fula.

The Mandingo women are wrapped in cotton garments of quite an Arab cut, roughly dyed with native indigo, and the men, who have

solemn long faces and peaked beards, wear Sudanese "abbas," with huge sleeves. Their heads are either covered with a red fez or a very broad-brimmed hat of plaited reeds. Round their necks hang rosaries of black beads, and amulets made of written extracts from the Koran, enclosed in leathern coverings. Many other Negro races have their representatives in Bolama, very distinct in type, but whose names it is difficult to ascertain and record. They come from the mainland at the north of Bolama, where nearly every congeries of villages is inhabited by a different tribe. The Krumen from Sierra Leone who are settled in Bolama, the half-breeds and hybrids between all these different races, with a fair intermixture of Portuguese mulattoes, add to the diversity of types and the babel of tongues.

Amongst the white inhabitants, those of Portuguese nationality naturally prevail, owing to the soldiers of the garrison and the Government officials, but all the principal merchants are French, and the commerce of Portuguese Senegambia is almost within their hands. They have many trading establishments, not only in Bolama but in most of the neighbouring islands. The greatest trade is done in ground-nuts, of which shipful after shipful is sent to Marseilles for the manufacture of spurious olive oil. Besides this, wax, coffee, cocao, india-rubber, and hides are also exported.

Several of the large islands in the Bissagos archipelago are inhabited by a semi-piratical race, which owes a fluctuating allegiance to the Crown of Portugal, and its chiefs take advantage of this to come and solicit presents at Bolama. The temperature of this part of Africa is high, and the heat more oppressive than in regions nearer the equator; nevertheless, in spite of this disadvantage, Bolama is not an unhealthy place, and the Portuguese and French residents have assured me that the loss of life among Europeans is decidedly less than in Senegal or on the Gold Coast. The commonest ailments among the white population are severe agues and rheumatism. Yellow fever is quite unknown. Bolama and many of the adjacent islands and continental territories fortunately rejoice in the most perfect drinking-water—cold, clear, and sparkling, as it comes up from natural springs or artificial wells. The natural history, especially the anthropology and ornithology of Portuguese Guinea, are less known, and promise to be more interesting than any portion of the African littoral which I have yet visited. We seem to have here a kind of isolated loop or corner of the West African region, in which some of its most typical and peculiar forms still linger. I recommend this country, therefore, to African naturalists, as about the most accessible and promising field of research at present available. It is within about a fortnight's journey from Lisbon by comfortable mail-steamers, and is situated about midway between the English possessions of the Gambia and Sierra Leone.

Putting aside the doubtful Portuguese possession at Whydah, on the coast of Dahomé, which at most consists of a single fortress, the next colony on my list is the island of Principe (Prince's Island).

This is one of the four volcanic islands which stud the Gulf of Guinea longitudinally. Fernando Po is first, then comes Principe, São Thomé, and Annobom. The first and the last are Spanish, the two middle ones Portuguese.

Principe, which is about the size of the Isle of Wight, is situated on the second degree of latitude north of the Equator. It is distant some 200 miles from the coast of Africa.

The harbour of its principal town and port, Sant' Antonio, is one of the loveliest spectacles that tropical Africa can offer. The port is of amphitheatre-like shape, enclosed with two horns of tree-crested promontories. Immediately above the town, as it seems, an extraordinary peak rises almost precipitately 3000 feet into the sky, covered with dark-green forest to its summit, only leaving bare a few grey streaks of rock in one or two sheer descents. On either side of this strange conical mountain rise billowy hills of dark velvety green. The intensely verdant vegetation stretches from the clouds down to the waves. From a distance, the town has a charming appearance—its white, red-roofed houses standing out like a chaplet of beads against the background of unvarying green.

On a wooded bluff, to the left of the entrance into the harbour, was what I took to be a pretty little summer-house, half hidden amidst the luxuriant greenery, but which I found was in reality a fort, armed with a few old rusty cannon.

On nearing the town the pleasing promise of the distant view changed into a saddening reality of desolation and decay. The first object which struck my attention was a fine old ruined house—almost a palace—rising above the water to the right of the city. The glass still remained in most of its small-paned windows, but inside it was quite ruined and abandoned, though the sculptured cornices and other evidences of artistic work attested the taste and opulence of its original owner. It was said to have been built by an ancient Governor of the island, called Ferreira, but the information respecting it was vague and uncertain. The present Governor lives—if he still be living—in a fine-looking residence, too; but he would have done more wisely, in my opinion, to have restored and inhabited that of his predecessor, which was much more beautiful and more healthfully situated. Soon after landing on a stone quay projecting into the water—a fortunately persisting relic of former magnificence—you pass through some ramshackle streets, and cross a stone bridge over the mouth of the little river. Hence there is a charming view of the distant peak reflected in the placid water. Many coco-palms droop over the stream, women come here to wash clothes, and little naked children chase the mud-fish and land-crabs through the ooze. Consequently a transient air of life and cheerfulness is imparted to the scene, which soon vanishes as you make further progress into the streets of the half-ruined town. Here it is as a vast cemetery, a city of the dead, wherein the hideous Negro loafers are the ghouls and afrits. On every hand are to be seen the vestiges of former life and prosperity, in the numbers of fine buildings

falling into ruin and decay. Of churches alone there are five within a space of one square mile, four of which have been long deserted and disused. These have become magnificent ferneries. The visitor who squeezes his way through the low casements of the windows, or pushes open the unfastened door, at first stands amazed and entranced at the scene of fairy-like loveliness before him. The chancels have become grottoes tapestried with a soft lacework of pale-green maidenhair. From the altar spring the superb fronds of a dark-green palm-like fern, which might be a fit altar decoration. Climbing ferns hang from the roof in long festoons; lycopodiums of a vivid blue-green carpet the aisles; the angles and architraves of the building are thickly clustered with clumps of osmundas, pterises, davallias, and nephrodiums. It is a sight so beautiful that it atones for the terrible scene of ruin, decay, and neglect which lies beneath this lovely shroud.

In some cases the rusty bells still remain in the belfries, but the interior of these is so choked with ferns and interlaced with creeping cucurbits, that I doubt if the bells could swing and ring.

In the same locality, and closely surrounded by the ruins of these churches, stand the remains of what once promised to be a handsome edifice resembling a Roman forum in shape. It is all overgrown with fig-trees, wild melons, and ferns, and is the unfinished carcase of a palace that a rich merchant of ancient days—name unknown or forgotten—intended to build for himself in Principe. But as it grew and grew under the hands of the masons, it threatened to overlook the neighbouring churches. It was the opinion of the local junta (largely composed then of the ecclesiastical element) that no man should presume to build higher than the House of God, so the unfortunate palace had to be discontinued, and has remained ever since abandoned, incomplete and roofless. Had the Portuguese authorities in Principe any energy—which they emphatically have not—they would clear away the rubbish and the intrusive vegetation, and restore and complete this fine building, the greater part of which is in sound condition, for neither the lapse of time nor the many rainy seasons have affected its solid masonry.

There are one or two good shops and stores in Sant' Antonio, but the majority of the modern town is composed of little tumble-down shanties where the black population lives. These hovels have tiled roofs, but are otherwise built entirely of wood, and are raised on wooden piles above the muddy shore. Their planks are stained and rotted with many rains, and these rookeries look as if they swarmed with every kind of vermin, and would crumble before the slightest gale. The smell they exude is fetid. Were they not so mouldering and damp, it would be a charitable act to set fire to them, but I doubt if they would burn.

Beyond the town, on the left-hand side, is another river, or it may be a branch of the first described. There are the massive foundations still left of a large stone bridge. Further on, the stream is crossed by a high and rickety bridge of planks, thoroughly African in character and design.

On the other side of this stream immense cocao plantations begin, wherein the undergrowth is a thick brake of pine-apples, loaded with deep red fruit. (Principe was, as far as record goes, one of the first parts of Africa into which the Portuguese introduced the pine-apple from Brazil, and it is not therefore surprising that it grows wild all over the island. The actual date of its introduction, is, I believe, recorded in the Portuguese annals.) Hidden amidst these groves of cocao are more ruins, another church, and a walled-in cemetery of dismal aspect. The water of the stream already mentioned—I do not know and cannot ascertain its name—is icy cold and perfectly pure and free from sediment. Of course the trees and shrubs that border it are most luxuriant in growth, and the banks are covered with an almost impenetrable tangle of pink-leaved colocasias, crimson-flowered cannas and rank high reeds and grasses, over which many purple convolvuluses and wild gourds with their yellow blossoms and green and white pendent fruit, are climbing and interlacing their network of vegetable cordage.

The richness of the vegetation in Principe exceeds anything I have ever met with, and is simply indescribable in a few short phrases. Not an inch of bare ground is visible, save the few streaks of naked rock on the great peak. Nevertheless, with all this wealth of forest, the soil is said to be of slight depth, and the rocky foundation soon reached—indeed certain trees cannot grow here for that reason. This is what I am told by Portuguese, but it seems difficult of belief in the face of such lofty and luxuriant forests.

Very little of the land is under cultivation. The principal estate belongs to a merchant residing in São Thomé—I think of German or Spanish nationality. Cacao is the chief product of the island. Coffee is hardly existing, although, in order to encourage its culture, the Government has made its exportation free of duty, whereas in São Thomé, coffee exported pays 5 per cent. on its value. The interior of Principe is very mountainous, and covered with unbroken forest. Most of the trees growing in São Thomé are met with here, and apparently one or two species which do not exist in the latter island, but are common to Principe and the opposite highlands of the coast of Africa. The pandanus, or screw pine, is common in low-lying districts, and tree-ferns are said to be found on the high mountains.

The highest point of the island is the great peak rising behind the town of Sant' Antonio, the height of which is usually estimated at 3000 feet. It has never been ascended by a competent observer, or indeed by any one, as far as I can ascertain. From its appearance I can understand that it should be thought inaccessible. I was very anxious to make the attempt myself, but saw no prospect of organising a trip during my short sojourn in the island, which was dependent on the uncertain stay of the mail-steamer.

In Principe almost the chief wild creature is the grey parrot, and this bird exists in such incredible quantities as to have become quite the lord

of the island. Principe ought, indeed, to take as its arms a grey parrot on a field vert. It has driven away all the birds of prey, and if ever a hungry eagle or kite chances to arrive from São Thomé or the mainland, he is soon killed by the parrots. Whether they are also the cause of the absence of their pretty little kinsman, the green love-bird (*Agapornis*), I do not know. It is curious that in São Thomé there are *no* grey parrots, but myriads of love-birds, while in Principe it is just the contrary. The grey parrot of Principe, is, I must observe, gradually shaping himself into a distinct variety. He is becoming larger, losing his mimetic power, and generally developing a very savage, predatory nature. To call him grey is a misnomer. He is sometimes deep purplish brown in colour, with a beautiful blue iridescent sheen playing over his feathers, while his scarlet tail has become a reddish mauve.

There is not an indigenous land mammal on the island except several species of fruit-eating and insectivorous bats.

Hump-backed whales abound round the shores of Principe. The females come into these waters to calve.

Sharks are so numerous and bold that in the estuaries of the streams they almost take the place of crocodiles.

Man inhabits Principe to the extent of about 3000 individuals, of whom not more than 100 are white. The remainder are descended from freed slaves, and are only a tithe or less of the original population. They are compounded from a mixture of nearly every kind of West African Negro, with a decided infusion of white blood. The only language spoken is a Portuguese patois. The principal Portuguese officials consist of a Lieutenant-Governor, who receives an annual salary of £300, a commandant of the fort, who is, I think, only a sergeant, a Government doctor, and two white priests, who officiate in the only church which retains its roof.

This climate of Principe is said to be somewhat insalubrious during one half of the year, when the north wind blows over the poisonous exhalations of the Niger delta.

The ancient prosperity of Principe, so noticeable in the seventeenth and eighteenth centuries, declined and fell some hundred years ago to its present moribund condition, owing to the short-sighted policy of the Portuguese Home Government, ever, until the present reign, the curse of the colonies. Until this period, the wealth and prosperity of the island had been based on its sugar plantations. These, however, were crushed by a decree forbidding the exportation of sugar from Principe, in order that Brazil might enjoy the monopoly of the trade.

Portugal ever sacrificed her African to her South American possessions, and when she lost the latter, the decay of those earlier settlements in West Africa was far advanced.

To quit Principe, and arrive in the not far-distant island of São Thomé, is like leaving a cemetery for a public garden. São Thomé is as full of life and progress and enterprise as Principe is devoid of all these qualities.

This equatorial Madeira is an island of about 1000 square miles in area, situated almost immediately under the Equator.

The island of São Thomé has a very mysterious look from the sea. The huge peaks veiled in dark clouds, and the curious shapes that its mountains assume—all draped, as they are, in solemn purple forests; the apparent absence of life, and the great white breakers dashing in foamy leaps against the rocks and islets that surround the sandy shores, give it a fantastic look that must almost have deterred the superstitious navigator who discovered it from landing. It is an ideal Enchanter's Island. One very remarkable peak, which is distinctly seen from the sea, on the southern side, looks like a weird finger pointing towards the skies. Its head is often enveloped in clouds, and the entire absence of forest on its precipitous column-like sides distinguishes it, in all its nakedness, from the surrounding forest-covered hills. It is of basaltic formation, I am told, and bears the inappropriate name of Cão Grande, or "Big Dog." Nobody knows its height, but I should judge it to be about 1000 feet above the sea. Some of the peaks round it are assuming a similar shape and appearance, notably the Cão Pequeno, or Little Dog. These strange formations are probably due to the erosive action of the heavy rains, which wash away all but the hard core of ancient volcanic craters.

The highest peak in São Thomé reaches an approximate altitude of over 7000 feet. I do not think it has ever been ascended to the summit.

Only about one-third of the island is cultivated, but agriculture is decidedly progressing. Quinine, coffee, cacao, sugar, and coco-nut palms are the chief objects of attention, all growing at different levels; the quinine between two and four thousand feet above the sea, coffee a little lower than quinine, cacao not above 500 feet altitude, sugar-cane in the hot marshy valleys, and coco-nuts down on the very verge of the ocean. Several Portuguese have made and are making their fortunes over quinine and coffee growing, and there is consequently quite a pleasant amount of opulence and refinement in this lovely island. The country-houses, or Roças, as they are locally termed, of São Thomé are often charming abodes, combining in their unique surroundings the beauties of Switzerland and Equatorial Africa. Here you may meet with every reasonable accessory to civilised life—even æsthetic wall-papers only two or three years out of fashion, besides grand pianos, French novels, English, French, German, and Portuguese journals, reviews, and magazines, and the latest technical works on agriculture, as well as newly invented agricultural machines. Some of the São Thomasians light their pretty abodes with gas made on the premises—others boast of their fine studs of horses, or elegant carriages. In short, the civilisation, comfort, and enterprise which are prevalent in this island do not answer to the typical idea of a Portuguese colony.

It must be confessed that the system of organised labour that is at work accounts for much of this prosperity. The Portuguese are, I know, accused of practising virtual slavery, in forcibly apprenticing their black

subjects to labour for certain fixed terms of years. Into the rights and wrongs of this system I cannot enter now, as there is not sufficient space in a paper that ranges over such a vast space of territory; but I might remark that the coolie traffic, or the Pacific labour-trade, in which English, French, and Germans have engaged, is of a far more cruel and unjustifiable character than the apprenticeship system of the Portuguese, which is now under careful Government control. I can only say it works admirably in São Thomé, and a happier or better-cared-for class of Negroes than the Government apprentices I never saw.

The population of São Thomé is about 20,000, of which from four to five hundred are whites, including one hundred convicts. The coloured inhabitants of this island are necessarily mixed in race, for they are the descendants of the many slaves which were brought here from different parts of the West Coast during the days of slavery. However, the principal part of them came from Cabinda, the Congo, and Angola, and consequently spoke kindred tongues. The patois of the island seems to be a sort of corrupted Portuguese, intermingled with Bantu words and grammatical forms. There are a few Dahomean Negroes settled in the island, but they seem to have forgotten their original tongue. In the south portion of São Thomé are still existing a curious semi-independent tribe, the so-called "Angolares." These people had their origin in a crew of slaves that set out from Angola, towards the end of the last century, for Brazil. The vessel bearing them was wrecked on the southern shore of São Thomé, and the slaves mutinied, murdered the captain and officers, and escaped into the thickly forested hills. Here they established themselves strongly, and shortly afterwards began to make raids on the more settled parts of the island for food. At last their boldness reached a climax. They descended on the town of São Thomé, captured a quantity of women, and returned with new wives into the interior. For some time they were rather turbulent, and the Portuguese never seemed to take the trouble to subdue them; but in course of time civilisation and commerce began to effect a softening in their manners. They came to the settled parts of the island, to exchange the honey and other products of their forest-fastnesses against tobacco, cloth, and aguardente; and now, at the present day, they are quite peaceable, and Europeans hold estates in their once independent district. The Angolares at the present time number about 2000, and many of the young men are dispersed about the island, pursuing different trades.

The lower classes among the black population in São Thomé are not a very agreeable set, being rude, self-sufficient, and greedy for gain. They lack, however, the insufferably insulting manner of the Sierra Leone blacks. The civilised Negro—well dressed, well informed, and educated in Lisbon—occupies many important posts in the island Government. He is generally polite and gentlemanly in demeanour, wears patent-leather boots, fawn-coloured gloves, fashionably cut clothes, and a glossy silk hat. Further, as the rays of the equatorial sun might damage his complexion, he

is almost always seen carrying a white umbrella. And, really, I do not see why he shouldn't! People who are so anxious, on the one hand, that the Negro should be civilised, are nevertheless apt, when he becomes so, to sneer at him if he dresses as well as a European. Would they prefer that a man who has been to school, speaks French, plays the piano, and goes to Europe constantly for the sake of his health, should continue to wear nothing but the loin-cloth of his ancestors, with a straw hat on Sundays?

São Thomé, Principe, and the fortress of São João de Ajudà in Dahomé, form together a separate African province under the rule of a Governor, who resides in São Thomé, and receives an annual salary of £800. The chief judge in the island gets £350 a year. Most of the Portuguese officials on this island with whom I have come into contact are refined and agreeable men, speaking several languages besides their own, and thoroughly conversant with the chief topics of the day. They are very anxious to aid strangers in visiting and enjoying the beautiful island over which they govern.

Until 1879 there were only "padres indigenos" (coloured priests) in São Thomé, and it must be confessed that they were a worthless, ignorant, and immoral set; but then came some white priests from Portugal, who were fortunately an intelligent and energetic body of men, and they began to speedily make their influence felt on the island. The clergy here have a "provigario" (who occupies the place of a suffragan bishop) at their head. São Thomé, Principe, and Ajudà really form a bishopric of ancient date, but the office of bishop has been in abeyance for 150 years, and the provigario fulfils his duties. The ecclesiastic who at present occupies that position is a singularly able and enlightened man, enthusiastic in the cause of education. He has organised several very superior schools in the island, besides prompting the completion and initiation of works tending to the public comfort, such as draining marshes and making good roads.

The capital of the province, a town which is also called São Thomé, extends along a shallow bay, which is one of the few harbours in the island. It is called at times the Bay of Ana de Chaves, or the Bay of São João, or the bay of somebody else—indeed, for so poor a port, it has a great choice of distinguished names. Ana de Chaves was, I believe, a Portuguese heiress, into whose possession the greater part of the island came a few centuries ago. She wedded a worthy with the not very distinctive name of Gomçalo Alonzo. In a ruined church near the town I found a tombstone which marks the place of the burial of herself and spouse. It may be translated as follows:—"Here lie Gomçalo Alonzo and his wife, Ana de Chaves, whom death first separated and then joined." The Cidade (city) of São Thomé is a place which can boast of some very creditable public buildings. The Custom-house is provided with a fine long stone pier for the landing and embarking of goods, along which a little railway runs. The Town Hall or "Camara Municipal"

contains several really handsome apartments, hung with portraits of the present and late Kings of Portugal and bygone Governors of São Thomé. There are three or four churches in present use, wherein the interiors are decorated with much better taste than is usual among the Portuguese Catholics. The ancient Cathedral of the See (Sé) has been recently restored, but is now used as a Government office. A good hospital is built on one side of the harbour, and on the opposite side is an old grey fortress. There is a well-kept cemetery a little way out of the town.

The streets are clean, and the appearance of the houses is neat, if not always pretty. Some are built of stone, others of bricks, but wood as a building material prevails. Order is kept by an efficient and smartly-dressed body of police, who, save the small garrison of the fort, are the only representatives of force in the island.

The climate of São Thomé varies naturally with the altitude of the different localities. Above 3000 feet it is strangely chilly, considering the island lies under the Equator, and in many of the country-houses at this elevation fires are used in the evenings. In the plains near the sea it is hot, but not unusually so, the temperature in the shade very rarely exceeding 90°. It rains all the year round in the higher regions, but there is a dry season of three to four months in the plains. The climate, on the whole, is considered decidedly favourable to Europeans.

In natural history it is the botanical department which offers the most interest. The few native mammals were mostly introduced by man's agency. Birds, reptiles, and insects are poor in species. The vegetable products of the island are singularly rich. Three different kinds of trees produce india-rubber, valuable gums are exuded by others, while the timber of many kinds is much sought after for local use and export.

Altogether—and I am forced here to omit a number of favourable details—we may conclude that São Thomé is about the most satisfactory Portuguese settlement in West Africa.

About the new possessions of this Power on the Congo and Cabinda coast I shall say nothing, as at the time I visited them they were not Portuguese, and consequently I had no opportunity of judging of the result of Portuguese rule. I will therefore turn further southward to the old "Provincia d'Angola," the nucleus of which the Portuguese have possessed for upwards of 400 years. This valuable and extensive colony is under the supreme rule of a Governor-general, who resides at São Paul de Loando, and receives a salary of about £1500 a year. I believe this official also has control over the adjacent Congo territories.

The province of Angola at present extends from 7° 40′ to 18° S. of the Equator, and is further sub-divided into four districts, three of which have subsidiary governors, the fourth or home district being more immediately under the Governor-General. These three are called the Governments of Ambriz, Benguela, and Mossâmedes, Loanda being generally the designation of Angola proper, over which the Governor-

General has more direct supervision. Most places of minor importance are under the care of "chefes" or commandants. The number of white troops in this colony does not possibly exceed 1000, and these are mainly officers. The great mass of the army is recruited among the black population, and scarcely exceeds, I fancy, 8000 men. It is an inefficient force, and of no real value in maintaining order. Still, strangely enough, the Portuguese domination over the tribes in their large West African possessions exists and extends apparently by the free-will of the natives. In some posts in the interior the garrisons consist of ten black privates and a white corporal, who is probably a convict, and yet this seems sufficient to maintain order. The physical geography and natural history of such a vast region as the province of Angola, which stretches over eleven degrees of latitude and eight of longitude, naturally offer very varied and diverse features. Altogether, it may be described as, including within its limits, the finest, richest, and healthiest regions of West Africa, though these better portions generally lie at a mean distance of 100 miles from the sea, and consequently are as yet very insufficiently known. The littoral of Angola, though much healthier than the other coast lands to the north, is not of a very prepossessing character at first sight, and entirely misleads one as to the great richness of the interior. This is owing to its increasingly sterile, or rather desert, character as you proceed from north to south. It is hardly too wide a generalisation to say that the Kalahari Desert begins 50 miles south of the Congo. By desert a region of restricted rainfall and paucity of vegetation must be understood. At Ambriz, in 7° 40′ S., this dry, parched country is about 5 miles in width; at Loanda it has increased to 15, and at Mossâmedes to 70. Further south it extends for hundreds of miles nearly across the narrowing termination of the continent. When this cheerless district is crossed vegetation quickly assumes a very rich character, though its luxuriance retreats further and further from the coast-line as you proceed southward. Thus 100 miles inland, in the district of Mossâmedes (about 15° S. latitude), you reach the fine tropical forests which at Cabeça de Cobra, a point 50 miles south of the Congo, come down to the very sea-shore.

The interior of Angola is very mountainous. The ranges do *not*, as is generally stated, proceed regularly from north to south, in the manner of parallel terraces leading up the Central African plateau. There is, however, a gradual ascent as the far interior is reached. The mountains of Angola frequently reach a height of 8000 feet in the Chella, and other neighbouring ranges. I have myself ascended to an altitude of over 7000 feet. I believe the greatest *recorded* height is 8200 feet, but it is quite possible that in the Mosamba Mountains, whence many affluents of the Congo, Zambesi, and Quanza take their rise, this altitude is exceeded. No mountain reaching the snow-line has ever been reported.

Immense districts in the interior of Angola lie at an average elevation of 5000 feet, and consequently enjoy an almost European climate.

The chief rivers of this colony are, commencing from the north, the

Loge, which disembogues near Ambriz, the Bengo, the Quanza, the Cuyo, the Catumbella, and the Cunéné.[1] There are, besides, a multitude of minor streams and tributaries, so that the interior is one of the best watered parts of Africa. The river Quango (or Kwango), a great affluent of the Congo, has been recently recognised at the Berlin Conference as the eastern boundary of Portuguese dominion in the South-West Africa. On this stream, they have, as yet, no fixed settlement, though the district of Cassanje (Kasanji) has been at different times occupied by their soldiers. On the Cunéné (Kunēnē), in the far south, the Portuguese, at the time of my visit, had several flourishing settlements near its source, but only one—the fort of Humbi—on its middle course, and none whatever near the mouth.

But the chief river, commercially and politically, of this colony, is the Quanza (Kwanza), which Monteiro justly calls the "Gem of Angola." This fine stream, which is navigable by river steamers for nearly 250 miles from its mouth, has been in the possession of the Portuguese, during parts of its lower course, ever since the end of the fifteenth century. It is situated about 200 miles from the mouth of the Congo, and enters the sea in 9° south latitude. In some ways it may be taken as a zoological boundary, many peculiar West African animals and plants not straying far from its banks. It is an important commercial channel, and Dondo, which is situated some 200 miles from the sea, is a great emporium of South-west African trade, and attracts to its markets the products of the far interior of the rivers Quango and Kassai, and all the outward trade of the Muata Yanvo's empire. In fact, one may say that the trade of the Upper Quanza has relations with the heart of Africa and the Portuguese dominions of the East Coast.

Although, during the Portuguese decadence of the last century, the establishments and commerce of the Quanza fell into complete decay, still, during the last fifty years great efforts have been made to resuscitate them. Silva Americano, Oliveira Massango, and other Brazilo-Portuguese merchants, got up a service of merchant river steamboats to navigate the Quanza and develop its trade. These boats are now being worked on behalf of the company by an enterprising English firm, Messrs. Newton & Carnegie of Loanda. Travelling on the Quanza is very different from what it is elsewhere in Africa. It is quite as comfortable and as interesting as on the Rhine. Not only is the scenery very pretty and thoroughly tropical, but the river contains more "history" than, perhaps, any other part of Western Africa; for, as I have before remarked, the Quanza has been continuously occupied by Portugal since the fifteenth century, and can show on its banks many signs of the former puissance and religious fervour of that interesting country.

In the north, the botany and zoology of Angola much resemble that

[1] In all these African names, I give the Portuguese spelling. The versions in brackets are written according to Lepsius' system of pronunciation.

of the lower Congo, and of West Africa generally. In the central portions, forms from the south and east intrude, but for this reason it is the richest in its mammalian fauna. In the southern districts (Mossâmedes) the fauna and flora most nearly resemble the common East African types, which extend from the Nile to Senegal, and from Somali-land to the Limpopo. The elephant is no longer abundant in this colony, except in the far interior, and on its southern borders. The ostrich extends as far north as Bihé, in about 12° S. latitude. The grey parrot finds in the centre of Angola the southern limit of its range, and the highest development of its species. The grey parrots of Malanji, and the Upper Quanza, have a great disposition to assume a red or pink plumage all over. They are generally called king parrots by the traders, and are the best talkers, and the most intelligent. In the north of Angola, the little red buffalo (*Bubalus brachyceros*) is found; in the south, the Cape buffalo (*B. caffer*) takes its place. In this southern portion of the colony, more especially in the district of Mossâmedes, nearly all the big game of Africa is present, including the rhinoceros, an animal which is found in no other part of West Africa, being absolutely absent from the forest region. The leopard is everywhere; the lion only extends as far north as 11° S. latitude, except in the far interior, where he ranges right through Central Africa. The lion, like the rhinoceros, giraffe, and many of the large African herbivora, avoids the dense forests of Western Africa.

There is a good deal of forest land in the interior of Angola, and most well-known West African trees are represented. The oil-palm extends only as far south as 10° S. latitude. Coffee grows wild on nearly all the highland districts, and in the north of Angola is semi-cultivated by the natives of the interior, who bring it in enormous quantities to the coast, where it enjoys a good reputation among traders. The chief export of Ambriz is coffee. India-rubber, from the *Landolphia florida*, is a considerable feature in the Angolan trade. Cotton of good quality is very largely cultivated in the south, more especially in the district of Mossâmedes. Some of the best plantations are on the river Coroca, in 16° S. latitude. Sugar is much attended to in all parts of Angola, in the low-lying portions, and in the vicinity of rivers.

The domestic animals kept by the natives or introduced by the Portuguese are cattle, sheep, goats, pigs, dogs, cats, turkeys, fowls, Muscovy ducks, and pigeons. The turkeys, ducks, and pigeons are introductions from America and Europe; the cats may or may not have been brought by the Portuguese; the other creatures have an Eastern origin, and have been possessed by the ancestors of the present Angolan inhabitants before they came to that land.

The native races inhabiting the colony of Angola belong, with two slight exceptions, to the great Bantu family, which peoples nearly all Africa south of the Equator. The exceptions mentioned are the tribes of Bushmen, which are found in certain portions of the south-east, and a few Hottentots which have crossed the Cunéné, in the south-west. The

remainder of the Negro population belongs to the Bantu family, and speaks languages divided mainly into three important groups; the Mbunda in the north, the Nano in the middle, and the Herero in the south. By "Herero" I mean the sub-division of Western Bantu tongues, to which Sindonga, Ochimpo, Umbundu, and others belong. Herero is the language of Damaraland, outside the Portuguese boundaries.

One reason for the easy spread of Portuguese power is the absence of any great chieftain or native sovereign throughout the extent of the colony. The Soba of Humbi, on the Cunéné, is perhaps the most important chief south of the Quanza and west of the Okavangu. He rules over about 80,000 subjects despotically, but permits a Portuguese "chefe" (commandant) and a garrison for a few Portuguese soldiers in his midst.

The entire population of Angola may be roughly assumed at 3,000,000, including about 12,000 whites. These are mostly of Portuguese origin, and among them may be reckoned the few hundred convicts transported hither from Portugal, but there are also in the province of Mossâmedes, or were, at the time of my visit, some 300 Boers who had emigrated from the Transvaal. They were settled in the upland district of Humpata, at the back of the Chella Mountains. Here they grew quantities of corn, and at first seemed likely to prosper, but the climate proved very unhealthy for their horses, the game fled further north and east to escape their *battues*, and their quarrelsome disposition and high-handed proceedings involved them in constant disputes with the not too peaceable natives. Whether this Boer colony still remains, I cannot say.

The chief towns in the province of Angola are Loanda (São Paulo de Loanda, as it is called in full), Ambriz, Benguela, Mossâmedes, Dondo, Muxima (Mushima), Novo Redondo, Catumbella, Caconda, Quillengues (Kilengesi), Huila (Wila), and Humpata (Ompata).

Loanda is the capital, and boasts a history of over 400 years. Its present population is perhaps 14,000, all told, and including the 2000 or 3000 whites, who are mostly officials, soldiers, or merchants. There are excellent shops in this town, and it is generally fairly well provided with the elements of civilisation.

Ambriz, Benguela, and Mossâmedes, especially the latter, are fairly flourishing towns, where life is not more unbearable than it is in any other half-civilised districts of West Africa.

What Angola might be made in the hands of a richer and more vigorous power than Portugal, it is difficult to say; but, even as it is, we must not forget to give the Portuguese their due. Of all the European powers that rule in tropical Africa, few have pushed their influence so far into the interior as Portugal. And the Portuguese rule more by influence over the natives than by actual force. The garrisons at Dondo, Malanje, and other places in the interior, at varying distances of 200 to 400 miles, range, perhaps, from 50 to 200 men, and these are nearly entirely native soldiers. The country is so thickly populated, that if the inhabitants

really disliked the Portuguese rule, they could in a moment sweep it away. What Portugal wants for the development of her magnificent colonies is money and men. She is too poor and too thinly populated to be able to supply these essentials herself, and she is too much afraid of foreign aggression to invite them from other nations.

The more one travels in West Africa, the more one arrives at the conclusion that the Portuguese have got the pick of the coast-lands; but unfortunately another conviction forces itself upon the mind, that they have far more than they can reasonably be expected to develop. There is no reason why they should sell, cede, or exchange them, but let them be thrown open unreservedly to all comers and all capitalists, and Portugal will soon, as their suzerain, become a wealthy power.

ON SOME RECENT EXPLORATIONS IN NEW GUINEA.

Read at Meeting of British Association, Sept. 1885.

By Coutts Trotter, F.R.G.S.

Having had the honour two years ago to read a paper at Southport before this Section, in which I endeavoured to give a summary of our actual information about New Guinea, I only propose to-day to occupy a few minutes of your time with the results of one or two not unimportant journeys which have taken place since that date. The present time and place seem particularly appropriate for a few words on the subject; for, as many of you know, there is at this moment a special bond of connection between New Guinea and Aberdeen. An accomplished traveller and naturalist, Mr. Henry Forbes, who is now on his way to explore the unknown interior of Eastern New Guinea, is a native of this most hospitable city, and will, I am sure, highly appreciate a sympathy which is not confined to our own branch of the British Association—a sympathy and approval to which the Council of the Association has already given material expression, which I sincerely hope will be repeated.[1]

Much valuable, though still partial, light has been thrown on the physical character of this eastern part of New Guinea by the labours of the Rev. James Chalmers, a missionary, and a man of a superior order; but even he has not succeeded in reaching the great central range.

The characteristic features of the peninsula to the south of the central mountains are as follows:—A low barren range of recent limestone, with a marked Australian appearance and flora, fringes the coast, and appears in many places to intercept the drainage from the highlands of the interior, thus forming a sort of *terai*, or swampy plain, which in the hot season is flooded and very unhealthy. Between this and the great central range lies a very broken and difficult hill country, densely wooded, with numer-

[1] It will be seen on p. 527 that a second grant has been made to Mr. Forbes.

ous streams, and many open valleys capable of growing any tropical produce; but these appear to be limited in extent, and already carefully cultivated by the natives. To the west of Redscar Bay the barrier reef, which has up to this point skirted the shore, for a long distance from the eastwards, forming with it many valuable anchorages, terminates; for the number of rivers which here enter the sea prevents the formation of coral. It is probably in this neighbourhood that the long-sought-for route across the mountains will be found; for ornaments and trinkets have been met with here, identical with those worn on the northern coast, and said by the wearers to be brought from thence, and the reports of the people further east all point to a route from sea to sea as lying through this district. But the natives of this part are said by their neighbours to be exceptionally savage. The country increases in fertility in this direction, and a considerable water traffic is carried on with the more easterly tribes, who exchange their pottery and other manufactures for the sago of the district of Elema. Possibly it is the great wealth of this district, or perhaps because it is the most distant land known to the eastern tribes—the Far West, in short, which has exercised a fascination on so many peoples—which causes it to be known among them as the "Abode of the Gods." Certainly there are numerous so-called temples here, buildings which, though partly used for hospitality, or for meetings of the privileged male sex—like the Polynesian *marae*—are chiefly devoted to religious purposes. But instead of finding, as in other Papuan buildings of the kind, only the karwars, or images of a recently deceased ancestor, we find here—though the karwar is also reverenced—images representing incorporeal beings of a quite different order. We find here also a priestly class, devoted to the service of the temples, and quite distinct from the mere sorcerer or rain-maker. All this is important as implying conceptions foreign to, and in advance of, the ordinary religious beliefs of Melanesia, which have not advanced beyond the fetish stage. It tends, in fact, to show that tribes of, at all events, the two great branches of the Oceanic race, are to be found here side by side, or perhaps half-fused, and influencing each other under circumstances and to a degree of which as yet we know very little. While, however, on the subject of religion I should like to call attention to a curious fact, which some of my audience may be able to explain. Mr. Chalmers, whose intimate knowledge of the native ways and languages makes his information specially trustworthy, tells us that one day, while sitting by the fire, he threw into it a piece of plaster which he had taken off his foot. On this there was a general rush to find it, and it was pulled out of the fire and returned to him. And, similarly, they remonstrated with him for throwing into the fire the loose hairs from his comb. Can all this imply a reverence for fire, or is it merely a fear that something might happen to the owner of the *exuviæ* so destroyed?

To return to our map. At the head of the Gulf of Papua are several larger river-mouths, and beyond them the Aird River, the intended

starting-point of a new Australian Expedition. It is hoped that the river will lead up into the interior, and at all events the expedition should throw some light on the curious water-system of this region. Not being sure, it is unwise to prophesy, but it seems not unlikely that these streams will be found to form, along with the Fly Delta, a vast net-work of creeks draining the great half-drowned region which lies between the sea and the central mountains for an unknown distance, inland and westwards.

Recent Dutch surveys have been occupied with the coasts of another great level tract in the south-west, Onin, where similar hydrographical problems remain partly unsolved; for it is still doubtful whether the creek running up from Arguni Bay does not communicate with the head of M'Cluer Inlet, and it is also still thought possible, though not probable, that a water communication may even exist between this point and Geelvink Bay on the north. In this neighbourhood lies the only true fresh-water lake as yet reported to exist. Its direction was pointed out to Dr. Meyer when he ascended these hills from Geelvink Bay, his native informants indulging in satirical remarks on the scantiness of the costume worn by the dwellers on the lake, which, considering the nature of their own attire, was perhaps being hypercritical.

As the difficulty of penetrating New Guinea arises chiefly either from a combination of steep mountain-sides with impenetrable forest, or from impassable mangrove swamps—for the country is sometimes so flat, and the sea in front of it so shallow, that vessels cannot even approach within sight of land—it is natural that explorers should devote their attention to the rivers. But those that have been attempted have been generally found too short in their course, or choked with timber and other impediments. The Fly River, indeed, Mr. D'Albertis ascended for some 500 miles, but he hardly got beyond the swampy plains, and discovered but little, while the unfortunate character of his relations with the natives has made that route difficult for those who may follow him. On the north coast, east of Geelvink Bay, the volumes of muddy water and vegetable *débris* brought down by the Amberno River, besides its great distance from any mountains, long led to the hope that it would furnish a large navigable waterway to the interior. This was the route by which Mr. Wilfred Powell proposed to reach the central highlands. The honours of the first ascent of this river, however, has fallen to the Dutch; and we must not grudge it to them. Mr. Van Braam Morris, in the little steamer *Havik*, succeeded, after some ineffectual efforts not unattended with danger from the violence of the broken water on the bar, in discovering the entrance, and after crossing the bar he found himself in a river some 800 yards wide, with a depth, nearly all across, of five fathoms, and a current of three miles an hour.

After steaming some 60 miles through a flat alluvial region, the surrounding country became somewhat less level, the water rapidly shoaled, and the current increased, and, while crossing the stream to look for another channel, the vessel was driven on a sand-bank; and although she eventually

floated off, her commander thought it prudent to return seawards. The water, at the highest point reached, was grey and muddy, and black sand at the bottom stained the hands like coal; and there were rolled and veined pebbles, supposed—it is not very clear why—to indicate a rocky barrier higher up. For various reasons, however, it is not improbable that above these rapids the river may again become navigable. It is, if not the only, certainly the main channel of drainage for a very wide area. The name by which it is known, for a long distance round, signifies the "Great River," implying that there is no other great stream in the neighbourhood. The various creeks and active rivers which open on the eastern shores of Geelvink Bay almost certainly communicate with it directly or indirectly. On its right bank there seem to be no such offsets, for the population carry on their intercourse with their eastward neighbours by way of the sea. To the east, indeed, there is what appears to have been a former channel. It has a wide mouth, visible from the sea, with a couple of fathoms on the bar and a much greater depth within. But it has little or no current, and is probably choked higher up. This phenomenon repeats itself along the coast eastwards. Within a few miles of an obvious river-mouth, discharging discoloured water, we find another, probably older, and now inactive channel. On ascending this it is found to open into wide-spreading lagoons, with a numerous thriving half-amphibious population, and with a wealth of coco-palms. The problem, what the interior of New Guinea at this its widest part may be like, is still then entirely unsolved. Comparing the position, and distance from the sea, of the lofty mountains seen from the northern and from the southern coasts, and from Geelvink Bay, respectively, it seems as if there might be either two great ranges, with a wide elevated plateau between, or at all events many secondary ranges and spurs enclosing extensive upland straths enjoying a temperate climate. We need not speculate on the wonderful discoveries which there await the naturalist. Mr. Wallace, on *à priori* considerations, forbids us to expect any important mammalian discoveries; but, to say nothing of the birds, the few researches made in the Arfak Mountains show that we may look for a considerable temperate and even an Arctic flora.

The frontier of the German territory begins at Humboldt Bay, at long. 141° E., and extends down the coast to lat. 8° S. Until two years ago, the whole eastern half of New Guinea was generally considered to be under British influence. But, recently, the express limitation, by Lord Derby, of our protectorate to the southern coast, practically invited the annexation of the northern part by Germany.[1] The Berlin Company, to which the German territory has been handed over, is already doing vigorous work. It has discovered and surveyed a very valuable harbour in Astrolabe Bay. The country immediately around this is clothed,

[1] It may be interesting to note that the area on the mainland of the British territory is 60,143 geographical square miles, of the German 52,088, and of the Dutch 114,323.

to a height of many thousand feet, with dense forest; but further down the coast, towards Cape Cretin, the country is much more open and accessible, with abundant streams and large tracts of land suitable for grazing or cultivation. It rises at once from the sea in great successive terraces, so that there is no fever belt, and a comparatively temperate climate must, no doubt, be found at a certain elevation. Altogether, so far as we know, this is the most valuable district, and the most available for European settlement, in all New Guinea. The giant terraces have been found to consist of a coralline limestone; if, therefore, as seems probable, they are ancient sea-beaches, they testify to an enormous and comparatively recent elevation, of which, indeed, other signs occur at various points along the entire northern coast. A great river debouches in Huon Gulf, its upper course trending S.E., but here again low shores and inland mountains are alike covered with dense forest.

The nomenclature of the new German territory has naturally undergone some modifications. New Britain and New Ireland, with the adjacent islands, have become the Bismarck Archipelago. The memory of our great navigator, Dampier, however, is retained in the strait and island which bear his name, in his Rooke Island, and in his Cape King William, though the monarch of glorious and immortal memory is rather overshadowed by Kaiser Wilhelm. As for Captain Moresby's rival peaks, Mount Disraeli and Mount Gladstone, the former still remains on the map, though with the alternative designation of Schopenhauer. Mount Gladstone has disappeared.

It would be interesting, if time permitted, to glance at the probable results of the recent political arrangements in these regions. While the whole of eastern New Guinea was still looked on as an appanage of Australia, I ventured to urge the injurious effect on the harmonious development of the future Australian Empire, of the introduction of alien jurisdictions into any of its component parts. These inconveniences, whatever they may amount to—and I sincerely hope I exaggerated them —have now to be met. I need only allude to such obvious points as the greatly increased cost of defensive armaments which will by and by be thought necessary; the possible vicinity of convict labour; the maintenance of customs lines, and rival tariffs. And finally, as regards the interests of the natives generally, it would be Quixotic to expect a rivalry in philanthropy between the two nations, and philanthropic action on the part of one would be nullified by a different action on the part of the other. To take the single instance of the labour question, public opinion in England has been a good deal exercised on the subject, and would probably be found, for the present at least, to view the matter differently from the Germans. From this point of view then it is difficult to regard the prospects of the natives as hopeful; but it is pleasanter to assume that the matter will be treated by the two Governments in the enlightened spirit of which we have an earnest in the recent action of the Government of Queensland.

WHAT HAS BEEN DONE FOR THE GEOGRAPHY OF SCOTLAND, AND WHAT REMAINS TO BE DONE.

Read at Meeting of British Association, Aberdeen, Sept. 1885.

By H. A. Webster.

The subject to which I have the honour of calling your attention is, "What has been done for the Geography of Scotland and what remains to be done." Were I to turn the title I have chosen into a couple of queries, some of you, I dare say, would be disposed to reply to the first, "What has been done?"—"Why, of course, everything;" and to the second, "What remains to be done?" with as little hesitation, "Nothing." In a country such as ours, which has been traversed and retraversed in every possible direction by persons devoted to every department of knowledge, in which every district has been mapped and remapped, in which every county and town and parish has its local guide-book, its local antiquary, its local geologist, its local botanist, surely, you say, every geographical fact must have been recorded and made readily accessible to any who feel interest therein. In the few minutes, however, you have kindly placed at my disposal, I hope to show you that, to many questions which the geographer naturally asks, no answer is forthcoming, and that there are whole departments of geographical investigation at which we have only begun to work in a serious and fruitful manner. If for a little we may pause at this Rest-and-be-thankful on the mountain slope, and look back with pride and satisfaction over the rich retrospect of achievement, we must also look upwards to heights yet unscaled, and summits to be reached only by exertion, endurance, and skill.

First, then, as to what has been done for the physical geography of Scotland. Nothing perhaps is more striking to one who has not hitherto thought much about the geography of his native country than to learn at how recent a date we have got to know with scientific accuracy the physical features of this little fragment of an island. It was only the other year that the noble army of the Ordnance Survey withdrew its forces from Scotland after an occupation of the better part of a century, during which it had peacefully conquered for science every rood of our territory; and at the present moment we still await the complete publication of the record of its campaigns. Mr. John George Bartholomew has recently issued a beautiful map of Scotland giving us a visible picture of the vertical development, the relief, or, to use a more graphic word, the embossment of the country; but for this map it was necessary in some limited portions to have recourse to older and less trustworthy surveys than the Ordnance, and consequently to proceed so far by the method of constructive imagination. When we examine Mr. Bartholomew's (that is in the main the Ordnance Survey's) presentation of the embossment of our country, we obtain, I think, not only a more distinct, but, if I mistake not, a more correct idea of it than from any of our ordinary maps.

As Professor James Geikie has so lucidly pointed out in *The Scottish Geographical Magazine*, we largely get rid of the fictitious or partially fictitious ranges of mountains with which most of these maps are disfigured. We all know how difficult geographers have found it to define the Grampians, and no wonder, when in a certain sense they did not exist except in traditional geography, being, as Dr. Skene has well said, not a continuous mountain range, but an apparent barrier formed by the termination of numerous lesser ridges. But it is not in regard to the Grampians alone that our geography had become traditional and required to be brought by the Ordnance Survey to the test of facts. Even Dr. Skene himself, in another passage of his admirable work on *Celtic Scotland*, writes as follows:—"A mountain chain known by the name of The Mounth extends across the island from the Eastern Sea near Aberdeen to the Western Sea at Fort-William," "and a second great chain, less elevated and massive in its character, crosses the other at right angles, running north and south and forming the backbone of Scotland, the great wind and water shear—termed, in the early records of Scottish history, Dorsum Britanniæ, or Drum-Alban. It commences in Dumbartonshire and terminates in the Ord of Caithness." If our eminent historical geographer had possessed such a reduction of the Ordnance Survey's orography of the country as Mr. Bartholomew has provided, I am sure he would not have indorsed such a traditional view, which confuses a water-parting with a mountain chain. But if, till the Ordnance Survey approached completion, it was impossible to construct a true picture of the embossment of our country, need we wonder that we have only to go back a few hundred years to find the whole cartography of Scotland a thing of the future?

Time would fail me to attempt to rehearse the dry list of the early descriptions of Scotland, and, truth to say, they are of interest rather to the historian than the geographer. A first rough sketch of the outline of the northern part of our island was provided by that excellent pilot, Alexander Lindsay, who accompanied James v. in his circumnavigation, and whose observations were made accessible to the public by Nicolay D'Aulphinois, geographer to the King of France. But it is not till the close of the sixteenth and the beginning of the seventeenth centuries that an attempt was made, on a large scale, to fill up the inland details of the map. A private individual undertook a survey at his own charges, and by his own exertions. To this man, if to any man, the geographers of Scotland ought to raise a monument, so that the name of Timothy Pont might be as familiar to Scottish ears as the names of Robert Burns or David Livingstone. For this, too, was a man of genius. Little is known of his personal life except that he was the son of a minister of the West Church of Edinburgh, graduated at St. Andrews in 1583-84, became minister at Dunnet, in Caithness, in 1600, and, in 1609, subscribed for 2000 acres in the forfeited lands in the province of Ulster. "Having but few advantages," says Gordon of Straloch, "and not being supported by the favour and assistance of any person of high

rank, Timothy Pont, a person of great spirit, himself, unaided, undertook this work. He travelled afoot over the whole kingdom, which no person before him had done; he visited all the islands, inhabited for the most past by barbarous and uncivilised people, of whose language he was ignorant, where he was often despoiled by cruel robbers, as I have heard him relate, and suffered all the hardships of a difficult and dangerous voyage, without growing weary or ever losing his courage. Being to return to his home, after so much wandering, and to prepare for bringing to perfection the descriptions he had made, he could not accomplish his intention by reason of the avarice of printers and booksellers, who refused the necessary charges for its execution; and, while he waited for some more favourable occasion to present itself, death took him from us, before his time, in the flower of his age. His heirs, to whom he had left his papers, in their ignorance neglected them, and no care being taken of them, they were likely to be consumed by vermin, and in danger of being wholly destroyed, when James the First, King of Great Britain, being informed of them, gave directions for purchasing them from his executors that they might be published. But oh! Good Lord, what unhappiness! It was as if these papers had fallen from the smoke into the fire; they came into the hands of persons who had the design to conceal them like the mysteries of Ceres. Thus, once more having merely changed possessors, they remained buried in darkness, until the time that you, Sir," (Gordon is writing to Sir John Scot, of Scotstarvet), "taking compassion for such a great loss, have promised that they shall come to light."[1] Was not Timothy Pont a hero; and is not the history of his survey a romance? We all know how his maps, supplemented by the labours of his generous-hearted eulogist Gordon of Straloch, became the basis of that magnificent fifth volume of the *Geographia Blaviana*, or *Bleau's Atlas*, which, with its bold engraving and bright fresh colours, forms the pride of many a collection. Nor, interesting though it is, need I detain you with the detailed account of what was done for the map of Scotland between the completion of that atlas and the commencement of the Ordnance Survey. Those of you who wish may consult the sketch prefixed to Thompson's Atlas. Let it suffice, at present, to recall the marvellous and many-sided labours of Sir Robert Sibbald, Geographer to King Charles (1673), and to mention the names of Mackenzie, Adair, Elphinstone, and Knox.

From the historical let me turn to the practical side of my subject: what remains to be done for the physical geography of Scotland. When the last sheet of the map of the Ordnance Survey has been issued, ought we to consider the work of the Ordnance Survey completed, and disband our surveyors like soldiers at the close of a war? I beg to maintain most distinctly and decidedly that we ought not; and I am glad to think that I only share the opinion of some of the most competent geographers. In

[1] See *Cunninghame, Topographised by Timothy Pont;* edited by the late James Dobie, F.S.A., and John Shedden Dobie, 1876.

the maps of the 1-inch scale, certain *lacunæ*, especially as regards altitudes, should be filled in; the accidental blunders which human frailty has allowed to slip into the beautifully accurate work should be weeded out; and, what I wish especially to insist on, the general results of the Survey ought to be rendered more readily available by being co-ordinated in an official hand-book. Colonel Stotherd, the present Director of the Survey, was good enough to inform me that the idea of such a hand-book had his personal approval, but that the Government had not as yet voted money for its production. Geographically considered, the Survey has suffered largely by attending so much to the parish. As a geographical unit the parish is an absurdity. The parochial character of the area books render them practically useless to the geographer. Even if he is content to accept the parish as his unit of description, it is only by a tedious arithmetical process he can discover how much of this area is occupied by land and how much by water, how much is arable and how much under forest; and so on. Let me give a concrete instance. Suppose one, wishing to know what is the finding of the Ordnance Survey as regards the area of Loch Lomond, consults the parish area books, he has to take the area books of four or five different parishes. In one he gets the area of a section of the lake, islands excluded; in another the area of a similar area, islands included; and in a third he finds a water area which is not distinctly assigned to the lake at all.

In other words, as far as the area books are concerned, such a geographical unit as Loch Lomond does not exist. The surveyor's sublime neglect of everything outside of the parish he is directly dealing with, puts one in mind of the fish Frank Buckland tells of, which, after being confined in a section of an aquarium by a glass plate, continued to keep within these same narrow limits when the obstruction was withdrawn. To all such questions as, What is the length of this river?—What is the extent of its basin?—To what distance is it navigable?—To what distance does the tide ascend?—How much of this or that area lies between 500 and 1000 feet?—How much between 1000 and 1500 feet? and so on—the Survey maps may be said to contain the answers, but in most cases they contain them, so to speak, only in solution. No accurate measurement, for example, appears to have been made of the river-basin areas. In 1866, it is true, I find that Mr. James Leslie, civil engineer, presented to the Royal Society of Edinburgh MS. plans of the areas of the drainage of Scottish rivers and their principal tributaries; but the documents have been lost sight of, whether permanently or for a time only it would be hard to say. According to an estimate made by Mr. Stanford, it would cost a private person £20 to get the necessary operations performed on the basis of the Ordnance maps. Even the accurate measurement of the development lengths of the rivers would be a tedious task. To the Ordnance Survey Department, I maintain, and not to any private individual, naturally belongs the work of digesting and summarising the results of the Survey. If the man who wants to know the details about his parish has the facts

placed comparatively within his reach by the Survey, which guarantees their accuracy, why should not the man who wishes to know the greater facts about his country, as a whole, not have them presented to him on the same authority?

But, further, to several of the questions which the geographer naturally asks, the Ordnance maps supply no answer at all. While, for instance, we have the altitudes of many of the lakes, for some of the more important ones—even for Loch Tay—we have no precise figures. If the officers of the Survey undertook a digest of their work they would discover such *lacunæ*, and fill them up from their unpublished sources.

To pass to another department: in regard to the depth of our lakes and rivers—and the submerged portion of a valley is geographically as interesting as the sub-aërial portion—absolutely no data are supplied by the Ordnance Survey. An excellent bathymetric survey of Loch Lomond and of Loch Awe was made years ago by the officers of the Hydrographic Department, as Mr. Buchanan[1] has just told us, but these are the only lakes in regard to which we have officially authenticated information. Now, it is an open secret that when this omission was pointed out to the Government by the Royal Societies of London and Edinburgh, the Lords of the Treasury refused and again refused to authorise a bathymetric survey of even a select number of our lakes and rivers being carried out either by the officers of the Ordnance Survey or by those of the Hydrographic Department. Such a survey, forsooth, did not belong to the jurisdiction of either.

I remember an old-fashioned story of a gentleman who had a coachman and a maid-servant. Owing to some disarrangement in the water supply, the girl had to carry pailful after pailful up a steep hill to the house. Observing that the task was beyond her strength, the old gentleman took compassion on her, and said to John, the coachman, "Go and give Lizzie a hand with fetching the water." But John, who, like most people who have too little to do, did not care to disturb his leisure; and gruffly replied, "That he was there to drive the coach, and not to carry water." The master took the remonstrance in good part; but John was soon after ordered to drive his coach to the well, and his fare back was Lizzie and her water-pail. Need I apply the parable? Do we not require in our public service a little of the old gentleman's ready wit? Mr. John Bull has a coachman and a servant, but though both would be willing, alone or in company, to look after the water, he reasons that he did not engage either of them for this purpose, and this important part of his domestic economy suffers in consequence. But let us hope that when the Government is again asked to move in this matter they will be asked for more and not for less.

We require not only a hydrographic survey done once and for all

[1] Mr. Buchanan's paper contained a most valuable addition to our lake-lore, mainly the result of his own exploration.

(though that is worth the doing): we require a systematic registration of hydrographic facts throughout the country, in order that the true *régime* both of lakes and rivers may be known in detail and with scientific precision. The ignorant niggardliness of the British authorities is in striking contrast to the conduct of some foreign Governments. In Switzerland, for instance, there is a regular system of inland hydrographic observations, by which the *régime* of all the principal rivers is annually recorded and rendered easily intelligible by a series of graphic bulletins. In regard to a Swiss river we can tell the volume at any period of the year at several important points, and can compare the facts of 1884, for instance, with those of any year in the last two decades. Every one knows what a vast body of interesting data has for generations been accumulating about such rivers as the Po and the Rhone, and many of you have no doubt heard of the system of hydrographic stations recently established by the Italian Government in the basin of the Tiber. Why should not we too endeavour to learn something definite and precise about the character of our own Scottish rivers?

> "'Behold the Tiber!' the vain Roman cried,
> Viewing the ample Tay from Baiglie's side;
> But where's the Scot that would the vaunt repay,
> And hail the puny Tiber for the Tay?"

The investigation, Professor Chaix informs me, is popular in Switzerland: why should it not be popular here? "Your country," writes that eminent Swiss authority, "presents a very interesting and not so difficult a field for hydrographical studies, by the fact of its being sub-divided by your lakes into many fractional basins of easy measurement."

To those who are disposed to ask, "What would be the practical value of such an inquiry?" I would observe that it is only the natural complement, on the one hand, of the study of the physical structure of the country, and on the other, of its meteorology. Our Scottish Meteorological Society (thanks to the quenchless devotion of Mr. Buchan) have succeeded in establishing meteorological stations throughout the country: hydrographic stations ought to be established in like manner along all our principal rivers. Rainfall and river discharge are mutually illustrative,—a fact that is well recognised by the Hydrographic and Meteorological Departments of New South Wales.

As but slightly connected with geography, I need merely mention the subject of the determination of the different chemical qualities of the waters of our lakes and rivers. Sir Robert Christison, it will be remembered, made a considerable contribution to this subject. But to proceed to a strictly geographical matter, it has been frequently pointed out that, unfortunately, the results of the coast surveys have not been incorporated in the seaward portions of the Ordnance Survey maps; nor indeed is the submarine portion of our island group sufficiently attended to in most of our physical maps. A special interest attaches to the hollow of the North

Sea, and yet, as Mr. John Murray tells us in his article in the *Encyclopædia Britannica*, no systematic investigation of the North Sea has yet been undertaken, and, in consequence, our knowledge is in many respects very meagre. That was true when he wrote in 1884, and I fear it is still true in 1885. For the best representation of the bottom of the North Sea we are indebted not to a Scotchman or an Englishman, but to a Frenchman. Good work is beginning to be done at Granton, and elsewhere, by Mr. R. H. Mill in regard to the difference of salinity between the water of this almost land-locked basin and that of the open Atlantic.

Let us now turn to the political or administrative geography of Scotland. Here we have been particularly fortunate in the solid qualities of several of our investigators. We have more than one elaborate study of the Ptolemaic geography of Scotland, and such men as Cosmo Innes and Dr. W. F. Skene have reconstructed for us the civil and ecclesiastical divisions of certain periods of our history. Published as it was by the Bannatyne Club in three of its costly volumes, the former writer's *Origines Parochiales Scotiæ* is not so well known as such a repertory ought to be; happily, the works of Dr. Skene are among the most popular of the class to which they belong. The detailed history of the rise and relations of the modern Scottish counties and of the fixing of the Scottish-English Border would still, I believe, furnish subjects for difficult but interesting investigation.

A matter, however, of much wider import—and to this I beg to call your special attention—is the study of our geographical nomenclature. A curiosity about the meaning and history of place-names is very widely diffused both in England and Scotland, and the result has been the production of a greater amount of literary rubbish than it is possible easily to realise. You recollect that Gordon of Straloch tells us that Timothy Pont travelled in the Highlands among people whose language he did not understand, but it is another instance of the intellectual activity of the man, that in his brief notes he has left business-like memoranda on geographical nomenclature. He thus ranks in this department of inquiry as a European pioneer, as has been acknowledged by Professor Egli of Zürich, whose attention I called to the existence of this Scottish genius. Since Pont's day we have had abundance of philological conjecture applied to our place-names, but much of it has not risen far above the level of those punning or canting etymologies which explain Stracathro by the Roman (!) soldiers' battle-cry of "Strike a' through"—and Guthrie, by the King of Scotland's advice to *gut three* of the fishes presented to him. Those of you who care to follow the movement towards a scientific treatment of the subject may consult Dr. Skene's excellent paper on the Celtic topography of Scotland in the *Transactions of the Royal Society of Edinburgh*, along with which I would associate Captain Thomas's study of the nomenclature of the Hebrides published in the *Proceedings of the Antiquarian Society*. But it seems to me that the time has come for another step in advance. We require a complete system of registra-

tion of all our place-names and a co-operative system of historical and philological illustration. I say co-operative, for to accomplish what I conceive to be necessary a variety of faculties and equipments is requisite. We require the man with well-trained eye and competent scholarship to read the old forms of our place-names in old public charters and private documents; we require the man with delicate ear and skill in phonetics to take down the actual form in use from the lips of our common people; and we require the accomplished historian and the accomplished philologist, working together, to digest the material. As Dr. Skeat has recently warned us, nothing must be taken for granted; the longest established tradition of popular etymology, such as the identification of Eccles with the Greek *Ecclesia*, must be brought to the test of facts. The scheme is a vast one, but do not let us say it is impossible. Scotland is not a larger country to deal with than the Netherlands, and the geographers and philologists of the Netherlands have laid their heads together to provide their country with a trustworthy *Nomina Geographica Neerlandica*, which in many respects is a model for all interested in a similar undertaking. What the Dutch have accomplished is surely not too much for the Scotch to attempt. The Publications Committee of the Scottish Geographical Society is endeavouring to organise a special committee in connection with this subject, and I venture to solicit the co-operation of any who feel themselves competent to advise or assist.

And now, lastly, though the subject may be said to be as much sociological as geographical, let me call your attention to the need of a greater application of cartography to the rendering of statistical facts, such as those of density of population, birth and death rates, distribution of trade and commerce, education, etc. Augustus Petermann, at the census of 1851, set an admirable example to our census authorities, but they have, strangely enough, failed to follow it. We can actually get a clearer idea of the relative density of the population from Petermann's map than from anything, as far as I know, that has since been published. It is true that in Mr. G. Phillips Bevan's *Statistical Atlas of England, Scotland, and Ireland*, published by Messrs. W. and A. Keith Johnston, 1882, we have a map of the distribution of the population according to the census of 1881; but if any person will take the trouble to compare this production with Petermann's map he will be struck with the inferiority of the method employed by the more modern statistician. In the one case, the density of population being expressed by density of colour, the facts "leap into the eye," while, in the other case, the inquirer has to pick up the details piece by piece, as he would from an ordinary table of figures. A series of maps such as those of Petermann's would teach more in an hour than could be taught in a week by any less graphic method. In this whole matter of applied cartography, Scotland (and it might be added England also) is deplorably behind several foreign countries—notably Germany, France, Italy, and the United States. The statistical map-making

of Italy, as it appears in the publications of the Government Statistical Department under Professor Bodio, is especially remarkable for so young a nation. To some extent our backwardness is the fault of our cartographers, but to a much larger extent it is due to the small attention that is bestowed on the systematic collection of statistical information in such a form as can be tabulated or "graphicised." Nothing is more difficult, in many cases, than to obtain statistical facts for any smaller totality than the United Kingdom; and the difficulty, it is to be feared, will remain, unless the brilliant example of the United States teach our authorities how the machinery employed for the ordinary census may be utilised for the collection of other classes of facts of national interest. At the present moment, the administrative geographer is quite as ill-off as the physical geographer. If the one is left to measure the river-basins for himself, the other is left to measure the burghal and municipal areas. Even the officials of the Royal Convention of Burghs seem to have no list of the areas of the burghs they represent; and without a knowledge of the areas, one cannot, of course, compare the relative density of population.

Considering how long has elapsed since the publication of the last *Statistical Account of Scotland*, it is time that an attempt were made to compile a work of similar scope, but laid down on lines fitted to the new conditions imposed by the advance of science. In the older statistical accounts the parish was the recognised unit; and we had descriptions of the flora of a parish, the fauna of a parish, and so on. One might almost as well have had the flora of a gentleman's estate, or the fauna of a railway system. In any new account an attempt must be made, by competent authorities, to define the faunal and floral regions as they naturally exist.[1]

In what way this enterprise, as a whole, should be organised, it is not for me to say. Possibly it might be carried out by a combination of the principal scientific societies of the country, under the presidency of the Royal Society of Edinburgh. In any case, it is too complex and difficult for private accomplishment. Such an excellent work as Mr. Groome's *Ordnance Survey Gazetteer* shows how much can be done in this way: but it also shows how hard it is to make bricks without straw.

In conclusion, and as an apology for detaining you so long with the geography of Scotland, allow me to say that if any of the suggestions now brought forward are of any practical value, they are equally applicable to England. And I would express the hope that the Royal Geographical Society of London, without intermitting its labours in the field of foreign exploration, will turn its attention homeward, and see that something worthy of England is done for English geography.

Postscript.

As General Walker, President of the Geographical Section of the British Association, expressed a strongly hostile opinion in regard to one

[1] Compare Mr. Harvie Brown's Appendix to the new edition (1884) of St. John's *A Tour in Sutherland.*

portion of the preceding paper, and judged it inexpedient that I should attempt to rebut his criticism at the time, it will not, I hope, be deemed out of place if I take this opportunity of defending my position. The thesis which General Walker impugned was, that it is desirable that the officers of the Ordnance Survey be instructed to prepare an official hand-book in which the general geographical results of the Survey shall be digested and rendered easily available to the public. This was, he maintained, an absurd and Utopian proposition. He did not deny that the work ought to be done, but he suggested that it ought rather to be undertaken by the Scottish Geographical Society, or by some other private or semi-private agency.

The principal argument advanced by him was, as far as my memory serves me, expressed in the familiar words: "*Don't you wish you may get it!*" and, truth to say, when I consider it carefully, I have some difficulty in recognising this as an argument at all. According to my analysis of it, it amounts to this: "The Government is niggardly in regard to all such scientific schemes; and, consequently, it is a mistake to try to make it less so." Nor do I perceive much more cogency in the argument the General derived from Timothy Pont's example:—"Because Timothy Pont, a private gentleman in the sixteenth century, found means to make a provisional survey of part of Scotland, therefore it is expedient, in the nineteenth century, that the natural completion of the Ordnance Survey should be left to private enterprise." The same reasoning would prove the impropriety of all Government surveys whatsoever.

But to turn from presidential criticism to the subject which evoked it. The strongest consideration in favour of my proposal is that of economy of labour and expense. In order to make a satisfactory hand-book of the Ordnance Survey, an intimate acquaintance with the Survey is admittedly necessary. The officers of the Survey already possess that acquaintance. Any other body of men that might be got to work together would require to spend a considerable time in acquiring this knowledge; and even then they would be at a disadvantage, because the Survey Department possesses unpublished material which would render the digest more complete and satisfactory. Already the Survey has thought it worth while to print, on certain of its index-maps, a list of the islands (with their areas) pertaining to the district. This is really the first stone of an official hand-book. Why should the islands be better treated than our lakes, rivers, drainage areas, towns, etc.? H. A. W.

GEOGRAPHICAL EDUCATION.

Read at the Aberdeen Meeting of the British Association, September 1885.

By J. Scott Keltie, Librarian, R.G.S.

The Royal Geographical Society has, in various ways, for many years endeavoured to improve the position of geography in the education of this country. These efforts have certainly not been without fruit; and it is largely due to them that the subject has the position it now holds in the various English University local examinations. On the results of the Oxford and Cambridge examinations the Society continues to award medals. For sixteen years it awarded special medals for competition among the higher-class schools, and these were only withdrawn (probably temporarily) last year in order that a thorough inquiry might be made into the whole subject of geographical education in this country and abroad. I had the honour of being intrusted with the conduct of that inquiry, and my Report to the Council on Geographical Education embodies the results.

In this country I found that the nominal position of the subject in elementary schools was, on the whole, satisfactory. Forty years ago the attention of the Education Department was drawn to the subject of geographical teaching in a Report by Professor Henry Moseley to the Privy Council Department, in 1845. "Geography," Professor Moseley wrote, "acquires its full value as a branch of education only when it loses the character of an accumulation of facts, undigested by the child's mind, but heaped up in his memory, linked by no association with the world of thought and of action which immediately surrounds it, or with that which is within it. Tell the child to observe the lines of the map which hangs perpetually before his eyes, and talk to him only of the *names* of the places indicated upon it, and you will soon weary his attention. But speak to him of the men who inhabit any of these places, tell him of their stature, and aspect, and dress, and ways of life, and of their forms of worship; speak of the climate of that country, of the forms of vegetable and animal life with which his eye would be conversant if he dwelt there, and of the birds and beasts, and you will carry his interest with you."

This advice of Professor Moseley, though perhaps somewhat vague, is certainly in the right direction. Geography, dealing as it does with the surface of the earth and all that is thereon, might, with proper method, in the hands of well-trained and well-informed teachers, be made an invaluable medium not only for conveying solid, useful information, but for training the pupil to habits of correct observation and accurate thinking. The value of such a discipline in elementary schools, where time and the range of subjects are limited, must be evident. In another Report of the same

date as the above, I find Professor Moseley states that "Geography, in its larger acceptation, yields to no other branch of secular knowledge in its adaptation to the highest purposes of secular education." It is, therefore, satisfactory to find that the Education Department has made fair provision for its teaching. The progress in this branch of elementary teaching during the last forty years must have been very great; for I find Professor Moseley reporting, with reference to the schools in the Midland district, in 1844, that geography was taught in only one school out of every three, and to one pupil in every five and a half. Now, as we know, it must be taught in every school. For each Standard a certain programme must be followed; the plan being to begin with the schoolroom, and, going outwards, to give the youngsters an elementary notion of the physical and political geography of the whole world.

In the revised instructions to inspectors for this year will be found an admirable passage, showing the broad conception of geography which now prevails at headquarters, but which reads like an expansion of Moseley's idea of forty years ago:—

"Geographical teaching is sometimes too much restricted to the pointing out of places on the map, and to the enumeration of such details as the names of rivers, towns, capes, and political divisions. It is hardly necessary to say that geography, if taught to good purpose, includes also a description of the physical aspects of the countries, and seeks to establish some association between the names of places and those historical, social, or industrial facts which alone makes the names of places worth remembering. It is especially desirable in your examination of the fourth and higher Standards that attention should be called to the English colonies, and their productions, government, and resources, and to those climatic and other conditions which render our distant possessions suitable fields for emigration and for honourable enterprise. In order that the conditions laid for the geographical teaching of the lower classes may be fulfilled, good maps, both of the county and of the parish or immediate neighbourhood in which the school is situated, should be affixed to the walls, and the exact distances of a few near and familiar places should be known. It is useful to mark on the floor of the schoolroom the meridian line, in order that the points of the compass should be known in relation to the school itself as well as on a map."

This seems to me to show that if geography is not well taught in our elementary schools it is not the fault of the Education Department. But that Department may draw out an absolutely perfect plan of teaching the subject, and the results be as meagre as of yore, if the teachers are not equal to it. From what I saw on my visits to elementary schools in England, I must say that the teachers are making a conscientious effort to carry out the spirit of the Department's programme, though this is certainly not always done with intelligence. In one school, where I was present at several lessons, the poor little ill-clad, ill-fed things in one class were knitting their brows and racking their brains in vain over the laborious efforts of the master to explain the difference between a square penny ink-bottle and its picture. In another school, again, with a quiet, self-possessed, well-informed teacher, fond of his subject, it was a pleasure to

watch how interested the boys were in going over a relief of the ground on which the town was built, its slopes and its valleys, its little streams, the run of the streets, and situation of the public buildings; while the teacher insinuated some notice of its geology, and of the relation which the industries of the town had to its surroundings. Equally interested was another class when this same teacher produced actual specimens of the products of the countries referred to in the lesson, photographs of some of their features, views of the chief towns, pictures of aboriginal populations, all the while quietly getting the boys to think and draw conclusions for themselves, or conveying to them, in a way that could not fail to impress, notions of its leading geographical conditions. Some schools, especially in large towns, with intelligent and liberal Boards, I found well provided with maps (not always of the best, I fear), and even with geographical and ethnological pictures, relief globes, and cheap relief maps,—very poor as a rule, but still a hopeful sign of an earnest endeavour after improvement.

I think we may feel satisfied that geography in our elementary schools is in a healthy condition of progressive evolution. If the Education Department continues to insist on its ideal being constantly aimed at, if it encourages the Normal Schools to train their students in the best methods, if it discourages mere book-work and mere memory-work (though of course a certain amount of memory-work is indispensable to every course of education), and insists on the teaching being as realistic as the subject will admit of, I have no doubt that in time the elementary teaching of geography in this country will be at least on a par with the best teaching of the same grade in Germany. I believe Germany has quite as much to learn from us, in many things, as we have from Germany; but I am bound to say, from what I have seen, that in this matter of geography we shall profit by taking a leaf or two out of her book.

As to the great chaotic mass of English middle-class schools, the position of geography is far from satisfactory. As I am addressing an audience in a Scotch University town, it will be safe to admit that Scotland is better off in this respect. In some of the middle-class schools which I visited in Edinburgh and Glasgow, and in others in Aberdeen and elsewhere, concerning which I obtained information, geography is in a fairly satisfactory position. In certain of them it seems really well taught. In others again, and those of the highest grade, it is no better off than it is at most of the great English public schools. To judge from the results of the Oxford and Cambridge local examinations, and from my own observations, geography, especially physical geography, must have a place of some importance in not a few middle-class schools. Even among these, however, with very few exceptions, it is at a disadvantage, partly from the over-crowded state of the programme, and partly because the masters have so little taste for it, or such a poor opinion of it as a means of education, that it is relegated to the lowest place among the subjects taught. The higher one goes among our schools, the less do we find geography attended to; and in those great schools which educate

boys for the Universities or for the professions, the subject, as a whole, has virtually no place at all. True, that in such schools as tolerate modern or science subjects, physical geography forms one of these. But this physical geography is generally what is known as Physiography, and indeed is largely Geology. What is known as Political Geography, when it is taught at all, is little more than a long string of names and figures; and it is no wonder, then, that masters and pupils are glad to get rid of it altogether—and this is what too often happens.

It seems to me that the wretched place which geography holds in our schools, and the barren results which in too many cases follow its teaching, are largely due to this narrow conception of what is known as Political Geography. Until we get beyond this fruitless conception of the subject; until we come to realise that political geography is really the resultant of ever so many factors, of the interaction not only between man and man, but between man and his physical surroundings, and until teachers are trained to bring the subject in this living aspect before their pupils, it will never be otherwise than the dull and barren task that it now is. I have seen geography treated in this way over and over again in German schools, where it is regarded as one connected whole, no impassable gulf being found between physical and political geography as in England. I have also seen it so treated in one or two institutions in this country. One of these was Bedford College, for Ladies, where I heard Mr. Ravenstein (and *he* is a German) give one of the most instructive and interesting lectures I ever listened to, on the General Conception of Political or Statistical Geography, to an audience of three young ladies and a chaperone. And I am glad to know that Mr. Ravenstein means to expand the course of lectures, of which this formed one, into a text-book, which I am sure will do much to open the eyes of English teachers to the value of geography, not only as a branch of knowledge, but as an educational discipline. Meantime, such teachers as can read German might study Peschel's lectures, which seem to me admirably to define the field of geography, and of which some patriotic publisher, willing to lose a little money for the good of his country, might issue a translation.

There has recently come into my hands a little pamphlet by Mr. A. Park, head-master of the Albion Educational Institute, Ashton-under-Lyne, on "How to teach Geography," which I advise all teachers interested in the subject to study. Mr. Park makes frequent reference to the well-known work on Education by Dr. Alexander Bain,—a name that has shed lustre on the University of this town. Dr. Bain's remarks on the teaching of geography are well worth study.

The greatest of English public school masters, Dr. Arnold himself, had a high opinion of geography both as a discipline and as an indispensable aid to the comprehension of many other studies. "A real knowledge of geography," he writes in a passage on geography in his lectures on history, "embraces at once a knowledge of the earth, and of the dwellings of man upon it. It stretches out one hand to history, the other

to geology and physiology. It is just that part of the domain of knowledge where the students of physical and of moral science meet together."

In my Report, to which I must beg to refer you, many other testimonies will be found to the value of geography as an educational subject, from eminent authors in all departments of knowledge—from historians on the one side and students of physical and natural science on the other. In it also will be found extracts from the mass of correspondence I received from English head-masters, the burden of whose complaint is that the subject does not pay; and therein is the kernel of the whole matter.

In contrast with the position of the subject in England, I found in all the continental countries which I visited, in which education of all grades is under State control, that the subject has a distinct place in every grade of school—and in every class, except in some cases, the very highest. As to the time allotted to it, while naturally it has not the same position as languages and mathematics, it has a better position than either history or physical science. On an average, two hours a week is allotted to it, and as, in Germany at least, the higher school course lasts nine years, it will be seen that under the trained teachers who undertake the subject there, the excellent methods which they have been taught at normal schools and universities, the carefully-compiled text-books, wealth of good maps, reliefs, geographical pictures, and other apparatus, a boy has a fair chance of leaving school with a substantial knowledge of the subject. Germany in this matter is naturally taking the lead, but other continental countries are rapidly following her example—none more rapidly than France, in the two great military schools of which, St. Cyr and the Staff College in Paris, geography in its widest sense is the chief subject of education. The ideal aimed at in Germany, as well as in the other continental countries which I visited, is to have one continuous course of geographical instruction from the youngest school year up to the University.

Beginning with *Heimatskunde*, the young pupil drinks in, almost unconsciously, at the hands of an efficient teacher, the most elementary notions of geography, the points of the compass, the course of the sun, the topographical relations of the school and neighbourhood, the making and uses of maps, the action of the forces of nature on a small scale in his own neighbourhood, and the products of the district and their relations to its industries, becoming personally acquainted with both. Then outwards to the province or county, the topography and physical geography of which the pupil grasps by good maps, reliefs, building up models with sand on the basis of the staff map, excursions, and other means; the connection of topography and physical conditions with history being brought out. And thus onwards to the country itself, after the same method, the subject of course assuming greater complexity, but the connection between physical and political conditions never, in the hands of a good teacher, being lost sight of. Then to Europe and other continents, general physical geo-

graphy and some notions of cosmography being introduced at the proper stage, until, as Mr. Francis Galton put it in a remarkable paper in the *Cambridge Essays* of 1855, "step after step, the pupil has learned the distribution of all the leading forms of organic matter over the globe, recognises the harmonious order in which they exist in relation to one another and to the land itself, and is led to examine the whole in relation to man, and to trace in broad outlines the effect of the geographical element in the history and progress of his race."

The universal testimony in Germany of geographers and teachers is that the present position of the subject in schools is mainly due to the establishment of Geographical Chairs in the Universities. It is only within the last fifteen years that there were more than one or two such Chairs in Germany. Now there are thirteen, one having been founded only this year at Münster, in Westphalia, to which my friend Dr. Richard Lehmann, late of Halle, has been presented. This influence has acted in two ways. It has raised the standard and the status of the subject, which now has in the German Universities a position on a par with all other subjects there recognised. Secondly, from these University classes, year after year, considerable contingents of teachers are sent out who have had a thorough training in the facts and principles of geography and in the best methods of teaching it, and who have had to pass a very real examination in order to get their diploma or *facultas docendi* in geography. These men have a thorough grasp of the subject and a genuine liking for it. They are not dependent on text-books; you rarely see one with a text-book in his hand. The teacher is constantly referring to his map or his pictures, or his models, or making use of his varicoloured chalks on the blackboard, all the time drawing out what is in the pupils, teaching them to think, and compare, and draw conclusions for themselves, he imparting to them from the rich stores of his own knowledge.

There can be no doubt that if geography were recognised at our Universities, it would probably do more than anything else to raise the standard of the subject in our schools, and compel its solid recognition where now it is slighted. In the Scotch Universities such recognition would not involve much difficulty. If some wealthy merchant prince or rich and benevolent old lady, in search of some worthy object on which to bestow their superfluous wealth, were to endow a Chair at one or other of the Scotch Universities, I am sure the Universities themselves would welcome such an accession to the professoriate. This would be a great step gained. In the English Universities the case is different. The establishment of a professorship or lectureship would no doubt be a matter of great importance; but the point is to fit the subject into the complicated system of examinations in Oxford and Cambridge. Geography is not quite unrecognised in the history schools and in the science schools of these Universities. If this recognition were greatly extended; if it were insisted on that such subjects as have geographical bearings should be examined in a substantial manner in respect of these bearings, it would not be long before

something was done to have geography properly taught both at our schools and Universities. As a matter of fact, a lecture on geography is given one hour a week at Oxford in connection with the very slender examination in historical geography.

As to the fitness of geography for recognition as a University subject, it is surely not necessary to argue that point in an assembly of geographers. The success of the many German Chairs, not to speak of those of Italy, France, and Austria, is surely a sufficient reply to theoretical objections. Here the historian would probably claim much of the field as his, while the geologist would claim the rest. Neither has time to cultivate the field as it should be, and so it falls between two stools. There is no one science, and no collection of sciences, when they keep to their own spheres, that are called upon to work out the problems with which geography has to deal, and with which, for many years, it has been made to deal, under the hands of German geographical students. What geologist as such, or historian as such, has ever sought to investigate the geographical conditions which have determined the different developments of the two mainly Teutonic peoples that inhabit Germany and Great Britain?

The value of geography in connection with several of the most prominent existing studies there, is generally admitted by University men themselves, as will be seen from what is said in reference to English Universities in my Report. To effective research in history, we are granted, it is indispensable; in the illustration of ancient literature, and classical literature especially, it is most valuable. Geology, botany, zoology, physics in its widest sense, have all important geographical aspects. But at present the bearings of geography on all these various subjects are almost entirely overlooked, simply because historical, literary, and scientific specialists have no time to carry their researches beyond the very beginning of the geographical field. In my Report, with its appendices, those interested in this aspect of the subject will see what is actually being done in these directions at German Universities.

There are many other points in connection with geographical education which might be touched upon, but that would take up far too much of your time, and probably there are those in this audience far better qualified to discuss them than I am. With regard to apparatus, I must reserve what I have to say on that subject for the catalogue I shall have to prepare of the Exhibition of Geographical Appliances to be opened in London in November. In the letters which I have from so many head-masters, there is an almost universal complaint of the want of satisfactory text-books and other appliances. These are mostly on a par with the position of the subject. It is rarely the case that English text-books of geography are written by men who have any special knowledge of their subject. They are written mainly to suit the mere memory-work of which English geographical teaching chiefly consists. As to maps, while there have been improvements recently, while one or two publishers aim at bringing

out maps that really try to represent the actual features of a country after some scientific method, most of our school maps are mere daubs, sometimes substituting eccentricity of method for honest work. I am glad that an attempt is being made to introduce some of the fine series of geographical pictures which one sees in almost every German school. Some of them, and also some of the Continental maps, I have brought with me just to give some slight idea of the helps which are in the hands of the German teacher of geography. Of course there is every encouragement in Germany, and also in France and Austria, and even Italy and Switzerland, to produce such appliances. But I believe if we had publishers enterprising enough to produce such articles from an English standpoint, they would not only soon create a market, but also help to raise the position of the subject, and improve its methods. Some of the most beautiful and carefully executed school maps I have seen, are those of Randegger, of Winterthur, near Zürich.

I might also touch on the subject of map-drawing. As generally taught in English schools, I doubt if it is of much educational value, if it even fixes in the memory of the pupil a lasting impression of the situation of the places he fills in. In most cases, I fear, map-drawing is an object in itself. In one of our most celebrated public schools I found map-drawing was relegated to the drawing-master; the object here as in too many other schools being to produce pretty maps. When this exercise is carried out with intelligence on the part both of teacher and pupil, it is certainly an excellent means of mapping the world on the memory of the pupil. But it ought to go further. In German and Swiss schools I found constant efforts were made to teach the pupils to read a map as they would do a book. The ordinary cartographic symbols are easily enough learned: on the Continent you will find them taught in elementary schools. The pupil trained to read these aright will see a hundred times more in a well-drawn map than the pupil who vaguely knows that black smudges mean mountains and wavy lines rivers. I have brought here a few specimens of an exercise common in some continental schools, in which the pupils build up with cardboard a relief corresponding to the contour lines of a map. These were taken from a cupboard containing some hundreds of similar reliefs done by a class of girls in Zürich, the age of the pupils averaging about twelve years. While I was looking through the cupboard half-a-dozen of the girls built up with sand a relief of England. I am glad to find this method of using sand and clay for building up reliefs is finding its way into English elementary and middle-class schools. Of course this kind of exercise can only be satisfactorily done with first-rate maps as patterns. Much more on this subject of map-drawing will be found in my Report.

In conclusion, it seems to me that, so far as our schools are concerned, the two great weaknesses are want of knowledge in the teachers and want of organisation in the programmes and methods.

To quote from a letter addressed in February 1884, by the Rev. E. Hale, of Eton College, to the Council :—

"The point to be aimed at by the Royal Geographical Society is to teach those who will have to teach geography in our higher schools. The head-masters would like some geography to be taught because parents desire it, but few if any of their assistants care at all about it, or take any trouble in the matter. There have been various attempts to introduce a better system of geographical teaching by schoolmasters, and the two desiderata have always been that the schools want proper plant and good teachers. Every Swiss school is better provided than Eton and Harrow. German schools suffered as much as we do, until Karl Ritter was made Professor of Geography at Berlin, when teachers had to attend his lectures; and you now know what good geographers the North Germans are. The study of geography as a mental exercise is denounced by schoolmasters because they do not understand the sense in which science employs the term."

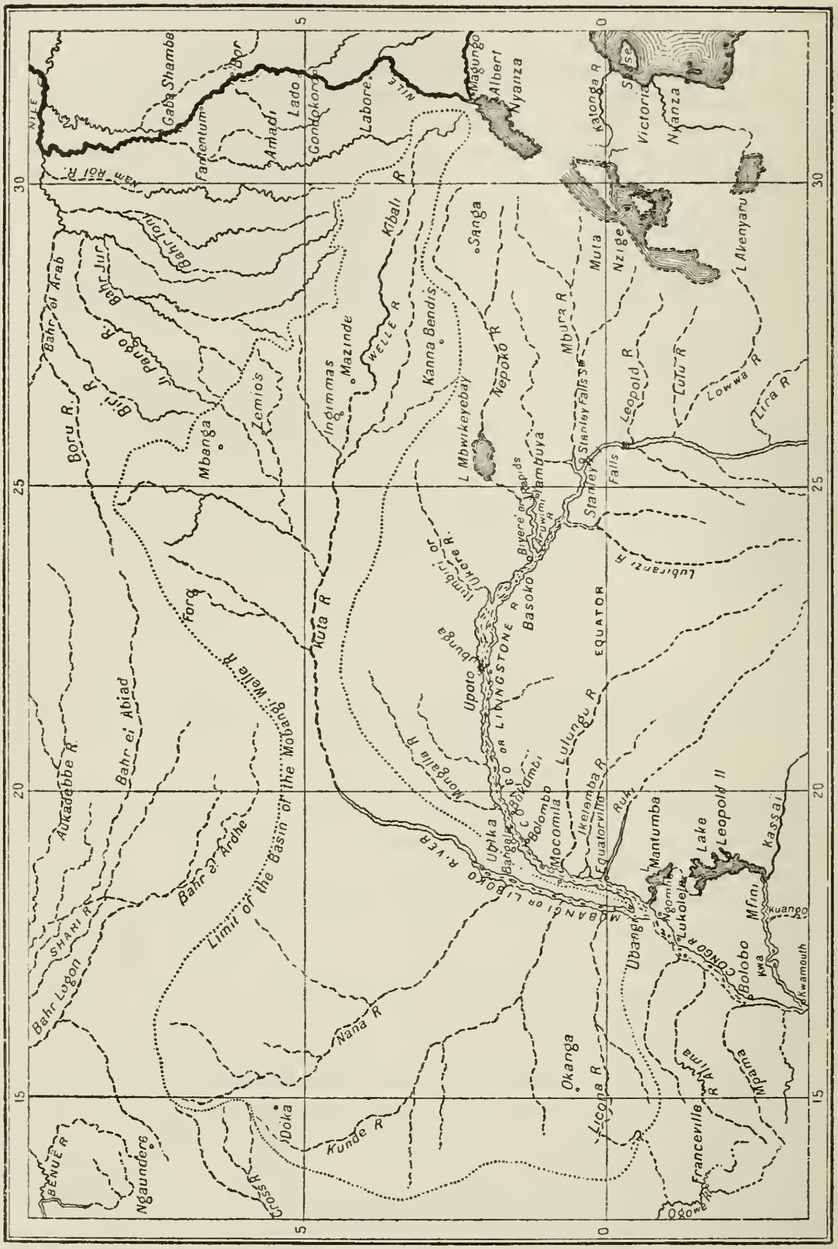
I am sure that teachers themselves would welcome a graded programme for geographical teaching, similar to those in use in Austria, France, and Germany, embracing all primary, middle-class, and higher schools, and all classes in these schools.

To carry out such a programme would require trained teachers, and text-books, maps, and other apparatus of a character superior to those at present obtainable in this country.

THE WELLE-CONGO THEORY: A NEW SOLUTION OF AN OLD PROBLEM.

THE Mountains of the Moon have long since ceased to diversify the surface of Northern Central Africa in our maps, but the regions they were long supposed to overshadow are still among the most unknown and inaccessible portions of the continent. From the Albert Nyanza and the Upper Nile basin westwards to the head-waters of the Benue, from the Congo northwards to the basin of Lake Chad has remained so entirely unexplored, that it is still necessary for geographers seriously to discuss the question whether in this region there is a great river with a westward course of 2000 miles or not; and, if this river exists, whither it ultimately finds its way.

The problem was first suggested by Schweinfurth's memorable discovery of the Welle River in 1870. In the Monbuttu country, well beyond the watershed of the Nile tributaries, the German explorer saw a noble stream with a strong and steady current to the west. The Congo was then unknown, save for a short distance from its mouth. It was not dreamt of that it had so vast a basin, still less that a large part of its course lay north of the Equator, and that it touched a region not so very far from the southern edge of the Monbuttu country. As the Welle did not connect with the Nile, Schweinfurth's most natural conclusion, after-



Albert Nyanza
Victoria Nyanza
Magungo
Lado
Labore
Gondokoro
Amadi
Fatiko
Bor
Gaba Shambe
Nam Rol R.
Katonga R.
Sesse
Muta Nzige
L Akenyaru
Kibali R.
Sanga
Mbura R.
Nepoko R.
Welle R.
Kanna Bendi
Mazinde
Ingimmas
Zemios
Mbanga
Boru R.
Biri R.
Bahr el Arab
Bahr Jur
Leopold R.
Lulu R.
Lowwa R.
Lira R.
Stanley Falls
Yambuya
L Mbwikeyebay
Aruwimi R.
Basoko
Lubiranzi R.
Equator
Upoto
Lubunga
Livingstone R.
Kuta R.
Forg
Bahr el Abiad
Aukadebbe R.
Mongalla R.
Lulungu R.
Bolombo
Mocomila
Ikelemba R.
Equatorville
Ruki
Mantumba
Lake Leopold II
Kassai
Mfini
Kuango
Kwa
Kwamouth
Bolobo
Lukolela
Ngombe
Congo R.
Ubangi
Mobangi or Liboko River
Upika
Limit of the Basin of the Mobangi-Welle R.
Bahr el Ardhe
Shari R.
Bahr Logon
Nana R.
Okanga
Licona R.
Alima R.
Mpama
Franceville
Ogowe R.
Kunde R.
Doka
Cross R.
Ngaundere
Benue R.
Nile
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wards fortified by Junker, was that it must be a head-stream of the distant Shari, and send its sweet clear water to be ultimately evaporated from the surface of Lake Chad in Bornu—a lake without outlet to the sea.

Seven years later, Stanley forced his way down the course of the Congo to the sea; and noting north of the Equator an important tributary, the Aruwimi, coming from the north-east or thereabouts, he was led to assume that this was the lower course of Schweinfurth's Welle, which was accordingly to be treated as a tributary of the Congo. The dignity and magnitude of the Congo were already multiplied almost beyond recognition by Stanley's actual explorations; and as the distance of the Congo from the Welle had been decreased to so comparatively inconsiderable dimensions, Stanley's inclusion of the Welle in the all-absorbing Congo basin seemed to many geographers a highly reasonable correction of Schweinfurth's view.

Another suggestion was subsequently made, that the waters of the Welle more probably reached the Congo not by the Aruwimi, but by the tributary called by Stanley Itimbiri or Ukere. This is the next great confluent received by the Congo on its right bank, and it, too, joins the main stream from the north-east, coming apparently from somewhere not far from the Welle region. Grenfell calls it Loïka.

The newest judgment on the Welle's future still dooms it to final absorption in the Congo, but compels it, in the interim, to perform a vast detour, and arrive at the Congo far to the west, just a little to the south of the Equator, which the Congo now crosses for the second time on its way seawards. The name of the mighty affluent which here joins the Congo is Mobangi, Mbanghi, or Ubangi, otherwise Liboko.

Something was learned by Stanley of the great confluent falling into the Congo near the Equator on the occasion of his first journey. Officers of the International Association went up the Mobangi a short distance; and, at the Conference in Berlin, Mr Stanley spoke of this stream as being large and important, having its source far to the north, near the sources of the Shari. But by far the most extensive exploration of the Mobangi has been made this year by the Rev. George Grenfell, and has helped to forward the solution of what has been called "the last great hydrographical problem in Africa,"—very near the time at which important work was being done to settle finally the lower course of the Congo's great southern tributary, the Kassaï, and the waters connected with it.

In October of last year Mr. Grenfell and Dr. Sims, Baptist missionaries on the Congo, started from Stanley Pool, on an extensive voyage of exploration in the small steamer *Peace*, belonging to the Stanley Pool Mission. Ere they returned in March of this year they had sailed along the main stream to Stanley Falls, besides 400 or 450 miles up the Mobangi, and about 300 miles up the courses of other affluents of the Congo.

On their upward journey they entered the mouth of the Mobangi, some 6 miles wide, under the impression that it was a part of the Congo itself, and, as the course of the main stream and its great tributary are

there so nearly parallel, they had sailed up the Mobangi nearly 130 miles before, by the absence of stations, they assured themselves that the stream was distinct from the Congo. On their return journey down the Congo they renewed their exploration of the Mobangi, and, sailing mainly north-by-east, penetrated to 4° 30′ North latitude. Allowing for bends, this would probably be 400 or 450 miles from the embouchure of the Mobangi at the Equator. At 4° 23′ north the stream was 673 yards wide, and is nowhere narrower below this; the mean depth seemed to be 25 feet, while the current was 80 to 100 feet per minute. This enormous volume of water running southward to the Congo, and so near the supposed sources of the Benue, naturally led the explorers to ask where it all came from, and in this connection to note the fact that the "trumbashes" of the Chad basin as drawn by Schweinfurth (also noticed by them in Stanley's Ukere) were common on the Mobangi, though unknown on the Congo. They returned from their voyage well assured that the Mobangi is not merely the largest tributary of the Congo, but that it promises by far the most valuable waterway, though navigable rapids occurred on the portion explored by them.

It was believed by the editors of the *Baptist Missionary Herald*, when publishing in August the first half of Mr. Grenfell's letter reporting at length the results of his voyage, that Mr. Grenfell and his Congo colleagues were of opinion that the Mobangi was the inferior course of the Welle. The full-fledged theory that this was so, had, however, been suggested almost as soon as the first brief summary of Mr. Grenfell's work reached Europe. M. Wauters grasped at once the possibilities of the case, and in the *Mouvement Géographique* of the 31st May worked out the theory of the Welle-Mobangi in an elaborate article.

Taking advantage of the ascertained facts as to the breadth, depth, and volume of the Welle, he proceeded to compare these in detail with the corresponding data available in the case of the Shari, the Aruwimi, and the Itimbiri; bestowing also special attention on the time at which the rivers assumed to be connected, rise and fall in volume according to the rainy season. Thus, making allowance for the length between the lowest known part of the Welle and the highest known part of the Shari, he concluded that the volume of the Shari is very greatly less than that of the Welle might be expected to become if continued so far west and north. Also the time at which the Shari is fullest of water does not, he holds, correspond with the date at which the flooded waters of the Welle should reach that point were the two rivers identical. In like manner the claim of the Aruwimi and the Itimbiri are dismissed, mainly because of the comparatively small volume of these Congo tributaries.

No similar difficulty, M. Wauters declared, stood in the way of identifying the Welle and the magnificent river reported on by Mr. Grenfell. The size and volume of the Mobangi are quite sufficient to represent those of the Welle increased by additions received during the long course attributed to it. No obstacle arises from anything we know as to the relief of

the land in the intermediate district; and further, the probability that some large tributary of the Congo does run nearly parallel to the main stream at some distance to the northward, is heightened by the fact that from the point where the Itimbiri joins the Congo to the embouchure of the Mobangi, no nameworthy tributary enters on the right bank save the unimportant Mangalla. Whither, if not into the Mobangi, does the water drain that is collected from the long tract of country north of the central section of the Congo's course?

This bold and brilliant essay in theoretical geography at once attracted notice and made converts. Almost, if not altogether, Dr. Schweinfurth was persuaded by it, though himself the first propounder of a rival theory; indeed he at once professed himself as "two-thirds converted." The newest map of Africa published by the Geographical Institute of Gotha adopts provisionally the hypothesis of M. Wauters. Objectors there are who point out that in spite of the painstaking, acute, and long-headed consideration of every available scrap of recorded information on the geography of the regions concerned, the data presented by the "arm-chair geographer" do not suffice for the identification of the Welle and the Mobangi. Certainly they do not prove the identity; nor will this new hypothesis be satisfactorily made out till other laborious explorers survey the intermediate part of the course. Best of all would it be if, after some months' voyaging, a steamer should arrive from Stanley Pool at the borders of the Niam-Niam country, thereby proving not merely that Welle and Mobangi are one, but that in them Africa possesses another incalculably important waterway for commerce and civilisation. Meanwhile Mr. Grenfell and M. Wauters will be content that home-keeping geographers keep their judgment in suspense, and do not finally reject all the rival hypotheses as impossible. D. P.

GEOGRAPHICAL NOTES.

EUROPE.

Visit of Lieutenant Greely.—We are glad to state that Lieutenant Greely, who will open the new Session of the Society on November 19, in Edinburgh, has consented to deliver addresses to the Society's Branches in Glasgow, Dundee, and Aberdeen in the course of the following days.

The "Justus Perthes" Centenary.—The Geographical Establishment of Justus Perthes, in Gotha, celebrated on 11th September last the centenary of its foundation. In a volume which we have received from the firm, published in commemoration of the event, we read with gratitude of the great services which have been rendered to geography by this important establishment; and biographical sketches of the several chiefs, with their portraits, add to the interest of the book. Fulfilling, in part, if not altogether, the functions of a geographical society, the establishment of Justus Perthes can claim the well-earned applause and congratulations of all geographers, who are so much indebted to its publications; and the Scottish

Geographical Society, recognising its existence as an important factor in the promotion of scientific and useful research, offers its most cordial congratulations on what has been accomplished in the past and its best wishes for continued activity in the future.

North-West Coasts of Sutherland.—In the forthcoming volume of the *Proceedings of the Royal Physical Society*, will be found an interesting paper on *The North-West Coasts of Sutherland and their Bird Life*, by John A. Harvie Brown, Esq., F.R.S.E., etc. The district described extends from Loch Inchard round by Cape Wrath to Loch Eriboll. In regard to the valley of Dionard or Grudie, by which he reached Durness, Mr. Harvie Brown states that he knew of no valley in all Sutherland so weird in its utter loneliness. "The view from Cape Wrath towards the south includes Sandwood Bay and the cliffs beyond its entrance, and Brelgie Island and the high rugged coast between. Inland extends a bare and cold-looking moorland, rolling away in wavy undulations at a considerable height above the sea. To the west and north is the open sea. Lewis is visible; but it is only very rarely indeed that the light of the Butt lighthouse can be seen at night, and then only at ebb tide. It is some 60 miles distant. Rona and Souliskeir are easily and distinctly seen in clear weather; and nearer, within a mile of the cape, and nearly due north, looking almost within stone-cast of the balcony of the lighthouse, lies the dangerous rock of Dhuslag, on which a vessel called the *Captain*, of Hull, was wrecked; eastwards, Farout Head; and nearer, Garbh Island and the high cliffs, culminating in Clo-More, Cearvig Bay, sands, and shepherd's house, and some fine but almost birdless cliffs between, considerably higher than Cape Wrath. Near Clo-More is an extensive nursery of puffins, occupying an area of three miles in cliffs 300 feet high. In the lochs of the Durness district is found a species of trout which, according to Dr. Francis Day, is the nearest link yet discovered to the Loch Leven trout."

ASIA.

The Survey of Palestine.—The following is from the Report of the Committee, consisting of the Rev. Canon Tristram, the Rev. F. Lawrence, and Mr. James Glaisher (Secretary), appointed for the purpose of promoting the Survey of Palestine:—"The survey of Eastern Palestine has been carried on during the last year privately by Herr G. Schumacher, C.E., assisted by Mr. Laurence Oliphant, who has also furnished the Committee with valuable notes of personal exploration in the district now called Jaulan—the ancient Gaulanitis. The portion surveyed by Herr Schumacher consists of about 200 square miles, and covers an area previously quite unknown. The map, which is now in the hands of the Committee, is accompanied by voluminous memoirs and a great number of sketches, drawings, and plans of ruins figured for the first time. These drawings are now in the hands of the engravers, and it is proposed to publish them, with the memoirs, in October. The map will be laid down on the sheet to which it belongs. As regards other portions of the Holy Land, the map of the Wady Arabah has been laid down in the Society's sheets; the geological memoirs compiled by Professor Hule after his expedition of 1883-1884 are nearly ready, and will be issued before the end of the year; and the Society has been enabled to secure Mr. Chichester Hart's Natural History memoir, made from new observations during the same journey. In addition to Mr. Laurence Oliphant's paper, the Committee have received from Mr. Guy Le Strange, and published, observations and notes made by him during a recent journey east of Jordan. The results of the survey, so far as it has been completed, will appear in a map reduced to a scale of about three miles to an inch, showing the

country on both sides of the river Jordan, instead of on the western side only. The Old and New Testament names, with tribe boundaries and later divisions, have also been prepared for this map, and will be printed upon it in colour. A list of ancient names with modern identifications has been prepared, and will be issued with it. This portion of the work is under the direction of Colonel Sir Charles Wilson, K.C.M.G., F.R.S. The Society has also issued during the last year a popular account, by Profesor Hule, of his recent journey, called *Mount Seir*, and reprints of Captain Conder's popular books, *Tent Work in Palestine*, and *Heth and Moab*. Finally, the Committee have completed the issue of their great work, the *Survey of Western Palestine*, with the last volumes of *Jerusalem*, the *Flora and Fauna*, and a portfolio of plates showing the excavations and their results."

The Influence of the Himalayas on Pendulum Observations.—General Walker's Presidential Address to the Geographical Section of the British Association contained the following interesting passage:—"The pendulum operations in India have been successful in removing from the geodetic operations the reproach which had latterly been cast on them, that their value has become much diminished since the discovery that the attraction of the Himalayan Mountains is so much greater than had previously been suspected, that it may have materially deflected the plumb-line at a large number of the astronomical stations of the Great Arc, and injuriously influenced the observations. Everest considered the effects of the Himalayan attraction to be immaterial at any distance exceeding sixty miles from the feet of the mountains; but in his days the full extent and elevation of the mountain masses was unknown, and their magnitude was greatly under-estimated. Afterwards, when the magnitude became better known, Archdeacon Pratt of Calcutta, a mathematician of great eminence, calculated that they would materially attract the plumb-line at points many hundred miles distant; he also found that everywhere between the Himalayas and the ocean, the excess of density of the land of the continent as compared with the water of the ocean would combine with the Himalayan attraction and increase the deflection of the plumb-line northwards, towards the great mountain ranges, and that under the joint influence of the Himalayas and the ocean the level of the sea at Kurrachee would be raised 560 feet above the level at Cape Comorin. But as a matter of fact the Indian arc gave a value of the earth's ellipticity which agreed sufficiently closely with the values derived from the arcs measured in all other quarters of the globe, to show that it could not have been largely distorted by deflections of the plumb-line; thus it appeared that whereas Everest might have slightly under-estimated the Himalayan attraction, Pratt must have greatly over-estimated it. His calculations were, however, based on reliable data, and were indubitably correct. For some time the contradiction remained unexplained, but eventually Sir George Airy put forward the hypothesis that the influence of the Himalayan masses must be counteracted by some compensatory disposition of the matter of the earth's crust immediately below them, and in which they are rooted; he suggested that the bases of the mountains had sunk to some depth into a fluid lava which he conceived to exist below the earth's crust, and that the sinking had caused a displacement of dense matter by lighter matter below, which would tend to compensate for the excess of matter above. Now Pratt's calculations had reference only to the visible mountain and oceanic masses, and their attractive influences—the former positive, the latter negative—in a horizontal direction; he had no data for investigating the density of the crust of the earth below either the mountains on the one hand, or the bed of the ocean on the other. The pendulum observations furnished the first direct measures of the vertical force of gravity in different localities which were

obtained, and these measures revealed two broad facts regarding the disposition of the invisible matter below; first, that the force of gravity diminishes as the mountains are approached, and is very much less on the summit of the highly elevated Himalayan table-lands than can be accounted for otherwise than by a deficiency of matter below; secondly, that it increases as the ocean is approached, and is greater on islands than can be accounted for otherwise than by an excess of matter below. Assuming gravity to be normal on the coast-lines, the mean observed increase at the island stations was such as to cause a seconds pendulum to gain three seconds daily, and the mean observed decrease in the interior of the continent would have caused the pendulum to lose 2½ seconds daily at stations averaging 1200 feet above the sea-level, 5 seconds at 3800 feet, and about 22 seconds at 15,400 feet—the highest elevation reached—in excess of the normal loss of rate due to height above the sea."

The Rivers of the Panjab.—General Robert Maclagan, R.E., read a paper on this subject at the meeting of the British Association. The following is an abstract:—"The country called Panjab receives its name from the rivers which give it its distinctive geographical character. The name, as is well known, means 'five waters,' and they are the five great tributaries of the Indus, namely, Jhelam, Chináb, Rávi, Biás, and Satlaj. In early times it was called the land of the *seven* rivers, including the Indus itself on one side, and on the other the Saraswati, which was the eastern boundary of the land occupied by the Aryan immigrants from the north (about 1500 B.C.). The modern British province which we call Panjab—the country marked off for administrative purposes as the charge of the local government—is not thus bounded by the lines of one river system. It includes on one side the strip of country between the Indus and the hills, and on the other a large extent of cultivated plain as far as the Jamna, a river which has different geographical relations. The seven-river-land (Sapta-Sindu) of the early Aryans had distinct river boundaries, as then understood. The Saraswati, its eastern boundary, presents to us an interesting geographical problem. It is not now such a river as is described in the ancient writings, in which it is mentioned along with the others, and as being of still greater size and importance. Nor can it ever have been a river of the same kind, as it has its source in the low outer hills, while the others come from perpetual snows. Its channel is dry for great part of the year, and it never carries water on so far as to unite with the other rivers. The changes in the country through which it passes may account for a great change of the river. About the sixth century B.C. the Saraswati was said to sink into the earth, and to pass underground to join the Ganges and Jumna at their confluence. This seems intended to describe a river such as it is now. The Satlaj is the distinct eastern boundary of a great area of hill and plain country enclosed between it and the Indus. These two rivers have their sources within a short distance of each other, on the opposite sides of the same mountain mass, and they unite in the south of the Panjab, the Indus having run a course of about 1350 miles and the Satlaj about 950. The maximum distance between them, the breadth of the area they enclose, is about 350 miles. The Satlaj a few years ago brought down one pier of the railway bridge, sunk to a depth of 70 feet, by scooping out the bed below it. In 1841, and again in 1858, there were very striking and serious floods in the Indus, caused by temporary obstruction of narrow gorges in the hills. In both cases warning came (but was not fully understood) by the river at Attak falling when it should have been rising. The effect, when the barrier gave way, was very remarkable and very destructive. In 1858 the Kabul River was driven back by the immense volume and force of the released

Indus, which flowed up stream as far as the British station of Naoshera, which was inundated and destroyed. The fall of these rivers being greatest in the hill portion of their course, and decreasing as they came down through the plains, the vertical section of their course is a curve terminating in a nearly horizontal line at the sea. From Attak to Kalabagh the fall of the Indus is 50 inches per mile, from Kalabagh to Mittan Kote 12, and from Mittan Kote to the sea 6, the end part being less. The result is a constantly increasing tendency to deposit silt and raise the bed, and by overflow to raise the banks. For a great part of its course the Indus flows in a channel slightly above the level of the land on either side. Canals carrying water permanently throughout the year, are drawn off from some of the rivers in the upper part of their course near the foot of the hills, and are carried along high land for the supply, all the way, of the country right and left. So great areas of land are protected against the possible effects of their scanty and precarious rainfall. Where these canals and their branches flow, the level of water in the wells is raised, and thus more advantage can be taken of the great sheets of water at varying depths below the surface. In the country through which run the dry channels of the Saraswati, Ghaggar, Markanda, etc., the depth of the wells is very great, but the rainfall, though small (about 18 inches), is much greater than in the country to the west, at the tail of the Panjab rivers. The Panjab rivers are of different colours, depending on the soil through which they have passed and the tributaries they have received. The different colours of two rivers is often observable for a long distance below their confluence. The Indus below Attak is dull blue; its tributaries in this part of its course are red, except the Harro, which is light in colour and comparatively clear. The Gharra (Satlaj) is light but not clear where it is joined by the red Chináb, and they run on for a long way not mixed. The united rivers which join the Indus are of less volume and velocity than its single stream. The width of the Panjnad (the combined five) is more than twice that of the Indus, but its depth is smaller and the rate of its current less than one-half. In the low season the discharge of the Indus is 92,000 cubic feet per second, and of the Panjnad 69,000—in all 161,000. The flood discharge in the month of August below the junction has been estimated at 446,000 cubic feet. Such rivers are great powers, very valuable, and difficult to deal with. By watching their characters, and obeying while controlling the action of nature, we can do much to make them subservient to our purposes, and in some measure to illustrate man's influence on the physical as well as political geography of a country."

The Indian Forest Survey.—Major F. Bailey, Superintendent of Forest Surveys in India, in a paper on this subject, read at the British Association, said that it was only in comparatively recent times that measures had been undertaken to preserve what remained of the great Indian forests. The first thing to do was to demarcate the tracts which were to be reserved and to free them from rights. The area reserved was about 30,000 square miles, or about 3½ per cent. of the total area of British India, not including the native States. The tracts demarcated owed their immunity from destruction either to the fact that they occupied ground which was, in the absence of communications, inaccessible, or which was much broken, or could not be irrigated. They were situated either in the plains or on the low ranges of hills rising from them, or on the lower or middle slopes of the Himalayas up to an elevation of 8000 or 9000 feet above sea-level.

The first work undertaken was the survey of the forests of Dehra Dun, about 573 square miles, the private lands of the district being surveyed at the same time by the Imperial Survey Department, and a combined map of the whole country being thus produced. The next work was the survey of the Kumaon and Garhwál

forests,—area about 1400 square miles; and the survey of an area of about 1600 square miles in Hyderabad was now in progress. Altogether, since 1872, about 3000 square miles had been surveyed and mapped, mostly on the scale of 4″=1 mile.

South-Western China.—Mr. A. Hosie's paper on "Journeyings in South-Western China," read at the British Association, deserves mention. In the autumn of 1881 Mr. Hosie was appointed Her Majesty's Agent in Western China, and reached Ch'ung-ch'ing, in the province of Ssu-ch'uan, in January 1882. From this point he made three journeys in South-Western China. In February, 1883, Mr. Hosie again left Ch'ung-ch'ing, and proceeded north-west to Ch'êng-tu, the capital of the province of Ssu-ch'uan, by way of the brine and petroleum wells of Tzu-liu-ching. From Ch'êng-tu he journeyed west and south-west through the country of the Lolos, skirting the western boundary of Independent Lolodom. From Ning-yüan, locally called Chien-ch'ang, and lying in a valley famous, among other things, as the habitat of the white-wax insect, he passed south-west through the mountainous Cain-du of Marco Polo, inhabited in great part by Mantzu tribes, and struck the left bank of the Chin-sha Chiang two months after leaving Ch'ung-ch'ing. From this point Ta-li Fu, in Western Yünnan, was reached. From Tal-li Fu Mr. Hosie journeyed eastward to Yünnan Fu, which he had visited the year before, and then struck north-east through Western Kuei-chou to the Yung-ning River, which he descended to the Great River. Lu Chou, an important city at the junction of this river with the T'o River, was soon reached, and the Great River was again descended to Ch'ung-ch'ing. In June 1884 Mr. Hosie again left Ch'ung-ch'ing, and from Ho Chou, a three days' journey to the north of that city, he struck westward through a beautifully cultivated and fertile country to Chia-ting Fu, on the right bank of the Min at its junction with the T'ung River. Chia-ting is famous as the great centre of sericulture in Ssu-ch'uan, and as the chief insect wax-producing country in the Empire. A day's journey west of Chia-ting is the famous Mount O-mei, rising 11,100 feet above the level of the sea. This mountain, which is sacred to the worship of Buddha, Mr. Hosie ascended in company with crowds of pilgrims. He then proceeded south, skirting the eastern boundary of Independent Lolodom, to the river of Golden Sand, the left bank of which was struck at the town of Man-i-ssu, between forty and fifty miles above P'ing-shan Hsien—the highest point reached by the upper Yangtsze Expedition in 1861. From Man-i-ssu Mr. Hosie descended the Chin-sha Chiang and the Great River to Ch'ung-ch'ing.

AFRICA.

Return of Mr. Joseph Thomson.—Mr. Joseph Thomson has recently arrived in Scotland from a trip up the Niger on a mission, of some commercial importance, to the Sultan of Sokoto. He left England on the 2d of February, and reached Akassa, at the mouth of the Niger, on 15th March, where three days were spent collecting stores and making various arrangements for his journey. He proceeded up the river in a steam launch, and, on 7th April, reached Rabba, the former capital of the Nupè country, having in the course of his voyage organised a caravan of over 120 strong, and completed his arrangements for the start into the interior. On the 8th April he left the river, accompanied by two European companions, two coast clerks as Haussa interpreters, and an Arab as Arabic interpreter; but, on the very first march, an accident deprived Mr. Thomson of one of his companions, who returned to the river with a broken leg. Following, generally, the route taken a few years previously by Flegel (to whose work Mr. Thomson bears high testimony), the expedition reached Sokoto on the 21st May, and Wurnu, the present residence

of the Sultan, two days later. Mr. Thomson was received in right royal fashion, and entertained for ten days. Having concluded his business arrangements with the Sultan, he started on his return journey, visiting, on the way, the Sultan of Gandu. The expedition got back to Rabba on 7th July. Its success would have been complete but for the unfortunate circumstance that at Kowara, on the Gulbi-n-Gindi (River of Gindi), Mr. Thomson's diaries and note-books, together with other things, were stolen from him ; though, there is just a hope they may yet be recovered. Akassa was reached on the 26th July, and Liverpool on 9th September. The whole journey was thus performed in seven months, three of which were spent at sea.

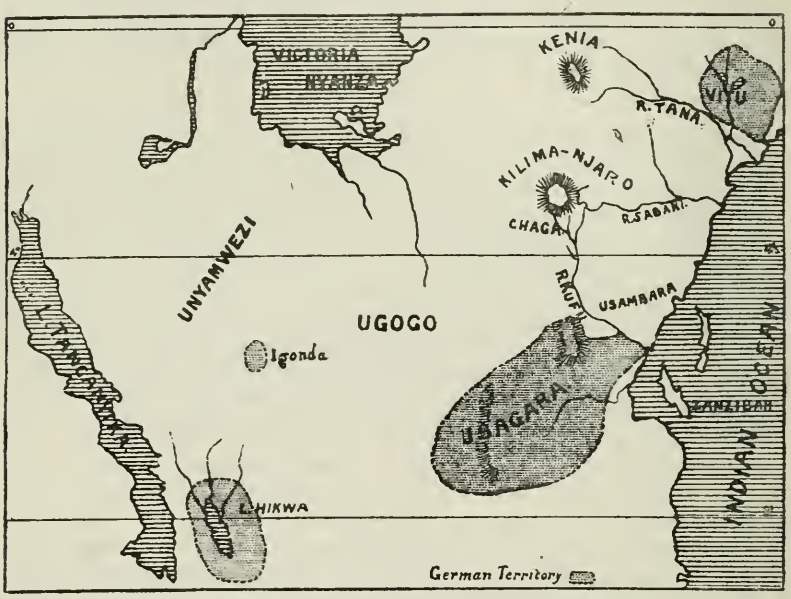
Solution of the Kassaï Problem.—The *Mouvement Géographique* of 14th September announces the receipt that day in Brussels of the following telegram from Lieutenant Wissmann, who, as we have already mentioned in a geographical note on the subject (pp. 192, 193), has been exploring the whole course of the Kassaï to the Congo :—"Leopoldville, 18*th July* 1885.—Arrived by water at Kwamouth from Lubuku with Dr. Wolff, Von François, Lieutenant Müller, Gunsmith, and Schneider. Franz Müller and Meyer dead. No obstacles to navigation. The Kwa-Mfini (Mfini R.) is the lower course of the Kassaï. The Sankuru, Lake Leopold, and the Kuango are affluents.—Wissmann."—(*Vide* Sketch-map illustrating Welle-Congo Theory.)

Climate of the Congo.—In a report recently made by Rear-Admiral English to his Government (U.S.A.) as to the advisability of establishing a commercial station, or a coaling-depôt, at the mouth of the Congo, the following statements by United States Commercial Agent Tisdell are quoted :—"The reputed wealth of the Congo valley has been greatly exaggerated, and it will be an undesirable and unprofitable country for an American to make his home. Between Vivi and Stanley Pool I saw on all sides misery, want, sickness, and death, particularly among the *employés* of the International Association. The country does not and cannot produce food for the white man to live upon, and barely produces enough for the natives." This opinion is confirmed by Commander Bridgman of the *Kearsage*. Such an unfavourable report we feel ourselves bound to notice, considering its official character. We merely remind our readers that there are two sides to the picture.

German Claims in East Africa.—Up to the present time the territory claimed by Germany in East Africa is not of wide extent, although it would seem as if that Power ultimately aimed at the complete absorption of the Zanzibar Sultanate, an act which would be a severe blow to English commerce, but which would otherwise aid in the opening up of Eastern Africa, provided German settlers could be induced to live there. On the adjoining map, the districts now placed under German protection are indicated with as near an approach to accuracy as is possible in default of definite information. The territory of Vitu, in the north, will probably lead to the possession of the Tana River. Usagara is on the main road to Tanganyika, and is a mountainous and healthy region. Igonda, a German station in Unyamwezi, is also a stage in the direction of the great lakes. Around Lake Hikwa, or Leopold, the Germans have been established some five years. The district is a very beautiful but very unhealthy one ; and of the original expedition of five individuals which first started for its occupation, only one (Dr. Reichardt) is now living.

German pretensions to the river Jub, the great equatorial river of Galla-land, and to Kilima-njaro, the snow mountain of Chaga, are also reported, but not confirmed. Needless to say, that in most of these regions bordering the coast,

Germany has not the faintest claim to sovereignty that can bear justification. In most cases she has seized on districts which have long owed allegiance to the Sultan of Zanzibar, and have been garrisoned by his troops. This has made no difference to Prince Bismarck's plans for colonial extension, and the Sultan of Zanzibar, with a fleet of German ironclads ranged under the windows of his palace, has been forced to acquiesce in each fresh spoliation of his territory. Neither France nor England cares to intervene, and in these days when might is right, it is not likely that Germany will be long to seize the remaining portions of Zanzibar territory. It is to be hoped, when she has substituted her rule for that of Sayyid Barghash, she will take some steps to check the horrible trade in bad potato-spirit, in which the principal German firms in East Africa at present engage. This, and the guns and gunpowder introduced from the same source, are at present the curse of the East African littoral, and the great incentives to murder and rapine in the interior. In previous times the Sultan of Zanzibar had placed considerable restrictions in the way of the trade in alcohol and arms, but under the threats of a bombardment these checks to German commerce have been removed. H. H. Johnston.



Serpa Pinto's Expedition.—A private telegram has lately been received in London, according to which Major Serpa Pinto has, owing to the state of his health, been forced to relinquish the command of his expedition, which, it is hoped, will nevertheless go on under Lieutenant Cardoso, the second in command. Major Pinto was on his way home, *viâ* Zanzibar.

Bechuanaland.—Mr. George Baden Powell confirms most strongly the opinion we expressed, both in the July and August numbers, as to the pre-eminent importance to be attached to Sir Charles Warren's doings in South Africa. He considers that Khama's capital, Shoshong, situated as far north almost as the northern limit of the Protectorate, is bound to become a great focus of converging trade routes, tapping all districts lying to the south of the Congo and Zanzibar areas. A good road has been opened up by Sir Charles Warren, with efficient watering-places and

telegraph all along it, connecting Shoshong with Kimberley; and Kimberley, it will be recollected, is in direct communication by railway with the docks at Cape Town. Already the people round Shoshong are buying Manchester piece goods, Sheffield hardware, and even Birmingham screws; whereas three years ago they made their own copper wire and axe-heads, and clothed themselves in skins of their own killing and curing.

Re-discovery of lost Numidian Marbles.—Lieutenant-Colonel Playfair, H.B.M.'s Consul-General in Algeria and Tunis, read a very interesting paper before the Geological Section of the British Association. The following is an abstract:—Various classical writers, *e.g.* Seneca, Pliny, Isidore of Seville, Suetonius, speak of Numidian marble, which was imported into Rome for purposes of ornamentation. It is highly probable that the term is a misnomer; at all events two distinct localities in which richly-coloured marbles were quarried by the Romans lie outside the boundaries of ancient Numidia. The first was Simittu Colonia (modern Chemtou), in the valley of Medjerda, on the railway between Algeria and Tunis. This place was not far from the eastern frontier of Numidia; hence perhaps the origin of the term "Numidian marble." The quarries at Simittu, as well as most others known, at the time of the Antonines, were the property of the emperors. Three distinct varieties are obtained in that locality; a yellow marble, true *giallo antico;* a stone with a rose-coloured tint; and a small brown breccia. Although the plain of Chemtou is thickly covered with ruins of Roman buildings, there is hardly an instance of decorative work done in the coloured marbles of the district: the rubble masonry of the public buildings is, however, made partly of the *débris* of these marbles. These facts indicate that the products of the quarries were regarded as too precious for common use. The second locality is that of the mountain called Djebel Orousse by the French,—probably a corruption of Jebel-er-Rus (Mountain of the Capes), but generally called Montagne Grise. It overlooks the little village of Kleber, north-west of Mefessour, a village in Western Algeria, between Arzeu and Mostaganem, and twenty-one miles north-east of Oran. The chain of hills which constitutes the mountain stretches from Cape Aiguille north-eastwards to Cape Carbon, and includes Cape Ferrat. The highest point is 2000 feet above sea-level, and the central plateau of the range, from 1500 to 2000 acres in extent, is almost destitute of soil and vegetation, being in fact one unbroken mass of "marble and breccia, mixed more or less over its whole surface with manganetic iron ore." An Italian marble-dealer from Carrara, Signor Delmonte, is the discoverer and owner of the quarries on this mountain. Emigrating to Algeria soon after the French conquest, he was fortunate to discover some quarries of Algerian onyx, a species of alabaster, at Ain Tekbalet, near Tlemçen. Soon afterwards, in making excavations at St. Leu, near Arzeu (*Portus Magnus*), certain very fine mosaics of a totally different marble were brought to light. This induced Signor Delmonte to examine carefully the surrounding country, and he then discovered the quarries of Montagne Grise, which, as well as the adjacent district, he purchased and now works. His marble, which would be cheap at 1000 francs in Paris and London, he offers to deliver for shipment at Oran, at 450 francs per cubic metre. These quarries, which were visited in 1880 by Lieutenant-Colonel Playfair, bore no indication of having been worked for huge monoliths, and there was no *débris* lying about, nor any inscriptions; hence he infers that the emperors carefully guarded the secret of their existence, and had the blocks brought away in a rough state, just as they were split from the mountain. Colonel Playfair describes the Montagne Grise in the following words:—

"Although no geologist, I will endeavour to give as simple an account as I can of

this mountain. On the summit is an elevated plateau of an oblong form, running east and west. The soil, where any exists, is of a deep red colour, and there are traces of iron everywhere, but more especially on the western side. The original colour of the rock was creamy white; in the extreme eastern part where the amount of iron is small, it exists very much in its natural condition, only somewhat stained with iron, which communicates to it a tint resembling ivory. In conjunction with this is a rose-coloured variety which is capable of being worked either in large masses or in the finest ornamentation. I have seen trinkets made of it which so closely resemble coral as entirely to deceive the casual observer. Here all the rock is of a uniform structure, marble, in fact, as distinguished from breccia. In the west of the plateau, however, there appears to have taken place some great earth movement. The whole of this side of the mountain has been crushed by pressure into fragments varying in size from large angular masses to the merest dust.

"This disintegrated mass has subsequently been cemented together by the infiltration of water; the fragments have retained to a certain extent their original rose or yellow colour, while the matrix has been stained of the deepest brown or red, owing to the iron oxide and the manganese which has been carried by the water through the fissures, the whole thus forming a beautiful breccia of endless variety and colour. The matrix is quite as hard as the fragments it contains, so that it takes a uniform polish throughout its whole surface.

"Between these two extreme varieties, namely, the white and rose marble on the east, and the breccias on the west, there are many others, such as the well-known yellow, called *giallo antico*, a cippolino of almost indescribable beauty, a variety which the owner has named *paonazza* from its resemblance to a peacock's plumage, and a deep red species, somewhat brecciated, and greatly resembling, if not identical with the famous *rosso antico*. All these owe their colour and form to the iron and to the greater or less amount of crushing force to which they have been subjected."

These marbles have been used for the decoration of the English Church at Algiers; a dado has been erected composed of alternate slabs of different-coloured breccias, framed in bands of *giallo antico* and *breccia dorata*, surmounted by a frieze of smaller tablets of rose-coloured marble, similarly framed. Specimens have been used in the British Museum as pedestals for sculptures, and others have been submitted to Mr. Ruskin and Professor Bonney, the former of whom was specially warm in his praise of the marble. The most striking varieties are called by Signor Delmonte:—marmor bianco, rosa carnagione, giallo avorio, giallo carnarino, giallo paonazzo, cippolino rosso, rosso antico (?), breccia sanguigna, breccia coronata, breccia dorata, breccia grande, bianco e nero antico.

Geographical Philology of Africa.—In the wide field of African philology, the term *Geographical* appears to be more convenient than that of *Ethnographical* for the purpose of classification, owing to the vast number of languages and dialects, many of them, so far as is known, with but few if any affinities to those spoken in the neighbouring regions. The Semitic invasion from Asia seems to have been preceded by two Hamitic invasions; the first, probably from Mesopotamia, spread from the Red Sea to the Canary Islands and from the Mediterranean to the Senegal and Niger. Although the languages of this group have perished in Egypt, Tripolis, and the Canaries, they are still spoken in distinct forms in Tunis, Algeria, Morocco, and the Great Sahara as far as the Niger. The second influx must have entered by way of Abyssinia across the Red Sea. The Semitic and Hamitic languages resemble each other more closely than any of them do the other tongues of Africa. The invasions of the Semitic languages followed four main routes. The first accompanied the wave of Mohammedan conquest which swept over Tripolis, Tunis, Algeria, and Morocco. The second crossed over from Arabia; and the Old Ethiopic or Giz, and

the modern Amharic and Tigre superimposed themselves upon the existing Hamitic languages. The nomad Arabs, crossing the Red Sea, carried a third division of Semitic speech into the Egyptian Sudan. The south-east corner of Arabia sent forth the fourth influx to Zanzibar and the East Coast of Africa. The Arabic of these last immigrants has materially affected such African tongues as Kabail, Swahili, and Fulah, and has made its influence felt everywhere in Equatorial Africa as far as the Niger and the Congo. The great group of pure Negro races and languages is so vast and heterogeneous, and our knowledge of it so imperfect, that nothing more than a provisional subdivision can yet be attempted. In the first place some authorities detach a group, to which they give the name of Nuba-Fulah, from the two predominant languages which constitute it. Besides Nuba, which is spoken in the Nile Valley from Dongola to the First Cataract, there are the languages of the Niam-Niam, the Monbutto, the Masai, the Kwafi, and others; the Fulah are a superior race in the western regions of Central Equatorial Africa, north of the Equator, who have embraced Islamism and subdued the Negro races with whom they have come in contact. Arabic is the language of religion amongst these peoples, whilst Fulah is the official language. The next large division, the region of the pure Negro languages, extends from the Atlantic to the Nile and from the Senegal to the Cameroons and the Bight of Biafra. In that region it is estimated that there are 200 million inhabitants, speaking 195 distinct languages, and 49 additional dialects. Of these the Atlantic sub-group is very important, including the Wolof, Mande, Susu, Mende, Bullom, Kru, Grebo, Ashanti, Akra, Ewe, and Yariba. The sub-group of the Niger embraces the languages of the Idzo, Ibo, Igara, Igbira, Nupe, Efik, and many others. The most important tongues of the central sub-group are the Housa, the *lingua franca* of the regions north of the Equator; the Surhai, the language of Timbuctu; the Kanuri, spoken in Bornu, round Lake Chad; and the Tibbu, prevalent in the west of the Great Sahara, south of Tripoli, and Fezzan. The Dinka and the Bari are the leading languages of the Nile sub-group, which stretches from the district of the Upper Nile to Victoria Nyanza. These sub-groups are merely chosen for the sake of convenience in classification, and do not necessarily indicate the existence of any affinity amongst the languages grouped under them. Between the Equator and the southern extremity of Africa lies the region of the Bantu family of languages, surrounding enclaves of the Hottentot-Bushman group. This family embraces 168 languages and 55 dialects, all of which resemble each other not only in grammatical system but also to some extent in vocabulary. Among these tongues, Swahili, Zulu, Suto, Herero, Bunda, Congo, Pongwe, and Dualla are declared to be of great melody and comprehensiveness. Behind this first series come two others, one, with much more numerous languages, now in course of being studied—grammars being compiled, vocabularies collected, and translations made; the other consisting of languages as yet unstudied. The dialects and languages of the Hottentot-Bushman enclaves are rapidly becoming extinct. The chief agents in collecting information and materials in connection with these multitudinous languages have been missionaries and private travellers, principally the following: among *Frenchmen*, Hanoteau, Faidherbe, Duveyrier, Lamoise, Kobes, D'Abbadie, Du Berre, Mabille, Arbousset, Halévy; among *British* subjects, F. Newman, Norris, Baikie, Crowther, Wakefield, New, Henry Johnson, Goldie, Hunter, Moffat, Roberts, Davis, Livingstone, Steer, Baker, Beke, Last; among *Americans*, J. C. Wilson, Grout, Payne, H. Stanley, Mackey; among *Germans*, Fr. Müller, Lepsius, Bleek, Koelle, Schön, Nylander, Schlenker, Isenberg, Hinderer, Kolbe, Krapf, Rebman, Auer, Schlegel, Christaller, Zimmermann, Barth, Nachtigall, Schweinfurth, Reinisch, Munzinger, Dillmann, Mitterrutzner, Halm, Steinthal;

among *Italians*, Beltrame, Sapeto, Marno ; and the *Swedes*, Almqvist and Englund, and the *Norwegian* Schröder.—*Abstract from Mr. R. N. Cust's Paper, read at Meeting of British Association, Aberdeen, September* 1885.

AMERICA.

The Danish East Greenland Expedition of 1884.—An account of the operations of this expedition, reference to which was made in the *Magazine* for April, has been furnished by Lieutenant Garde, of the Danish Navy, one of its officers. The division to which he was attached had spent the preceding winter on the west coast of the island, where it was joined by the other division, which had been on service on the east coast. The expedition, thus reunited, put to sea on the 5th of May, in order to make another cruise along the eastern coast. It consisted of four boats made of skin, carrying nineteen women and girls, and twelve men, exclusive of the boats' company (*Besatzung*) of six men, who were partly Dolmetschians and partly Europeans.

The voyage began auspiciously ; the waterway was clear of ice ; the weather was fine ; and all were in high spirits. But it did not long continue prosperous ; for, on the evening of the 6th, the expedition had to land at Sangmisok, just after it had entered Ikek Sound, and was obliged to remain there for ten days. This was in the neighbourhood of Cape Farewell, which is always a very perilous point for navigators. Ice had been seen on the 5th of the month, and by the morning of the 7th the long narrow sound was found quite covered with huge masses of it, which, drifting in from the east coast, impinged with frightful violence against the rocks along the shore, or against each other in the midst of the rapid current. The *kayak* people were consequently seldom able to go out seal-hunting, and all that the party could do was to wait till a west wind should spring up and clear the waterway. The ground at Sangmisok was still all covered with snow, and the temperature was, at night, several degrees below freezing-point. In spite of all, however, recreations of various sorts—taking observations, drawing, photographing, collecting specimens, running about in snow-shoes, and engaging in various games—made the time pass pleasantly enough.

At last, on the 16th, the signal of departure was given. The course at first lay across the Sound, as it had been ascertained that on the opposite side there was a small open channel which could be navigated. This was reached, but still the way forward was so frequently barred with ice, that it was fully fourteen days before the Sound could be quite cleared. The weather after this changed for the worse, and continued to be bitterly cold, wet, and stormy till the 26th of June.

The greater part of this time the expedition lay encamped on a tongue of land which projected far out into the sea from the island of Alluk, a place commanding a wide prospect over the whole coast as far as Cape Vallöe. The prevailing wind here, which is from the north, carries down before it great masses of ice to the southern extremity of the island, where they are driven on shore in the neighbourhood of Cape Farewell. During the long halt at Alluk, many seals were caught. Of the seven kayakmen, whose duty it was to hunt for them, only five were found to be efficient at their work. Of the other two, one was a young man, who was so deeply enamoured of one of the young women, that he could not bear to leave her side. The other was an elderly man, who made excuse for his idleness by saying that he could not go to catch seals upon such a stinted allowance of tobacco as was doled out to him weekly. On the whole, however, no complaint could be made against the Greenlanders : one could not but admire their cheerfulness and vivacity if, after being confined for days by the state of the weather within their miserable

rain-soaked little tents, the sun shone out, though but for a single day. As for the Greenland women, nothing ever depressed their spirits. They skipped to and fro, sang songs, danced with each other on the cliffs, and dreamed, no doubt, of the beautiful dancing saloons of Nannortalik, and this, too, in all weathers, whether fair or foul. When the fishing was good, the cooking-pot would be always well filled; and of fat there was such abundance that cooking was possible in the worst of weather. This was the main reason why the Greenlanders did not weary—eating, drinking, and story-telling being with them the main thing in life. The Europeans occupied their enforced leisure in making observations of various kinds. The commander, Lieutenant Holm, was very anxious to reach, in the course of the summer, the 66th degree of latitude, and had consequently still 6 degrees to cross. Yet more than a month had already been spent over the half of 1 degree, and the stock of provisions, besides, was beginning to show signs of serious diminution. He therefore gave orders for the resumption of the voyage as soon as he saw that a passage might be practicable.

A fresh start having, accordingly, been made, the mouth of the Lindenow Fiord was shortly reached, and when Cape Vallöe, which lay a little further, was doubled, a shout of joy was raised, for it was seen that the passage northwards along the coast was free of ice. By dint of hard rowing, continued for a whole day, a run was made of about eleven miles, and, by midnight, Kasingortok was gained—the furthest point that had been reached in 1883, and the place where a supply of provisions had then been left, intrusted to the protection of the inhabitants of Illuidlek—a heathen people, whose chief was called Navfalik. They had been told, when accepting the trust, that the expedition would return early in the following year; and they had at the same time promised that they would accompany it on the voyage northwards as far as Tingmiarmiut, in latitude 62° 40′, where it was expected inhabitants would again be met with. Great was the joy and satisfaction of all when it was ascertained that Navfalik had been faithful to his trust, and that not a single article left in the depôt had been touched. Navfalik, who lived in a small island called Ivimiut, which lay to the south of Illuidlek a good half hour's distance from the depôt, came next morning to visit his friends of the previous year. He was very cordially received, and his fidelity was rewarded both with thanks and presents. He is the foremost man of all the east-coast Greenlanders, south of the 63d degree of latitude, and seems to have a far higher innate conception of honesty and morality than any of his Christian compatriots on the west coast. On the 29th June the depôt was visited by the ladies of Navfalik's household. They came over from the island in a smart-looking boat; and they were all of them dressed in fur mantles, so dazzling white that they threw completely into the shade the oarswomen of the expedition, who wore only their everyday costume, their white fur mantles being donned only on holidays. Navfalik, who was present on the occasion, promised that he would accompany his friends when they resumed their voyage northwards. Accordingly, on leaving Kasingortok, the expedition crossed over to the island of Ivimiut, Navfalik's summer residence, and visited his tent, which was large, and made of sealskins. As for the inhabitants of the east coast, whom one would expect to find melancholy and taciturn, since they live so much isolated from each other, it was remarked that they were of a wonderfully cheerful and lively temperament.

Navfalik was true to his promise, and departed with the expedition, which had now to advance into seas that none of its members had ever before visited. He travelled in his own boat, on board of which he had placed his women and his dogs and all his other belongings. Cape Discord was now doubled, and several fiords

which lay beyond having been passed, Aneretok, which lay at the mouth of a deep fiord filled with ice, was reached by the 3d day of July. Here there was a company of East Greenlanders who, in 1883, had visited the west coast for trading purposes, and had been met with on the previous voyage at Nunatsuk. Lieutenant Holm was pleased at again falling in with these men, as several of them belonged to Angmagsalik—the district where he purposed spending the winter. He thought it would facilitate the accomplishment of his object if he could prevail on a few of these men to accompany him. With a view, therefore, to conciliate their good graces, he approached, in full state, the part of the island where they were encamped, the five boats being decorated with all their flags, and followed by eleven *kayaks*. This movement being noticed, a band of them came down and stood on the shore ready to receive those who landed. They were men with long, sleek, black hair, and wonderfully oval and European-like faces. A bevy of women stood shyly at some distance off. The way in which Navfalik and these people made their mutual greetings was highly characteristic. They scarcely so much as looked at each other, and interchanged only a few words, which turned apparently upon some quite indifferent matter. The number of these people, adults and children, was twenty-seven, and yet two small tents, much the worse for wear-and-tear, formed the whole of their accommodation. They paid a visit of ceremony as soon as an encampment had been formed. It could not but be noticed how much they differed from Navfalik in their looks, in their manner of speaking, and in their whole mode of behaviour. They belonged to countries in the north—Angmagsalik and Sermilik. One of the chiefs of Angmagsalik, called Umerinik, is described as being of a light, supple, and elegant figure, as having an insinuating, smiling expression, a pair of rolling eyes ever in active play, and a theatrical way of mincing his words. One could neither feel quite at ease in his presence nor help suspecting his sincerity. He represented it at first as all but impossible for the expedition to reach Angmagsalik. The voyage, he said, would take quite as many days as he could count on his fingers and toes all taken together ; but, as soon as he saw the variegated contents of the chest of wares that were meant for barter, he changed his tone, and made much less of the difficulty of reaching his country. On the 3d of July, the weather being rainy, the day was spent in intercourse with the natives. It was remarked that the women, like the men, bore, in external appearance, some resemblance to the Eskimo. Some of them had fair hair, and were altogether very pretty. They were certainly not so vivacious as the men.

On the 4th of July the expedition left Aneretok, and reached, by noon, Inugsiut, which lay at the mouth of a fiord of considerable size, that was filled with ice. Navfalik had piloted the way, looking out for openings in the ice that would admit of a passage for the boats. At Inugsiut natives were again met with to the number of thirty-two, some of whom were kinsmen to Navfalik. The way in which they saluted each other afforded much amusement. They are extremely undemonstrative, being trained from their earliest youth to give as little expression as possible to their feelings. One of the chiefs volunteered to accompany the expedition, and thus the number of persons, now all proceeding northward, including the contingent from Aneretok, amounted to 119. Some had brought their dogs with them —savage, wolf-like animals which could not bark, but kept on howling in concert from morning till night.

On the morning of 6th July the expedition left Inugsiut, hoping to be able to pass that same day the glacier of Puisortok, which is always spoken of by the natives as a dangerous point. This hope was not realised, for at noon, when the projection of Cape Adelaer was reached, it was ascertained that the ice beyond was

lying everywhere thickly packed together. It was necessary, however, to proceed further and double the Cape, for the cliffs at its extremity were too steep for pitching tents on. The voyage was therefore continued as far as Karoakornak, between Cape Adelaer and Cape Ranzau,—a locality fraught with dismal memories, for here Graah had found it necessary to send home the half of his company, while he, the only European left, had to proceed on his way with the Greenlanders who remained faithful to him. It was, then, not without some dark forebodings, destined to be in part realised, that the place was approached. The tents were, however, taken on shore, where they were pitched in the usual manner, those which accommodated the heathen being arranged in a circle round the others. Here seventeen days had to be spent ; but, fortunately, the weather kept fine all the time ; and this enabled the members of the expedition to survey all the region of the two capes, and explore thoroughly its natural history. In the evenings they amused themselves with the Greenlanders, who exhibited before them their heathen dances, which were truly marvellous performances. They witnessed also the way in which a heathen marriage is celebrated, and noticed in it traces of the primitive custom of obtaining a bride by capture.

On the 15th of July, Hanserak, a native catechist, and the leader of the Greenlanders, who occasionally, as opportunity occurred, preached to the heathen, and who was in many ways serviceable to the expedition, informed Lieutenant Holm that two boats' companies (which, according to the agreement, should have turned back earlier) had declared that they would go no further, but return home. The Lieutenant, knowing how useless it would be to try persuasion, merely said, "We must try, then, to hold to the heathen." The fact was, the men had lost heart on account of the numerous interruptions to the voyage, and so, on the morning of the 18th, no fewer than fifteen persons departed for home in one of the boats. The thirteen who remained were distributed among the other three boats, and matters on the whole turned out better than at first seemed likely. Navfalik, besides, was able to announce on the 23d, that Puisortok was passable, and preparations for departure were accordingly made.

The heathen Greenlanders have a superstitious dread of this glacier, and caution those who would pass it in safety not to provoke its wrath by speaking, laughing, eating, smoking, or pronouncing its name. It was certainly difficult work rowing past this dangerous projection, but no mishap occurred, and by evening Otto Rud's island was gained, where, on the naked rocks, a welcome repose was obtained for the night. The voyage was continued northwards for several days towards Tingmiarmiut, which was Navfalik's native country, and the nearer this was approached the land lost more and more its forbidding aspect. The snow and ice, which had hitherto formed the main feature of the shoreward landscape, now retreated further inland, so that in many places a growth of heather gave to the land a cheerful, home-like look. On the 27th, at midnight, one or two of the boats arrived at a small island in Tingmiarmiut Fiord, and next morning reached Navfalik's encampment. The other boats, which had been lost sight of during the darkness of the night, arrived there also in the course of the day—all except one, which did not turn up until nightfall. Wandering about from one island to another in the fiord, the company on board were so indignant at having been left behind, that they declared their resolution not to go any further. It had, however, already been determined that this boat's company should turn back, in order to be employed in the exploration of the stretch of coast from Illuidlek, which had already been passed. Lieutenant Holm, who saw that the time had now arrived when the expedition should separate, at once took decisive action. He prepared his despatches and letters for home, and drew up a

paper of instructions for Lieutenant Garde, who was to command the returning division, and conduct the explorations. All the other necessary preparations were soon made, and, on the 30th of July, Lieutenant Garde and his assistant officer, Eberlin, bade adieu to the commander and their former comrades.

The Lieutenant, in the paper of instructions, was directed to employ the remainder of the summer in surveying and examining the coast between Tingmiarmiut and Illuidlek, and special attention was to be devoted to the numerous fiords by which it is indented. It was with pleasurable anticipations he entered on this work, for the best part of the East Greenland summer—the month of August—was still all before him. He found that between the two places mentioned there are eight fiords, each running about sixteen miles inland. These so abounded in glaciers that one could row in them for hours without seeing aught else but ice and snow. Their shores are very steep, and offer but few landing-places. When, in addition to this, strong currents happen to be running, a trip in boats rowed by women can be dangerous enough. The three fiords, however, which lie furthest north are favourably distinguished from the others. They are not so filled with glaciers, and have a more genial and friendly aspect. The mountains were found to be seldom of any great height in the vicinity of the coast. They become big, steep, and wild only behind the more inland recesses of the fiords. Gneiss, granite, and gneiss-granite are the chief kinds of rocks, and the coasts are distinguished by a richness in beautiful and rare minerals. In many places far inland syenitic rocks of great height and beauty, and of a reddish tint, rise soaring above the ice-plains, and impart to the whole scene a character of wildness. The loftiest summits were estimated to attain an elevation of about 6000 feet.

On the 1st of September the Lieutenant returned to Illuidlek, well satisfied with the work his party had been able to accomplish. In returning to the west coast, he had to contend with storm, rain, ice, and sea-currents till the 26th of September. The friendly Sound of Nannortalik, beyond Cape Farewell, was, however, at last safely reached, and there the natives were discharged, receiving each from 50 to 100 crowns as pay. They all volunteered for service in the summer of this year.

How far the northern expedition may have been able to proceed Lieutenant Garde was unable to conjecture. He hoped it would be able to accomplish its proper object—the exploration of the stretch of country whereon lay the flourishing colony established of old by the Danes—that of "Oesterbygden."

Before concluding his narrative, Garde adverts to the question whether the sea along the east coast of Greenland is capable of being regularly navigated. Experience, he says, can alone settle this point; but he is of opinion that it is only in the autumn of each year that it will be possible for a steamer to advance to the east coast. There is no channel which is constantly free of ice, and the amount of ice that may exist is altogether and entirely dependent on the wind. In autumn the girdle of ice is so narrow that one would find no difficulty in voyaging by steamer along the coast. With reference to the establishment of harbours of refuge, he thinks this would be futile, for during the time they would be most wanted access to them would be blocked by ice.

Progress in Newfoundland.—The Premier of Newfoundland, in his manifesto to his electors, reviewing the acts of his Government, says:—"During the past few years nearly 100 miles of railway have been built at a very moderate cost. A magnificent dry dock has been constructed, and the lighthouse system extended from sixteen lighthouses and fog-alarms in 1873 to thirty-four in 1885. Telegraph communication has also been greatly extended, the postal system enlarged, public institutions maintained in excellent condition, local industries fostered, the Bank

fishery revived, roads and education amply provided for, and all this without any increase of taxation." The manifesto, says *The Colonies and India* (Aug. 28), points to further improvements which the Government contemplate.

Territory of Alaska.—The Government (U.S.A.) Expedition on the Copper River have found the navigation of the stream to be very difficult. The name of the river has been ascertained to be so far appropriate, but the ore is not so plentiful as was supposed. The salmon-canning industry was flourishing. The volcanic island Chernabura or St. Augustin, in Cook's Inlet, continued to pour out smoke and steam from innumerable fissures.

The death is recorded, at Sanakh Island, of Robert King, an Englishman by birth, noted for his kindness to scientific travellers in the Territory, and who had made useful contributions to local meteorology and geography.

Deep-Sea Soundings in the Caribbean Sea.—At the instigation of the United States Coast Survey, expeditions have been sent out at different times to carry on soundings in the Caribbean Sea. The principal of these have been that of the steamship *Blake*, in 1874-78, under the direction of Lieutenant Charles D. Sigsbee, and that by Commander J. R. Bartlett a few years later. In 1884, another important series of measurements and observations was made by the *Albatross*, Lieutenant Z. L. Tanner, of the United States. In the eastern division of the Caribbean Sea, between the northern coast of South America, on the one hand, and Porto Rico, Hayti, and Jamaica on the other, five lines of soundings were taken in a north-west and south-east direction. Further to the west a sixth line was drawn from Aspinwall (in Panama), past Old Providence, between Quito and Sueño Banks and Serrana Cays, then in a north-western direction between Rosalind Bank and Musquito Bank, across Misteriosa Bank, to the westernmost point of Cuba. Besides, soundings were taken off the coast of Venezuela, between Los Roques Islands, La Guayra, and Curaçao, and off the coast of Colombia, from St. Marta to Cartagena, and further to the south as far as Fuerte Island; thence diagonally across the Gulf of Darien, and along the coast up to Aspinwall. The passages between Santa Cruz and Porto Rico, between Jamaica and Hayti, and between Hayti and Cuba, were also explored. In 12° 11′ 30″ N. latitude, and 74° 27′ 30″ W. longitude, the *Albatross* reached a depth of 2057 fathoms. In the passage between Hayti and Jamaica, at a distance of about 29 miles east of the latter island, a bank was found at only 17-32 fathoms, and was called Albatross Bank. It consists of coral, and rises abruptly from the sea-bed, stretching between the limits of 17° 36′ and 17° 45′ N. latitude, and 75° 38′ and 75° 45′ W. longitude. But, on all sides, the depth increases rapidly to 160 fathoms, and soon to more than 550 fathoms. From the easternmost point of Jamaica, as well as from the westernmost point of Hayti, there stretch two depressions each of more than 1000 fathoms deep, almost entirely across the passage, leaving only in the centre an east-west canal with greater depths, which becomes narrower towards the east. South of Kingston in Jamaica they found an isolated ridge, having a depth of only 26 fathoms, in 17° 46′ 10″ N. latitude, and 76° 46′ 5″ W. longitude.

Previous investigations and measurements of temperature in the Gulf of Mexico had yielded everywhere, at a depth of 800 fathoms, a temperature of 39·5° Fahr.—the normal temperature of the Equatorial Current in this region. In the case of an almost land-locked sea, which is separated from the open ocean by a submarine water-parting, experience teaches that its temperature from the level of the parting to the deepest depressions is uniformly the same, equal to that of the ocean outside at the depth of the water-parting. By applying this empirical truth to the circumstances of the Caribbean Sea, it was inferred that it is surrounded by such a water-

parting situated at a depth of 800 fathoms. With a view to get evidence confirmatory of this inference, all the channels between the islands from Trinidad to Cuba were examined; but the only one in which the parting was found to be at the requisite depth was the Windward Passage. Between Santa Cruz and St. Thomas there is a deep basin (2400 fathoms), the temperature at the bottom of which measured 38° Fahr.; and connected with this basin was a gully of 1100 fathoms, having the same temperature at its greatest depth. The discovery of a spot west of this basin, and south of the Mona Passage, with a temperature of 39·6° Fahr., suggested the idea of a second submarine water-parting between Santa Cruz and Porto Rico; and, agreeably to expectation, the *Albatross* did find a ridge having a greatest depth of 900 fathoms, and a lowest temperature of 39·6° Fahr.

The Caribbean Sea consists of three large divisions. Between the Windward Passage and the peninsula of Honduras there rises a submarine plateau, which increases in breadth towards the continent, and divides the sea into two large basins. That on the north-west is bounded by this plateau, Cuba, Yucatan, and the north coast of Honduras. That on the east is shut in on the north by Hayti and Porto Rico, is protected against the Atlantic Ocean by the Little Antilles, and bounded on the south by the continent of South America. The former basin is in turn divided by a ridge of which the Cayman Islands and Misteriosa Bank are constituent parts, and which may be regarded as a continuation of the mountain chain in the south-west of Cuba. The division to the north has a tolerably uniform depth of about 2430 fathoms. South of this comes a narrow gully which is very deep in places, called the Bartlett Depression; it extends from the Windward Passage into the Gulf of Honduras, and has a length of about 810 miles, and an average width of a little over 90 miles. Its greatest depth is 3428 fathoms. Between the western extremity of Jamaica and Cape Cruz it widens, and the soundings gave a depth of 3000 fathoms to a distance of 18 miles from Cuba, and of 2800 fathoms to 29 miles from Jamaica.

The central plateau never exceeds a depth of 1000 fathoms; a continuous ridge is formed across it by Jamaica and the many "banks"—such as Pedro, Rosalind, Serranilla, Serrana, Musquito—which lie between Jamaica and Honduras. Going eastwards the depth gradually increases to 2600 fathoms, the average soundings obtained in a vast basin of 230,600 square miles, which stretches between Hayti and Porto Rico on the north, and South America on the south, being separated from the land in both cases by a flat girdle or ridge. Eastwards of a line drawn from St. Thomas to Margarita, the depth decreases again very considerably. In consequence of lines of soundings taken, first by the *Blake* from Dominica to Bird Island, and thence to Montserrat, and then by the *Albatross* from Porto Rico to Bird Island, thence to Trinidad and back to Mona Passage, it was ascertained that a submarine elevation extends in a north-south direction near the chain of the Antilles, and parallel to them. Along this ridge the soundings gave considerably less than 1000 fathoms, whilst on the one side the measurement was 1500 and on the other 2000 fathoms. It is also worthy of remark that this elevation terminates outside the line of the Little Antilles in a depression which contains the deepest soundings yet taken in the Atlantic Ocean, 4558 and 4220 fathoms.

In the Caribbean Sea the greatest depth is that already mentioned as occurring in the Bartlett Depression, 3428 fathoms, in 19° 1′ N. latitude, and 81° 2′ W. longitude; in the eastern basin the greatest depth is 2844 fathoms in 13° 25′ 4″ N. latitude, and 66° 25′ W. longitude.

The bottom of the eastern division of the Caribbean Sea between Hayti and Venezuela and the Little Antilles consists for the most part of yellow, green, grey,

brown, and blue ooze, mixed with fragments of shells, fine sand, and corals. A limited area between 17° 36′ and 17° 45′ N. latitude, and between 75° 46′ and 75° 42′ W. longitude, forming the Albatross Bank, yielded nothing but coral, with a small proportion of broken shells. Immediately south of Porto Rico and Santa Cruz the bottom consists of coral ooze and sand, containing some broken shells and a few *Globigerina*.—*Annalen der Hydrographie*, Heft. viii., 1885.

AUSTRALASIA.

Mr. H. O. Forbes' Expedition to New Guinea.—By the last letters received from Mr. H. O. Forbes, we learn with regret that, while embarking at Batavia on his voyage to New Guinea, he met with a serious mishap. A prahu containing his guns, instruments, provisions, etc., was capsized, and though he hoped to recover a good deal, and that the ultimate delay to the expedition would not amount to more than three weeks, the pecuniary loss will be considerable. Happily, this will be covered to a considerable extent by a grant of £150 which has just been voted to him by the British Association.

New Guinea.—The Maclay Coast of New Guinea appears to be subject to frequent earthquakes. During the years 1871, 1872, no less than thirteen shocks were felt. M. de Miklukho-Maclay found, in 1876, that eminences which in 1872 were covered with vegetation had been in parts denuded by tidal waves, and that the depth of the sea in some places had been considerably altered. It would appear also that a gradual upheaval of the coast has been for some time and still is, in progress.—*Proc. Linn. Soc., New South Wales*, vol. ix.

POLAR REGIONS.

Overland Expeditions to the Arctic Coast of America.—Dr. John Rae, at the British Association meeting, read an exhaustive paper on "Overland Expeditions to the Arctic Coast of America." The following table indicates the distances traversed by the several expeditions :—

Approximate Amount of Geographical Work done by the Expeditions under—

			G. M.		G. M.	G. M.
1821.	Franklin & Richardson . . .	on foot . .	35	in canoes	415	450
[1] 1826.	„ „ . . .	„ . .	90	in boats	955	1,045
				Total . .		1,495
1834.	Back	in boat / on river	120	in boat / on coast	105	225
1837. / [2] 1838. / 1839.	Dease & Simpson (H. B. Co.)	on foot . .	95	in boats .	722	817
1847. / [3] 1851. / 1853–4.	Rae (H. B. Co.)	sledging / on foot	1,123	in boats .	369	1,492
				Grand total . .		4,029

[1] Actually two expeditions, one east, the other west.

[2] Dease and Simpson had to pass over about 800 miles of previously traced coast before getting to new ground, but Franklin and Richardson were on new ground at once on reaching the coast.

[3] Of the coast, etc., traced by Rae, 1,123 miles were done by sledging, believed to be the most laborious of Arctic work.

NEW MAPS.

EUROPE.

BRITISH ISLES—Mean Annual Rainfall of the—, for the twenty-four years from 1860 to 1883. *Journal of the Scottish Meteorological Society*, 1884-5.

Illustrating Mr. Buchan's paper on *The Climate of the British Isles*, this map is, we believe, the first of its kind published in this country, the importance of which, in representing at a glance the accumulated evidence of a whole mass of statistics, cannot be over-estimated.

LONDON.—Large-Scale Ordnance Survey Plan of the City of London, by JOHN BARTHOLOMEW, F.R.G.S. Scale, 12 miles to an inch; specially revised to the present date. *London: George Philip & Son. Price, in cloth case, coloured, 2s. 6d.*

This is a completely new plan of the City of London, reduced from the last Ordnance Survey, and brought up to date by special surveys. The plan is beautifully engraved and printed, the buildings being brought out by tints, while the railways, parishes, and other features are also clearly shown. Excepting the Ordnance Survey, this is really the most elaborate and minute plan of the Metropolis yet published.

ISLAND—Das Lava Gebiet von Ódádahraun in—. Aufgenommen von TH. THORODDSEN in Sommer, 1884. *Petermann's Mitteilungen, Jahrgang* 1885. *Tafel* 14. *Gotha: Justus Perthes.*

Map of the lava region explored by M. Thoroddsen in 1884, reference to whose expedition was made in the *Magazine* for last month.

ASIA.

ASIEN—Karte von—, in Ph. Fischer's perspektivischer Projection. Konstruiert von Dr. A. M. NELL. Massstab, 1 : 64,000,000. *Petermann's Mitteilungen, Jahrgang* 1885, *Tafel* 15. *Gotha: Justus Perthes.*

Professor Fischer has done good service to cartographers by supplying a scientific basis for globular projections. Hitherto, most of our maps have been drawn upon projections, which are mechanical and arbitrary. Dr. Fischer's is scientific. As in the stereographic, he looks at the country concave ; but the point of view, instead of being two diameters, varies according to amount of area to be drawn. When it is large the distance is small, and when it is small the distance is great. This gives the best possible representation of a globular surface. Being scientific, every map requires a different projection, and this involves great labour in the calculation of the latitudes and longitudes. Dr. Fischer, however, has supplied three ; one for Europe, one for Asia, and one for Africa. He has also given a map of Asia, which is the most difficult of all our maps, and the result is admirable. We venture to predict that, hereafter, no map of Asia will ever be published on any other projection than Fischer's.

HERI-RUD AND MURGHAB RIVERS, and Intermediate Territory from Merv to Herat. Compiled from the Survey by the Officers of the Afghan Boundary Commission and the members of the Russian Military Topographical Department. —*Proceedings of the Royal Geographical Society, September* 1885.

THE SCOTTISH
GEOGRAPHICAL
MAGAZINE.

NORTH-WEST AUSTRALIA.

A SKETCH OF THE RESULTS OF RECENT EXPLORATION; AND THE SCOPE OF THE COUNTRY FOR COMMERCIAL DEVELOPMENT.

Read at Meeting of British Association, Aberdeen, Sept. 1885.

By John George Bartholomew,
Honorary Secretary, Scottish Geographical Society.

In introducing the subject of my paper to your notice, I should like to lay some stress upon the great importance, more especially at the present day, of diffusing among the public a thorough knowledge of the geography of our colonies. As every one knows, the old country is becoming incapable of supplying labour to sustain its rapidly increasing population; and to the greater number of those who have employment there is little or no scope for successful enterprise. Whereas, in possession of our immense colonies abroad, with their almost unlimited and, to a very great extent, undeveloped, resources, there is no reason why our large surplus population should not select prosperous new homes to their own liking in almost any quarter of the globe. It ought also to be borne in mind that at the present day, with our many lines of fast steamships and other ready means of direct communication by railways, posts, and telegraphs, the distant parts of the world are practically brought much nearer home; so that in this respect, emigration is a much less serious consideration than it used to be.

But, unfortunately, the general public, and more especially the poorer classes, who are really most concerned, know little or nothing of even the existence of the rich lands in these far-away countries, and continue at home pursuing their hard struggle for existence, instead of going where their labour would be in great demand, or where they might have lands of

their own to farm and trade on. Thus, the primary evil is ignorance, and this particular ignorance is only to be remedied by the teaching of Practical Geography, the value of which at the present day, from a social as well as commercial point of view, is not at all fully realised. The teaching of Geography in this country has as yet been a failure, because it has had no definite aim beyond the learning of dry undescriptive facts without illustration or explanation, and, therefore, with little practical result or value as far as Geography itself is directly concerned. Geographical teaching will only be satisfactory when our present vast stores of scientific and commercial information about the world are classified and reduced to correct and general results, and when these and their practical deductions are thoroughly taught and fully illustrated by competent men. Geography will then become one of the most essential and useful of all branches in either a scientific or commercial education.

But what I would specially advocate, in the meantime, is that the descriptive and commercial geography of our British colonies should be made a subject of primary importance in school education, so that the children of our working classes may thus become familiar with the advantages and disadvantages to be realised by living in India, Australia, Canada, Cape Colony, or any other part of our British dominions, and thus, by inducing free and voluntary emigration, avoid the very possible political necessity of compulsory emigration. Much has been done in this direction by the work of Colonial Governments, and even the enterprise of shipping agents, and railway and land companies; but, to be effectual, such "Emigration Geography" must be more widely diffused, and this can best be done in our schools.

In the short time at my disposal, and with such an extensive subject as North-West Australia, I cannot do more than give you a very brief and general sketch of that great tract of the British Empire which is so little known or heard of by the outside world. Whilst other colonies, which opened their career under more favourable auspices, have received all our attention, its claims for notice seem to have been neglected, and it has even remained until late years quite unexplored. However, it now appears that Western Australia by no means deserved her bad reputation, and that she is full of almost as much promise as any of our other colonies. She has just begun her pioneering work when her sister colonies are settled, and although she cannot yet raise the cry of "Gold," which so rapidly populated Victoria and New South Wales, yet the reports of her pioneers are much more hopeful than any one at first anticipated, and fully justify the prediction that she will now rapidly come to the front and soon be as well known for prosperity as the eastern provinces of Australia.

The country along the north-west coast to which I wish to direct your special attention, extends from Shark's Bay to Cambridge Gulf, a length of about 1200 miles, and reaches about two or three hundred miles inland, until it is lost in the dry and sandy desert country of the interior.

It includes the Northern District of Western Australia, extending from Shark's Bay to beyond the De Grey River, and the adjoining district of Kimberley lying to the north of it, extending northwards to the Timor Sea and eastwards to the boundary of the Northern Territory of South Australia.

It is rather extraordinary that this north-west coast, which was the first part of Australia to be discovered, should be the last to be explored. As long ago as 1500 it was known to the Spaniards and Portuguese as "Great Java," and, later on, the Dutch gave it the name of "New Holland," a name afterwards applied to the whole continent. But, in those days, European nations did not settle down to found sheep-rearing colonies; the search was for plunder; and if a profitable trade in gold, silk stuffs, spices, or other rich produce was not readily found they sailed away again. Thus it has been that the sandy coasts of North-Western Australia have, with the exception of passing visits, remained so long neglected, and the country in the possession of its aboriginal inhabitants, until recent explorations revealed the fine large rivers and broad pastures which are now bringing it into notice.

As my object is to deal more with the results of recent discovery, a record of the explorations of the country would be quite beyond the scope of this paper, and I can only include in my general description the results of the earlier journeys made by the Gregorys, the Forrests, Warburton, Giles, Von Mueller, Austin, Sholl, and other brave pioneers whose names are so much identified with Australian geography. They endured the most severe privations and hardships in their persevering efforts to explore the interior; and although they brought to light the pasture lands of the Gascoyne, Ashburton, Fortescue, and De Grey Rivers, yet these discoverers were not so encouraging as those of later date; and, strangely enough, the discovery of the great desert regions seems to have made the deepest impressions, and frightened away possible settlers from the other districts. The recent tide of good fortune really seemed to set in after the celebrated journey of Alexander Forrest to the Kimberley district in 1879; for since then the reports have continued more and more favourable, while many are most glowing and enthusiastic, and lead to the most sanguine expectations for what is yet to be discovered.

I shall now endeavour to give a descriptive sketch of the country, beginning at Shark's Bay and proceeding north-eastwards with the coast.

Shark's Bay itself is a large shallow inland sea, about 150 miles long by 60 or 70 broad. A profitable pearl-fishery is carried on here, the annual export of pearl for the north-west coast valuing about £50,000. In the fishing, a fleet of some 60 little cutters, managed by Europeans, and employing aborigines and Malays as divers, is engaged dredging on the banks here.

The Gascoyne River, which flows into Shark's Bay, is about 500 miles long, and its tributary, the Lyons River, about 250 miles. The surrounding country is pretty much broken up with detached ranges of sandstone

and trap formation, the disintegrated trap-rock forming a rich soil which is clothed with short green grass and with a plentiful growth of water-melons. Fine brood alluvial plains, well suited for cultivation, lie along the river valleys. Just bordering on the Tropic of Capricorn, the climate is hot in summer, but at other seasons very agreeable and, sometimes, even chilly; the heat, however, is never unhealthy, for, being dry, it causes no unhealthy vapours to rise from the lands.

Proceeding north-eastwards we come to the Ashburton, Fortescue, and Sherlock Rivers, with numerous tributaries, having their source far inland, at a height of about 2000 feet, among some fine mountain scenery where the peaks are 3000 and 4000 feet high. The interior here is described by Mr. Gregory as "a very rocky but highly fertile country of trap formation," and the numerous short hill-ranges all over the country are spoken of as sources of fecundity as well as humidity to the country. In the river valleys are rich alluvial plains, adapted either for cultivation or rich pasture, so that the lands here alone could easily support a much larger population than is at present in the whole of Western Australia. The coast-line of this region is, however, not so attractive as it is inland. After leaving the low sand-hills of Shark's Bay, we pass the headlands of Cloates Point and North-West Cape, under the shelter of which lies the large inlet of Exmouth Gulf, where the coast again becomes low and sandy, and bordered with coral reefs and islands extending as far as the Dampier Archipelago and Nickol Bay. Nickol Bay is described by Gregory as "a harbour only second to King Sound, as it can be entered in all weathers:" owing, however, to the want of fresh water for a township there, the principal harbour at present is Port Cossack, a little further east, where there is a thriving settlement, and where considerable quantities of wool are shipped to England. Cossack is also the headquarters of another large and very important pearl-fishery, which is here capable of great development as a very profitable industry. The fishing season, which is limited by the temperature of the water, lasts from beginning of September to the end of May. It is carried on by divers who work at slack water on the pearl banks, some of which are as far as 100 miles from Cossack. Stormy weather is the only serious interruption to the fishing. The divers, who are principally natives, are paid off at the end of the summer, when they either return to their tribes or find employment as shepherds or shearers at the sheep stations.

Eight miles inland from Cossack lies Roeburne, the centre of the trade of this large and successful pastoral region; it is administered by a Government Resident, and is a rising township with a bank, post-office, and several stores. Indications of lead and copper have been found in the district, but capital and labour are required to discover and develop these resources.

Proceeding eastwards from Roeburne, and crossing the Sherlock River, we come to the Yule, Turner, Strelley, and De Grey Rivers, which all

flow in a north-westerly direction through a continuation of the same fine grassy plains of the Fortescue. The De Grey, which is about 200 miles long, with many important tributaries, has rich agricultural lands in its lower course, the delta being described by Gregory as containing between 90,000 and 100,000 acres of alluvial land, which, he imagines, would be well suited for the growth of either cotton or sugar-cane.

Briefly reviewing the physical features of this district between the Ashburton and De Grey Rivers, we find an area of about 70,000 square miles well watered by large rivers, and broad grassy plains divided by low ranges of sandstone and granite hills, lightly wooded with eucalyptus and baobab trees. The country, however, cannot be said to be all fine, for there are large patches of desert, sandstone, and hard granite, and in many parts the water is scarce, and there is little or no vegetation; but it is to these desert patches that the salubrity of the hot climate is largely due. Mr. Bonwick, in his admirable little geography of West Australia, says that "the settlers soon come to know that a sandy desert belt adds enormously to the health conditions of a more fertile neighbourhood." The general climate here is said to be somewhat like that of Spain and Southern Italy.

The country near the coast, which was surveyed for the Government by Mr. John Forrest in 1878, is now being rapidly taken up for sheep and stock stations, which are worked almost entirely by native labour, and the wool crop is in every way satisfactory. Fish are plentiful in the rivers, kangaroos are common, and ducks, partridges, and other birds numerous. Fruit cultivation has not yet been attempted, but there is every probability that most tropical fruits, spices, and sugar-cane will be successful. Of the minerals little is yet known.

After leaving the De Grey there are no other rivers until we come to the tributaries of the Fitzroy, a distance of about 250 miles. The intervening country is a long level plain of sand and limestone formation, very unpromising, and, as Mr. Bonwick truly says, "there is more spinifex than grass, more scrub than forest, more unavailable than available land." At the latitude of 19° 30′ south we cross the boundary of the North District of West Australia into Kimberley District—the most recently opened up, but perhaps the most hopeful of all. It comprises all the country in West Australia lying north of 19° 30′, and has an area of about 134,000 square miles. The Government is doing much to explore and survey this district, and, towards this end, have already spent £10,000, with the most hopeful results. The report of the well-known traveller, now Surveyor-General, the Hon. John Forrest, on his recent expedition there, corroborates the accounts of his brother, Mr. Alexander Forrest, together with those of Messrs. De Grey, Von Mueller, Stokes, Durack, O'Donnell, Greffrath, Panton, and others, whose enthusiastic descriptions of the richness and beauty of the country bode so well for its future. A survey of the coast has also been carried out under Commander Coghlan.

After crossing the boundary, there is some good land along the coast

at Lagrange Bay, but the first place of importance that we reach is Roebuck Bay, where a township, named "Broome," after the present Governor of the colony, has just been planted. To the north-east, between Roebuck Bay and King Sound, lies Dampier Land, of which, as yet, little except the coast-line is known; but the country in the neighbourhood of Broome, especially towards the Logue River, is described by Mr. Forrest as being magnificent pasture-land, well suited for cattle, and in some places thickly wooded with baobab and short eucalyptus trees. At some seasons it is not well watered; but, as in most other places along this coast, good water can easily be procured at any time by sinking to a depth of 16 feet.

Descending the Logue River, which runs through a flat country splendidly grassed, and well suited for either cattle or sheep, we come to the Fitzroy River, which here runs into the splendid inland sea called King Sound. King Sound is about 70 miles long by 30 broad. Forrest describes it as like a large tidal river in which you can anchor at any time, and the water is generally as smooth as in a pond. There, as in all other bays to the extreme north-east, the pearl fishery can be carried on; and as it may almost be said to be inexhaustible, it is capable of very great development. At the head of King Sound is Derby, the capital of the Kimberley District, and named after the present Lord Derby. There is a Government Resident here; and from its splendid position as a port at the mouth of the Fitzroy River, and as the trade outlet of an extensive stock-raising country, it may soon be expected to become a very thriving town, although at present there are only a few small huts and tents scattered among the baobab trees.

Flowing into Stokes Bay, at the south-east end of King Sound, are the May and Meda Rivers, forming the delta of the Leonard River, which rises 100 miles inland, among the forests at the foot of Mount Broome in the Leopold Range. The land between the May and Meda is rich alluvium, splendidly grassed, and at present supporting thriving flocks of sheep and cattle. Its suitability for cultivation is more a question of climate, which has yet to be determined by experience, as we have no statistics of the meteorology of the district.

North of Stokes Bay towards Port Usborne the country is more hilly, and formed chiefly of quartzite ranges, cut up by many narrow valleys, in which there are abundance of fresh-water streams, with palms lining their verdant banks. To the southward, between the Leonard and Fitzroy Rivers, is mostly a plain, grassy in places, and in others sandy, with spinifex. Proceeding up the Fitzroy, which is navigable for several miles inland, we pass through extensive plains of fine pasture-land, bounded by wooded uplands. For about 200 miles, Mr. Forrest says, "this fine river flows strongly and steadily through a grassy country which, without it, would be scarcely fit to be occupied;" but the never-failing springs in the Leopold Ranges supply this immense valley with a permanent stream, while the tropical rains cause it to overflow its banks, and leave large

waterholes, many of which, if not permanent, last a considerable time. Alexander Forrest said he believed the Fitzroy Valley alone could carry more sheep than were at present existing all over the colony. The main river, which is, altogether, over 300 miles long, has for its principal tributary the Margaret; and they both have their sources in the Leopold Range, a chain of mountains, about 130 miles long, running N.W. and S.E., and forming a watershed varying from two to three thousand feet high, between the rivers of King Sound and those flowing into Cambridge Gulf. The grassy lands of the Fitzroy are continued eastwards across the Leopold Ranges down into the valley of the Ord River, and southwards towards Sturt Creek and Denison Plains; beyond that the country is unexplored, but is supposed to be principally desert, with occasional fertile oases.

Perhaps the finest part of Kimberley, if not one of the finest in all Australia, is the Glenelg District. Its splendid harbours, beautiful tropical scenery, and rich luxuriant pasture-lands have been the admiration of all who have visited it.

Camden Sound, Port George, Port Nelson, and, indeed, all the bays along the coast here, are splendid natural harbours. The Glenelg, Prince Regent, and Roe Rivers contain in their lower courses fine land, well suited for rice and sugar-cane culture, while the richly grassed plains of the higher lands are more essentially a wool-growing country.

Proceeding round the coast, past the large inlets of York Sound and Vansittart Bay, numerous islands are passed, on many of which valuable deposits of guano have been found and profitably worked. The trepang fisheries along the coast here are described by Commander Coghlan as capable of much development. As a field for the naturalist, this coast teems with unexplored wonders.

Rounding Cape Londonderry, the northernmost point of West Australia, little is known of the country until we come to Cambridge Gulf, a considerable inlet of about 70 miles in length, described by Commander Coghlan, who has recently surveyed it, as a splendid port for landing or shipping stock. Viewed from La Crosse Island, at the entrance, he says Cambridge Gulf has the appearance of a magnificent river from 6 to 12 miles wide. The western shore consists of sandstone hills from 800 to 1000 feet high; the eastern side is low and marshy, and lined with dense mangrove thickets, over which the tops of the distant hills are just seen. Half-way up Cambridge Gulf is Adolphus Island, where the gulf divides into an eastern and a western arm. The eastern arm is the outlet of the Ord River, the upper course of which was discovered by Alexander Forrest in 1879. Since then its whole course, about 300 miles long, has been explored by Messrs. Durack, O'Donnell, Carr-Boyd, and other travellers, who have discovered two large tributaries on its west bank—the Denham River and the Bow or Fraser River, both supposed to rise in the Leopold Range. In this district are the Cambridge Downs and Ord Plains, and other stretches of fine country, already being stocked

with sheep. It is composed principally of high downs and rich grassy valleys, watered by numerous streams, and has the advantage of being free from the floods which visit the lower levels of the Fitzroy. At the head of the western arm, or the gulf proper, the lofty peak of Mount Cockburn is the most prominent object in the landscape, and down at its western base is the mouth of the Pentecost River, discovered by Mr. Durack.

In addition to the Ord, Pentecost, and Durack Rivers, an expedition at the end of 1884, under Mr. Stockdale, reports the discovery of six other rivers falling into the west side of Cambridge Gulf: they were reported to be larger than the Ord, and as having their sources in the Leopold Range. Mr. Stockdale describes the surrounding country to be "as fine pasture-land as he had seen anywhere in Australia—entirely free from poison plants; and, although it was then the dry season, the grass was in splendid condition and water everywhere abundant." Game was scarce, but the rivers abounded with fish. The natives were friendly, but not at all numerous. The discovery of these rivers is as a new mine of wealth to the Kimberley District, and insures a prosperous future for Cambridge Gulf.

About 60 miles east of Cambridge Gulf, at the meridian of 129° East longitude, we cross the boundary between Western Australia and the Northern Territory of South Australia—a country which will no doubt share much in the future fortunes of the North-West.

Briefly reviewing the leading features of the Kimberley District, we have an extensive country about four-and-a-half times the size of Scotland, the greater part of which is well watered with splendid rivers, and possessing millions of acres of some of the finest pastoral and agricultural land in Australia. The heat of the climate in summer, although to a certain extent a drawback to Europeans, is not nearly so bad as in other countries in similar latitudes. Owing to the heat being dry, the climate is not at all unhealthy, and there is an almost entire absence of fevers. In winter the air is said to be quite bracing; while Captain Grey and other explorers speak of it as one of the finest and healthiest climates in the tropics. The wet season, during the north-west monsoon, extends from the beginning of October to the end of April, and the dry season from May to September; but, even in the dry season, the dews at night are so heavy that land where the grass has been burnt by the natives is very soon green again.

As to the geology and minerals little is known, but from the fragmentary data now before us, Mr. Panton, the explorer, sums up his description by thinking it probable that Kimberley may be found to yield gold, antimony, silver, copper, and, perhaps, tin.

The present population of Kimberley only numbers about one hundred white men. The blacks are not numerous, but at present they may be seen in all their native simplicity and savagery: they are, however, often very tractable, and, when better acquainted with the white man, will no

doubt prove useful as shepherds, stockriders, and general station hands, as well as on the coast fisheries.

Sheep, cattle, and horses thrive well, and it is almost a certainty that the breeding of horses for the Indian and Eastern markets will be one of the most important industries of the colony in the future. On the rich alluvial lands of the rivers, especially those flowing into Cambridge Gulf, it is confidently expected that sugar-cane and other tropical products may be successfully cultivated, but, as yet, they have not been tried.

In addition to its intrinsic wealth, the commanding geographical position of the north-west coast in its proximity to India and the East, and in its being the nearest coast of Australia to Europe, together with its possession of a series of the finest harbours in the world, give it commercial advantages which it is difficult to exaggerate, and almost sufficient to justify the prediction that it may one day, as the terminus of a transcontinental railway, be the chief outlet for Australian trade. La Crosse Island, at the entrance to Cambridge Gulf, while 1850 miles distant from Perth, is only 1450 from Batavia, and 1950 from Singapore; so that it will be seen that in this direction is one of the most likely highroads for its commerce; and, indeed, a line of steamers, subsidised by the West Australian Government, is already run by Messrs. Trinder, Anderson, and Co., from Freemantle to Singapore, calling at all the ports along the coast. Messrs. Bethel and Co., of London, are also enterprising pioneers of the shipping trade on this coast. From Singapore there is, of course, ready communication by different steamship lines to India, China, and Europe.

From this hasty descriptive sketch of the general features of the country, it may be seen that it possesses valuable resources, to develop which, population and a very moderate capital are all that is required. As Sir Napier Broome says—"The colony is like a ship undermanned, which, however fair the wind may blow, cannot spread its sails to catch the breeze." At present there are many large tracts of fine country, capable of supporting millions of sheep and cattle, which have never been visited except by the travellers who discovered them. It is a good field for enterprising emigrants, either with small or large capital, and those who are afraid of the long severe winters of Canada may here find a warm sunny land more to their liking.

Under the present energetic Government, with Sir Napier Broome at its head, great advances are now being made; roads, railways, telegraphs, and shipping communication are extending in all directions, and no effort towards promoting the interests of settlers seems to be neglected, so that at last a new era for Western Australia appears to have fairly commenced.

The keen business men of Victoria and New South Wales are becoming alive to the advantages which it offers as a field for commercial speculation, and there is little doubt that when the existence of its rich pastures becomes more generally known, they will soon be covered with flocks and herds. Its rich soil and warm climate will soon attract the

planter, and its almost inexhaustible pearl-shell beds will be largely and profitably fished.

At present it is a country of almost unlimited hopeful possibilities, and offers as great scope for enterprising settlement as any other part of the globe.

THE BASIN OF THE BEAULY.

Read at Meeting of British Association, Aberdeen, Sept. 1885.

By Thomas D. Wallace, F.G.S. Ed.; F.S.A. Scot.

Introductory Remarks.—The geography of Scotland has long and wisely occupied a foremost place among the subjects of our earliest instruction; but while this is the case, it may well be questioned whether the knowledge thus imparted leaves any real lasting impression of the country upon the youthful mind.

Those interested in the advancement of geographical knowledge, and specially of such knowledge as tends to the development of a wider and more correct acquaintance with the geography of Scotland, must have hailed with enthusiastic satisfaction the inauguration of the Scottish Geographical Society, which will no doubt make the geography of Scotland the subject of investigations, and the spread of such knowledge, through the Society's publications, one of its principal aims.

Many admirable descriptions of Scottish scenery are to be found scattered here and there among the literature of the country—some of them the result of much careful investigation and moderate good taste: others at best but flashes of enthusiasm, kindled in the mind of an occasional patriotic observer. They are pleasant pictures much overdrawn, and very often conveying an impression quite disappointing to the subsequent visitor.

Some guide-books, again, convey much that is interesting to the holiday-seeker; but to *know* a district, more than a passing visit must be must be paid to it. Days must be spent in leaving the beaten paths, and miles of moorland, bog, and hill-side must be traversed before an acquaintance can be claimed with either the country or its people.

At intervals during the last two years it has been my privilege to traverse the greater part of the basin of the Beauly—with the exception of the most westerly parts, bordering on Kintail—to make myself acquainted with its geology, archæology, natural history, and general physical features, a condensed summary of which I have now the honour to submit to you.

Boundaries.—The basin of the Beauly may be roughly considered as

NOTE.

Owing to the scarcity of information regarding the interior of Australia, the physical colouring on the map is of course very general, and only approximate. The main object of the map is to give a correct general idea of the character of the country, and to dispel the most erroneous belief still held by so many, that Western Australia is a colony struggling for existence among deserts.

The pastoral and agricultural land which is denoted on the map by the light green tint is good land, fairly well watered all the year round, and quite suitable for permanent habitation. At certain seasons of the year it might, however, be quite correct to carry this green colouring over the greater part of the so-called desert, or when the rain comes, this great sandy scrub and desert region, as shown by the light brown tint, is immediately changed to a fertile prairie, covered with flowers and grass. The want of a regular and sufficient rainfall in these parts is, however so very serious, that it would appear to render the country unfit for permanent habitation, there being no rivers or other water supply lasting throughout the dry season.

Owing also to the prevailing sandy character of the soil, the rainfall is, in most cases, immediately absorbed, and where in the case of a particular geological formation, lakes are formed for a time, these are mostly all completely evaporated during the dry season. In this wide prairie country where there is little rain, the comparative fertility of the land of course varies very much according to the geological formation, physical contour, and elevation of the district, on which the existence of springs may depend. Where springs occur—and in many places they are frequent—the vegetation is luxuriant.

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an isosceles triangle, having its base to the west, measuring 20 miles. The other two sides measure between 40 and 50 miles each, and meet in the apex of the triangle at Kessock, near Inverness.

This area is bounded on the north side by a range of hills, with Ben-Bhach-Ard, 2826 feet, Sgur Ruadh, 3254 feet, and Sgur Chaoruinn, 3452 feet, which separates Glen Strathfarrar from Strath Orrin. One point in this range, to the west of Sgur Ruadh, is 3552 feet, and gives a small stream to the Orrin.

On the south it is separated from Glen Urquhart, Glen Morriston, Glen Clunie, and Glen Shiel, by a range which rises gradually from east to west: its highest point is Crailic, 3673 feet.

On the west it is separated from Kintail and Lochalsh by several picturesque ranges of mountains, of which Scour Ouran, 3505 feet, Mam Soul, 3862 feet, Cairn Eige, 3877 feet, Sgur-na-Lapaich, 3773 feet, are the principal peaks.

General Aspects.—The entire district presents a variety of natural features, full of interest to the lover of natural scenery and the student of physical science.

The lower or eastern basin of the Beauly, where the river expands with the rising tide into the Beauly Firth, is diversified with rich agricultural lands and wooded slopes. The firth itself possesses special interest in its evident geological changes and prehistoric remains.

The upper and western parts are diversified by mountains and valleys. Sometimes the hills are bare, and much denuded by sub-aërial agents; and sometimes they present pleasant slopes, beautified with green patches of cultivation, surrounded by forests of dark Scotch pine, light green hazel, and silvery drooping birch.

There are also wide stretches of flat uplands of moss and heather, with numerous lochs of various sizes, and at different elevations, each with its own variety of fish and wild-fowl, and frequently occupying depressions in the grey metamorphic mountains, which are still the haunts of the eagle, hawk, and raven; and where the fox and wild cat can rear their young almost undisturbed.

At other places the hills close in upon the valleys, and compel the smooth-flowing streams to force a passage, in foaming floods, through steep and tortuous channels. In this way one is often suddenly transported from a quiet peaceful vale into a scene of rugged and turbulent grandeur.

The Beauly, with its tributaries, flows in a north-east direction, and waters Glen Strathfarrar, Glen Cannich, Strathaffric, Strath Glass, Glen Convinth, and the Aird, which are separated from each other by mountain ranges rising, as we have seen in one case, in Cairn Eige, 3877 feet.

These valleys are all valleys of erosion. The first four are formed out of the ordinary metamorphic Gneissose rocks of the Highlands, which have given to the mountains their peculiar natural features. The Beauly

Firth is surrounded by a fringe of old red sandstone, through which the Beauly has cut for itself deep channels at the Dhruim and Kilmorack. The old red sandstone occupying so much of the lower basin of the Beauly has made the natural features in the eastern stand out in decided contrast to those in the western areas.

Prehistoric Inhabitants.—Before proceeding to describe in detail the characteristic features of these glens, I will call your attention to their archæological remains. As far as evidence can be deduced from present remains, these parts of the Scottish Highlands must have been thickly peopled in prehistoric times. This conclusion has been forced upon the writer by a personal examination of considerable portions of the northern area, not confined to the district now under consideration, where it has been invariably found that each slope has two circles—the supposed bases of their tents or wigwams. In some instances hundreds of tumuli surround these circles. They are invariably found on high slopes, possibly on account of their dryness, and partly, because in that position, they could more easily descry a coming foe.

The possession of two such circles only, among numerous tumuli, points to the dwelling of the family of the chief or head of the tribe, the retainers being allowed to squat as they best could in less comfortable quarters.

These circles, usually called "hut circles," vary in size—from 30 to 42 feet, and in one instance to 56 feet in diameter. They are composed partly of earth and partly of stones, and, as they now stand, measure $2\frac{1}{2}$ to 3 feet high.

The tumuli measure from 12 to 21 feet broad, and from 4 to 5 feet high. They yield graves containing the remains of the dead—sometimes in urns of sun-dried or burned clay, along with flint flakes, arrow and spear heads, and other well-known stone implements.

In addition to these there are remains of stronger buildings, occupying the most commanding points in the district, and probably used for protective purposes. They are usually circular in form, and from 50 to 60 feet in diameter. The walls are from 10 to 18 feet in diameter; but from the ruinous condition in which most of them now stand, it is quite impossible to say anything about their original height, and as to their use it must be conjectural. They are in some cases protected by outworks, which vary in form and number with the ground on which they are built.

There are also several vitrified forts within this area, varying in character and shape with the ground on which they stand.

There is at least one lake-dwelling which possesses a special feature, of which we must speak again.

A very interesting relic of former times is to be found in the "hunting pits." These are artificial hollows in the ground at the confluence of two glens or openings in the mountains, in which the hunter might lie concealed from the game which was compelled to pass him at that point. So

admirably adapted are these pits for this purpose that they are still sometimes used with the same object.

Relics of a later civilisation, still partly in use in the Western Islands but entirely extinct in the basin of the Beauly, are seen lying about the old houses on the hill-sides in the shape of "roller-querns" or "rubbing-stones, "round querns," and "barley mills."

THE BEAULY LOCH AND RIVER.—The Beauly Firth, into which the river empties itself, measures $6\frac{3}{4}$ miles long by $1\frac{1}{4}$ miles broad at high water. The entrance to it is narrow, and commanded by two bold headlands, surmounted by the vitrified forts of Craig Phadrich and the Ord of Kessock.

The firth is very shallow and full of sand-banks, formed by sediment brought down from the surrounding old red sandstone areas. This is the *Sinus Farraris* of Ptolemy, which name is still attached to one of the chief tributaries of the river, viz., the Farrar, which waters the beautiful glen of the same name.

At low water the Firth is little more than a river, and contains within low-water mark tumuli, showing clearly a considerable depression of the area subsequent to their erection.

The sand-banks are covered with seals, and occasionally a whale has been seen and caught. Hundreds of wild ducks frequent its waters in their season. The heron is a constant, and the wild goose an occasional, visitor to the shores.

Here, as well as in other parts of the Moray Firth, the oyster, which has entirely disappeared from the Beauly, must have found a genial habitat. The shells lie embedded in great numbers in a deposit of blue silt at high-water mark, and in the ancient sea-margins at Groam and Clunes, about 20 feet above sea-level.

PLACES OF INTEREST ON THE SHORE.—At Clachnaharry (the Stone of the Watchman), in the days of clan feuds, as its name implies, was the point whence the coming foe was easily descried. A monument still commemorates a desperate clan fight between the Munros and Clan Chattan. At a short distance from Clachnaharry stands the house of Bunchrew, formerly the property and residence of Lord President Forbes of Culloden. On the opposite shore is Redcastle (Edderdor), which dates back to the time of William the Lion. Not far from Redcastle is Tarradale House, the birthplace of Sir Roderick Murchison. The ruins of the old church of Wardlaw, which dates to 1220, occupy the summit of an out-crop of metamorphic rock, and contain the dust of many of the family of Fraser of Lovat, and, among others, that of Simon of the "'45." The ancient residence of the family—Wester Lovat—stands on the banks of the Beauly about 200 yards from this spot.

The river at Beauly has a winding course, and in some places its banks are covered with the *Lupinus perennis*. Here are two or three marshy

islands covered with alder. There was once an old ford here called the "Stockford," supposed by some to have been crossed by Edward I. when he laid siege to Beaufort. Here also the armies of Middleton and Montrose lay in sight of each other for days before the latter retreated further to the north.

BEAULY.—The town of Beauly is built on the left bank of the river, and is said to have originally occupied an island called Achinbady. It has the remains of a cathedral, formerly the residence of monks of the Cistercian order, but now used as a burial-place, and contains the ashes of many chiefs and members of Highland families, such as the Frasers, Chisholms, and Mackenzies of Gairloch.

The Gaelic name of the town is Balmanach or Banachan (the Monk's Town), and the surrounding land, Leornamanach (the Monk's Land).

For two miles above Beauly the river winds slowly and silently through a richly-wooded district surrounding Beaufort Castle, the residence of Lord Lovat.

The Falls of Kilmorack, about 2½ miles from Beauly, attract attention, not so much from the height of the fall as from the broad expanse of water and the picturesque surroundings. The river has forced its way through gigantic masses of conglomerate, covered here and there with ivy, honeysuckle, and a variety of creeping plants. "It is the banks, rich with foliage, and the exuberance of vegetation, combined with the height of the rocks above the dark convulsed river, that lends its chief glory to Kilmorack."

Having escaped from its narrow confinement, the river dashes over the rocks in a series of cataracts, and suddenly widens out into a broad and noble stream.

The Beauly has long been famous for its salmon, and at the Falls of Kilmorack they may be seen leaping over the rocks and making their way in hundreds. They used to be caught by men standing on the rocks, and armed with spears and hooks fixed to long poles. Sometimes they fell on the rocks, and were thus captured.

Dr. Carruthers, in his *Highland Note-book*, says, "this suggested to the former lairds of Lovat the well-known feat with which they use to regale their visitors: a kettle was placed upon a flat rock beside the fall, and kept full of boiling water. Into this the fish sometimes fell in their attempt to ascend, and, being boiled in the presence of the company, were presented to dinner." I think we might well agree with Dr. Carruthers when he remarks, "it must have been a luxury of no ordinary description to sit on the rock, under a canopy of trees by the side of the chief, and partake of a voluntarily cooked salmon."

Another group of falls occurs about 3 miles further up the river, at the top of that part of the glen, called the "Dhruim," which means a narrow pass. "This is the most sweetly Highland and beautiful part of the valley of the Beauly. On either hand the hills are steep and rocky,

and the valley between them is not a quarter of a mile broad; but woods of birch and fir encompass the whole scene, especially on the north side, and the banks of the river are fringed all along with rows of oaks, weeping birches, and alders. In one part, half up the strath, near the village of Teanassie, the waters plunge through a rocky passage, encircling high pyramids of stone standing up in the middle of the stream, gigantic witnesses of its ceaseless and consuming power. Immediately below the turmoil ceases, and the quieted element reposes in smooth dark linns, while the rocks, at the same time, recede and give place to patches of corn land."

On the southern shore, on a high conical mound rising above a perpendicular wall of rock, is the vitrified fort of "Dun Fienne."

At the further end of the Dhruim, the road begins to ascend towards the interior of the country, and here the river is seen pouring down on each side of a high rounded hill covered with oak and birch, at the lower extremity of which it forms a second set of small but beautiful cataracts.

This wooded hill is the Island of Aigas—formed by the river parting in two, and encircling it—noted as having been the temporary retreat to which Simon, Lord Lovat, conducted the Dowager Lady Lovat, when letters of fire and sword were issued against him and the principal families of his clan in 1697.

Emerging from the Dhruim, a totally different aspect of country lies before us. Here the glen widens into a beautiful flat strath, through which the river winds slowly in a circuitous course. Before the river cut a passage through the rocks at the Dhruim, this must have formed an expansive lake, discharging its surplus waters through the hollow known by the name of Fanellan, and finally emerging at Groam of Annat, near Beauly Bridge.

When the river is in flood it overflows the greater part of this flat, and two or three small lochs still remain on the south side. These are fringed with sedge and the beautiful white flowers of the *Nymphæa alba*.

This same plant grows luxuriantly round Loch-na-Caillach, above Aigas Ferry. This loch is about 300 feet above the sea, and surrounded with some of the largest "hut-circles" to be found in the North. One of them measures 56 feet in diameter. There is also a boulder with twelve cup-marks on it; Craig Dhu, which commands the whole valley east and west, is surmounted by an old fort.

From Struy, where the valley narrows again, three glens or straths lead through to the West Coast. These are Glen Strathfarrar, Glen Cannich, and Strathaffric, with The Chisholm's Pass.

It is very probable that the whole of the river, from Inverness to the head of this glen, was called the Farrar, seeing that the Romans designated the Beauly Firth *Æstuarius Varrar*, or *Sinus Varrarus*. The name is now only applied to the 15 miles of stream beyond Struy.

Glen Strathfarrar consists of a series of circular valleys opening into one another, with three beautiful lochs, which may be considered as simple

expansions of the river-bed. The first is Loch Bunacharan, about a mile and a quarter long by about a quarter of a mile broad, and 367 feet above sea-level. A mile further on is Loch Muilie, which is about the same size, and contains an island, whither Lord Lovat is said to have retreated after the disaster at Culloden, and from the top of an adjoining hill saw the flames of his residence at Beaufort illumining the sky. This island was a favourite retreat of the late Lord Lovat, where he periodically shut himself up for rest. Loch Muilie is 418 feet above the sea-level.

Three miles further on is Loch Monar, 683 feet above sea-level, and 7 miles long. The road from Struy winds in and out along the north bank of the river, and round the shores of these lochs. To the west of Loch Monar is a series of three smaller lochs, Loch-an-Gead, Loch-an-Tachdaidh, and Loch Calavie (1129 feet above the sea).

Immediately to the north-west of Struy is Ben Bhach-Ard, 2826 feet, and to the north of Loch Muilie is Sgurr-a-choir-chlais, 3554 feet; while the highest point to the west of Strathfarrar is Beinn Dronnaig, 2612 feet, a little to the west of Loch Calavie.

Sgur-na-Lapaich, 3773 feet, a beautifully peaked mountain, lies on the south side of Loch Monar, and between it and Glen Cannich; and to the west of it an enormous shapeless mass called Riabhachan, 3526 feet, flat at top and scarred by innumerable streams and gullies, the first and highest mountain on the Loch Alsh property, and from the summit of which both seas are visible.

The peaks of Creachal come next, and splendid grassy shoulders descend from them, stretching off and uniting with the lands on the West Coast.

The hills on both sides of the glen are high and rocky, having only their bases wooded. On the south side, about two miles from Struy, the late Lord Lovat opened a lead mine about sixty years ago, which has long been discontinued. It is now in the centre of the deer forest. Along the north side, and extending from Muir of Ord to Struy, a dyke of mica trap runs, which, when not appearing at the surface, is easily discovered by the growth of grass and bracken which cover the soil above it.

Glen Cannich begins about 7½ miles from Struy up Strathglass. Through these 7½ miles flows the river Glass, which is formed by the junction of the rivers Affric and Cannich at Invercannich. At the junction of the Glass with the Farrar there is a wooden bridge called "Drochaid-innis-nan-Ceann" (the bridge of the water of the heads).

The entrance to Strathglass at Struy has been of old well guarded by two forts occupying very commanding points on the end of the range dividing Strathfarrar from Glen Cannich.

Glen Cannich, which derives it name from the Cotton Grass which abounded in it, is about 20 miles long, and consists chiefly of a mossy flat, abounding at one time in much good pasture. It is at considerably higher level than Strathfarrar, and has Loch Mullardoch, 705 feet above

the sea, and 4 miles long; Loch Longard, 761 feet above sea-level, and 1½ miles long. "The western part of the glen is called Glasletter, a name which points to its rich green pasture."

Strath Affric and The Chisholm's Pass.—About half-way between Invercannich and Fasnakyle, a road leads to the right through The Chisholm's Pass, the scenery of which has been likened to that of Killiecrankie and the Trossachs, "but on a much grander scale; and to the beauty of the birch and of many large native ashes and elms, the intermixture of tall fantastic pines here superadds the sombre and imposing majesty of the Rothiemurchus and Mar forests."

The river Affric has a series of waterfalls from 10 to 30 feet high, occurring in the course of about a mile.

This glen has also a series of lakes, of which the chief are Loch Beinn-a-Mheadhoin, 600 feet above sea-level, and Loch Affric, 744 feet. The former is about 2¾ miles long and the latter 3¼ miles. They are separated from each other by a narrow rocky glen covered with pine and birch. The scenery of the upper part of the glen is grander than that of the lower end.

The mountains which previously appeared in depressed perspective, increasing in size, press close at hand, especially in the north in all their lofty grandeur, and the pine-clad shores of Loch Affric bestow an indescribable sense of lonely and sombre solitude on the scenery. On the northern shore of the lake are the sides of Sgur-na-Lapaich (3773 feet) and Mam Soul (3862 feet); from the summit of the latter both seas are said to be visible. To the west of Loch Affric the river receives two considerable streams, the Allt Gleann Fionn, rising to an altitude of 2750 feet, and the Allt Gleann Grianain, rising to the height of 2500 feet above the sea.

About 1¾ miles from Fasnakyle is the "Dog Fall," and about 1 mile from Guisachan House are the Plodda Falls, formed by the Eas Socach, which falls into the Amhuinn Deabhaidh, which joins the Affric above Fasnakyle.

Between the Affric and this stream is a place called Larach-Tigh-nam-Fionn, "the site of the house of Fion." This glen seems to have been closely connected with Fingalian myths. At the very upper part we have the Allt Gleann Fionn (Fingal's Burn); at the junction of the rivers, Larach-Tigh-nam-Fionn (the site of the house of Fion); and on the Beauly at Eilean Aigas, Dun Fienne (Fingal's Fort).

The whole of the mountains lying to the west of the area just described, and forming the irregular boundary between Inverness and Ross shires, are grouped "into enormous chains and clusters set on a high table-land or base, to which the lesser chains on the confines of Loch Duich, Strath Glass and Glen Urquhart appear only as buttresses," and which attain an elevation considerably over 3000 feet.

The district to the south of Eskadale rises 900 feet above the sea, and

is covered with a series of uninteresting lakes, occupying hollows in the bare metamorphic rocks. The largest of these, Loch Garbh Iolachan and Loch Neaty, empty themselves by Alt Garbh into the Beauly at Eskadale, a little village with a Catholic chapel, the burial-place of the present family of Lovat. On this high ground is a series of cairns or tumuli accompanied by two "hut-circles" and two cup-marked stones.

The next tributary of any importance is the Bruiach, rising in Loch-a-Bhruithaich. This stream, after receiving the waters of Allt-na-Loin and Allt-na-Skiach, flows through a flat moorland valley, over old red sandstone, for about half its course, and falls into the Beauly at Beaufort Castle.

Loch Bhruithaich measures $1\frac{1}{4}$ miles long by $\frac{1}{2}$ mile broad, and contains an artificial island of great interest, built upon piles and cross-beams of oak, fir, and birch. This structure has also been surmounted by a vitrified wall or fort. The island is literally covered over with vitrified masses and charcoal. The flint chips picked up on my visit show it to have been occupied by the primitive inhabitants of the country. There are also remains of a stone structure or castle, no doubt the remains of the castle or strength to which the Earl of Arran fled for refuge after having run a career of violence and ambition.

Tradition also preserves the memory of a clan fight between the Frasers and Chisholms on the shore of the loch, occasioned by a son of the latter having carried off a daughter of the former and hidden her in the island on the Loch Bhruithaich. The island is 240 feet long and 140 feet wide at the broadest part. The surrounding slopes are covered with tumuli. The east and south slopes are surrounded by the old red sandstone conglomerate, and the north and west by the metamorphic rocks. On the south-east corner of the loch there is a very large bed of barytes or heavy spar, containing a new mineral interbedded with the old red conglomerate, which dips 56° south-south-east, and can be traced into the loch for 12 yards.

The Allt-na-Skiach is a tiny stream which joins the Bhruithaich about a mile from the loch, and forms a very beautiful waterfall, leaping over the old red sandstone rocks, and falling 70 or 80 feet. This is really a most beautiful little waterfall concealed from view among the foliage of birch, hazel, and mountain ash. The whole surrounding district being flat and comparatively uninteresting, gives to the fall the greater charm.

Coul-ma-Skiach, the ridge from which it flows, is covered with tumuli, and has been taken possession of by a colony of sea-gulls who nest here every season. The tumuli are occupied with their nests, and the projecting stones forms convenient watch-towers for the male birds when standing sentry over the female on the eggs.

Passing over this low ridge or coul we enter Glen Convinth, which is watered by the Allt Dearg, called also Belladrum Burn lower down.

Glen Convinth possesses no special feature. It is a beautifully cultivated and thickly peopled glen, formed in the basin of the old red

sandstone. The hill to the south of Blair More has at one time been cultivated to the very top, 900 feet above the level of the sea. The furrows can be distinctly traced, and half of an old roller quern or rubbing-stone, used for grinding the corn, still lies on the top of the hill.

From this hill a view of Glen Urquhart and the "Urquhart Lakes" is obtained. The glen possesses the remains of a very ancient graveyard, and the ruins of a chapel which dates from the beginning of the thirteenth century. The village of Tom-na-Cross or Kiltarlity is at the mouth of the glen. Within the graveyard of Kiltarlity stands a Mote-hill or Judgement Hill, on which the primitive courts were held in days long gone by. This district is very rich in stone circles.

Moniack Moss and Relig Burn are all that remains to be described. The former was at one time a lake and the old bed of the Beauly. It was subsequently a marsh or swamp, which was drained at great expense by the late Lord Lovat, and is now well-cultivated land. It is separated from Glen Convinth and Kiltarlity by a serrated ridge of metamorphic rock. The vitrified fort of Dun More occupies one of these heights, and the remains of Castle Spynie—a round tower or broch—occupy another.

Relig Burn is a narrow gorge cut by the stream through metamorphic limestone rocks to a great depth. It issues from a district called the Caiplach, a wide expanse of cultivated moorland, no doubt at one time the bed of an extensive lake before the stream burst the barrier at the lower end. The middle part of the stream is wildly grand. The rugged precipitous banks of rock and boulder clay, which sometimes almost close overhead, are still the favourite haunt of the raven.

The lower part of the glen was converted into a perfect botanic garden by the late James Baillie Fraser. Apart from the different groups of trees, which in themselves possess great interest, the botanist could have seen at one time 150 varieties of plants in this glen. Walks led to all the natural beauties of the glen, and rustic bridges spanned the narrow gorges to introduce the visitor to the innermost recesses of this interesting place. Rustic seats and imitative ruins were erected in every nook. Among the botanic treasures we will only single out a group of twenty-eight cedars of Lebanon, some of which have attained a great size. The largest specimen measures, at 2 feet from the ground, 13 feet in girth, and the spread of the branches from tip to tip 90 feet.

In conclusion, I have to state that a district abounding with more beautifully varied scenery, and fuller of a greater variety of scientific interest, it would be hard to find.

RORAIMA.

Read at Meeting of British Association, Aberdeen, Sept. 1885.

By Everard F. im Thurn.

The whole country of Guiana may be likened to a wedge driven into the very distinct north-eastern shoulder of the continent of South America; or, rather, it is like three wedges, represented respectively by the three countries of British, Dutch, and French Guiana. Of these, British Guiana penetrates furthest inland; and just beyond the apex of this,—where, according to the at present vaguely accepted limitations of their respective boundaries, Brazil, Venezuela, and British Guiana meet,—stands the wonderful mountain of Roraima, which, till the 18th of last December, was deemed inaccessible. It stands, therefore, just outside British territory, in the Brazil.

Roraima was first heard of—if we except a possible but doubtful reference to it by Sir Walter Raleigh—and then reached, some forty-five years ago, by the brothers Schomburgk. Their account of the remarkable character of this mountain, and especially of the inaccessibility of its—as it seemed to them—for-ever-isolated summit, excited the vivid interest of scientific men. Since their time, some half-dozen white men have reached its foot, only to return with renewed stories of the wonder and the inaccessibility. In 1877, an article in the *Spectator* may be said to have popularised, raised, and spread far the fame of Roraima.

Yet, in mere height, the mountain is but a dwarf, surpassed by many up which tourists every summer-day carry their bottled beer and sandwiches; for its summit is but between 8000 and 9000 feet above the level of the sea, and only some 5000 feet above the level of the plain from which it rises. The interest lies, not in its height, but in its extraordinary formation, and in the apparent inaccessibility of its summit. Imagine a flat-topped pillar, itself some 2500 feet in height, set on a very steeply-sloped truncated cone of about another 2500 feet in height; or rather, first imagine a flat-topped, mason-wrought pillar of but 25 feet in height, set on a steeply-sloping pediment of another 25 feet. It would be rather difficult, if unaided by ropes or mechanical appliances, to ascend that pillar.

Much more difficult, then, did it seem to ascend the natural pillar, in all some 5000 feet in height, formed by Roraima. And even yet more difficult did this feat seem when it is remembered that the sloping base on which stands the pillar-like portion of Roraima is, over the greater part of its surface, rendered but just barely passable by reason of a complete covering of huge boulders and rocks, such as would present the appearance of an enormously magnified moraine, and that it is clothed, obscured, and rendered yet more impassable by one of the densest and most tangled forests to be found even in the tropics. And, once again, yet more difficult did the feat seem, when it is

remembered that on many days throughout the year—only, however, the Indians vow, when white men are about it—the mountain is enveloped from base to summit in densest mist, and that hardly ever is it clear in all its parts from huge masses of drifting vapour.

Yet, on the 18th of December last year, without any difficulty greater than might be overcome by a very ordinary degree of endurance, my companion and I, followed by seven Indians, reached the summit; and reached it—at first sight curiously enough—from the very point from which almost every one of the few previous attempts had been made and abandoned as hopelessly impracticable. Nor can we claim merit for the success which, after being denied to others, came to us. The merit is due to this Association and to the other Societies which by their liberality enabled us to spend sufficient time on the mountain—seeing our way—before we finally ascended. Previous travellers had reached the mountain, but had almost immediately been driven back by want of provisions before they had had time to see their way. Many, in all probability, never saw the path unobscured by mists, which led us to the summit. We were enabled—by you—to spend some three weeks on the mountain, watching and noting day by day, as occasion and the floating mists allowed, each detail of the mountain, and so determining the course which, with full knowledge gathered, we afterward followed with ease.

I must pause here to dispel a notion which seems to be not uncommonly held about Roraima—the notion that this mountain, so remarkable in form, is solitary, unique, and peculiar. Rather is Roraima the most famous, slightly the most lofty, and perhaps really the most striking of a group of similar mountains. If you have followed and realised the description I have given of Roraima as quite essentially pillar-like in form, you will not find it hard to follow me when I now declare that Sir Robert Schomburgk's description of this whole group of pillar-like mountains, of which Roraima is but slightly the most remarkable, as resembling, when seen from a sufficiently distant height, an indescribably vast natural forum—a forum in ruins—is an entirely adequate and satisfactory description of the appearance of the group.

Or perhaps, if you will let me depict the group in yet another way, it may raise a more distinct mental picture. Probably most of you have noticed in winter, when a thaw has set in after heavy snow, how, on the vanishing snow-drifts, small pillarlets of snow, capped and protected each by some small pebbles, are ranged over the surface; and, if you have been in the tropics, you will, after some terrific downpour of water—such as often there takes the place of our gentler rains—have seen, on some thrown-up heap of loose soil, many pillarlets of earth like those pillarlets of snow. And again, if you had walked with me to Roraima over the savannahs—over those swelling surfaces, barely covered by a thin sheet of hardest conglomerate, or of hardened mud, but really consisting of sand which is just coherent enough to seem at some times sandstone—just friable enough to seem, at another time, rather sand than sandstone—you

would have seen that, in places, the conglomerate or mud sheet had been broken up, and lay in small patches over the otherwise exposed and underlying sand, and would have noticed that there, occasionally, the sand, where exposed, had been washed away, but that where capped and protected by small patches either of conglomerate or hardened mud, it still stood in the form of pillarlets—sometimes even of great pillars—of sand, corresponding to the pillarlets of snow. Not seldom, hundreds of these pillars stand in great pits formed by the washing away of the sand from a hill-side. The phenomenon is indeed so common as to have earned a name from the Indians of the district, who call such places *Eppeling*.

The most noticeable instances of these eppelings were on a hill near the village of Konkarmo, some 50 miles south, but within sight of Roraima. At some five different parts of that hill, apparently very many hundreds of tons—in one place very many thousands of tons—of sand had been washed away, leaving countless erect pillars, of which the tallest corresponded in height to the original height of that part of the hill. The whole effect was most peculiar. Sometimes, I may add in parenthesis, the picturesque effect of these places was much increased by the extraordinarily pure rose-red colour of the sand.

Eppelings, on the comparatively small scale here described, abound about Roraima. I have dwelt on them because it seems to me that the group of remarkable pillar-like mountains of which Roraima is chief is but an eppeling on a gigantic scale, formed in the same way, and altogether—except in its gigantic size—equivalent to the pillarlets on the loose water-washed earth and to the pillarlets of snow on the snow-drifts.

Here it occurs to me that, having dwelt so long on the pillar-like form of Roraima, I had better explain that it does not form a round pillar. Were we to make a ground-plan of it, its diameter would be much greater from north to south than from east to west. From east to west, as viewed from the south, the mountain is just about four miles across; from north to south it appears to be some seven or eight miles.

Of our actual ascent of the mountain I need not say much here; for I have elsewhere told of this in some detail. We reached the mountain on its southern side; and on that side, too, we made an ascent. The house which we built for ourselves and occupied during our three weeks of preliminary exploration, was rather more than half-way up the sloping part of the mountain, the pediment of the pillar. Up to that point the slope, on that side, was grass-covered and swampy; the cold and damp were intense. Above that point, from our house to the base of the actual cliff, the slope was much more steep, and was entirely covered by terrific moraine-like masses of huge fragments of rock, over which had grown the densest forest of small but gnarled trees, matted together by ferns and climbing bamboos. At the top of this slope—at the base, that is, of the actual cliff—was a curious belt of blackberry bushes—a rare, perhaps a unique, instance in the tropics. And immediately above this, rose, for more than 2000 feet, the sheer cliff. Or rather the cliff was not quite sheer;

for its top overhung its base; and, as I sat at the base of the cliff, with my back against it, trying to put roughly into papers the too abundant new plants which I had gathered on the way up, the water which ever drips from every part of the upper edge of the cliff, fell, not on to, but beyond me.

So far the way had been but a very difficult climb up the slope. To this point others had reached. But above us, still to be ascended, rose the real difficulty—the cliff.

From below, we had noticed, and carefully noted, a broad but uneven, and in many parts much-broken ledge, which runs diagonally up the face of the rock, from the top of the forested slope to the upper ledge of the cliff. It was obviously the path by which we should ascend. One difficulty which had presented itself to our eyes from below had already been overcome; for, wandering, without being able to see more than a yard or two on each side of us, up through the densely tangled vegetation of the slope, we had yet managed to strike the bottom of the ledge where, emerging from the slope, it passed up the cliff. The lower part of the actual ledge was, however, much broken, and its surface was much obscured by blocks of stone and dense plant-growths. Higher up, a yet more serious difficulty had seemed to present itself. For there, a stream of some size, falling over the upper edge of the cliff down on to the ledge, had worn away the latter, and made for itself a deep ravine—a break in the shelf. It proved, however, not very difficult to climb down into this gap, to pass (in that state of the water it was possible, though after heavy rain it might not be) actually through the water as it fell like very heavy rain, from 2000 feet high on to our heads; and then to climb up the other side of the gap on to the upper part of the ledge: and on, through a paradise of strange and lovely plants, to the top of Roraima. Then the pillar had been climbed, and we stood on its summit.

Surely no stranger sight than that which now met our eyes was ever seen. Now and again in an old picture by some skilled painter, who, never having been outside his flat rockless native land, has yet ventured to add an imaginative background of rocky landscape to his figure subjects, is to be seen some approach to the landscape on Roraima. In the foreground, on either hand, rose a fantastic pyramid of rock, and these were as the gate-posts; within, on the right, three detached pillar-like blocks of stone, lying evenly side by side on the top of one huge square block, pointed, in marvellously close resemblance to three great guns, outward through the entrance. Within the gate thus strangely guarded lay a great plain, with surface generally somewhat uneven, its lowest flatter parts clothed with a grass-like and very peculiar vegetation, the even stretch of which was broken by but a few, singly and widely scattered, very low shrubs, its higher more swelling parts of bare rock curiously, most elaborately, and intricately terraced. Through the plain meandered numberless tiny streamlets of clearest water, now falling in miniature cascades over the sloping rocks, then winding through the grass, and again

widening out into little pools. And on this plain, singly, in the foreground, but more and more abundantly in the distance, till they excluded further view, were ranged, in orderly disorder, many single masses and piles of masses of great rocks from 20 to 80 feet high—each single rock, each pile of rocks, of perfectly indescribable, nay—to those who have never seen them —incredible strangeness of form. It seemed a disordered gallery of countless vast stone monsters. Here was a rocking-stone—or so it seemed until experiment proved that its upper part was really fast joined by a narrow neck of stone to the lower; there was an "Old Man of Hoy;" then again an archway, seeming the strange proscenium to that strange scene beyond; then a terraced Mexican pyramid, its steps even enough to afford easy access to its summit; then a gigantic human mask of stone; next a cap of stone; animal figures of stone, and hundreds of similar natural grotesques. In short, it seemed for the moment hard to believe but that there had been gathered together, and put away on that lofty and isolated small summit, all those grotesque, artificial-seeming natural rocks which, attracting the attention of the curious traveller, are usually found scattered singly, and at wide intervals over the face of the whole earth.

At the moment it all seemed inexplicable, and even now I seem to feel it almost presumption to suggest an explanation of this strange scene. But it must be done. The whole group of grotesque rocks seems to me to be but another and very remarkable example of one of those eppelings—the nature and origin of which I have already described. Each of the rock-monsters on the top of Roraima, whether it consists of a single rock or of a pile of rocks, is distinct from each of its fellows. Each is, it seems to me, a single pillar—more or less gigantic as it may be, yet comparable to the melting pillarlet of snow; and each of these pillars is gradually melting away (like a snow-man in a thaw) under the influence of the aërial denudation which on Roraima,—the very home of all mists and rain and storms and winds,—exercises in a degree hardly approached elsewhere its unchecked and powerful sway.

Before I close, there is another aspect of Roraima, the "ever-fruitful mother of streams," as the Indians call it, on which I must say a few words. Gathering their waters on this marvellous top of Roraima, and starting with a wonderful leap of 2000 feet down over its cliff, are streams which flow in various directions to swell with no inconsiderable contribution of water the Orinoco, the Essequibo (the little sister of the Orinoco, the Indians say this is, but it is only little by comparison) and the Amazon, —the three chief river systems which water the greatest part of the Atlantic side of the continent of South America. Roraima is but a little mother; but her offspring—her streams—are great. To the poetical imagination the summit of Roraima is a most fitting home and place of origin for these great streams; but to the more sober reason it seems at first sight a little wonderful that so small a plateau should pour out such great waters. Yet the phenomenon can be very easily explained.

The summit of Roraima is in reality not a perfectly level plateau, but a very slightly hollowed basin. The countless pillars of absorbent sandstone which stand on it constantly gather the great moisture which the winds ever drive round about and against them; and this moisture trickling down through the rock pillars, accumulates in the spongy masses of soil formed in the lowest parts of the basin by the herb-like vegetation. Thence, in the tiny streamlets which have already been described, the water makes its way to the edge of the plateau through deep channels which it has cut for itself through the rim of the rock basin; and, emerging not quite at the top of, but some distance down the cliff, it makes its great leap downwards, and then hurries some of it to the north, to the Orinoco, some to the west, to the Essequibo, and some to the south, to the Amazon.

It will not be difficult to understand, then, that the streams which ever drop—sometimes it may be but a trickle—down the face of Roraima, are normally but small in volume, but that at very frequent intervals the shortest rainfall—tropical rain-pour, though, it must be remembered—swells them to great and potent size.

My farewell to Roraima was made with curiously mixed feelings, for not often in any lifetime does one come to such a place, under such circumstances, and consequently acquire for it in so brief a stay so much affection. The closing day of my stay there was last Christmas Day, which we spent at Teruta, the Arecuna village at the foot, and from which is the most astoundingly magnificent view of the twin mountains of Roraima and Kookenaam. In the morning, the day before having been dry, the streams were but barely discernible as they descended the cliff; but during the day rain fell, the streams increased in volume, doubling—though that had seemed impossible—the magnificent beauty of the scene, and adding to its grandeur the splendid music of their roar. In such a scene, on such a day, all other impressions were effaced in that of grand and terrific splendour. Then, when night fell and hid this, the Indians around us, under the influence of a most remarkable ecclesiastical mania which had just then spread in a wonderful way into those distant parts, raised—as they kept Christmas with much drinking, without intermission from sunset to the next dawn—an absolutely incessant shout of "Hallelujah! Hallelujah!" Such an anti-climax to the most impressive scene I have ever witnessed, sent me, with mingled regret and sorrow, away on my homeward journey in the morning.

But a very few words more, and I have done. We found the way up Roraima; but, that done, we had exhausted our means, and were unable to proceed with the further exploration of the mountain which is most desirable. Often I hope that I may still be permitted to do that further work; always I wish that, whether I or another do it, it may be done. The knowledge which I have gained would enable it to be done with comparative ease; and if there is any one here, or elsewhere, who will undertake it, that knowledge shall be placed as freely at his disposal as it would be used by myself.

GEOGRAPHY AND TRADE IN THE EAST.

By John Geddie, F.R.G.S.

Nothing is more noticeable, in an analysis of current problems of foreign politics and foreign trade, than the intimate way in which every one of them has combined in it an element of geography. This has, of course, been more or less true at all periods of history, but the tastes and necessities of our own time would seem to demand every day a stronger blend of geographical knowledge, in order to make questions of over-sea politics or commerce appreciated. There are explanations of this which we need not stop here to discuss. One, no doubt, is to be found in the fact that the world, so far as concerns the expansion of trade in the old channels, appears for the time to have reached a stage of arrested development; that commerce is eagerly looking for new outlets and markets in quarters hitherto neglected; and that Governments are eagerly assisting the search by the acquisition of colonies. If zeal has in some cases outrun discretion, and blunders have been committed, it has been because the merchant and the politician have not taken sufficient counsel with the geographer before entering on their adventures, or because the latter has been himself remiss, and is void of information. To geography should be assigned the honourable function of acting as torch-bearer in the new departure that is being made in so many branches of national enterprise abroad. A "forward policy" in exploration is good at all times; at a time when diplomacy and trade seem not only inclined but compelled to embark in discoveries and experiments, it becomes an essential part of political action.

Materials for a fresh start are being sought chiefly in two directions—in Africa, and in the far East. Africa—at all events, the kernel of that dusky shell—is a present which geography but the other day opened to the view of commerce and politics. For their part, the traders and the statesmen, after some hesitation, are eagerly stretching out hands for the gift. National, international, and individual action is being taken in the basins of the Congo, the Niger, and the Zambesi, and on the east and west coasts of the continent, which will have immense influences in the sphere of politics and of trade. There is in it all, however, a good deal of the spirit and the risks of gambling. No one can calculate, because there is no exactly analogous experience in the past to guide us, what may be the profits or the losses of bringing the barbarous millions of the African interior into contact with the civilisation of Europe. In the East we tread on surer ground.

The subject of the enormous field for the development of trade that exists in China and the adjacent regions, and the desirableness of initiating a bold and definite line of national policy on the subject, has been brought forcibly before the country in an able paper which Mr. A.

R. Colquhoun has addressed to the Chambers of Commerce. In a variety of other ways it is being pressed upon our notice. Above all, the action of France in Annam and Tonquin has infinitely modified the conditions of the political and commercial problem in the East, and has raised to a position of general importance questions in which, until recently, the geographical specialist alone took any interest. From another point of view, the changes and developments that are going forward in the Middle Kingdom and its borders—over the whole vast territory indeed, from the Bramaputra to the Amur—have an intimate bearing on the great Asian Question—the rivalry of Britain and Russia in the Eastern continent. There is a third leading factor in this problem—the existence, the persistent coherence, in spite of all the forces acting towards disintegration, of the Chinese Empire; and France desires to make a fourth. Japan also occupies a peculiar position, and will play an essential part in the unfolding of this plot of Oriental destiny. Another important element is the growing share which Germany is taking in Chinese trade.

For the present, however, Britain holds an easy lead of all competitors in the field of Eastern commerce. Not only does our part in the traffic of China and Indo-China exceed that of any other Western nation—it vastly surpasses in value and bulk the trade carried on in these seas by all of them together. Somewhere about 70 per cent. of the export and import trade of the Chinese treaty ports is with the United Kingdom and its dependencies; still larger is the share of this commerce carried on British bottoms. The maintenance and strengthening of this dominant position, the multiplying of the facilities for entering the country, and the opening up of the interior with its population of hundreds of millions of industrious people, hitherto shut out by national prejudice and the jealous exclusiveness of their rulers rather than by physical obstacles—these have become more than ever objects of prime importance to British statesmen and merchants. The value of our trade with these countries of the far East considerably exceeds £50,000,000 sterling. As yet, however, they have been "tapped" only at some points on the coast. There remain for exploration the grand channels of inland navigation: and the Irrawady on the one side and the Yang-tze on the other are already yielding evidence of the important part the rivers will play in the development of Eastern trade, as soon as the artificial barriers that have so long shut out the commerce and products of Western civilisation are removed.

There remain also the various lines of land approach, especially those from the side of India. These were once of much importance. Even with the slow and cumbrous means of transport in use in Eastern countries—the pack-saddle, the bullock-wagon, and the porter—a considerable volume of trade flowed backwards and forwards by way of Bhamo and other trade routes, between China and its tributary states in the Trans-Ganghetic peninsula, and even between China and India. For many years past these old arteries of commerce have been practically closed; but with a

change of policy on the part of the Chinese authorities, with a termination of the disorders that have so long prevailed in Upper Burmah, the Shan States, and Yunnan, they might again become worthy of the attention of the British trader and the Anglo-Indian administrator. China and its neighbour countries have still to feel the magic influence of the railway; the enormous mineral resources they contain are as yet practically untouched. The frank adoption by the Pekin Government of a policy of railway construction, such as is now being initiated in Japan, would unquestionably work a revolution in the social and commercial condition of the country. It would also produce a revolution in British trade and intercourse with the East. The question of securing and improving old means of access to China, of penetrating to its back countries, and there creating and developing commercial wants, is thus one of incalculable importance to British manufacturers. It is, if possible, of still higher significance, looked at from the point of view of the interests of our Indian Empire and subjects.

There are signs not a few that the present advisers of the Dragon Throne, driven thereto more by force of circumstances than by free will, are meditating a reversal, or at all events a modification of the traditional policy. It is certain that "circumstances"—represented by French, Russian, and British pressure at different points on their frontier, and by the pouring in through the treaty ports, through the channels of the great navigable rivers, and along the tracts followed by consular officers, missionaries, and other agents of civilisation, of that new wine of Western influence which is gradually permeating the interior—will, at no distant date, open up China, with or without the consent of its rulers. Hence the necessity, strongly insisted upon by Mr. Colquhoun, in his paper, of carefully reviewing the situation, and of determining on some clear and definite course of action, in prospect of the fresh dangers and opportunities that have arisen in Eastern trade, politics, and geography. From each of these three points of view, this country occupies a position of great strategic strength—a position that is, at the same time, capable of being made much stronger than it is at present.

As a base of operations for commercial, political, or geographical enterprise, in the direction of China and Indo-China, we hold an almost unbroken line of territory from the Himalayas to Singapore. The eastern seaboard of Indo-China, the outlets of the great rivers of the region that find their way into the Bay of Bengal, are in British hands. In Upper Burmah, in spite of the hostility of its ruler, in spite of our own wise disinclination to interfere in its affairs, so long as it was possible to refrain from interference, we hold a dominating position by sheer force of geographical relationship and of the development of British Burmah under our rule. In Siam the preponderance of British influence and commerce has until lately been unquestioned. Hong-Kong and North Borneo are British territory. Hong-Kong, in particular, is one of the miracles of modern commerce; in the course of the forty years it has been

in our hands, it has grown to be one of the most important spots in the Eastern world, as an *entrepôt* of trade and an advanced post of civilisation. At Shanghai, Canton, and other treaty ports, we have long had an established position and recognised rights; within the "concessions," these are, to all intents and purposes, small self-governing European colonies. The opening of the port of Newchang, in the Yellow Sea, has enabled us, in the van of other foreign countries trading with the East, to take an important share in the wonderful work of development and colonisation which has since the last Chinese war, and more especially since the famine of 1877, been proceeding in Manchuria. Exclusive of the junk traffic, the value of the exports and imports at Newchang have increased from £15,000 in 1861, the year when the port was opened, to £2,154,116 in 1884. Of the tonnage employed in this trade, some 60 per cent. is under the British flag. In this direction there is a tempting and inexhaustible field for geographical research and commercial enterprise; and the political importance of Manchuria, lying as it does between the Russian outposts on the Amur and the Chinese capital, is also very great.

From an interesting report by Mr. Christopher Gardner, the British Consul at Newchang, we learn, among other things, that the total area of the consular district is 300,000 square miles, and that the population, as estimated by the Roman Catholic missionaries, is at least 15,000,000, and is rapidly increasing through constant inflow of emigrants from China, who are rapidly superseding the Manchu inhabitants, and are penetrating and occupying the extreme northern province of Heh-lung-Kiang, and the "debatable land" between the Palisades and the Yalu River and Corean frontier. Christian missionaries, both Protestant and Roman Catholic, are doing good work in this region, not only in their own special sphere of labour, but as geographical explorers and pioneers of mercantile enterprise. All this is true also of Corea, whose long and strict isolation is at length being broken up. Commercial treaties have been concluded, and the beginning of what in time promises to be a valuable commerce has already been made at Chemulpo, the highest point on the Han River that can be reached by sea-going vessels, and the port of Söul, the Corean capital. Interesting reports on journeys into the interior of this little-known country, and on the gold-washing and other native mining operations carried on in the northern mountainous region, have been made by Mr. Aston, Mr. Carles, and other energetic consular officers; are they not to be found written, by those who choose to look for them, in the volumes of Blue-books annually laid before Parliament? In Corea, also, diplomatic action has not been idle. We have heard tell of Russian intrigue, and of efforts made at Söul to secure for the Czar by negotiation those rights of suzerainty and of exclusive commercial privileges in Corea, which France has obtained in Annam and Tonquin, only after a costly war. Not unnatural or unjustifiable these, considering the great importance which Russia attaches to the possession of open winter ports in

the Pacific; and of course equally justifiable, or more so, considering the vast interests she has at stake in these seas, was Great Britain's endeavour to safeguard her position, and provide against eventualities, by occupying Port Hamilton, in the Corean Archipelago.

Having glanced hurriedly along the lines that converge on the centres of trade in Eastern Asia—and, after all, the ocean must always afford the infinitely best line of approach, and that from which Britain's preponderating advantages must be chiefly derived—we must hark back again to the Indian frontier, and say something about the commercial projects and political difficulties which have within the last week or two brought Burmah and its geographical features prominently before the public. The shortest road, in a bee-line, from India to China is, of course, to be sought for in Assam and the upper valley of the Bramaputra—in that direction they may be said to touch. It is a region, as every one knows who has paid any attention to geographical discussions, full of the most puzzling and intricate questions in physical geography and ethnology—questions that at most are still only in a state of semi-solution. But the idea of a possible highway of commerce being found through it has generally been given up in despair, although the Bengal Chamber of Commerce have recently commended to the Indian Government the survey of a route of railway from the Bramaputra, having as its objective the town of Li-Kiang-fu in Western Ssu-chuan.

A scheme that gives better promise of an ultimate practical issue is that which contemplates forming a connection between the Indian system of railways and those of British Burmah, by a line starting from Dibragarh, or some other point in Assam, and crossing the territory of the independent or semi-independent tribes on the North-East Frontier to the upper valley of the Irrawady. Available routes are known to exist through this mountainous tract, though at present very little commerce passes over them; armies have even traversed them in recent times, on their way from Burmah to Assam. Whether a paying line of railway can ever be carried across this line of country is, however, a question on which we have as yet no means of forming an opinion. Here, as elsewhere, geographical research and diplomatic action are needed to clear the way for commercial enterprise. In any case it is a project that must wait for solution on the settlement of the difficulty between the Indian Government and King Theebaw of Mandalay, which has just now reached the stage of acute crisis, and on the development of the trade of the Upper Irrawady.

This great river—an East Asian Nile—undoubtedly marks, with its grand navigable channel, its fertile alluvial banks, and the mineral resources of the ranges of mountains bounding its valley, one of the fields in which Eastern commerce can confidently look for large future expansion. The political and scientific interest attached to it as a probable line of approach to the south-western provinces of China has also been long recognised. In the thirty-three years during which the delta of the river

has been in our hands, the portion of the old Empire of Ava under British control, has prospered amazingly, in spite of occasional bad harvests and periods of depressed trade. Rangoon and Moulmein have become busy commercial cities and marts of the rice and teak trades. The native race have been found to be a people easy to govern, with a talent for trade and barter, and with this great advantage over the bulk of the inhabitants of British India, that they are not handicapped by a system of caste. The finances yield a handsome annual surplus, which, as the province is for administrative purposes attached to the Presidency of Bengal, goes to make up deficiencies in the Calcutta budget. A flotilla of river steamers plies on the Irrawady, and the construction of a railway system has been successfully initiated. Besides the natural increase of population, it is recruited year by year by refugees from King Theebaw's anarchic realm, this infatuated ruler having apparently no other notion of government than that of handing over towns and districts to be "eaten up" by greedy officials and court favourites. Besides the natural growth of its internal trade, British Burmah profits by being the sole channel and intermediary by which the Independent State can hold intercourse with the outside world.

Since Theebaw came to the throne of Mandalay, and signalled his accession by the massacre of all his relatives on whom he could lay hands, the Irrawady traffic has been in a critical state. An entire rupture of relations between Mandalay and Calcutta has only been avoided by the prudence and forbearance of the Indian Government; Theebaw, moved by dynastic alarms as much as by any other motive, has for seven years done all he could to provoke it. At last he appears to have trespassed beyond the bounds of long-suffering. He had been watching, no doubt with mingled feelings, the approach of France from the side of Tonquin. M. Haas, an enterprising French consular agent and commercial speculator at Mandalay, seems to have been able to afford the Burmese King the opportunity he has been looking for of playing off another Power against that of his too powerful neighbour. Theebaw seized it with an eagerness which M. Haas and himself have already cause to repent. A diplomatic mission has been sent from Mandalay to Paris, and a commercial treaty has been concluded, and awaits only the final sanction of the French Chambers. Large and wide commercial concessions and monopolies have been, it would seem, secured by French syndicates in Upper Burmah; they include, among other things, the foundation of a banking monopoly, and sole rights of building railways and of exploiting the forests and minerals of the country. The Bombay-Burmah Trading Corporation—a British company—have for some years held a lease of the teak forests of Ningyan, and have carried on an immense trade, employing thousands of coolies and hundreds of elephants in the transportation of timber. It was necessary, for King Theebaw's purpose, to discover some pretext for ousting the Corporation. It was found or made in charges brought against the company of illegal cutting of timber; these charges were brought

before what, at Mandalay, stands for a court of justice; and the preposterous fine of twenty-three lakhs of rupees (some £200,000) was imposed.

With this last action the cup of Theebaw's offences nearly ran over. Representations were made at Paris, and the French Government promptly disclaimed any intention of disputing the paramount political influence of Britain in Upper Burmah, and M. Haas was recalled from the scene of his activity. King Theebaw, however, was in nowise disposed to give way. To the request of the Indian Government that the claims against the Bombay-Burmah Corporation should, according to treaty stipulation, be tried by a mixed court, or settled by arbitration, he has returned an insolent answer. Should he remain deaf to the ultimatum sent to him demanding the reception of an envoy and military escort at Mandalay, the only means left of bringing him to his senses will be that which proved effectual with his predecessors—namely, armed force.

The solution of the Burmese difficulty will have a necessary and immediate effect on the conditions of the problem of the opening of land routes into South-Western China. Whether annexation or some form of protectorate is finally determined upon, the result will be to place India in a new commercial and political relationship with the Chinese Empire. The two countries will in effect be coterminous over several hundred miles of border; and North-East Frontier affairs will take a new complexion and interest. A wall—a series of walls and fosses—will still separate the two teeming Eastern populations; but there will be gates and windows in it. They will see each other, though with difficulty; they can hold intercourse and barter wares across the frontier, though with much toil and scrambling over mountain pass and river gorge.

The best-known of these gateways to South-Western China—in point of fact the only one that has been examined in such a way as to enable us to judge its capabilities as a route of commerce—is that which is found by ascending the Taping branch of the Irrawady from Bhamo, and which leads by way of Momein and Yung-chun to Tali, the capital of the Panthay "Sultan" during the period of the Mohammedan rebellion in Western Yunnan. The labours of a series of exploring expeditions and commercial missions have made this route familiar. Margary, Browne, Sladen, Gill, Cooper, Baker, Mackenzie, and Colquhoun have been among those who have passed over or approached it from one side or the other. The physical difficulties are of the most formidable kind; high mountain ranges have to be surmounted, and the deep gorges formed by the Shweli, the Salween, and the Meikong Rivers have to be crossed. The bridges and other works constructed by the Chinese in earlier times for the accommodation of the traffic have fallen into disrepair or complete ruin. The district of South-Western China to which the route gives access is rugged and mountainous, and of naturally poor soil, and it has been depopulated and impoverished by long-continued anarchy and rebellion. Other obstacles in the way are the independent hill tribes on the frontier, and the robber bands that infest the line of route.

Mr. Colquhoun's opinion is that it is impracticable as the route of a railway into Western China. Nevertheless, with a strong and civilised government established in Upper Burmah, a considerable amount of traffic may be expected to flow through this old channel—always provided that the Chinese authorities abandon their old traditions of exclusion and obstruction, and regard with a friendly eye the establishment of British rule or a British protectorate at Mandalay. Mr. Colquhoun's journey across the border-land of Southern China led him to the belief that the really fertile and valuable part of Yunnan—the part with which an important trade might spring up, and might ultimately be found to afford access to a large area of the interior of the Middle Kingdom, is to be sought in the south of the province, about Pu-erh, and adjoining the Burmese-Shan States on both sides of the Meikong. These Shan principalities, which have in quite recent years thrown off their allegiance to Burmah, of themselves, promise to afford an excellent market for European goods, if safe and easily traversed roads could be opened up. Whether such a route can be found, either from the side of Tonquin or of Upper Burmah is a moot question; in both cases the known physical features of the intervening region render the prospect a very dubious one.

Mr. Colquhoun, who, on account both of his personal researches and the special study which he has given to the subject, is entitled to be heard with respect, contends strongly that the true line of approach must be sought for further south—in British Burmah. His idea is that a trunk line of railway should be constructed, which, starting from the British Burmah system—from the line just completed from Rangoon to Toungoo—should be carried north-westward and "tap" China somewhere about the town of Ssu-mao. He believes that the physical obstacles to be encountered would not be serious, or at least would not be insuperable; while both the region traversed and the country to be tapped contain a large and industrious population and great natural resources, and are capable of immense development.

Mr. Colquhoun must be content to wait a while before seeing his full project of a "trunk railway to China" in the way to be realised—for this, among other reasons, that the line of country over which he proposes to carry it has never so far been traversed throughout by a European explorer. It is different, however, with that part of his scheme recently so ably advocated by himself and Mr. Holt Hallett, which contemplates the junction of Rangoon with Bangkok, by means of a railway, which, so far as within British territory, would be guaranteed by the Indian Government, while the Siamese Government would undertake the construction of the section on their side of the frontier. This line has been carefully surveyed, and has been found to present no great engineering difficulties, the highest ridge to be crossed being of only moderate elevation above the sea. A trade of no insignificant amount already passes by this route between Burmah on one side and Siam and the Shan States on the other, in spite of the great delays and dangers attending on the present means of

transport. There are numerous towns and villages and much cultivated land on or near it, and at the south-eastern extremity is Bangkok, a city of half a million inhabitants. As to the importance of retaining by all means in our power the share we possess of the trade of Siam, Mr. Satow's last report on the commerce of that country may be consulted with profit. From the returns for the year 1884 the Consul-General shows that "the commercial interests of Great Britain in Siam, as compared with the rest of the world, are:—In fixed capital, as 2 to 1; in steamers, as 8 to 1; in exports, as 9 to 2; and in imports, as 2 to 1;" further that "nine-elevenths of the total export trade of Bangkok, valued at nearly £1,650,000, is with Hong-Kong and Singapore."

Mr. Colquhoun's proposals are therefore worthy of the careful consideration of the Indian Government and of the British nation. The projected line would, as far as Raheng, be part of the trunk line to China, and the section from Raheng to Bangkok would be a feeder; it would be the base of operations, the first step in one of the boldest and not the least promising of the enterprises in the history of Eastern commerce. Whatever may be said of it from a political, commercial, or financial point of view, Geography must desire that the surveys may be completed and the work of penetrating China by railways successfully begun.

REPORT TO COUNCIL.

By Mr. Coutts Trotter, the Society's Delegate to the British Association, 1885.

Gentlemen,—As you did me the honour of appointing me to represent our Society at the recent meeting of the British Association at Aberdeen, it appears desirable that I should lay before you a short notice of the geographical work which was done on that occasion. We are now affiliated to the Association as a Corresponding Society, and as such are represented on the General Committee; but our more immediate and intimate relations are, naturally, with the Geographical Section, and, as will be seen from the following list, our Council was adequately represented on the Committee of the Section—the President being also a distinguished member of our Society.

Section E.—Geography.

President.—General J. T. Walker, C.B., R.E., LL.D., F.R.S.

Vice-Presidents.—Professor James Donaldson, M.A., LL.D., F.R.S.E.; John Rae, M.D., LL.D., F.R.S.; Admiral Sir E. Ommanney, C.B., F.R.S.; Lieut.-Colonel R. L. Playfair.

Secretaries.—J. S. Keltie; J. S. O'Halloran; E. G. Ravenstein (*Recorder*); Rev. G. A. Smith, M.A.

Committee.—A. Buchan, M.A., F.R.S.E.; Dr. W. G. Blackie; Hugh Cleghorn, M.D.; Robert Capper; Sir George Campbell, K.C.S.I.; Sir James Douglass; Admiral Farquhar; Francis Galton, M.A., F.R.S.; James Matthews, Lord Provost of Aberdeen; Admiral Bedford Pim; Trelawney Saunders; David Stewart; Rev. Canon H. B. Tristram, F.R.S.; Coutts Trotter; H. A. Webster; William Westgarth; Captain W. J. T. Wharton, R.N.; A. Silva White; Cope Whitehouse, M.A.

The Committee sat on the 9th, 10th, 11th, 14th, 15th, and 16th September, and among other resolutions passed were a request to the Committee of Recommendations for a grant in aid of Mr. H. O. Forbes's Expedition to New Guinea,—the Committee for furthering the Exploration of New Guinea being also re-appointed.[1] Committees were also appointed—the resolutions having been approved by the Committee of Recommendations:—

(*a*) For the purpose of organising a systematic investigation of the depth of the permanently frozen soil in the Polar regions, its geographical limits, and relation to the present pole of greatest cold; Mr. H. W. Bates to be secretary.[2]

(*b*) For the purpose of taking into consideration the combination of the Ordnance and Admiralty Surveys, and the production of the bathy-hypsographical map of the British Islands; Mr. E. G. Ravenstein to be secretary.[3]

(*c*) For the purpose of inviting designs for a good differential-gravity meter in supercession of the pendulum, whereby satisfactory results may be obtained at each station of observation in a few hours, instead of the many days over which it is necessary to extend pendulum observations; Professor J. H. Poynting to be secretary.[4]

(*d*) For the purpose of drawing attention to the desirability of further research in the Antarctic regions, nearly half a century having elapsed since the last exploration; Admiral Sir E. Ommanney to be secretary.[5]

Reports were received from the Committee for furthering the scientific examination of the country in the vicinity of Mount Roraima in Guiana, and from the Committee for promoting the Survey of Palestine. An abstract of the latter report appeared in the *Magazine* for October.

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[1] The Committee consists of:—General J. T. Walker, Sir J. H. Lefroy, Lieut.-Colonel Godwin-Austen, Mr. W. T. Blandford, Mr. Sclater, Mr. Carruthers, Mr. Thiselton Dyer, Professor Struthers, Mr. G. W. Bloxam, Mr. H. W. Bates, Lord Alfred Churchill, Mr. F. Galton, Mr. J. S. O'Halloran, Mr. Coutts Trotter, and Professor Moseley.

[2] Members of the Committee:—General J. T. Walker, Sir J. H. Lefroy, Sir William Thomson, Mr. Alexander Buchan, Mr. J. Y. Buchanan, Captain Dawson, Mr. John Murray, Dr. John Rae.

[3] Members of the Committee:—General J. T. Walker, Sir J. H. Lefroy, Sir William Thomson, Mr. H. W. Bates, Mr. Alexander Buchan, Mr. J. Y. Buchanan, Mr. Francis Galton, Mr. John Murray.

[4] Members of the Committee:—General J. T. Walker, Sir J. H. Lefroy, Sir William Thomson, General Strachey, Professor Chrystal, Professor A. S. Herschel, Professor C. Niven, Professor A. Schuster.

[5] Members of the Committee:—Sir Joseph Hooker, Sir George Nares, Sir Leopold M'Clintock.

A resolution, expressing sympathy with the action of our Committee in the matter of New Guinea, was also sent in by the Committee of Section H (Anthropology), whose President, Mr. Francis Galton, has interested himself warmly in Mr. Forbes's success. The Committee of Recommendations has, accordingly, again shown its confidence in Mr. Forbes, and its approval of his previous work, by a grant,—this time of £150, being the largest sum voted by them this year in support of any undertaking whatever.

To give an idea of the geographical area embraced, or, it would be better to say, attempted to be embraced, by the work of the Section, it will be sufficient to mention that at its five sittings, averaging something less than four hours each, thirty-eight papers were read on different subjects, besides the President's address. It was hardly possible that the varied topics could all receive, and in fact they did not all receive, adequate attention, and it was generally felt that some better regulation, or reform of procedure, is desirable. This feeling was by no means confined to the arrangements of Section E, and various suggestions have been made to meet the difficulty.

Obviously in those Sections where, from the nature of the subject treated, a full discussion of the paper is necessary, arrangements must be made some time beforehand. This no doubt applies less to Section E than to some others; still even here the occasional discussion of a paper may be of much value or interest, and the contingency should be provided for. Something might perhaps be done, as a last resort, by the strict enforcement of a ten or fifteen minutes', to say nothing of a thirty minutes' rule; something by the authority of the chair. Some papers again which, however valuable, would be fitter for a magazine or a gazetteer article, might be taken as read. In fact it is probably by more systematic organisation and stringency of supervision and selection by the officers and committees of Sections, as regards the number, length, and quality of the papers, that the difficulty will have to be met.

President's Address.—The subject chosen for his Address by General Walker was, naturally, the great work which he so long and ably superintended, viz., the Trigonometrical Survey of India. The title of the "Father of Indian Geography" is, as he tells us, usually applied to Major Rennell, whose life and work were recently the subject of a sketch of singular interest by Colonel Yule; but, as General Walker also reminds us, Indian geography counts besides, among its direct ancestors, the venerable names of Hakluyt and D'Anville.

The sketch which follows, of the progress of the Indian Survey, is full of interest. This work is entirely European in its conception and execution. Occasional local measurements of land were made by previous Asiatic Governments, "but merely with a view to acquiring some idea of the relative areas of properties" for purposes of assessment. As the British began to take possession of the country, the survey of their territory was among their first acts, and gradually this "survey became developed from

a rude and rapid primary delineation of the broad facts of general geography, to an elaborately executed and artistic delineation of the topography of the country, and in some instances to the mapping of every field and individual property. Thus there have been three orders or classes of survey, and these may be respectively designated geographical, topographical, and cadastral. All three have been frequently carried on *pari passu*, but in different regions, demanding more or less elaborate survey according as they happened to be more or less under British influence. There is also the Great Trigonometrical or Geodetic Survey, by which the graphical surveys are controlled, collated, and co-ordinated."

How this takes place is clearly and fully described in a historical summary, which includes a discussion of the various schemes and methods employed at different times, with notices of successive workers in the department, culminating with a sketch of the important labours of Everest, and ending with the completion of the great work under the writer's own superintendence in 1882.

Of the numerous papers read on various subjects connected with India, abstracts have already appeared in the *Magazine*, of General Maclagan's interesting notice of the "Rivers of the Punjab," and of Major F. Bailey's "Observations on Indian Forestry"—an important subject, which called forth some remarks from Dr. Cleghorn and other experts. The other papers on Indian matters were by Colonel B. R. Bramfill, "On the Physiography of Southern India," where the elements of change are, according to the author, exceptionally active and perceptible; by Major Baird, "On Levelling Operations in India;" by Lieutenant-Colonel H. H. Godwin Austen, "On Colonel Woodthorpe's Recent Trip into the Khamti Country, and the Western Branch of the Irawadi"—a region about which our information is still very incomplete; by Mr. Trelawney Saunders, "On the Exploration of Lake Yamdok, in Tibet;" by Lieutenant-Colonel W. Barron, on the Cadastral Survey of India, showing its great administrative advantages to the Government; by Colonel H. Tanner, "On Himalayan Snow-Peaks," and by Mr. Douglas Freshfield, "On Recent Mountaineering in the Himalayas." The latter author proposed to substitute the name of Gaurishankar for Mount Everest, which was objected to by the President on the ground that the mountain had already three native names, of which no one had a pre-eminent claim. Papers dealing with both the land and people of Brazil were read by Mr. Colin Mackenzie and by Professor J. W. H. Trail of Aberdeen—the latter giving the result of his experiences as botanist and surgeon of an exploring expedition in the tributary valleys of the Upper Amazon.

After the Report of the Roraima Exploration Committee had been read, Mr. Everard im Thurn gave an excellent account of his ascent of that mountain. Sir Erasmus Ommanney, a veteran Antarctic explorer, gave a very full summary of the work done in past years in that quarter, and he, as well as Mr. Murray and Dr. W. B. Carpenter, spoke of the great interest which would attach to further exploration of the region;

the two last speakers, however, dwelling emphatically on the serious character of the difficulties to be encountered, compared with those of a North Polar expedition.

Mr. J. G. Bartholomew opportunely called attention to the geographical importance and economical value of "North-West Australia;" and Mr. Trelawney Saunders to the "Ordnance Survey of Cyprus." Dr. John Rae read a long retrospective account of Expeditions to the North Pole, and suggestions as to the best mode of reaching a very high latitude.

Mr. Cope Whitehouse, in his paper on the "Projected Restoration of the Reian Mœris, and the province, lake, and canals ascribed to the Patriarch Joseph," proposed to fill up the great depression said to exist in the south of the Fayum, and effectually to drain the latter and less important basin. The result, as he confidently anticipates, would be to supply an immense reservoir for high-level irrigation and navigation; to avert the dangers of a high Nile, and to reclaim the great lakes of the Delta.

Lieutenant-Colonel R. L. Playfair, who is a standard authority on the French territories in North Africa, gave an interesting account of the changes in "Tunis since the French Protectorate," describing, *inter alia*, the plans to be adopted for promoting archæological research: good roads are being made, and municipal and sanitary improvements carried out without interfering with the picturesque.

Papers were also read by Major Hill, "On a Clinometer to use with a Plane-table;" by Mr. C. Meldrum, "On a Supposed Periodicity of the Cyclones of the Indian Ocean south of the Equator;" by Mr. E. G. Ravenstein, "On Batho-hypsographical Maps;" by the Rev. W. Wallace, Rector of the High School, Inverness, "On the Geographical Features of the Beauly Basin," which shows that some schoolmasters, at all events, appreciate geography and are competent to teach it.

A short abstract of Sir J. H. Lefroy's valuable paper "On the Depth of the Permanent Frozen Soil in British North America," in which the author suggests further inquiries into this important question in physical geography, and points out its obvious bearings on the agricultural capabilities of a district, will appear in the *Magazine* for November.

Mr. J. Y. Buchanan's paper on "Ocean Islands and Shoals," gave some important facts, taken from his own observations, bearing on the permanent character of the great oceans; he also, in another paper, gave some interesting statistics of the "Depth and Temperature of some Scottish Lakes," and adverted to some of the *lacunæ* still remaining to be filled up in the Scottish Survey, which are dealt with in Mr. Webster's paper.

Mr. R. N. Cust's paper on the "Progress of African Philology," and Mr. A. Hosie's on "South-West China," have already been published in abstract; Mr. H. H. Johnston's on the "Portuguese Possessions in West Africa;" Mr. Coutts Trotter's "On Recent Explorations in New Guinea," and Mr. H. A. Webster's "On the Requirements of Scottish Geography" *in extenso*, in the last number of the *Magazine*.

Last, and perhaps the most important, Mr. J. S. Keltie's paper on "Geographical Education," which also appeared in the October number, is condensed from his valuable Report to the Royal Geographical Society, the result of the journeys, undertaken at their instance, to inquire into the mode in which geography is taught in the various countries of Europe. The full Report, which is expected shortly to appear as a supplementary volume of the Royal Geographical Society's *Proceedings*, is amplified and illustrated by a variety of suggestive matter, and is well worthy the attention of teachers and parents, and all who are interested in education.

In an important and very interesting evening lecture, delivered by Mr. John Murray, on the results of the Challenger Expedition, with especial reference to the bed of the ocean, the fact brought most prominently forward was the extreme paucity of specimens, as well as of species and genera, found at depths below 2 000 fathoms in mid-ocean, compared to those found in similar conditions, but much nearer the shore. These abysmal regions seem to be the most permanent areas of the earth's surface, thus so far negativing the possibility of a Lemuria, an Atlantis, or any tertiary continent in the mid-Pacific. Dr. W. B. Carpenter expressed his agreement with Mr. Murray's views, and his sense of the value of his researches. It is intended to publish an adequate notice of this lecture in the *Magazine*.

The Corresponding Societies.—I have already explained that our Society has been selected as one of the Corresponding Societies of the British Association, and as it was, in fact, in virtue of this selection that I became your delegate to the Aberdeen Meeting, perhaps you will now permit me to state in a few words, for the information of members who may be unfamiliar with the details of the subject, the advantages to be derived by the Society from such affiliation, and the services expected from it in return.

It is hoped, then, that the Conference of Delegates, under the auspices of the Association, will act as a focus for collecting, transmitting, and, in short, systematically utilising the fruits of much of the work done by Local Societies all over the country. The Association has arranged that papers of special interest or importance which have appeared in the journals of these Societies shall be published, in abstract at all events, in the Transactions of the Association, thus giving them wide publicity, and affording means of ready reference to them. The objects of this conference will, it is felt, be further promoted by personal intercourse among the delegates, and discussion of suggestions thrown out at their meetings.

The two meetings held at Aberdeen were, from one cause or another, but scantily attended. It was arranged, however, that next year the delegates should cement each other's acquaintance at a dinner, and this —the orthodox British solution of the problem—will no doubt prove efficacious.

The thirty-nine Societies represented at the conference form, no doubt, but a small proportion of those which exist throughout the country; but

several of the delegates represent Unions or groups of Societies, and this will probably be the case to a greater extent in future. Of Scottish Societies, those represented at the conference were, besides our own, the Geological Societies of Edinburgh and Glasgow; The Natural History Society of Glasgow; The Aberdeen Natural History Society; The Dumfriesshire and Galloway Scientific, Natural History, and Antiquarian Society; The East of Scotland Union of Naturalists' Societies; The Inverness Scientific Society and Field Club; and The Perthshire Society of Natural Science.

Thus the Societies represented are pretty evenly distributed over Scotland, a point of which the importance will be noticed presently.

It is open to the Secretaries of any Section, during the meeting of the British Association, to send to the conference of delegates of the corresponding Societies any communication bearing on matters coming within the province of that Section, which would then be taken up by the delegate of the Society whose work is in connection with that Section. On the present occasion no such communication reached the conference from Section E (Geography), and there is consequently no special point to which our attention is officially called. If, however, this conference of delegates is to have, as is hoped, some practical outcome, it behoves us—seeing that our connection with the local Societies, through affiliation to the great scientific centre, must tend to the advantage and practical usefulness of our Society—to make this connection, as far as in us lies, a working reality.

It will be readily seen that the aims of our Society are in many respects not only wider than, but different from, those of an ordinary local Natural History or Archæological Society, or even of a union of such Societies. But I do not think that our sphere of activity falls the less on that account within the intended scope of the conference; for in our active and increasing Branches we may expect to find most appropriate agencies for local investigation. And, considering the wide sphere which Geography embraces, I would even suggest the possibility of our acting as a medium of communication—at all events in Scotland—between other Societies or individuals engaged in researches, or seeking for information on those branches of knowledge which are interdependent with our own.

Before leaving the subject, I ought, perhaps, as your delegate to the British Association, to refer to one definite suggestion, which was made to our Society by the President of the Geographical Section, *à propos* of Mr. Webster's paper on the needs of Scottish Geography.

The author, as you will remember, called attention to various points of information falling within the department of a Survey, which, as they are fully provided for by governmental authority in other countries, might fairly, he considered, be required from the Ordnance Survey of this country. The proposition was at pronounced by the Chair to be impracticable, which was to be regretted because, owing to the lateness of the hour, there was no time or opportunity for independent expression of opinion on what, after all, was a fair subject for discussion, and has in fact

been ventilated already at the Royal Society of Edinburgh. But what we are now concerned with is the decided opinion, expressed by the President, that the matters in question, which will be found duly enumerated in Mr. Webster's paper, ought to be undertaken not by the Ordnance Survey, but by our Society. The position so long held with distinction by General Walker gives much weight to his opinion on such a subject; and accordingly, without at all abandoning the hopes and suggestions put forward by Mr. Webster, I have no doubt that the Council will take an early opportunity of considering in what manner they may be able to act up to the advice thus given.

Loan Collection.—The principal contents of the Loan Collection, organised by our Society, of maps and other works bearing on Scottish Geography, will be noticed in the *Magazine*. The idea of such an exhibition was generally approved, and though the collection could, with a little more time, have been made fuller and more interesting, it was evidently much appreciated by numerous visitors of all classes. Its success was entirely due to the great personal labour devoted to the work by Mr. Webster and Mr. Silva White, and by the Rev. George A. Smith, of Aberdeen, aided by the cordial co-operation of Mr. David Stewart, Convener of the Aberdeen Branch of our Society.

LOAN COLLECTION OF SCOTTISH MAPS.

As the Loan Collection of Scottish Maps, etc., exhibited under the auspices of the Scottish Geographical Society, at the Aberdeen Meeting of the British Association, excited a more general and intelligent interest than the promoters of the scheme had ventured to anticipate, it may not be out of place to give some notion of its scope and character. The idea of forming such a Collection was first broached by Mr. Ernest Ravenstein, Recorder of Section E; and it was not till within a few weeks of the opening of the Association meetings that any steps could be taken by the officials of the Society. In spite of this late start, and in spite, too, of the absence from home of several who would have been, and the apathy of some who ought to have been, interested in the scheme, a sufficient number of exhibits were sent in to insure the success of the Exhibition, and forming a highly suggestive body of documents. While, unfortunately, Timothy Pont's autograph maps—the most remarkable cartographic relics in Scotland—had not been obtained, the style of this artist's work was shown in a fine copy of the Spanish edition of Blaeu's Atlas (Amsterdam), lent by Mr. Mackenzie, and in a map of Cunningham, reproduced for Mr. Dobie's edition of Pont's notes on that district. The visitor had only to turn to the quaint old map of Scotland in Mercator's Atlas to see how great an improvement resulted from Pont's enterprise. A little map in Hermannides, *Britannia Magna* (1661), showed into what curious blunders a copyist might stumble, even with good material to hand—the two Aber-

deens being placed at a distance of many miles from each other, and Dirleton occupying as prominent a place as Edinburgh. Another series of works illustrated, in some detail, the steps by which the coast-survey had advanced from the sketchy compass-map of Nicholas Daulphinois (1583) to the finished charts of the Admiralty. Among these may be mentioned Captain Granville Collins' *Great Britain's Coasting Pilot, being a new exact survey of the sea-coast of England and Scotland* (London, 1693), Adair's *Coasts and Islands of Scotland* (1703), and Murdoch Mackenzie's *Orkney Islands* (1750). But, perhaps, even greater interest attached to the evident improvement that had taken place in the representation of the vertical relief of the country. First of all we had in the seventeenth century what might be called the pustular method, by which the hills were made to appear like a wonderfully regular arrangement of pimples; and, next, we advanced to the vermicular method, in which the shading gave more or less the semblance of caterpillars or worms. Each of these methods was capable of teaching so much as to the physical features of the country; and the latter, in specially skilful hands, was capable of teaching a great deal. But for accuracy in detail both fell far behind the method of contour lines, particularly when the more important contours are brought out by some appropriate application of colours. A single glance at the ordinary schoolroom map of Scotland, and at the orographical map of Scotland by Mr. Bartholomew, was calculated to show the teacher of geography what a powerful instrument of instruction the newest method might become.

Besides the gentleman already mentioned, the Society is indebted to the following lenders of maps or guide-books:—Mr. Stuart Anderson, Mr. Bain, Mr. D. D. Baird, Mr. Bartholomew, Messrs. A. and C. Black. Mr. Alexander Buchan, Mr. Alexander Campbell, Dr. Cleghorn, Mr. George W. Dickson, Mr. Sheddan Dobie, Mr. T. Dodds, Sir Walter Elliot, Mr. John Fraser, Mr. Fleming, Mr. W. G. L. Grant, Mr. G. P. Johnston. Mr. Ruddiman Johnston, Mr. Knox, Mr. James Lennox, Mr. Macfie of Dreghorn, Mr. W. Macgill, Mr. Donald Mackey, Mr. James Mason, Mr. John Morgan, Mr. A. M. M'Coll, Alexander M'Connochie, Mrs. M'Cree, Mr. Parker Smith of Jordanhill, Mr. Souttar, Mr. Stevenson, Mr. James Sutherland, Messrs. Thomson Brothers, Mr. Coutts Trotter, Dr. P. Hately Waddell, Mr. Watson, and Mr. A. C. Lamb, whose set of maps of Dundee was the most complete and carefully collected series of local cartography placed at the Society's disposal. The Edinburgh University and the Antiquarian Society also lent some valuable contributions.

It may not be amiss to remind members and friends of the Society that the Loan Collection of Scottish Maps was only a suggestion of the fuller Permanent Collection which the Scottish Geographical Society proposes to form. Any map, book, or pamphlet, therefore, calculated to throw light on Scottish Geography or Topography will be a welcome addition to the Society's Library.

GEOGRAPHICAL NOTES.

EUROPE.

Population of Iceland.—M. Hansen-Blangsted sends the following note to the Paris Geographical Society :—The official *Gazette* of Iceland has just published the results of the last census in 1880. The population is thus dispersed :—

	Inhabitants.
Sydamtet (southern department), . . .	26,503
Vestamtet (western department), . . .	18,226
Nord-og-Ostamtet (northern and eastern department), .	27,716
Total, .	72,445

That is to say—1⅛ inhabitants to the square kilomètre, (0·386 English square miles). The increase of the population has been :—

From 1810 to 1840, . . .	20·9 per cent.
„ 1840 „ 1860, . . .	26·9 „
„ 1860 „ 1870, . . .	4·1 „
„ 1870 „ 1880, . . .	3·8 „

At the date of the census (1880) the number of families was 9796. All the inhabitants belong to the Lutheran faith, with the exception of three Mormons, one Catholic, one Unitarian, one Methodist, and three individuals of no faith whatever. There were 192 blind persons, and 59 deaf and dumb ; 3·3 per cent. of the population, *i.e.* 2424, in receipt of public charity ; and 12 prisoners in jail. The emigration returns in 1870-80 showed 2700, of whom 2127 were from the departments of the north and east ; but the population, instead of diminishing, as this emigration might imply, has, on the contrary, increased.

Lapland.—M. Charles Rabot, the Polar explorer, who, for the last six years, has been studying the glaciers in Lapland, sends to the President of the Société Royale Belge de Géographie, a letter dated "On board the *Lofoten*, latitude 70° N., Frozen Ocean, 4th August 1885," from which we make the following extracts :—

"I will give you some news not very welcome to 'Alpinists.' It is necessary to reduce by 600 square kilomètres (over 232 English square miles) the total superficial area of glaciers in Europe. M. Reclus, in his geography (Norway), mentions among the glaciers of Lapland the *Stör Börgefjeld*, giving it, I believe, a superficial area of 600 kilomètres. Be good enough to rectify this figure. As I have, I believe, already written to you, I had doubts as to the existence of this glacier. A mass of ice of such size could be seen from a long distance : but in 1881, during beautiful weather, I was unable, from the summit of Kjeringtind—1600 mètres (5250 feet)—to see any glacier in the direction of Börgefjeld. My doubts have now given place to certainty on the conclusion of the journey I have just made thither. The Stör Börgefjeld is not at all covered by vast glaciers ; one finds but few, all of secondary importance, the superficial area of which does not exceed a few square kilomètres, and in number about six or seven ; yet even these are not true glaciers. Glance at the map by Stieler : you will there find the Stör Börgefjeld forming an immense triangle, of which the two sides are formed by the Fiplingdal and the higher Vessendal. The Börgefjeld does, true enough, take this form ; the northern part is a plateau of a mean altitude of 1000 mètres (3281 feet), broken up by deep gullies running east and west. At 30 kilomètres more to the south, the ground rises to magnificent Alpine peaks, the altitude of which exceeds 1700 mètres (5578

feet). Prior to my journey, only the contours of Börgefjeld were known, and the interior of the mountain mass was represented by a white spot. The topographical sketch-map of my journey, however, gives an exact representation of the general aspects of the country. My sketch is also accompanied by geological indications that give the formation of this region, at least broadly. . . . . From the picturesque point of view, the country is splendid. The Vessendal offers a succession of gorges unique in northern Norway. These gorges have the aspects of cañons, only, it must be understood, they do not attain the same magnificent dimensions, and that the geological formation of the ground is very different. The country is covered with fir and birch-tree forests, enlivened by numerous torrents; the people are hospitable, and for a length of 70 kilomètres (43½ miles), the road is excellent. What more could one desire? . . . . In conclusion, the weather this year has been execrable—fogs, rain, wind, and intense cold (*un froid de chien*). For eight days the thermometer has not risen above −10° Centigrade, (or 14° Fahr.). In order to get warm again, I propose next year to make a tour in the East. To-night I shall be in Vardö, where I embark on Saturday for Kola."

Recent Colonial Acquisitions by European Powers.—Colonel Sir Charles Nugent read a paper last May before the Royal United Service Institution, on *Recent Colonial Acquisitions by Foreign Powers, and their Commercial and Strategical Aspects.* From this paper, for the laborious compilation of which the author deserves the highest credit, we extract the following passages:—"It is estimated that the area of the British Empire covers one-sixth of the entire globe, with a population amounting to one-fifth of the total population on the earth. The accompanying table shows a comparison of the areas and populations of the Colonial Possessions held by the principal colonising nations of Europe.

	Square Miles.	Population.
Great Britain, . .	8 millions.	204·5 millions.[1]
Holland, . . .	$\frac{3}{32}$ „	24 „
Spain, . . .	$\frac{1}{8}$ „	8·5 „
France, . . .	$\frac{1}{4}$ „	5·0 „
Portugal, . . .	$\frac{3}{32}$ „	3·23 „

Denmark and Sweden I have not gone into.

Of course different nations, or rather I should say, different races, have shown different aptitudes for colonisation, but success in colonisation has not always waited upon the most apt. Of all European nations the French have shown themselves most gifted in conciliating the races with whom they found themselves in contact, and in assimilating themselves to these races, yet the French have lost the extensive Colonies they once had in North America, and have suffered themselves to be pushed out of India; the large military settlements they now hold in Algeria and in Cochin China are Dependencies, not Colonies, while their dreams of fertilising the Great African Desert, by letting the Mediterranean into the ancient Lake Tritonis, now dry, and so introducing steamers into the Sahara, and by the appliances of military science, welding it with Algeria and Senegambia into one vast French Empire in North Africa, magnificent as they are, and much as, in the interests of civilisation, we may hope that they may be realised, are at present phantasms merely. Spanish and Portuguese Colonies are things of the past; the history of them is well known, and we may predict in respect of such modes of colonisations as the Spaniards and the Portuguese employed, that the old adage will be untruthful, and that *history will not repeat itself.* These nations

[1] Exclusive of the population of the feudatory States in India.

started upon the career of colonisation with the most favourable opportunities, but without regard for the interests of their acquisitions, swayed only by the greed of gold and lust of power, carrying with them the baleful incubus of the Inquisition and the moral plague of slavery, they flourished in blood, and, unable to support their own foul growth, fell to pieces under the first blow. The Dutch hold, and have held for many years, considerable Colonial possessions acquired through the important part they once took in the carrying trade of the world, but they still seem to make the fatal mistake of regarding their Colonial possessions as sources merely of revenue to the mother country. In reality, the only race which has shown inexhaustible capacity for colonisation is the English-speaking race ; yet this race is successful only where it finds the conditions of climate and soil such that the Colonist can make there his home. But there is also another condition necessary to entire success in colonisation, viz., that the inhabitants shall be few and of inferior race, so inferior indeed that they do not amalgamate with the whites and gradually die out. In all the Colonies where England's offspring most thrive, these conditions have been present. No doubt in this matter of colonisation, we have followed some unknown law, which has led us at the proper time to the spot most suitable for the extension of our race ; and here it is worthy of remark, that the only territories in which rival nations have found similar suitable conditions, and in which they have planted true Colonies, viz., North America, and the Cape of Good Hope, have passed into our hands by conquest."

The Most Elevated Meteorological Station in Europe.—The Vienna Meteorological Society has decided to establish a meteorological station on Mount Sonnenblick, near Tauern, in the central chain of the Tyrolean Alps. The altitude of this point is, says *Ciel et Tierre*, 3100 mètres (10,171 feet), and the station will be the highest situated in Europe.

ASIA.

Tibet.—According to the *Journal de St. Pétersbourg* for 27th August (8th September), Przhevalski's attempt to penetrate Tibet proper has again been frustrated by the resistance of the Chinese. On 1/13 July he sent a telegram (despatched from Osch 19/31 August) stating that the passage over the Kiria Mountains had been made impassable for beasts of burden, owing to the Chinese having destroyed the bridges and otherwise obstructed the roads and passes. It was the intention of Przhevalski to devote the month of July to the exploration of the snow mountains between Kiria and Khotan, in which latter place he hoped to arrive in the middle of August ; and then to continue his explorations along the river of the same name as far north as Aksu. The expedition was in good health.

New Commercial Route to Siberia.—The attempt made this year by M. Sibiriakoff to force a passage through the Kara Sea to Siberia, reference to which project was made in the August number of the *Magazine*, has again been unsuccessful. According to the *Petersburger Zeitung*, September 3d (15th) he left Archangel the middle of July, on board his steamer *Nordenskiöld*, but, being unable to penetrate the ice, was forced to return the middle of August. His second steamer *Ob* had carried a freight to the Petchora, which was conveyed by the road constructed last winter over the Urals to the river Tzchekuria (?) (Shtchekurya), a tributary of the Ob, and over which M. Sibiriakoff proposed to construct a tramway.

AFRICA.

The True Course of the Kassaï.—In the last number of the *Magazine* we reproduced in a *Note*, the telegram from Lieutenant Wissmann, stating that he had followed

the whole course of the Kassaï to the Congo, arriving at Kwamouth, thus identifying the Mfini with the Kassaï; and, in the map illustrating the Welle-Congo theory, in the same issue, its confluence with the Congo was accurately shown. This important discovery proves the Kassaï to be a river of great dimensions, rivalling even the Congo at places, and constituting a main navigable waterway to the heart of the new Free State. It was known that one of the chief objects of the expedition was to acquire territory on the left bank of the Lulua for the erection of a station, which has since been called Luluaburg. We are now able to give a few more details of the Lieutenant's journey, from an abstract of his report published in the *Mouvement Géographique* (Oct. 4):—The expedition left the station of Luluaburg under the charge of Buschlag, twenty-five soldiers, and thirty workmen. The caravan, which consisted of two hundred persons, embarked on board ten large *pirogues*, ten small native *pirogues*, and the steel boat *Paul Pogge*. They descended the Lulua for three days in a N.W. direction without encountering any obstacles until they arrived at the rapids, in passing which two natives were drowned and some articles lost. On June 2, the flotilla passed, on the left, the confluence of the Luebo, which flows from the south, and, on the 5th, it entered the Kassaï. After receiving the Lulua, the Kassaï assumes magnificent proportions. Its surface is studded with picturesque islands and its banks clothed with virgin forests and exuberant vegetation. This part of the country is called *Saïré* by the natives, who confirmed the information furnished by Livingstone, thirty years ago, that the Kassaï unites with the Kwango in forming the Zaïré. The right bank is inhabited by native tribes of the Bakuba nation, and the left bank by those of the Bachilele, who received the expedition favourably. Every morning the natives in large numbers arrived at the camp to barter their products, consisting chiefly of caoutchouc and ivory. All the forests extending round the rivers of the Kassaï and Lulua would appear to contain immense riches in caoutchouc. From this point the expedition entered unknown regions, never, it is supposed, traversed by a white man. The first important discovery was, on the right bank, the mouth of a mighty river, which was no other than the Sankuru, where the expedition arrived on June 16. This great affluent falls into the Kassaï through two arms, 270 and 330 yards wide. According to the natives no falls or rapids interrupt its course. It comes from the east, where it may be identified with the Lubilash, discovered in 1881 by Wissmann and Pogge, which Stanley supposed was an affluent of the Lomami, and flowed into the Congo a little above Stanley Falls; and then flows west by the Sankuru and Kassaï, rejoining the Congo at Kwamouth. From the confluence of the Sankuru, the Kassaï, instead of flowing north, as was supposed and is generally indicated on the maps, continues its course towards north-west. Its breadth continually increases and attains at places 656 yards. On June 19 the expedition arrived among the Badinga, passing through a densely populated country, and, on the following day, passed, on the left bank, the mouth of an affluent 44 yards wide, which had a reddish-coloured water, and was very swift. It bore the name of Temba, and is probably the Loango united with the Lutchiko. The expedition, which had up to the present been so successful, now approached the notorious Bakutu, who are known to be cannibals, and are very warlike and quarrelsome. Every precaution had been taken previous to arrival at their first village, near which it encamped, June 24. On the following day, the natives, who were from the first hostile, made a determined and vigorous attack by land and water, on the encampment, but were repulsed—with what loss, the report does not say. At this part of its course, the Kassaï, still flowing north-west, narrows, but increases in depth; there are no forests, and the population is of extraordinary density. On July 2, the expedition arrived at a spot where the Kassaï assumed enormous proportions (sometimes 9000

to 11,000 yards wide), and was covered with islands. On the left, they recognised an important affluent, the Kwango, coming from the south. The natives, who were armed with guns, were from this point less barbarous than those higher up the river, and were familiar with white men and steamers. On 4th July, Wissmann and his party reached the Mfini, flowing from Lake Leopold in the north,—which was discovered by Stanley,—and arrived at Kwamouth on 9th July, after a voyage lasting forty-three days. Lieutenant François, Geographer to the expedition, has sent home a map of the district traversed, in three sheets. We reproduce here some of the positions given upon it :—

	Lat. S.	Long E. Greenwich.
Village of Katendé,	6° 15′	22° 55′
,, Mona Tenda,	6° 17′	23° 37′
Lubuku,	6° 1′	22° 48′
Luluaburg,	5° 58′	22° 49′
Lulua Rapids,	5° 16′	21° 50′
Confluence of Luebo (left bank),	5° 25′	21° 35′
,, Lulua,	5° 5′	21° 5′
,, Sankuru (right bank),	4° 20′	20° 25′
,, Loango (left bank),	4° 25′	20° 5′
Village of Gana-Damata (left bank),	4° 5′	19° 45′
Camp near the Bakutu cannibals,	3° 45′	19° 20′
,, Badima,	3° 17′	18° 7′
Confluence of Koango (left bank),	3° 15′	17° 50′
,, Mfini (right bank),	3° 0′	17° 35′
Village of Mutschie,	3° 0′	17° 30′
Station of Kwamouth,	3° 10′	16° 45′

Songwi River and Aroangwa affluent of Zambesi.—The Rev. Alexander Bain, M.A., in charge of the Free Church Livingstonia Mission Station at Cherenji, on the Stevenson Road, between the Lakes, has sent a letter, containing some new facts on the above, to the Secretary of the Free Church, Dr. George Smith, by whose courtesy we are able to give some extracts. Mr. Bain, describing a recent journey to the Chiwinda region, says :—"I was fortunate in having with me Mr. J. A. Smith of Bandawé. The most attractive country we passed lay to the north-east of Chiwinda. Chiwinda himself is a poor man, living in terror of the Anemba, who, he said, had plundered and destroyed his gardens. The village is well defended by a double stockade, in many parts loop-holed. The Songwi is a noble river elsewhere, but here sluggish and dirty, bounding the village on two of its sides. Our first stage was a village eight miles away, under the chief Nyondo, but the petty chief of the village was named Muiereka ; and here we found, perhaps, the heartiest and happiest people with whom we had yet had the good fortune to associate. We left on the next day ; reached Nyondo's soon after mid-day : and on the following day we arrived at our station at Cherenji. The distance from Awandia to Chiwinda's is at least forty miles—possibly more. Midway is the country of Upigu, ruled over by Mwini Pigu, an independent chief—a stretch of country singularly beautiful. The Songwi winds like a silver thread through a long valley teeming with cattle, and rich with growing crops. I have seen no spot in Africa more lovely,—none where one would more desire to spend one's days. Upigu, who is one of the Kondé race, was very agreeable, and more liberal in his gifts than we in ours. I am very decidedly of the opinion that our influence would be much increased, and more widely felt by more frequent and more prolonged intercourse with these most interesting tribes.

"At the end of last month Mr. M'Ewan very kindly agreed to return from the lake, and make a tour with me among those chiefs whom in autumn we were reluctantly compelled to leave unvisited. The weather was very unfavourable, either for travelling or seeing much of the country. The superior chief of our people is Mwini Pangala; and therefore we visited him first. Under ordinary conditions, the village of Pangala is less than a day's march from Mwini Wanda's; but at least a third of our way was through sponge and water more than ankle-deep; and we rested for the night outside the village of a head-man, Makombé, under Mwini Pangala. This village—a small one, of perhaps sixty or seventy huts—is prettily situated on the Kasowi, which flows into the Aroangwa. Near the head-man's house, we saw a tall cactus, with a heap of buffalo and antelope skulls at its foot—an offering, we were told, to the guardian spirit of their village, who gave them success.

"Early on the following morning we entered the village of Pangala, crossing the Aroangwa, a rapid river of considerable depth. The rivers Aroangwa and Songoli, both flowing in a south-westerly direction, meet each other only a few hundred yards from the village. Three sides of the village are thus defended by them, rendering it a position of greater strategical importance than any we had seen, though we were told that in the dry season the Songoli is dried up, so as to be practically useless as a source of security from attack. Probably there cannot be less, and possibly there are more than two hundred houses, with the usual granaries attached. In a raised part of the village we found the chief seated beside one of the houses within a small enclosure, where his wives and children are separated from the common people. He was glad to see us, and was very affable—perhaps due to his being rather the worse for *Pombé*. We gleaned some history during our interview; nothing that we had not known before, but still confirming it. We were told by Pangala that they and the Wawanda are settlers of a comparatively recent date. Their country was Umu-wungu, their chief Mwini-wungu, who sent them from him; and coming here they were told to settle by the great Mwini-Kondé (Chungu). Umu-wungu is near Ufipa, on the north-west side of Lukwa or Hikwa. The date of their arrival cannot easily be ascertained, but was probably thirty years ago. The language here is identical with that of the genuine Wawanda.

"Our homeward journey was along the foot of the Watenga, perhaps Wasenga, Range, till we came to the village of Mpembe, under Mwini-wisi. The next day we climbed the lofty hills Mfangu and Kapyoro, which rise most abruptly from the plain. The haze hid the west and north from us, but in the east and south the hills of Angoni-land, and the Livingstone Range, with the lake far away to the south, were clearly seen. The hills are probably over 6000 feet above the sea. Our march home was a short one, and over comparatively level ground, which made our terminus visible from our starting-point. Any streams of importance on this journey were, we found, tributaries to the Aroangwa, which, in turn, is tributary to the Zambesi. We started again on 3d March on our way to the village of Mesuko. The country, as far as Mmoma, which we reached at sunset, was undulating; and our way led over high and grass-grown hills, on which were occasional woods, where we saw trees of enormous proportions covered from base to summit with moss and creepers. The people in this part of the country do not differ in their mode of life and language from the Wakondé.

"Mr. M'Ewan was unfortunately unable, from fever, to leave the tent to fix our position, so that I can only hazard a conjecture that we were then sixteen miles E.S.E. of Cherenji, with almost impassable hills between. Our next camping-place was in the Songwi Valley, at Mwini-Chinga's, where our journey ended."

We regret to have to announce that the able young civil engineer and missionary,

Mr. W. O. M'Ewan, succumbed on the 24th of May from fever. He was one of the most promising engineers and missionaries ever sent out to live and die for the people of Africa. Our May number, pp. 193-4, contained a bright and hopeful letter from this young Scotsman, whom Mr. J. Stevenson of Largs selected, and the Free Church of Scotland sent, to complete the road from Lake Nyassa to Lake Tanganyika. Mr. M'Ewan, only last year, was awarded the Cuthbert-Peek Medal by the Royal Geographical Society, in testimony of his zeal and ability as a geographer and astronomical observer. In him, at the early age of twenty-three, Science, as well as the Church, has lost an heroic and modest worker not easily replaced.

Tembuland, Gealekaland, and Bomvanaland.—By proclamation in the *Gazette*, His Excellency the Governor, acting under the powers of the Colonial Act passed last session, and letters patent issued in October 1884, fixes the proposed territories:—"Tembuland proper, Emigrant Tembuland, Gealekaland, and Bomvanaland as part of the colony, and subject to the laws in force therein, except as application of same to said respective territories is modified by the laws and regulations for government of the said territories contained in schedule hereunto attached." The laws and regulations attached are on the lines of those previously promulgated for other territories, and will serve well enough, it is thought, until the whole of the people can be brought under the Colonial law.

AMERICA.

On the Depth of the Permanent Frozen Soil in British North America (by General Sir J. H. Lefroy, C.B., K.C.M.G., F.R.S.)—The author of this paper, premising that the subject is one on which as yet we have very little accurate information, points out that, besides its interest to the physical geographer, the question has a direct practical bearing on the agricultural importance of any Arctic or sub-Arctic district. The agricultural population of such districts are sometimes, he says, disinclined to admit the existence of this stratum of frozen soil, from a mistaken idea that it implies an especially severe climate; whereas it appears to have the beneficial effect of counteracting the intense heating and drying power of the sun in the summer months, and thus secures a supply of moisture at that season in the roots of the cereals. When we consider the physical obstacles in the way of investigation —for frozen soil is nearly as hard to quarry or to bore as rock—it is not wonderful that comparatively little information is as yet attainable. Sir H. Lefroy gives some curious statistics which he has collected with his usual energy and diligence, and it is to be hoped that much more may be collected and systematised by the Committee of the British Association which was recently appointed at his instance. The vast depth, in some instances, of the frozen soil is shown by borings made at Yakutsk, about 120 miles from the Siberian pole of lowest temperature, where the ground-ice was only pierced at 382 feet below the surface. This is in 62° North and 129° 40′ East; annual mean temperature 14° Fahr. Much information may be collected by creating a greater interest in the question, especially in the Hudson's Bay district, where settlers and surveyors now abound, and the author further suggests examination of the landslips which so frequently occur on the banks of the great rivers. One of these, on the Mackenzie River, in about 62° 20′ North and 124° 15′ West, he examined himself,[1] and found the soil frozen to a depth of 45 feet from the surface, the limit being distinctly marked by a change of

[1] *Diary of a Magnetic Survey*, by Sir J. H. Lefroy, p. 181.

colour, and by the trickling out of water along the lower edge. This is the greatest thickness of ground-ice hitherto actually measured in America. The spot where the observation was made is some 700 miles distant from the American pole of lowest temperature, and it is supposed that the depth of frozen soil here recorded —and even that found in Siberia—is greatly exceeded in other parts of America. Indeed, from calculations made by Lieutenant Ray, U.S.A., at a pit sunk by him near Point Barrow, the total thickness is reckoned to be not less than 1300 feet. The intensity of the phenomena obviously depends on various conditions, such as the exposure, the nature of the soil, and the height above sea-level ; and it does not appear to have been observed at a lower latitude than 50°. The vicinity of a large body of unfrozen water seems to keep up the temperature of the soil. Correlative to this question of frozen soil is the depth to which the summer thaw reaches—a question, as the author observes, equally important to agriculture and much more easy to investigate. The author trusts that his paper may give fresh impulse to an inquiry which has been going on languidly since 1838, when Professor Von Baer brought the subject before the Royal Geographical Society (*R. G. S. Journal*, vol. viii.) ; and he is undoubtedly doing good service in thus calling attention to a question of so much practical as well as scientific importance.

Exploration of Lake Mistassini.—In the early part of 1884 steps were taken by the Canadian Government to organise an expedition for the purpose of extending the exploration and survey—commenced in 1870, and continued in 1871—of the region, as yet but little known, which lies to the north of Lake St. John, including the completion of the survey of Lake Mistassini, and an examination of the country between it and the shores of St. James's Bay. Mr. J. Bignell, P.L.S., was selected to take charge of the exploring party, and Mr. A. P. Low was appointed geologist and second officer in charge. The objects of the expedition were thus stated :— 1st. A thorough survey, hydrographical and topographical, of Lake Mistassini, especially of the northern and eastern portions. 2nd. A geological examination of the lake-shore, and of as much of the adjacent country as may be practicable. 3rd. The collection of specimens, vegetable, mineral, and animal, illustrating the resources of the region. A survey of the Rupert River, through which the waters of Lake Mistassini discharge into St. James's Bay, was to be considered an object of importance. This, it was thought, would require another season's work, unless the party could separate, one division to survey the lake, and the other to descend the Rupert River.

This plan, it was believed, would afford the greatest amount of information relating to those portions of the North-Eastern Territories of the Dominion, and the adjacent portion of the province of Quebec, which lie between the 72nd and 79th degrees of longitude and the 50th and 52nd degrees of latitude, an area of about 42,000 square miles, of which at present very little is known ; but which, there is reason to believe, may contain valuable minerals and areas of land fit for settlement. The route prescribed to be taken was the following :—Mr. Bignell, starting from Grand Lake Pipmuakan, was to ascend the river Betsiamites as far as Lake Manouanis, near the source of that river. From Lake Manouanis, he was to travel to Grand Lake Mistassini, in a westerly direction, following the streams and lakes which form the sources of rivers flowing south into Lake St. John, or in the opposite direction ; and he was also to pass by Grand Lake Manouan, about which he had received accounts from the Indians in the course of a previous survey.

A letter was received from Mr Low, dated from Pipmuakan Lake on September 1st. In this he reported that at a distance of 65 miles up the river Bersimis a yellow gneiss occurred, which he found highly charged with magnetite. The rock,

indeed, in some cases, consisted almost entirely of magnetite, in beds from 1 to 20 feet thick, as seen along the river and on the portages for a distance of 40 miles, and these, he considered, must contain a vast amount of valuable ore. The river he found to be navigable for 45 miles from its mouth. Its banks and the neighbouring mountains were clothed with a good growth of timber, consisting chiefly of spruce, red pine, birch, tamarac, poplar, and balsam. At the distance named there was a fall of about 100 feet, and above this, for 40 miles, the river is a succession of falls and rapids. It then becomes quite navigable to the lake. The timber extends only about 8 miles above the first fall. The river, above the falls, abounds with fish—large pike, suckers, and brook trout. Mr. Low, having returned from this excursion, joined Mr. Bignell at Lake Pipmuakan, which they left in company on the 10th of September. They separated soon afterwards, Mr. Low proceeding to Lake Manouan, *viâ* the Manouan River, while Mr. Bignell continued up the Bersimis River. Mr. Low estimates the distance he passed over at nearly 100 miles. Much time was lost on account of the inability of his party to cross the large lakes in small canoes during the prevalence of high winds. He reports the country between Lakes Pipmuakan and Manouan as flat, and covered with many lakes, only one range of hills, of about 800 feet high, having been passed on the Manouan River. The country had all been traversed by fires, and the timber had consequently all been burnt. Game and fish were both found to be scarce. He expected to reach Mistassini before the end of November. The thermometer was below 32° every night, and snow, which fell on the 8th of October, covered the ground almost 3 inches deep.

Mr. Bignell, meanwhile, with two men, in order to meet the main expedition, travelled towards Themiscomie Lake, which was the only practicable route by which it could first strike Little Mistassini. In doing this, he navigated Great Mistassini for 120 miles from Foam Bay, and also retraced his journey some 60 miles, as there was another route which the main expedition might possibly follow. He then crossed over to Little Mistassini, a distance of some 6 miles, and travelled 80 miles towards its head. The general trend of the smaller lake was observed to be the same as that of the great lake—S.W. to N.E. About 35 miles from the head of Little Mistassini the Rupert River enters, and flows out of it again, the inlet and outlet being almost opposite each other. The outlet, from the Little into the Great lake is not more than $1\frac{1}{4}$ miles long, but it is much broken by rapids. Little Mistassini may be about 100 miles long by 6 in breadth, and is a very beautiful lake, especially along its southern shores, where the land, clothed principally with spruce, etc., comes down to the water's edge in a gradual slope. Islands are numerous along the north shore, where the banks, composed chiefly of hard limestone, are generally low. Mr. Bignell did not run up the Rupert River from Little Mistassini, but struck it from towards the head of the lake by a portage of about $2\frac{1}{2}$ miles. The part of the Rupert which he travelled—some 25 miles—came from an east direction. He speaks of it as a large and noble stream. Leaving the Rupert, he reached Themiscomie Lake on the 23d September, and found there an old abandoned Hudson's Bay post, but discovered no traces of the main expedition. He pushed on, however, through the portages and lakes till he crossed the height of land, and struck the waters flowing into the Shipshaw River, into the Manouan, and by the Manouan into the large Peribonka. He finally arrived at Lake St. John on the 8th of October, without having met the main expedition, which appears to have reached the Shipshaw River after he had passed it. It seems that on the 12th of October the expedition was at Lake Manouan, some 285 miles from Bersimis River, by canoe route, and fully expected to reach Mistassini in canoes.

The Falkland Islands.—These islands, with an area of 223 square miles, contain at the present time a population of about 1800, the greater part of whom are English immigrants. The principal settlements are at Port Stanley and Port Egmont, the former with about 500 inhabitants, the latter with from 300 to 400. Port Stanley is the chief place of trade, and the seat of the governor and administrative officials. The Government is constituted by a governor, who generally holds office for six years, and a secretary, who must have had a legal training. The other officers are the harbour-master, a surgeon, and a chaplain and teacher. To these must be added four policemen, who, besides firing salutes from the battery at Port Stanley when occasion requires, also discharge the duties of prison warders. Although the islands have not a great trade, they export hides, wool, tallow, and sheep. These last are sent to the Patagonian districts bordering on the Straits of Magellan. The total value of the exports in 1884 amounted to £64,000. The imports, which consist of all the necessaries of life, except fresh meat, potatoes, and vegetables, are brought all the way from England, though some fresh fruits come from Monte Video. The trade is almost entirely in the hands of English houses. The principal means of communication with Europe are the vessels of the German Kosmos Line, which touch at Port Stanley once a month on their way from Monte Video to Valparaiso and back; the same vessels also carry the mails, European and South American. The Kosmos Company have a steamer of about 800 tons—the *Malvinas*, which takes its name from the old Spanish designation for the islands; this vessel keeps up communication between the several islands of the group, carrying the mails, passengers, and goods. Ships can always procure a supply of fresh meat at Port Stanley or the living animals—oxen, sheep, geese, poultry, and pigs; and the prices are low, beef averaging 2½d. per pound, and mutton 2d. But other necessaries, such as bread and potatoes, are very dear. Coal is sold at from fifty to sixty shillings per ton, since it has to be carried from England. Repairs can only be effected at ruinous cost; the necessary wood and iron have to be imported, and the wages of workmen are high, a carpenter earning sixteen shillings a day, and a smith twenty shillings. Moreover, there are no docks, and the harbour of Port Stanley, which has to be reached by way of a narrow passage from Port William, is very small. The currency consists of English money for the most part; but Mexican dollars (=4s.), and Peruvian silver dollars (=3s. 6d.), are also taken.—*Report of Captain Mensing, German warship "Prinz Adalbert," in Annalen der Hydrographie*, Heft viii. (1885).

AUSTRALASIA.

Geographical Society of Australasia.—The first volume of the *Proceedings* of this important Society has been published in Sydney, the administrative centre. Branches, as we have already stated in a former issue, have been established in Melbourne and Victoria, but some difficulties, which we trust will soon be overcome, seem to have accompanied their organisation. In addition to a report of the preliminary and inaugural meetings, and other matter, the volume contains several valuable papers. One by Mr. La Meslée, the Honorary Secretary and founder of the Society, on *Past Explorations in New Guinea, and a Scheme for the Scientific Exploration of the Great Island*, is a striking exposition of the useful work which the Society has so near at hand, and which it is at present prosecuting with such vigour. Mr. John F. Mann contributes a lengthy series of *Notes on the Aborigines of Australia*, and Mr. Alexander Morton on a *Trip to the Islands of Torres Straits, and on the South-East Coast of New Guinea;* Mr. Panton writes on the *Kimberley District;* and, finally, Mr. Macdonald shows *The Utility of and*

Necessity for a Geographical Society, the best proof of which—if proof, indeed, were needed—is shown in the admirable work already accomplished by this energetic young Society.

The Australian Aborigines.—At a recent meeting of the Board for the Protection of the Aborigines, Captain Page, Secretary, reported that he had visited the Swan Hill District, and had travelled down the Murray River from Swan Hill to Wentworth. He had endeavoured to gain all the information which was to be obtained from white people and the blacks as to the number and present abodes of the aborigines belonging to Victoria in that part of the country. Between Kerang and Ned's Corner, a distance of about 250 miles, there were 144 aborigines (perhaps a few more). Of this number only 10 were under the age of 15 years. The youngest child he could hear of was two years of age. Very few aborigines were camped about the river, most of the people being away back either in Victoria or in New South Wales, and engaged in killing rabbits. Twenty deaths had occurred amongst the aborigines since the beginning of last year, but no births that he could hear of. Between Kerang and Ned's Corner there were six depôts, where the blacks could obtain provisions and clothing, but during the last year they had not taken advantage of them so much as formerly, the reason assigned being that they had too far to travel. He had, therefore, made arrangements whereby they could obtain supplies more easily. At Swan Hill there was a good log hut, which the Board had erected about four years ago, but the aborigines did not make much use of it.—*The Colonies and India*, August 21.

The Caroline Islands.—A correspondent of the *Times*, describing Yap, states that it is not a single island but a group of islands lying together, fringed with coral reefs, and rising occasionally to a height of several hundred feet above the level of the sea. Unlike most of the islands in the western Pacific, they are well populated, the members of the several tribes that inhabit them amounting to between 8000 and 10,000. The people are of a comparatively light complexion; their bodies are elaborately tattooed; their dress is a short petticoat of shreds of bark reaching below the knee; and their principal decoration white flowers thrust into the bands of hair that hang in front of their ears. As is usual in the Pacific Islands, adjacent tribes are at constant feud with each other. The few white men who live on Yap are at Tomil Bay—a good and fairly spacious reef-harbour. In 1883 the number of foreigners was seven, of whom four were English, one was American, one German, and one Dutch; but the English commercial interests in the little archipelago are greater than those of any other country. The Yap natives are a highly intelligent and courteous people, uncivilised, but not savage, and apparently capable of profiting by contact with respectable Europeans.

The Australian Alps.—The New South Wales Minister for Mines has received from Dr. R. von Lendenfeld a lengthy and carefully prepared report, giving the results of his recent examination of the central portion of the Australian Alps, with an interesting description of Mounts Townsend and Kosciusko. The report is embraced under seven heads, viz.—Geographical Features, Calculation of Heights, Geology, Flora and Fauna, Meteorology, Practical Results, and Description of the Journey. After a few preliminary remarks of a general nature, Dr. von Lendenfeld proceeds to give a geographical description of the main range, and with regard to it says:—"The main range of the Australian Alps has a height exceeding 5000 feet, on an average, for a distance of about 50 miles. It attains its greatest average height in the vicinity of Mount Kosciusko. The direction is nearly due

north and south, tending slightly to the south-west. He considers part of it as belonging to the Kosciusko group of mountains, which lies between its junction with the Ramshead range, and the main source of the Murray. This part has an average height of about 3600 feet. Coming from the south-south-west, it joins the Ramshead range, which has an east and west trend, in Mount Clarke. From here the main range follows a northerly direction. Just below, to the eastward of Mount Townsend, there is a pass in the eastern secondary range termed Ramshead range, connecting the northern branch of the Crockenbach with the valley which is drained by the Snowy River." He calculates the height of this pass at 7052 feet, and names it Ramshead Pass. After describing other passes of great interest, he says, as to practical results, that the whole plateau of Mount Kosciusko, extending for about 160 square miles, is scarcely utilised at all. In the lower regions there are beautiful forests of timber, and above there is a well-watered, useful, treeless pasture ground, which can only be excelled by the pastures in the European Alps. There is no difficulty in making roads up to any part of the plateau, and he adds that he would guarantee to drive a buggy from Sydney up to the very summit of Mount Townsend any day. The whole ground is suitable for cattle, but sheep must be kept from the bogs for fear of fluke. The native dogs are another drawback to the breeding of sheep, but they could in time be exterminated.—*The Colonies and India.*

Australasian Forests.—The September number of *Forestry* publishes the following note from the pen of Mr. Henry Moore :—" So much of the Australian continent remains unexplored that the approximate area of its forest lands cannot be even conjectured. One thing is certain, however, and that is, that a much smaller portion of its surface, relatively speaking, is wooded than was the case on the North American continent when it was first colonised by Europeans. Nevertheless, it and the neighbouring islands of Tasmania and New Zealand contain immense forests of valuable timber for both constructive and ornamental purposes. These are described in a recent report to the American Government. There are 150 varieties of the *Eucalyptus*, or gum-tree, some of them attaining a gigantic height, as for example, the *Eucalyptus amygdalina*, which has been known to reach an altitude of 480 feet. The specific gravity of the *Eucalyptus rostrata*, or red gum, which is largely used for railway sleepers, nearly equals that of the oak, while it is capable of sustaining a much greater pressure to the square inch than either oak or teak. In point of durability the harder varieties of the *Eucalyptus* will last four times as long as the former. Many of the Australian trees, as, for example, the *Eucalyptus botryoides*, the *Cedrela toona*, the black-wood, and the *Frenela Endlicheri*, or cypress pine, and the numerous indigenous cedars, are beautiful in grain and colour, and take a fine polish. The kauri pine of New Zealand, which, with a diameter at the base ranging from 10 to 20 feet, attains the height of 160 feet, and often presents a columnar trunk of 100 feet without a branch, is much prized for its timber by the shipbuilder, the miner, the railway engineer, and the cabinetmaker. What renders it exceptionally valuable is, that it exudes a gum almost equal to copal, the choicer qualities of which will sometimes command from 584 to 730 dollars per ton in the London market. The *rurin*, or red pine, an ornamental as well as useful timber, some of it resembling rosewood, though of a lighter brown colour, is largely used in the manufacture of furniture. With the *totara*, a durable and clean-grained wood, not unlike cedar in appearance, the Maoris made their largest canoes, and almost invariably constructed the palisading of their 'pahs.' The forest trees of Western Australia claim special attention on account of their useful and valuable properties. Among these may be mentioned the tuart (*Euca-*

lyptus gomphocephala), an extremely hard, heavy, and close-grained wood, which furnishes the strongest timber known, its transverse strength per square inch being 2·701 as compared with the English oak, which is 2·117, or the Indian teak, which is 2·203. Hence it is extremely valuable for shipbuilding purposes. The karri (*Eucalyptus diversicolor*), also highly prized for its timber, attains to colossal dimensions, sometimes measuring 60 feet in circumference at the base, while its tall and shapely trunk rises to the height of 300 feet without a single limb. The jarri (*Eucalyptus marginata*), which resists successfully the attacks of both the white ant and the *Teredo navalis*, is unsurpassed for the durability of its timber. Specimens of jarrah piles, after being exposed between wind and water for over forty years, are still found to be in an almost perfect state of preservation. According to the Director of the Botanical Gardens at Sydney, no country has been favoured by nature with a greater variety and abundance of trees yielding strong, beautiful, and durable timbers, than the colony of New South Wales. Its magnificent forests contain woods valuable alike to the cabinetmaker and the shipbuilder, including such timbers as the different species of the *Eucalyptus*, the red cedar, turpentine, rosewood, mountain ash, and tulip-wood, most of which are beautiful in grain, rich in colour, and susceptible of a high polish. Queensland is richly endowed with immense tracts of forest lands, furnishing large quantities of valuable timber, and indirectly supplying the soil with an abundance of rain. The enormous fig trees and gigantic *Eucalypti* tower aloft and spread out their great arms, festooned with vines and flowering parasites, which throw themselves over every spreading branch, and deck it with their varied and brilliant colours ; the tall pine trees, the cedar, the myrtle, the rosewood, and tamarind trees are also forest representatives."

POLAR REGIONS.

The Beechy Island Cache.—Captain Deuchars, of the steamer *Jan Mayen*, which arrived yesterday from an unprofitable trip to the Davis Straits whale-fishing, reports having been boarded at Prince Regent Inlet by a tribe of Esquimaux, some sixty or seventy in number. The natives were unusually well clad, having flannel and blue cloth as lining to their skin dresses, and, when questioned on the subject, they stated that they had taken the goods from the depôt on Beechy Island, which was left by the ships employed in the Franklin Search Expedition. The tribe lived on the island last autumn and winter, and it is supposed they have left very few of the stores. They were provided with so much tobacco—of which they are extremely fond—that they declined to barter for the weed from the sailors. They had been successful in killing a large number of bears, and they left the island during the early summer, and travelled over the ice to Prince Regent Inlet for the whale and narwhal fishing. In answer to questions, they stated that they discovered the depôt about eighteen months ago, otherwise it would have been despoiled long before.—*Scotsman*, 22d October.

MISCELLANEOUS.

Geographical Onomatology.—The following letter has been received by the Editors of the *Scottish Geographical Magazine* :—

"Sir,—Professor Egli's paper in the September number of your *Magazine* hardly does justice to British efforts ; it does not seem fair to concede the claim he makes for the distinguished member of the Russian Academy, J. Grot, of 'having initiated a useful stimulus to the study of onomatology' without recognising such a work as that of Isaac Taylor in our own country.

"If Adam's *Word Expositor* was the first 'English attempt in the right

direction,' Dr. Latham's appendix to the fifth edition of E. Hughes' *Outlines of Physical Geography*, published by Longmans & Co. in 1855, should certainly claim to be an English school-book which taught the subject eleven years before Grot's essay suggesting its educational utility.

"But the Rev. Isaac Taylor's *Words and Places* is not mentioned in Professor Egli's paper, although this work has been before the public for many years, and has doubtless done more to popularise the subject than any other book on *Nomina Geographica*. It is even prescribed as a text-book in the Cambridge Higher Examinations for Women, and a new edition has recently been issued.

"Dr. Taylor's work also gives etymological illustrations of history and ethnology, but the index contains no less than 3000 geographical names, and the teaching of the book will enable a student to increase this number very much.

"It is not desired to compare his book with Professor Egli's *Nomina Geographica;* but, when the learned Professor claims that, up to 1882, his was 'the only attempt of the kind indicated,' *i.e.* 'a work with just pretensions to be considered something more than a mere lexicon,' a Britisher may be allowed, in these days of German 'omnigraphy,' to put in a word for his own countrymen.

"It is curious that Dr. Taylor, in his new preface, mentions nine 'German philologists,' and on page 335 some German and English books, without naming Professor Egli; so that it is probable these two learned men are not aware of each other's works.

"It is to be hoped that the fresh attention drawn to geographical names by the Professor's interesting Essay, and the simultaneous publication of the Royal Geographical Society's scheme for approximating to a rational uniformity, may bear good fruit in the school-maps of the future. At present it is a common thing to see such incongruities as *Pekin* and *Nanking*, and the suffixes *poor*, *pore*, *pur* on the same map. The point raised, however, is a small one compared with the extraordinary fact that in the greatest geographical kingdom the world has ever seen there is not a single Professor of Geography! Yet, tens of thousands of children, youths, and men are annually examined in the 'subject.' Have we ever succeeded in getting it uniformly spelled with a capital G, or in withdrawing it from the juvenile purgatory of *g*rammar and *s*pelling?—Yours sincerely,

J. F. Heyes.

"12 Merton Street, Oxford."

NEW BOOKS.

The Pentland Hills: their Paths and Passes. By W. A. S. With a Map. Edinburgh: Adam and Charles Black. 1885. *Price* 6*d.*

This unpretentious little book, pleasingly written, describes the scenery of the Pentlands, and serves as a guide over its paths and passes, whilst a neatly executed map of the district, by Mr. Bartholomew, shows very clearly many a delightful "tramp" across them. Were the Pentlands less accessible, there would doubtless be cheap excursion trains and other facilities for the good people of Edinburgh; but, being at one's very door, their great natural attractiveness—even in the midst of scenic attractions which few European cities can boast of—is so far neglected that we were sadly in want of a guide-book. The *Pentland Hills* fairly supplies this want. This is the first publication of the *Association for the Protection of the Public Rights of Roadway in Scotland*—a Society which is well deserving of the support of the public, in whose interests its work is conceived.

South France—From the Loire to the Mediterranean, and from the Bay of Biscay to the Rivers Arno and Po. The Island of Corsica. By C. B. Black. Fourth Edition. 1885. 38 Maps and 23 Plans. Edinburgh : Adam and Charles Black. *Price*, 7*s.* 6*d.*

North France—From the North Sea to the Loire, exclusive of Paris, and from the Bay of Biscay to the Rhine. By C. B. Black. New Edition. 1885. 19 Maps and 20 Plans. Edinburgh : Adam and Charles Black. *Price*, 7*s.* 6*d.*

Belgium—Rotterdam, Flushing, etc. By C. B. Black. New Edition. 1885. 10 Plans and 5 Maps. Edinburgh : Adam and Charles Black. *Price*, 2*s.* 6*d.*

To those who at the present season of year flit like the swallows on the approach of winter, we can confidently recommend a "Black's South France" if their destination be the "Sunny Riviera," or any of the other winter resorts in that direction : it will make their travels easy, and direct them to all that is most noteworthy. These three bulky little blue volumes appear to be the result of much thorough and conscientious care ; they bear evidence throughout that the author is an enthusiastic lover of his work, and that what he describes is written on the spot from thorough personal experience and study of the locality. As yet, there is no English "Baedeker" for France, but, judging from a comparison with the recently published French edition in two volumes, Mr. Black's Guides, although a little more bulky, are also much more complete—especially in historical and literary information. Each of the three, and more especially South France, is profusely illustrated with numerous large-scale maps and clearly engraved plans, which in themselves form quite a "Tourist's Atlas of France," and add much to the practical value of the books. Altogether, they are the best English Tourist's Guides at present before the public, and well deserving of a large circulation.

China and the Roman Orient : Researches into their Ancient and Mediæval Relations, as represented in Old Chinese Records. By F. Hirth, Ph.D. Leipsic and Munich : Georg Hirth. Shanghai and Hong-Kong : Kelly and Walsh. 1885.

Dr. Hirth's work is characterised by a critical caution, especially in the application of purely philological arguments, which prejudices the student in favour of his conclusions. Writing "at Shanghai, amid the bustle of business life," he has attained a judicial calmness sadly absent from many a page penned in the quietude and seclusion of learned leisure. The English, for whose defects he makes modest apology in his Preface, is, nevertheless, sound and lucid. Besides an introduction, the volume of 330 pages consists of a series of passages from various classical Chinese works, both in the original and in translation, and of an extensive exposition of the identifications which the author considers more or less clearly established. Among the more important are An-hsi (possibly = Arsak) = Parthia ; Pân-tou (Par-thuva) = Hekatompylos ; Mulu = Mouru, the present Merv ; Tiao-Chih, and perhaps Yülo = some spot in the neighbourhood of Nedjef—perhaps Hira ; Ssu-pin, doubtfully = Ktesiphon ; Aman = Acbatana ; and Anku (Arku ?) = Warka. Dr. Hirth does not conceal the uncertainty attaching to some of these suggestions.

Our South African Empire. By Wm. Greswell, M.A., F.R.C.S. In two volumes. London : Chapman and Hall (Limited), 1885.

This book is a valuable contribution to the literature on the subject of South Africa. The writer has given considerable attention to the question, and has mastered its intricacies. He writes clearly and earnestly ; his sympathies are entirely

with the policy of Sir Bartle Frere, and the two volumes are an elaborate defence of that statesman's administration in South Africa. He treats successively of the Dutch and English occupations, the various native races, the Kafir wars, the establishment of the Free State and the Transvaal, the proposed South African Confederation, the various phases of the Frere Administration—1st, across the Kei; 2nd, across the Tugela; and last, across the Vaal—accompanied with a review of Sir Bartle Frere's work, life, and character. He next proceeds to consider the question of Basutoland, the forms of government in South Africa, Imperial Federation, the Germans as colonists, and the education of the South African tribes. His sympathies are Imperialistic rather than philanthropic. His extreme partisanship, however, is the great drawback to a work which in other respects, is ably written, and full of valuable information. The South African problem is a triangular one—Boers, British, and Blacks—which requires a wise, patient, and far-seeing statesmanship to solve. A South African Confederation can only be accomplished by pursuing a consistent policy respecting the rights of the subject-races, conciliating the prejudices of the Boers, and maintaining the supremacy of the British. Statesmen have too readily overlooked the native races, and looked upon the question too exclusively as one between Boers and British. Our race still leads the van in exploring the Dark Continent, and in the task of reclaiming it. Statesmen may seek to arrest "forward" policy, but, in spite of protests and checks, our South African Empire has grown up, and will continue to do so; and the late Government has been compelled to yield to an irresistible pressure, and include Bechuana and other lands under British protection.

Visitors' Guide to Siena and San Gimignano. By J. L. Bevir, M.A. London: Edward Stanford. 1885. Pp. viii, and 232, including 4 pp. of Index.

It is a good idea to publish a handy little volume like this devoted to a single city. Nearly every city has a story that is worth telling, but which hardly can be hinted at in the brief and disconnected notes of the ordinary guide-book or cyclopædia article; and nearly every city, especially in such a country as Italy, has objects of artistic or antiquarian interest deserving to be described in detail. This volume on Siena is excellent, giving its information in a very orderly and simple style, and containing everything the visitor is likely to want in regard to public buildings, pictures, painters, etc. One misses, perhaps, the kind of faculty displayed by Mr. Capper in his article on Siena in *The Contemporary*, 1883, or by Mr. Howells in *The Century*, 1885. The historical sketch of the city might have been made more valuable if the influence of the political changes on the life of the people and the development of the city had been illustrated. One would like, too, to hear about the *vaghe donne e huomini cortesi*, who spend their lives in the *aer dolce lucida serena*. What kind of a place is Siena as a whole?—How are its inhabitants housed, occupied, clothed, fed, taxed, amused?—How do they compare with their fellows of Florence?—are some of the questions naturally asked.

This, it may be replied, is not matter for a guide-book. True, according to the habits of the past; but the sooner the traveller, and especially the sojourner (who is more likely to purchase a special guide like this), learns to take an interest in the living people, as well as the dead monuments of Italy, the better.

Brazil and Java. Report on Coffee Culture in America, Asia, and Africa, to His Excellency the Minister of the Colonies. By C. F. van Delden Laërne. London: W. H. Allen and Co. The Hague: Martinus Nijhoff, 1885.

The title of this book gives no idea of the value of its contents. While the cultivation of the coffee-plant is its principal subject, the author has considered

everything affecting the agricultural and commercial conditions of the coffee-growing countries as more or less within his jurisdiction. In regard to Brazil, for instance, we are provided with a general sketch of its geography and physical structure, with a sketch-map of its political development, with a similar geological map, tables of rainfall, statistics of slavery, colonisation, railways, exports, etc. etc. And all this is no mere padding or make-weight, but an integral part of the author's design. With unusual opportunities of getting access to Government information, he has not been content to take these with easy credulity, but has frequently subjected them to the most careful criticism, noting and explaining their discrepancies. As the author's main subject is coffee, we may give, in his own words, his decision as to the present position of the culture in Brazil and Java: —"Under very frugal management, and by cutting off all expenses not absolutely necessary, coffee-planting in Brazil may still yield a very good living to land-owners obliged to cultivate their lands themselves, if they desire to reap any profit. In a far higher degree than in Java, the landed proprietors of Brazil are doomed to tie themselves down to this industry. Fortunes are no longer to be made; at the present prices, 10 to 12 per cent. is the very utmost a man can make on his capital. And to do even this he must not be too far distant from the sea-ports. . . . People do not take the expenses of transport sufficiently into account when they assert that the coffee-producing district in any land whatever is unlimited as compared with the consumption of coffee. In Brazil the utmost bounds of planting have been reached, if not exceeded. I believe that nowhere in the world—at least not in Netherland India—are agriculturists granted so many legal securities to enable them to cultivate their lands in peace as in Brazil." In dealing with Java (and Java is the practical *raison d'être* of Mr. van Delden Laërne's mission and its book), our author's central contention is, that if coffee-planting is to be made a popular industry it must be pruned of all the faults that now cling to it, and the native must be brought back to the only natural position—that of planter and picker. He has no belief in peasant farming, as ordinarily understood. No crop that, after being harvested, has to undergo careful manipulation to become saleable in the general market can possibly be delivered to the trade in the required condition by the peasant or small farmer. To raise coffee, sugar, and indigo is a very different thing from raising rice, potatoes, or turnips, which need no special manipulation to render them fit for market. For the former Colonial products, the preparation is, next to careful cultivation, the principal requisite. After showing how the present system leads the native to pluck carelessly, and even to lose the fruit gathered, he advocates the purchase by the Government of the crude berry and the establishment of preparing factories under Government control. For further details we must refer the reader to Mr. van Delden Laërne's work, which, with the abundant light thrown by it on one of the principal articles of commerce, would have delighted the heart of Carl Ritter, whose chapters on coffee, cotton, etc., are among the most elaborate products of his erudition. At page 462 will be found a table of coffee produced throughout the world, from which it appears that from 4,567,000 bags (of which America furnished 2,916,000, Asia 1,630,000, and Africa 21,000), the total rose to 9,231,000 in 1884 (6,736,000 from America, 2,403,000 from Asia, and 92,000 from Africa). The table on pp. 464-5 gives specimens of estimates of the total world-production of coffee, which vary from 8,180,667 bags to 13,383,334. At page 514 another table shows how the consumption of coffee has increased in Germany from 1,655,167 bags in 1878 to 1,784,783 bags in 1882; in France from 901,751 bags to 1,063,982; in Holland from 365,650 bags to 751,033 bags, and in Belgium from 384,657 to 470,102; while in England the quantity remains very much the same. The total consumption in the 13 leading

countries of Europe has increased from 5,067,548 bags in 1878 to 5,964,550 in 1882.

Notices Coloniales—Publiées à l'occasion de l'Exposition universelle d'Anvers au 1885. Paris: Imprimerie Nationale, 1885. Two volumes.

The *Administration des Colonies* originally intended to prefix to the Catalogue of the French Colonial Exhibits at the Antwerp Exhibition a preliminary chapter containing brief accounts of each colony and protectorate; but the material sent in by the officials to whom schedules of inquiry had been distributed proved so valuable and abundant that it was ultimately determined to issue the documents as a separate work. While the *Administration* does not guarantee the absolute accuracy of all the several statements, the method of compilation gives every reason to trust the general correctness and fulness of the information. Each *Notice* has a map to itself, and, though special attention is called to the fact that they were not prepared for the work, and cannot be considered in any sense as official, they are both attractive and serviceable. We know of no similar publication in English, in regard to the British Colonies, that can be compared with these volumes. Something of the same sort was issued in connection with the Philadelphia Exhibition; but the information supplied by the English officials was not so complete, and maps were conspicuously absent. An excellent feature of the French maps is the filling up of blank spaces with insert-plans of towns, etc.; thus the map of Cochin-China and Cambodia contains a little sketch of the geology and plans of Saigon, Cholon, Mytho, and Vinh-long, sufficiently large and distinct to give some idea of the then general position and arrangement. In the map devoted to the now insignificant French possessions in India, we have distinct representations of the town, the territory, and the environment of Chandernagor, and similar groups dealing with Karikal, Pondichéry, and Yanaon. As giving some idea of the method adopted in the text, it may be mentioned that the notice of Tonkin fills 154 pages, and discusses in detail every physical and political aspect of the country very much in the style of an encyclopædia article, but with special reference to matters of practical interest, such as the exact development of the telegraphic and optical systems of communication.

The Purple Land that England Lost. Travels and Adventures in the Banda Oriental, South America. By W. H. Hudson. London: Sampson Low, Marston, and Co., 1885. 2 vols.; pp. 286 and 256. *Price* 21*s.*

It is not in his title only that Mr. Hudson shows himself a brilliant colourist; his last chapter is headed *The Brick-Red Waves of the Silver Sea;* another is *The Mystery of the Green Butterfly;* another *The Red Flag of Victory;* and a fourth, *The Romance of the White Flower.* The fondness for loud effects betrayed by such expressions, is characteristic of the whole book, which is overweighted with high-sounding bathos and extraordinary attempts at fine writing and smartness. Why Banda Oriental should be called The Purple Land, Mr. Hudson endeavours to explain in a wonderful sentence, containing the adjectives, "green," "auroral," "shining," "pale," "dark," and "sad;" but he does not explain why he should have chosen to publish a series of novelistic sketches (in which it is impossible to say where fiction ends and fact begins) under a title suggestive of a *bona fide* book of travel and adventure. When Mr. Hudson is content to write simply he can write attractively, as, for the most part, he does in the chapter telling the effect of his fairy story on a little girl Anita, seven years of age, but quite unaccustomed to such intellectual fare. And here and there a patient reader may pick out of

his pages a stray bit of description, or what appears to be a personal observation, of some interest.

Der Papua des dunkeln Inselreichs: im Lichte psychologischer Forschung. Von Adolf Bastian. Berlin: Weidmannsche Buchhandlung, 1885. *Price 7 marks.* Pp. 368, Index.

By this time all who are interested in geographical and anthropological inquiries know what to expect from a work by Dr. Adolf Bastian. From an enormous accumulation of book-lore, vivified by personal experience of life among both savage and civilised communities in all parts of the world, he pours forth an endless succession of illustrative instances, contrasts, analogies, which, by their multitudinous profusion, are apt to bewilder and fatigue the reader. One feels at first as if he were walking over the shingly shores of an estuary strewn with fragments brought down the stream from every stratum of rock through which it has passed; but by and by, if one's patience lasts, it will seem more correct to compare the chapters to cases in a museum, each full of specimens in orderly arrangement, but serving little practical purpose unless the visitor is either himself a specialist, or has a specialist as his guide, philosopher, and friend. This is to a certain extent true even of those works of Dr. Bastian which deal mainly with his own observations (such as his volumes on Birma and Sand Salvador); in the work now before us these features are exaggerated by the fact that it is purely eruditional, and may be briefly described as a critical '*apparatus*' calculated to guide the prospective explorers of New Guinea in collecting fresh psychological material for the student of the early stages of the intellectual development of mankind. In his preface Dr. Bastian emphasises the value of such material, and shows the scientific identity of the methods adopted by the physiologist and anatomist with those which ought to be employed by the anthropologist.

NEW MAPS.

EUROPE.

EDINBURGH—Bartholomew's Large Scale Ordnance Plan of——, Sheet No. 8 (Central Section), Scale 15 inches to a mile. Reduced from the Ordnance Survey Plan on scale of 5 feet to a mile, and specially revised to the present date.

Edinburgh: John Bartholomew. Price 2s. 6d. coloured.

This is the first published section of Mr. Bartholomew's new large plan of Edinburgh and Leith, which is to be completed in twelve sheets. It is a minute reduction of the Large Ordnance Survey Plan in sixty-six sheets, on the scale of 5 feet to the mile, and has the great advantage of being specially revised to the present date. Judging from this first sheet, the large plan when finished promises to be the most exact and complete representation of the city yet published. The work is a beautiful specimen of cartography, both in general effect and in execution of detail, and evidences great care throughout its preparation. Advantage has been taken of the large scale to show not only the outline of the buildings, but, in the case of all public buildings, the interior ground-plan also.

The publication of this map will supply a long-felt want for a plan less cumbersome than the Ordnance Survey, and yet larger than the usual city plans; and we hope that Mr. Bartholomew will not be long in issuing the other sheets.

ENGLAND AND WALES—Stanford's Parliamentary County Atlas and Handbook of——. Eighty-nine Maps, and Letterpress. 1885.

London: Edward Stanford. Price, hlf. pers. morocco, 8vo, 28s.

Besides being the latest, this is perhaps the most handy and complete atlas of

England and Wales at present before the public. Of the eighty-nine maps, sixty-three are county maps on a uniform scale of 7¾ miles to an inch, and show the new parliamentary divisions and boroughs. All larger towns returning more than two members have enlarged plans to show their parliamentary divisions. Each county is accompanied with descriptive letterpress, containing lists of parishes in each parliamentary division, petty sessional divisions and unions, population tables, and other particulars relating to county statistics, local administration, and new parliamentary constituencies—in fact, quite a census digest. The most novel, and perhaps to many the most interesting feature of the book, will be the general physical and statistical maps illustrating the geology, meteorology, commerce, and population statistics. The meteorological maps, illustrating air and sea temperature, rainfall and barometric pressure, number no less than twenty-four, and seem to have almost more than their fair share of space; but when we know that they are Mr. Buchan's work we can fully appreciate their special value. Altogether, the atlas is a very praiseworthy publication, the maps are neatly executed, and the whole work, so far as we see, appears to be thoroughly reliable.

ENGLAND—Philip's Handy Atlas of the Counties of——. Special edition, showing the New Parliamentary Divisions, 1885, with consulting Index.

London: George Philip and Son. Price, cr. 8vo, cloth, 3s. 6d.

The good reputation of Philip's *County Atlas* for correctness and handiness is now well established; and, brought out in its present form, with the new parliamentary divisions, it would have been one of the most useful and timely publications of the season had the work only received a little more thought and consideration. Unfortunately, however, while the county divisions are shown, the existence of the boroughs is entirely ignored, and they are most erroneously included in the county divisions, which is extremely misleading. Thus, for instance, all London south of the Thames is coloured into the Wimbledon Division of Surrey, and is said to return only one member. With the exception of this serious fault, the maps otherwise appear to be well brought up to date.

LANARK, RENFREW, &c.—Parliamentary Map of the Counties of——. Reduced from the Ordnance Survey. Scale 2 miles, to an inch. Coloured to show Parliamentary Divisions, Burghs, and Parishes.

Edinburgh: John Bartholomew. Price, in cover, 2s.

This map is published with the special purpose of showing clearly and effectively the parliamentary divisions of the counties of Lanark and Renfrew. The map also includes large portions of the adjoining counties, and extends as far west as Arran.

ASIA.

CYPRUS.—A Trigonometrical Survey of the Island of——, executed and published by command of Major-General Sir R. Biddulph, under the direction of Captain H. H. Kitchener, R.E. Scale, 1 : 63,360, or one inch to the statute mile. 1885.

London: Edward Stanford.—(Presented by Trelawney Saunders, Esq.)

After three years' work, this survey, the drawing of which was completed in 1882, is now engraved, printed, and published. The execution of the engraving work, which was intrusted to Mr. Stanford, has been well done, and perhaps much more speedily than if it had got into the Government office at Southampton. The map consists of 15 sheets on the scale of one inch to the mile, a scale sufficiently

large to show every detail in a country like Cyprus, where roads, houses, and villages are, of course, by no means so numerous as in England. The clearness of the map is no doubt to a great extent due to the hills being printed separately in a purple tint, which at the same time gives more effective prominence to the physical relief. In admiring the beauty and completeness of this map we cannot help thinking that it is a pity that a Government that spends annually so many thousands of pounds in this kind of work is so very slow to grant a few more towards exploration in the little-known parts of the world, where the opening up of new trade-routes for the promotion of British commerce and settlement would be of much more practical use and direct benefit to the country at large than the expensive work of surveying an island like Cyprus—useful though that may be from a strategical point of view.

AFRICA.

CÔTE D'OR, entre le Prah et le Volta, d'après les travaux des missionnaires de Bâle, et du Dr. Mähly, 1884. Echelle, 1 : 800,000.
Afrique explorée et civilisée, Octobre 1885. *Genève: H. Georg.*

HÁRAR.—Uebersichtkarte von dem Gebiet der Eyssa-Somál von——, und den nördlichen Galla-ländern. Entworfen und gezeichnet von Professor Dr. Philipp Paulitschke. Scale, 1 : 1,000,000.
Petermann's Mitteilungen, Jahrgang 1885, *Tafel* 17. *Gotha: Justus Perthes.*

This is a fairly complete map of the country round Hárar, showing the route to Zeyla, on the Gulf of Aden, through the Eesa-Somal country. A map of the Central Somali Country immediately adjoining Hárar to the eastward appears in the *Royal Geographical Society Proceedings* for this month.

L'ÉGYPTE—Nouvelle Carte de ——, et ses Dépendances. By Wagner and Debes ; Leipzig, 1884. Echelle, 1 : 3,000,000. *Berlin: Simon Schropp (Dulau).*

This is a large new map in three sheets, of the countries of the Nile Basin from the fifth degree of south latitude to the Mediterranean. Compiled from the best sources and embodying the most recent discoveries, it is one of the best maps of Egypt at present published. The information is very complete, and the work is tastefully executed.

MASSAI-LAND.—Bearbeitet und gezeichnet von L. Friederichsen, 1885.
Mitteilungen d. Geog. Ges. in Hamburg.

This is a good map of the country traversed by Dr. Fischer, 1883, from Pangani on the coast, to Naivasha Lake. To its excellence we alluded in a note on Dr. Fischer's expedition.

NIAM-NIAM COUNTRY.—F. Bohndorff's Reisen in Central-Afrika in den Jahren 1880 bis 1883. Entworfen und gezeichnet von B. Hassenstein. Scale 1 : 1,000,000.
Petermann's Mitteilungen, Jahrgang 1885, *Tafel* 16. *Gotha: Justus Perthes.*

This map shows the latest discoveries in the country around the upper waters of the Bahr-el-Arab and Welle Rivers.

SOMALI COUNTRY, Central.—The Province of Ogadayn, from a survey by F. L. James, Esq., 1885. *Proceedings of the Royal Geographical Society, October* 1885.
London: E. Stanford.

This map shows the strip of country across Somali-Land, between Berbera on the Gulf of Aden, and Madisha or Magadoxa, on the Indian Ocean.

AMERICA.

BRITISH GUIANA.—Roraima and Kukenam Mountains, and the Surrounding Country, surveyed by Mr. H. J. Perkins under the direction of Mr. Everard im Thurn. Scale, 8 miles to an inch. *Proceedings of the Royal Geographical Society, August* 1885. *London : E. Stanford.*

In addition to the special map of Mount Roraima there is also a general map showing Mr. im Thurn's entire route to British Guiana.

KARAIBISCHEN MEERE—Tiefen-verhältnisse im——. This map in the *Annalen der Hydrographie*, etc., Heft viii., illustrates the article on deep-sea soundings in the Caribbean Sea, alluded to in the *Geographical Notes* for last month.

NORTH ATLANTIC OCEAN—Pilot Chart of the——. Prepared by order of the Bureau of Navigation, U.S.A., by Commander J. R. Bartlett, U.S.N., *October* 1885. *Published monthly at the Hydrographic Office, Navy Department, Washington, U.S.A.*

The object of this chart is to present geographically any information relating to the North Atlantic which is of interest and value to mariners, and, we may add, to geographers. The statement of information, collected during the month preceding the date of issue, appears on the chart in red colours, whilst the matter in blue shows the meteorological conditions, and the deductions therefrom, to be expected during the month immediately following that date. The weather on the North Atlantic during September has been stormy. Moderate weather now prevails. Between the United States Atlantic coast gales occur (October) about once in eight days. Tropical cyclones may be expected. Transatlantic steamers will not encounter ice except perhaps an occasional berg near Newfoundland. Fogs are infrequent except on the Banks.

GENERAL.

THE BRITISH COLONIES AND POSSESSIONS—on a Uniform Scale. Scale, 1 : 7,603,200, or 120 statute miles to an inch. A school wall-map in 4 sheets. Mounted on rollers. *London : Edward Stanford.*

At the present day, when Colonial Geography is beginning to claim its deserved share of educational attention, this new map of Mr. Stanford's is a most useful publication. The different countries of the British Empire, drawn as separate little maps on a uniform scale, form a wall diagram of 4 sheets. The work is effectively engraved, but, although in most respects well up to date, the old boundary of Ontario, which was changed more than a year ago, is still shown. At the South Pole we are credited with the possession of an Antarctic continent more than twice the size of India, which, in appearance, certainly adds to the effect of the British Empire on the map, although we doubt if it has as yet been explored even by the polar bears.

Yours cordially
H. W. Beecher

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

ANNIVERSARY ADDRESS.

DELIVERED BEFORE THE SCOTTISH GEOGRAPHICAL SOCIETY, NOVEMBER, 1885.

BY LIEUTENANT A. W. GREELY, U.S. ARMY,

Honorary Member, Scottish Geographical Society.

MR. PRESIDENT, MY LORDS, LADIES, AND GENTLEMEN,—It was with a certain reluctance and embarrassment that I consented to appear and deliver the Anniversary Address on this occasion. It was not that I failed to appreciate the honour the Scottish Geographical Society did me, but, largely, that my profession ill fits me to well perform the task.

Trained for a quarter of a century in the army—first in the soldier's rough school of war, and later in the milder, though stern, discipline of peace—I found it easier to handle the sword, and to go a leader into the Far North, than now to manage the pen and discourse on matters of geographical interest. My shortcomings, I know, you will attribute in part to the Society's Council, which urged me, and perhaps more to the ill-health that prevented my attempting this Address until my recent arrival in England.

I must first congratulate you on the successful formation, and no less successful development, of your Society. It does credit to the men who planned, and to those who have laboured to its good. I am sure that, more fully than I, they appreciate how fruitful is the ground on which they have sown; for without popular and wide-spread interest, all such undertakings must fail, or, yet worse, live on devoid of merit or influence, Societies only in name.

It is difficult to make the young man believe that geography as an

exact science is of very modern growth, and that scarcely a century ago, save on the continent of Europe, man's knowledge of this globe was both vague and unreliable. Except the coast-lines, partly traced by the bold navigators of the seventeenth century, almost nothing was known, a hundred years ago, of Asia, Africa, and America.

To go further into detail, Australia was barely known to exist. The northern continent of America, now peopled by over sixty millions, had never been crossed from ocean to ocean to the northward of the Gulf of Mexico by civilised man, and when, later, it was done, a Scot was the man who did it. The veriest child now knows the long-guarded secrets of these great continents, and in the dwellings of the humblest will be found charts, marvels of accuracy, which a few short years since monarchs could not command. But, though much has been done, much yet remains to be done, and you will do wisely to heed the counsels of those who tell you what should be the geography of the future.

The Anglo-Saxon or the English-speaking nations were not the first to distinguish themselves in this field of geographical science; but, as always, they applied themselves nobly to the task, and probably have contributed more in the way of sound and valuable work than all other nations combined. I believe I am correct in saying that Great Britain is the only great nation which has thoroughly surveyed its own country.

The part which Scotland and Scottish travellers have played in this grand advance does not come within the scope of this Address. I cannot, however, refrain from voicing to the world something of their work, especially with reference to one continent—Africa—where their efforts have been crowned with such success and preponderating influence as to give great and enduring fame to Scotland.

Scottish nature has ever waxed ardent over the African problem, and but for the direct and indirect work and influences of Scotia's sons the Dark Continent would even to-day stand forth as a black blot on the fair scroll of geographical knowledge. Bruce, Mungo Park, Clapperton, Grant, and others did well their work towards rending the veil of mystery which, for thousands of years, shrouded the African Sphinx.

It remained, however, for Livingstone, the missionary, directly through his own work, and, later, fully and indirectly through Stanley's, to roll back that thick curtain, and reveal the fair features which to-day attract so strongly the gaze and attention of the Old World. And so the whole world hails the name of Livingstone, the Scotchman, who, scattering ever his Master's words and patterning his life after the Master, gave such Christian precept and example to millions in the Dark Continent.

So, too, you have given in this old capital city your meed of praise to Stanley, the follower of the Scot, the man whose courage, fidelity, and resolution—fruitful to a degree unparalleled in this age—has opened that great and fertile country to the commerce and influences of the civilised world. Erase from our maps the labours of these men, and what a void!

It was indeed fitting that here first should speak to you that extra-

ordinary man—whom the two great continents claim, only to yield him in the future to a third as their Moses—whose devotion to colonisation will bring Africa from the darkness of ignorance, barbarism, and superstition into the pure sweet sunlight of knowledge, civilisation, and Christianity.

But if the Scottish pines—emblems of strength, courage, and fidelity—have ever sighed for the palms of the south, yet not the less at times have her bluebells smilingly nodded to the snowy saxifrages of the north.

Under a Scotch monarch were attained, in the seventeenth century, the highest latitudes reached in the eastern and western hemispheres. Nearly three centuries ago, after James VI. of Scotland ascended the throne of England as James I., sailed forth two great voyagers. Hudson not only discovered Hudson Strait and Bay, and that noble river on the banks of which is situated our great American metropolis, but several years earlier, in 1607, attained in the Spitzbergen Sea a higher northern latitude than had ever before been reached. Two hundred years passed before another ship sailed yet beyond to the frozen north.

In 1616 went forth William Baffin, ever in quest of the North-West Passage, and on July 5th he sailed into Smith Sound, several leagues beyond Hakluit Island, reaching about 77° 45′ N., a latitude in the western hemisphere not only unsurpassed at that time, but which remained unequalled for two hundred and thirty-six years. It was over two centuries before another vessel even entered those waters, when, in 1817, a daring Scotch whaler ventured through the ice of Melville Bay into the open water near Cape York—the North Water, as we now call it.

A year later the writers of the day distinguished themselves by erasing from the charts Baffin Bay, as existing only in imagination; but, fortunately, another Scot sailed in command of a Government expedition, which restored Baffin Bay to our maps, and brought back news of the northernmost inhabitants of the globe, the Cape York Eskimo, whom Captain John Ross called the Arctic Highlanders. This same voyage resulted also in the finding of the red snow, from which was given the name of Crimson Cliffs to the coast near Cape York. Ross's action in reporting Smith, Jones, and Lancaster Sounds to be closed bays, gave rise to severe, and probably well-deserved, criticism. To his excuse it may be recalled, that at least one other officer, who lays greater claims to reputation as a practical and theoretical geographer than Ross ever did, curiously enough likewise transformed a strait into a bay. Ross unwillingly remained inactive under the strictures, and, later, made an extraordinary voyage, during which he remained four years in the Arctic Circle, and discovered the isthmus of Boothia Felix, the northern point of North America. Yet more important was his locating exactly the magnetic pole, a work done largely through the assistance of his nephew, a more famous voyager—Sir James C. Ross. The nephew particularly distinguished himself in his first voyage to the Antarctic Sea, during which the most southerly land known was discovered and charted. Remarkable to say, in this land was found an active volcano, a striking contrast to the ice-caps

of enormous thickness which covered the adjacent regions. It is Sir James C. Ross's peculiar honour to have approached nearer the two poles than any other traveller.

But it is not by sea alone that credit for Arctic work must be given to Scotland. In North America it was a Scot—Mackenzie—who first traced to its mouth beyond the Arctic Circle the great river which bears his name. To him and other of his countrymen is due much of present knowledge the world has concerning the great Hudson Bay Territory.

It was one of your countrymen too, Sir John Richardson, who was Franklin's staunch subordinate in the perilous land journeys which that great explorer made, in the vigour of his manhood, to the shores of the Polar Sea. Richardson not only distinguished himself by his great endurance and wonderful physical exertions in the interest of these expeditions, but, as the result of his keen accurate observations and pertinent researches, made valuable contributions to science in his great work known as the *Fauna Borealis* of America. Others have supplemented, but to this day no single work has supplanted it.

As one Scot shared in Franklin's early triumph, so another, Dr. Rae, brought back to the world the first intelligence of that disastrous retreat, and the report that many had perished. With M'Clintock's later discovery of the dead, and the record that Franklin's death occurred prior to the retreat, the story of that expedition was told. The careful and systematic researches of my countryman, Schwatka, during which he made the longest sledge journey on record, has filled in all possible gaps in the narratives of Rae and M'Clintock, and made the tale complete.

To me the story of that retreat is one of the most pathetic on record, and the simple yet graphic description of that march, given by the Eskimo, is the grandest compliment ever paid to the energy, the endurance, the persistent courage of the Anglo-Saxon race. "As they walked, they fell down and died." Faithful to the last—the common British sailor, as his commander—in that dread season.

Concerning the extent to which northern lands and seas are now known, there exists a widespread misapprehension, for the general public believes that only a little of the Arctic regions has been explored. Such is not the case, for fully two-thirds of that great area is as thoroughly known as general scientific interests demand. To no class more than to British navigators is this result due—a result extraordinarily great when we consider the dangers and privations relative to the small practical and remunerative outcome.

It is well to admit that the day has quite passed for any material or indeed important moral result to spring from Arctic exploration, but none the less it follows that it will be an unfortunate period for any nation when there shall not be found in it a strong element which will welcome exploration and adventurous daring for its own sake—for its reflex influence on their navigators and their country.

It happens that in this matter-of-fact period of the utilitarian nine-

teenth century, Arctic exploration has flourished to a marked degree. This has been particularly true of the past few years, and the rate of progress may well be determined with reference to the 80th parallel, since in 1870 it had been passed only in the Spitzbergen Sea and in Kennedy Channel. In this time many arctic "mountains of the moon" have vanished. Wrangel Land has dwindled from a continent to a small island, and Petermann's hypothetical continent, now nearly cut in twain by Lockwood's exploration, was proved quite impossible by the tidal observations of Bessels, a countryman of the great geographer.

In fifteen years we have not only increased tenfold our knowledge of the earth above the 80th parallel, but we have explored to the northward of the 83d parallel nearly twice as much area as was before known above the 80th. So well distributed has been the work, that now scarcely any point in the Arctic Circle is over five hundred miles from land or sea which has been seen by civilised man. It is hardly the distance from London to Aberdeen. It is to be noted that this reference to the 80th parallel excludes the area added to our knowledge by the marvellous drift of De Long, thirteen hundred miles north-eastward from Behring Strait, as well as those portions of the Arctic Ocean delineated and observed by the celebrated Baron Nordenskiöld in his greatest work,—the circumnavigation of Asia and Europe.

The day has gone by, however, when an Arctic traveller can hope for an influence as potent, and prolific of results, as that which sprang from Willoughby's expedition to the White Sea. If that unfortunate chief perished, we know that his subordinate, Chancellor, venturing again, ultimately opened up Russian trade to England, formed the Muscovite Company, and in many respects exercised incalculable benefit in the way of developing that trade and instilling that maritime spirit which has finally resulted in making Great Britain the foremost commercial, manufacturing, maritime and naval power the world has ever seen.

The development of new industries and the careful investigations of man have also united to turn us from seeking material advantages in the Arctic seas. The oil mines of Pennsylvania and the Black Sea region, the manufacture of many compound substances, the invention of the electric light, etc., have wrought such changes and benefits that it is not now needful to fill every Arctic sea with hundreds of whalers for bone and oil. Two nations only, and with but a score of vessels, pursue this dangerous avocation. The American ships, once our pride, now poorly found, ill-fitted for ice-navigation, barely venture over the Arctic Circle, and seek their game to the north of Behring Strait, along the edge of a dangerous pack. Having, with rare exceptions, no steam-power, they avoid the ice, and inevitably are wrecked if they are once beset.

The Scotchmen, having the endurance and courage common to Britons and Americans, appear alone in this age to have the qualities of thrift, energy, and management which, wisely and economically husbanded, have enabled them to wage successful battle against the adverse conditions that

beset the whalers of to-day. They have recognised the changed conditions of affairs, and by the application of steam and the addition to their fleet of vessels of unparalleled strength and build, have admirably succeeded. I have reason to thank God that it has been so, for, as I have elsewhere said, had it not been for Scotch whaling vessels and for the experience and skill gained by Scotchmen in navigating the perilous ice of Melville Bay, I should not have had the honour of addressing you to-night. This is no derogation to my gallant rescuers, Captain Schley and Lieutenant Emory, who dared all that men dare do; for they acknowledge the hearty counsel and advice, the benefit derived from Scotch experience in that formidable pack, and the hearty God-speed given them as they turned northward on their dangerous mission of humanity, and the Scotch whalers turned westward on their perilous work. It is here not out of place to remark that the Scotch whalers have pushed their vessels often into extraordinary latitudes, and have sometimes passed beyond the limits reached by other explorers. Several I know have passed in Smith Sound far beyond the 78th parallel, and gazed on the ice of those seas beyond the point reached by the ships of Baffin, Ross, Inglefield, or Hayes, and the record of one—Captain Walker—was found by me on Littleton Island in 1881. The veteran whaler—Captain Adams—has, I learn, sailed further into some of the inlets of Lancaster Sound than any of his predecessors. I know not whether it was a Scotch whaler who pushed so far into Jones's Sound in a sailing ship years before Inglefield ventured into its waters, but it may well have been.

Van Campen has graphically told us of the work of the Dutch in the Arctic Seas, and from an English whaler, Scoresby, we have the best general account of the Greenland Sea. To the credit of Scotland I hope that some pen will be found to do justice to the skill and courage, to the energy and resolution, with which her whalers have navigated and exploited the yet more dangerous waters of Baffin Bay and its adjacent inlets.

When commercial interests failed to further pursue researches within the Arctic Zone, science none the less demanded their continuance, and in its interests all later work has been done.

You have all heard the question of *cui bono* relative to Arctic work. I propose to answer it, as an American, by asking another question. Of what good were the cruises of the *Lightning* and the *Porcupine*, and the yet greater and more extended voyage of the *Challenger*, in which all Britain took pride, and for which the world owes her a debt of gratitude? Of what good the parties to observe the transit of Venus, or other voyages in the interests of scientific and theoretical astronomy? What profits you to know the altitudes of the mountains of Scotland and their geological formation, from the glacier-scratched rocks of the surface to the lowest strata that man has reached? What good, in short, to weigh the planets, to fathom the depths of space, to study the forces of external nature? Is it not an essential difference between barbarism and civilisation that one applies itself only to such knowledge as satisfies animal appetites, and the

other delves in all directions in order to minister to its physical, moral, intellectual and spiritual needs?

And so, for kindred reasons, the wise proposition of Weyprecht that Arctic exploration should hereafter be in the interests of science, and should be systematically pursued, met with such great success. It was a significant sign of the progress of modern civilisation—a civilisation the real progress and true nature of which it has been a fashion in late years to decry—that eleven great nations united in planning and executing for strictly scientific purposes so extensive and dangerous a work.

In this scheme it fell to my lot to occupy the most northern of the fourteen stations, in Discovery Harbour, 81° 44′ N. To reach this station it was necessary to pass through the series of channels incorrectly known to the world as Smith Sound, but better named by some geographical writer the West Greenland channel. It is a succession of narrow straits and large bays, which to the west of Greenland connects Baffin Bay with the Arctic Ocean. Smith Sound proper is the channel uniting the North Water with Kane Sea or Basin. Inglefield first determined its extent in 1852. Kane, in his second search for Franklin, carried northward these explorations to Kennedy Channel, whence, from the south side of Cape Constitution, about 80° 35′ N., Morton looked, on that fair June day, to Cape Lieber, in latitude 81° 32′,—the most northern land of that time.

Hayes' work as Kane's surgeon was most creditable, as well as when later he commanded an expedition. He discovered Hayes Sound, and was the first civilised man to put foot on the new lands of Ellesmere and Grinnell. His narrative is, however, too imaginative; and there is no doubt that his open Polar Sea was but the open waters of Kennedy Channel, which may be seen four years out of five in late May or early June. Hall's voyage in 1871 was remarkably successful; but his untimely death practically put an end to exploration. The expedition was most fruitful in geographical work, as it added a degree and a half of latitude both to Greenland and Grinnell Land, outlined Kennedy Channel, Hall Basin, Robeson Channel, and discovered the extensive Frozen Sea to the northward. Its meteorological observations were complete, and it established the important fact that the Atlantic tides flow into Robeson Channel from the northward. I deplore with you all the fact that land should have been charted from vague reports, unconfirmed by reliable observers. I do not think that any of our English critics have been too severe on that score. It should be recalled, however, that Hall's own work has never been questioned, and that the formal reports and charts were compiled under the direction of men not associated with the expedition. It may be well here to say that, for his own credit, any man of unbounded enthusiasm, lively imagination, or with deep-set theories to prove, had best avoid the *command* of any expedition, Arctic or African. As an officer of our Engineer corps said, when I sailed in 1881, "If you determine any point twenty yards out of the way, some man will come after you and point out the error."

You well know the history of the British Expedition of 1875-6. Whether fairly or not, I have already said, "This expedition, costing three-quarters of a million of dollars, commanded by an officer of Arctic experience—one of the finest seamen in her Majesty's service—composed of picked officers and men from the British navy, fitted out under the advice of Arctic veterans, thoroughly and efficiently equipped, withstood the experience and privations incident to Arctic life and explorations but a single year. They had, however, explored Archer's Fiord, outlined the entire northern coast of Grinnell Land, added nearly 100 miles to the Greenland coast, pushed an English vessel into the highest known latitude, and planted the Union Jack, both on land and sea, nearer the Pole than ever before. They brought back an elaborate set of tidal, magnetic, and meteorological observations, which are valuable contributions to the physical sciences. They charted Greenland and Grinnell Land with remarkable exactitude, and depicted the circumstances of their sufferings and experiences in narratives which are notable both for their modesty and accuracy."

The results of that expedition were not entirely satisfactory to Great Britain. Far be it, however, for one who, having experienced all the dread forms of Arctic dangers and privations, has paid the exacted tribute of broken health and deepest anguish, to here add any adverse criticism on his gallant British predecessors. I am glad to heartily concur in that public opinion, which can never have been of but one mind, regarding the indomitable energy and tenacity of purpose which enabled Markham and Parr, with overwhelming loads, to attain the furthest north. The extraordinary and (for that latitude) unsurpassed journey of Aldrich was the crowning feature of success, and, although praised, has not, as far as my observation goes, received its full share of credit.

Beaumont's strenuous efforts, which resulted in his reaching, with a Scotch quartermaster, the eastern shore of Sherard Osborn Fiord, are much to be admired, but yet more highly his unfaltering heroism, his abiding courage, his unselfish devotion to duty during his hopeless retreat with sick and dying men, to Thank God Harbour. It was my good fortune to bring southward with us, through our memorable retreat, the Union Jack which Beaumont was obliged to abandon. Her Majesty's Government, in tendering us thanks for this slight service, informed me that it had been deposited in the great Naval Museum at Greenwich. It is well that it should be so, for the cheerful and heroic manner in which the arduous and disheartening labours and privations of that expedition of 1876 were met and endured does honour and credit to the officers and men of the Royal Navy,—and more I cannot say.

Of the details of my own expedition, I will speak briefly. In judging of it you must bear in mind that, apart from strictly Service stores and supplies, there remained for special Arctic outfitting only some £1200. This small amount necessarily covered our supply of coal, boots, dogs, dog-food, fur clothing, natural history supplies, some scientific instru-

ments, pemmican, special articles of diet, etc. My friends and myself were even obliged to guarantee these purchases made on credit, to enable the expedition to sail in 1881.

Our voyage to Fort Conger (Discovery Harbour) was short and prosperous, and speedily we erected on that shore our small house,—the most northern habitation of civilised man. Arctic life and methods are much the same in all expeditions, and I pass them over, simply observing that at the end of two years' service, within eight degrees of the Pole, we had no serious frost-bites, no dangerous sickness, no scurvy, and no disaster. That our work was not all fair weather is evidenced by the fact that I kept parties in the field seventeen days after the winter sun had gone, and sent them out again ten days before its return. Our experiences prove quite conclusively the great superiority of small, perfectly equipped parties, assisted by dogs, which enable movements to be made with far greater facility than with larger, more unmanageable bodies of men alone. Though not considering sledging, in a scientific expedition, as the commander's duty, I travelled the first year over six hundred miles, without dogs. Lieutenant Lockwood in that time travelled nearly twelve hundred miles with dogs, and four hundred without. Sergeant Brainard's total journeys must have reached two thousand miles, as he was not only Lieutenant Lockwood's faithful associate in the furthest north and the crossing of Grinnell Land, but also did other work.

Dr. Pavy's trip northward over the Frozen Sea failed, despite his energy, owing to the disruption of the Polar Pack—an experience which justifies the judgment of the Admiralty in instructing Captain Nares to outfit Markham with a boat. Lockwood's work to the north-east, along the Greenland coast, was successful, to an extraordinary degree, in 1882—a year in which I did not expect such great results. In 1883, with improved sledging gear, better dogs, equal strength and greater experience, we hoped he would round Greenland, or reach latitude 85° N. Nothing but an extensive, if not general, disintegration of the main Polar Pack, during which several hundred square miles of open sea were seen, prevented this success. No time was lost, but the same party was sent southwestward on its return from the north, when Lieutenant Lockwood not only supplemented my discoveries of the preceding year, but crossed Grinnell Land, reached Greely Fiord, and looked out into the Western Polar Ocean, as had Aldrich, over 100 miles to the northward.

My personal explorations necessarily covered brief periods, as I allowed them in no way to interfere with all possible work by my subordinates. Two journeys—one in spring and the other in summer, aggregating over 600 miles—have enabled me to speak with authority as to the extraordinary and unsuspected physical characteristics of the interior of Grinnell Land. Before I dwell on the results obtained, I will comment on the retreat from Fort Conger southwards, which took place in accordance with my orders from the Government at Washington. Our means of transportation were a small steam-launch, a little larger than a

whale-boat, and three small boats. With these we made our journey, finding clear water only in part of Kennedy Channel. We necessarily followed the general contours of the Grinnell Land coast-line, being nearly always obliged to run inland to cross the numerous bays. The dangers, perils, and privations we experienced I will not dilate on. Strong north-easterly gales drove us, pressed by a grinding pack, against the high ice-floe, daily threatening to destroy our boats and leave us helpless. At times, when occasional south-west winds opened narrow lanes along the coast, they were never free from rough heavy ice, which was dangerous alike to boats and life. The unprecedented cold of August embayed us at one time for four days, and finally beset us permanently, midway between Cape Hawks and Victoria Head. For thirty days we lived on a moving pack, subject to all the discomforts, dangers, and privations incident to life on a floe, which were intensified by a series of violent gales. On abandoning my launch two boats were taken, but at the urgent recommendation of officers and men, I later abandoned one; and on 29th September we reached shore—having drifted south of Cape Sabine—at Eskimo Point in Baird Inlet. We there learned of the disaster to the *Proteus*, and found a month's rations to cover ten months with.

It has been objected by kind critics that I could have crossed Smith Sound, and that unfortunately I was not a seaman. Indeed, the judgment may be sound, but success counts for something. In 1872, however, in that very sea, within sight of my scene of action, the *Polaris* crew, all seamen, could not reach land but *four* or *five* miles distant, "despite," says the official report, "the most persistent efforts." In January 1870, the crew of the *Hansa* could not make land two miles distant, although their lives apparently depended on the result. My party not only reached shore *eleven* miles distant, but we did more. The distance from Conger to Eskimo Point is 300 miles, though the ice conditions involved 500 miles of travel. I landed my party of twenty-five on that coast in health and strength, together with all collections, every paper, all the records, and every scientific instrument with which I left my station. Not a pound of serviceable food was left in any cache to the northward, and we supplemented our supplies by killing twenty days' food while drifting in Kane Sea.

Of the long winter, fighting against fate, hoping against hope, ever striving our best, and never despairing, I have but little to say. It was passed, as men must pass it when thrown without shelter, warmth, or even proper food on a barren, desolate coast. Throughout it all, the party as a whole displayed the most remarkable fortitude, cheerfulness, and courage. I think better of mankind for my experience with those starving men. Never warm, our sleeping-bags frozen to the ground, hunger ever gnawing, with no ray of light entering our hut for five Arctic winter months, yet the returning sunlight came with but one death. Had strength remained a few weeks longer we could have crossed Smith Sound by boat, since its open mid-channel prevented crossing by sledge. But it was not to be,

and finally, as all know, relief did come on Midsummer-day, when the seven remaining were within a few hours of eternity.

That our work at Sabine may not be entirely over-shadowed, I here recall that our last scientific observation was taken forty hours before the rescue. If Nares extended Hayes Sound a score of miles to the westward, Sergeant Long of our party, from the northward side of Mount Cary, carried it yet twenty miles further. Rice Strait was discovered to separate Cape Sabine, on Bedford Pim Island. I may here say that this island was named after Lieutenant (now Admiral) Pim, R.N., whose sledge trip saved the crew of the *Investigator*. Day after day, in our extremity, we hoped and prayed for our "Bedford Pim" from the Ellesmere Land.

It remains for me to speak of the results of the expedition, which can be done only in a general manner. The scientific observations were as fully made as our instruments would permit, and whether their results will be commensurate with the hopes of the promoters of the international scheme time alone can show. The magnetic observations at Fort Conger have a new factor in their value from having been taken on the spot where Lieutenant Archer, R.N., did similar work in 1875-76. Consequently they are comparable—an important matter considering the remoteness of the spot and its very high latitude. The observations have not yet been reduced.

The barometer observations were watched by me with zealous care. I am sure that no one will rejoice more at the discovery of a diurnal fluctuation than one of the distinguished members of your Council, to whom not only Scotland but the world owes grateful thanks for his labours in the interests of meteorology. Not only is there a double oscillation, with an amplitude of 0·01 inch in that high latitude, but from comparisons made with the observations at Point Barrow, Serdze Kamen, Jan Mayen, and in Spitzbergen, it appears that this fluctuation is simultaneous. Mr. Buchan appreciates why I speak doubtfully on so complex a question, which has interested so many acute minds, and regarding which there has been no general (as this is not) solution.

The monthly barometric means show a double oscillation throughout the year, a condition which appertains to many American Arctic stations, although in Danish Greenland and Iceland there is, I believe, but one.

The temperature observations are mainly important in determining the fact that Grinnell Land has the lowest mean temperature in the globe (about −4° F. or −20° C.). This was in accordance with our expectations, but the idea was not uncommon, based on the single warm year of the *Polaris* expedition with reference to Kane's temperature at Van Rensselaer Harbour, that the climate becomes milder as the Pole is approached. The pendulum observations have not yet been reduced. Sound experiments in temperatures as low as −50° F. confirm the general law of regular increment of velocity with temperature as deduced from other experiments on a much more limited range in the temperate zones.

The tidal observations, only roughly reduced by me at Conger, confirm

the work of 1875-76, but a large number of simultaneous readings at seven special stations in the Polar Sea, Robeson, and Kennedy Channels, should enable tidal experts to determine quite accurately the shape and direction of the tidal wave,—an important element in the theoretical determination of the configuration of lands and sea-bottom to the north.

Much interest has lately been expressed over the question as to the habitat of primitive man, and on this point two books have lately appeared in America—one *The Navel of the Earth*, and the other, *Where did life first begin?* However absurd it may at first seem to place the Garden of Eden, or the earliest life, at the Poles, yet the theory appears to me to rest on sound scientific grounds. If it is accepted that the earth was once a molten mass gradually cooling, there seems no reasonable way of escaping the conclusion that the polar regions were first habitable. Certainly those parts of the earth which radiated relatively the largest amount of heat into space, and received the smallest quantity from surrounding planets, must first have been able to sustain life: and the polar regions alone fulfil the required conditions.

That human remains have not been found in the Arctic Circle is inconclusive evidence on this point, as only lately has it been admitted that man lived in the Tertiary period. The discovery of extinct species of animals, unknown in the history of man, in the ice of the new Siberian islands, tells us how long life must have there existed. In Grinnell Land the discovery of coal, not only at various points along the sea-coast, but at others in the interior, proves conclusively the changed climatic conditions, as does the fossil forest found near Cape Baird in 81° 30′ N.

In consequence of these facts, any new discoveries of Eskimo remains are of double interest, as showing the possible extent of this immigration of a *new* race into the Polar basin. Not only were Eskimo remains found along the shores of Kennedy and Robeson Channels, but to the very head of Archer and Chandler Fiords, along the inland valleys, and far from the sea on the great inland glacial basin filled by Lake Hazen. On the shores of that lake, I discovered the most northerly permanent habitation of man that is known. I have elsewhere expressed my reasons for believing that these natives soon vanished, some overtaken by disaster, others retreating southward, while the more active, pushing across Robeson Channel, reached the east coast of Greenland, to the northward of the inland ice, through Victoria, Nares, or Sherard Osborn Fiords. There is no good reason, in my opinion, for believing that the Arctic Highlanders are the remnant of a lost nation, or that these natives differ materially from other bands of the great Eskimo nation.

I pass to our geographical discoveries, and by those I mean land and sea which never before fell under the eye of civilised man. The northern work, if not of the greatest importance in some ways, naturally attracts especial attention.

The furthest *seen* by Beaumont was Cape Britannia, nearly fifty miles beyond the extreme point actually attained by that heroic officer. Lieu-

tenant Lockwood, in consequence, was obliged not only to force his disheartening way over the rough and broken pack which exhausted his heroic predecessor, but also to travel far beyond that, before extensive additions could be made to Greenland. He discovered, however, *en route*, Nares Land (hidden from Beaumont by Cape May), charted to the northward of Cape Wohlgemuth a new fiord, and extended considerably inland the shores of Victoria and Nares Inlets.

From Britannia Island, Lieutenant Lockwood and Sergeant Brainard pushed on a hundred miles further, and passed a day and a half at Lockwood Island—the furthest point by land or sea ever attained by civilised man—in 83° 24′ N., 40° 46′ W. From an elevation of nearly three thousand feet it was evident that no land existed within a radius of sixty miles to the north or north-westward, as only ice could be seen in that direction; but to the north-east the Greenland coast yet trended, ending to the eye at Cape Washington in 83° 35′ N.

To Greenland was thus added a hundred and twenty-five miles of new coast, excluding the fiord lines, and from Cape May the mainland was carried a degree of latitude to the northward. In extending Greenland ten degrees of longitude further to the eastward, Lieutenant Lockwood left but sixteen degrees for his successors to fill in.

The new land is composed of high, precipitous promontories along the coast, and equally broken country inland, in which but three glaciers were seen,—none discharging. It is evident the inland ice-cap of Greenland stops far to the southward of the 82d parallel.

The inland conditions of Grinnell Land proved most extraordinary, as developed during my own journeys, and as supplemented by Lieutenant Lockwood in his trip across Grinnell Land to the Western Polar Sea. I discovered Chandler Fiord, an important outlet, which through Ruggle's River drains Lake Hazen, a body of water covering three hundred square miles at an elevation of five hundred feet above the sea. In short, there exists from Robeson and Kennedy Channels westward to Greely Fiord and the Polar Sea a series of fertile valleys, clothed with vegetation of luxuriant growth, whereon pasture large herds of musk oxen. Over a hundred of these interesting animals were killed, and over two hundred others were seen. The boundaries of this fertile region are equally extraordinary. To the northward an ice-cap of several thousand square miles bursts through every gap in the Garfield and Conger Mountains in the shape of large glaciers, one of which, Henrietta Nesmith, has a front of five miles, and a perpendicular face from 150 to 200 feet high. To the southward a yet more remarkable ice-cap covered the land for several, and probably many, thousand square miles, stretching between Archer and Greely Fiords, nearly ninety miles, with an average perpendicular front of one hundred and fifty feet.

The unexpected and unfavourable orographical features in Greenland, which disappointed Nordenskiöld in his search for such physical conditions a thousand miles further south, here likewise prevail over the ice-clad

country, but give way in the fertile belt. The winter's scanty snow scarcely covers this favoured country, while its abrupt intersecting fiords and deep narrow valleys offer most favourable conditions for the action of the constant summer sun and the complete drainage of its rapid torrents. Similar favourable, or unfavourable, physical conditions must govern the distribution of the inland ice in Greenland. The result of our work in Grinnell Land alone gives us information as to the physical condition of over five thousand square miles, an area equal to the entire land discoveries of the expedition of 1875-76.

The intimate relation between the physical sciences is strikingly illustrated by the acute opinion of Sir Joseph Hooker, which that accomplished and highly-trained specialist, from a handful of plants, passed on the continental or insular character of Grinnell Land. Our discoveries bear him out in the statement that it is a land of limited extent, though Lieutenant Aldrich, in doing his share of the work, could not so report.

The charts and accounts of these discoveries (the originals of which, by the way, were at my personal expense), were first given to the world through the great Geographical Society of the world—the Royal Geographical Society. For that association I have the greatest respect, and to not a few of its distinguished and cultured members I owe hearty thanks for gracious courtesies and kindnesses. Its learned and distinguished President, Lord Aberdare, in his annual address, cordially acknowledged my courtesy, and gave credit for our work of exploration. One of its well-known Vice-Presidents, General Sir J. H. Lefroy, himself an Arctic scientific investigator of high standing, also most generously acknowledged the discoveries made by the Lady Franklin Bay Expedition.

In view of these facts, it was with great astonishment and a righteous indignation that many Americans have read the reference to my work of exploration as given in that greatest of Encyclopædias—with which this grand old city of Edinburgh is identified. The author of that article—well known to you as an acute and distinguished geographer—acknowledges the discoveries by incorporating them in his map, and, almost incredible to believe, adds (*Ency. Brit.*, Polar Regions, p. 326): "But all this region" (the northern coast of Greenland and the interior of Grinnell Land) "had already been explored and exhaustively examined by the English Expedition of 1875-76."

Ignorance might excuse the wanton attack on Stanley, made some years since by this geographer, but in this case it is out of the question. I should gladly have ignored this unpleasant topic, but for justice to the men who have died; and lest, even to the living, silence might bring reproach from a misapprehension of my motives. I improve this occasion to acknowledge the cordial appreciation of my work by the gallant officer who attained the highest north in 1876, as some Americans have unfortunately associated his identity with his kinsman, whose unwarrantable exaggeration of British work and suppression of American labours are in too petty a spirit to be dwelt on.

I leave this astounding action, by an official of a great Society, to the judgment of all honourable men, and by none, I am certain, will it be more quickly and sharply condemned than the officers in whose interests such a monstrous statement is put forth. Not only were these British officers, who perilled life and health and comfort in that desolate region for their country's honour, the first to give me welcome and congratulate me that "knowledge ever grows from more to more;" but one of them, when our fate was uncertain, offered to dare again the terrors of the "Unknown Regions" on behalf of his brother men.

I must add a few words as to my discoveries concerning the much-talked-of Palæocrystic Ice, especially the floebergs from 100 to 1000 feet thick. The opinion advanced by Sir George Nares that this ice forms over the Arctic Ocean is not borne out by facts, and I cannot commit myself to the judgment that this sea is for ever unnavigable from this ice, as we know that its quantity changes from year to year, and little of it was seen by Lieutenant Lockwood to the northward of Cape May. Dr. Moss was certainly correct as to the universality of stratification in this ancient ice, and I concur in his opinion that its salinity is due to efflorescence and infiltration. There is no doubt in my mind that these floes are simply detachments of slowly-moving glacial ice-caps from an ice-covered land in the neighbourhood of the Pole. Lieutenant Lockwood found in Greely Fiord small floebergs, perhaps a hundred to two hundred feet thick, detached from the adjacent ice-cap. Later, I was fortunate enough to clear up the question of the origin of this ice. In Kane Sea I visited a floeberg a third of a mile wide, a quarter of a mile long, and from a fifth to a sixth of a mile thick. The proof as to its terrestrial origin I think no one will dispute. On its surface were two valleys about thirty feet deep, along which were the medial moraines of the glacier—fully a hundred large stones, polished and worn smooth in places by the parent ice. I think it doubtful if these ice-caps increase more than three or four inches yearly; so that in its formation, its passage to the sea, its detachment and subsequent movements, from three thousand to four thousand years may easily have elapsed since the incipient birth of the berg in question. Elsewhere I speak more fully my views.

As to future Arctic work, which will surely come in its own good time, I advocate its being pursued in the direction of Franz Josef Land, believing that, as always, not only the one route to the Pole, but as that in which the most fruitful geographical Arctic work can be done.

Greenland, we know, must be separated from Franz Josef Land by the channel through which the Atlantic tide eventually flows southward into Robeson Channel from the Polar Sea. And now let me throw out a tentative theory, which I am willing should be torn in shreds by those gentlemen who are devoted to that work. I think it most probable that Franz Josef Land, extending northward as a separate land or a close cluster of islands, finally terminates in an ice-clad land, which sends southward from year to year the palæocrystic ice and floebergs of which you

have heard. The extremely low temperature of the Arctic Ocean prevents the submerged ice from melting, and the slow movement does not cause enough stress to split the bergs into the irregular shapes common to other icebergs. It goes without saying that the shallow Arctic Ocean forbids the free movement and distribution of these huge masses, and many must waste near the parent mass. In short, on a small scale, the same conditions prevail at the North as at the South Pole, and the flat-topped iceberg of the South is the floeberg of the North.

I am sure that you will pardon me if I close by touching on a point very near to my heart.

I cannot conclude without referring to my obligation to one whom Americans as well as Britons unite in honouring and loving as a woman and as a sovereign—Her Majesty the Queen. I should fail in duty to my living comrades, as to myself, did I not express how deeply our hearts were touched on learning of her gracious act as a sovereign in sending the staunch *Alert* to our relief, and to her thoughtful and tender consideration as a woman in the message of sympathy and inquiry, after our return.

But, apart from an individual sense of appreciation, I rejoice as an American in these acts, knowing well in what kindly spirit the tenders and acceptances of these international courtesies were conceived and carried out.

I am sure that this intelligent and distinguished assembly heartily unite with me in the hope that the relations of Great Britain and America shall never be of a less friendly character, but that, from age to age, harmony ever continuing, our interests may eventually become united and identical.

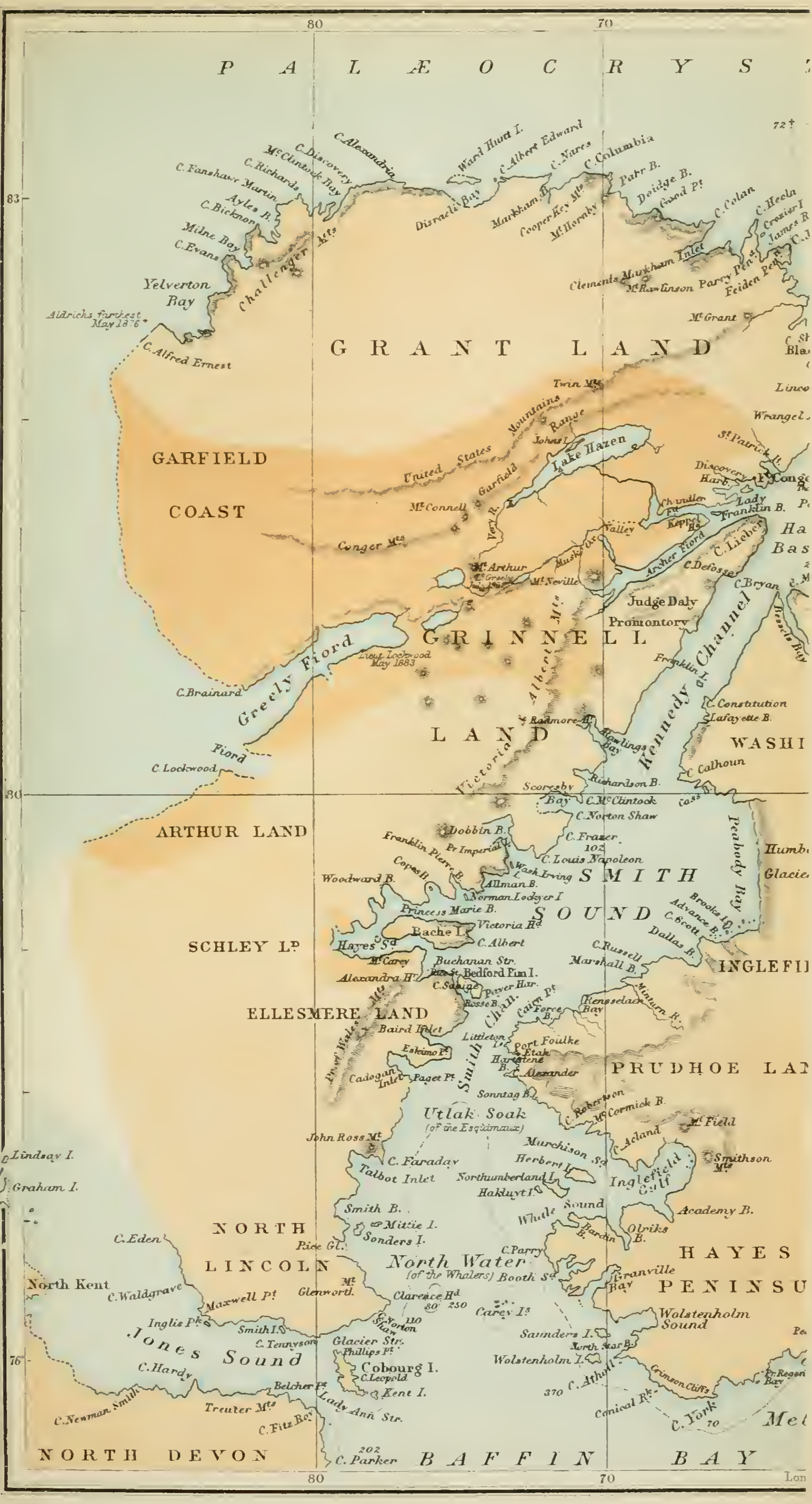
The mission of the United Kingdom has been unparalleled in the history of the world. To her it has been given to unite, harmonise, and develop the great Empire of India. From her loins have sprung the American, Australasian, and Canadian Confederations—in whom to-day rests the preponderating influence which in the future, more than ever in the past, will shape the destinies of the human race.

If it is but true to itself, whatever the English-speaking race of the twentieth century shall outline with one heart, one mind, one purpose, —that must be the fiat and the law of the world.

Before the Paper,—

The Earl of Rosebery, President of the Society, delivered the following Address:—

Ladies and Gentlemen,—You must excuse me if I cannot enter at any length—and I am sure you will readily excuse me when you know who is to follow me—you will excuse me if I cannot enter at any length into the position in which as a Geographical Society we meet, because unfortunately I am incapacitated by the influences of the weather from making myself heard except to a very few people for a very short time. But I think we have some reason to con-



PALÆOCRYS
GRANT LAND
GARFIELD COAST
GRINNELL LAND
ARTHUR LAND
SCHLEY LD
ELLESMERE LAND
NORTH LINCOLN
NORTH DEVON
North Kent
Jones Sound
SMITH SOUND
Kennedy Channel
Lake Hazen
Greely Fiord
Judge Daly Promontory
PRUDHOE LAN
HAYES PENINSU
Inglefield Gulf
Whale Sound
North Water (of the Whalers)
Utlak Soak (of the Esquimaux)
Smith Chan.
Bache I.
Cobourg I.
Carey Is
BAFFIN BAY
Yelverton Bay
C. Alfred Ernest
C. Lockwood
C. Brainard
United States Range
Conger Mts
Challenger Mts
Victoria and Albert Mts
Peabody Bay
Humb. Glacie.
INGLEFI
WASHI
Lindsay I.
Graham I.
80
70
83
80
76

THE INTERNATIONAL POLAR STATIONS 1882-83

TO CARRY OUT PROF. WEYPRECHT'S SCHEME OF SYNCHRONOUS METEOROLOGICAL AND MAGNETIC OBSERVATIONS

	GOVERNMENT.	NAME OF STATION.	LOCALITY.	NORTH LATITUDE.	GREENWICH LONGITUDE.	DIRECTOR.	SCIENTIFIC RESULTS.	REMARKS.
1	United States ..	Discovery Harbour	Lady Franklin Bay	81° 44'	64° 45' W.	Lieut. Greely, U.S.A.	Carried out International programme. Made important geographical discoveries and explorations in Grinnell Land and North Coast of Greenland, going farther north than any preceding Arctic explorer.	Owing to the failure of the rescue party to meet the expedition as appointed, they had to endure the greatest hardships and sufferings for nine months, until relieved by Capt. Schley in June 1884, when Lieut. Greely and six of the men were the only survivors.
2	German ..	Kingava Fiord	Cumberland Inlet, Davis Strait	66° 36'	63° 13' W.	Dr W. Giese		No mishaps.
3	German ..	Nain	Labrador Coast	56° 30'	62° 0' W.	Dr R. Koch	Carried out International programme. Also important ethnological information regarding Eskimos.	Do.
4	Danish ..	Godthaab	Coast of Greenland	64° 12'	51° 42' W.	Adjunct Paulsen	Carried out International programme.	Do.
5	British & Canadian	Fort Rae	Great Slave Lake	62° 38'	115° 55' W.	Capt. Dawson.	Do.	Do.
6	United States .	Point Barrow ..	Alaska ..	71° 18'	156° 40' W.	Lieut. Ray, U.S.A.	Do. and obtained valuable observations on the geography and natural history of the region.	
7	Austrian ..	Mase Mus Bay .	Jan Mayen Island	71° 0	8° 36' W.	Lieut. Wohlgemuth	Carried out programme. Made a collection of photographs and specimens of flora and fauna of district.	Do.
8	Swedish ..	Cape Thordsen	Spitzbergen ..	78° 30'	15° 30' E.	Mr Ekholm ..	Carried out International programme.	Do.
9	Norwegian ..	Bosekop	Norway ..	69° 34'	26° 36' E.	Mr Steen ..	Do.	Do.
10	Russian ..	Karmakuli ..	Moller Bay, Novaia Zemlia	73° 20'	53° 0' E.	Lieut. Andrieff	Do.	One death by accident.
11	Russian ..	Sagastir Island	Lena Delta ..	73° 0'	124° 40' E.	Lieut. Jürgens	Together with geographical research. The first season's programme was successfully carried out.	The party volunteered for a second year's observations.
12	Russian ..	Dickson Haven	Near Mouth of Yenisei	73° 55'	83° 0' E.	Professor Snellius	Meteorological observations while beset in the ice at Waigat Strait.	The "Varna" was beset in the ice at Waigat Strait, & the expedition did not reach its destination. They were rescued by the s.s. 'Ob' in Sept 1883.

gratulate ourselves on the position in which we stand to-night. The Scottish Geographical Society is holding its first anniversary meeting; and, in the first place, it has to congratulate itself on the fact that it has no less than 1030 members already, and in the second place, it has to congratulate itself on the fact that it has Lieutenant Greely here to lend lustre to that first anniversary meeting. Now, ladies and gentlemen, it is not very surprising, I think—though at first sight it might be a cause for some consideration—it is not very surprising, I think, that, though there is a Geographical Society in London of high position, yet that we in Scotland should wish to have a Geographical Society of our own. I think that everything that occurs in the world at this moment appears to force upon us, as a nation, the necessity of larger and more accurate geographical knowledge. Why, ladies and gentlemen, some of the names which up to a short time ago were hardly known outside the limits of the severest Civil Service examination have now become the watchwords of politics and the bywords of party. Owing to the action of two great European nations, we have had a greater opportunity of making ourselves acquainted with geography during the last eighteen months than we ever had before. The Cameroons, and Tonquin, and all those parts of New Guinea which have recently been re-christened, and which had never previously been heard of, bear testimony to the necessity in these days of accurate geographical knowledge among those who take an interest in public questions. But, in any case, there is always the high necessity before us of spreading our commerce through every part of the globe. I think wherever a new station for commerce is established, you will usually find a Scotsman in that station; and, under those circumstances, it does not seem to me surprising that we have resolved to establish a Geographical Society, or that it has acquired a very considerable membership. What does seem to me surprising is this—that we had not long ago a Geographical Society, and that we have not now an even greater membership. Now, to-night, ladies and gentlemen, we are not merely honoured by the recollection of the success which this Society has achieved, but we are also honoured, as I have already intimated, by the presence of one of those great world-pioneers who take the science of geography out of the limits of science itself and bring it within the broader sympathies of humanity. We have to-night Lieutenant Greely among us. Now, ladies and gentlemen, I know that if I want to get a round of applause from you I have only to mention Lieutenant Greely's name, and therefore I beg you will not applaud when I mention it. He will very well understand what your feeling is without that. But I think you should know this, that not merely have you a remarkable man among you, but he is paying you a remarkable tribute. Lieutenant Greely has refused, as I believe, to lecture anywhere on what he has seen and done. I believe, with one or two insignificant, and, as it were, private exceptions—I speak under his correction—he has refused to lecture anywhere. It is always embarrassing to a brave and modest man to speak about himself, and I suspect that it is this embarrassment under which he labours. But what I believe is this,—that he feels he has a special debt of gratitude—or good feeling rather than gratitude—to Scotland, because, when there was a question of rescuing those snowed-up, those isolated, those lost men, as it seemed, the Scottish whalers were those who gave the greatest impetus to the search by their dash and by their energy; and I believe that if Lieutenant Greely is here to-night to give us an address, it is due to the enterprise of those Scottish whalers, of whom we also are so proud. It is not a pleasant thing to speak about a man before his face, if you wish to do it in terms of commendation—it is much easier to do it in other terms. I do not suppose we shall know in all its fulness, till he writes it himself, what Lieutenant Greely has gone through; but we know this, that he has lived for months and for months in the presence and in the grasp of death itself; that he has lived in a region where nature herself seems unable to live, and where man himself, therefore, is unable to subsist without those outward supplies which must in time fail and cease Well, when we see a man who, with a small but devoted band, has lived in the very

presence of the destroying angel, in the very valley of the shadow of death, we know that he comes amongst us to some extent greater and stronger for that august and awful communion which he has passed through. I do not care, I am not able, to descant on the scientific results of Lieutenant Greely's expedition. I do not know them, and, if I did know them, I could not for want of scientific knowledge appreciate them at their full value ; but what I know, and what you all know—every man and woman in this hall—is the value of anything that raises the standard of that manhood to which we all belong. That we know from Lieutenant Greely. He was found with six or seven survivors out of five-and-twenty men, having had no nourishment for forty hours, within a few hours of death, by almost the chance hazard of a portion of the party that had started to discover them ; but through all that time I believe he never lost his courage,—though he had seen the dread moment of decease coming for months and for months—he had never lost his courage or his resource. He has shown himself a true leader of men. Now, let me go one step further. He belongs to a race which is as nearly ours as any can be which does not live under the shadow of the British Crown. We on two occasions fought with the United States. In the War of Independence, and in the war of 1812, we fought with that great nation which has grown to be what is called the United States, and of neither war can we have any pleasant recollection. If there is any pleasant recollection connected with those wars it is this, that those with whom we were engaged, and who showed themselves made of such sterling stuff, were of our kin and of our own race. Since then, ladies and gentlemen, there has grown up a communion of feeling between the two countries which makes every student of modern politics feel that it is absolutely impossible that in the future war can ever take place between the United States and this country. We are bound together by many ties—by the literature, and the language, and the race, of which we are all proud, and we still find that common bond growing and strengthening in this, that we are proud of the men of both countries. I am quite sure that Lieutenant Greely is just as proud of the great men of Great Britain as we in our island are proud of him. We have given up all idea of any rivalry in the arts of war, but we are proud to continue a rivalry of all that pertains to the arts of peace,—a rivalry of literature, a rivalry of commerce, a rivalry of all production that is creditable ; and in all those arts of production we are chiefly keen in the rivalry of the production of great men. I believe that in the exploits of Lieutenant Greely we find a new communion of pride between the two nations, and, therefore, a new bond of peace for the future of the two countries. I shall not detain you another moment, but ask you now to give a hearing to Lieutenant Greely.

After the Paper,—

Mr. Joseph Thomson, Honorary Member of the Scottish Geographical Society, rose to propose a Vote of Thanks. Mr. Thomson said :—

"My Lords, Ladies, and Gentlemen,—It is with no small pleasure that I find myself once more back from the tropics to appear at the commencement of your Society's second year of existence. My satisfaction is on this occasion immeasurably enhanced by seeing and hearing one who has made his name famous in the pages of Arctic research, and whose story of discovery and suffering has thrilled the heart of Europe and America with an emotion such as has been rarely evoked in the history of scientific progress. In the inscrutable wisdom of those who are responsible for the management of this Society, it has been thought proper that I, who am somewhat identified with the Tropics, should ask you to express, in the customary manner, the pleasure you have had in listening to an explorer who has made the frozen North his field of fame. I shall not attempt to explain this selection, but simply express the pleasure the task affords me, though I should have liked that some one better

acquainted with the subject of to-night's lecture had undertaken the duty. Lieutenant Greely, in his opening remarks, touched the patriotic chord, and found his way to our hearts, when he rehearsed the roll of Scotland's famous travellers. The names and deeds referred to are all well known to Scottish audiences, but, like familiar strains of music, we like to hear their praise again and again. It seems to transport us from the cares and artificiality of modern life into the region of romance. Our satisfaction would have been complete if Lieutenant Greely could have shown that, at some past time his ancestors removed from Scotland, and that therefore he might fairly be claimed as our own! As he has not told us anything to the contrary, we may yet indulge in that hope. With regard to his own unparalleled work in the Arctic region, we should naturally have liked to hear more. We should have liked much to have heard of how Lockwood added 125 miles of new coast-line to Greenland, and how Grinnell Land was explored. We could have wished him to dwell upon the remarkable aspects of nature during his two years' isolation at Cape Sabine; upon his retreat, replete with hardships; and upon that awful winter at Eskimo Point. The lecturer's modesty, however, has prevented him from referring to these personal matters, and at present we must be content to forego the pleasure. No one listening to such a story of suffering and daring as that told by Lieutenant Greely would think of asking, What is the use of it all? But if such there be, I would simply reply to him in the words of the American poet—

> "Whenc'er a noble deed is done,
> Our hearts with glad surprise
> To higher levels rise."

We may be a nation of shopkeepers, but we have a warm heart to everything which keeps burning brightly the sacred lamp of the chivalry in which there is as much daring, more self-denial, and a more tender regard for the weak and the oppressed than was ever practised by the flower of ancient knighthood. Though Lieutenant Greely has not told us, we all know the wonderful story of those awful months of self-sacrifice, and of how, till within a few hours of death from starvation, the strong neglected themselves and succoured the helpless. It is an episode almost unparalleled in the history of travel. On the general subject of Arctic exploration, you will not of course expect me at this late hour to speak. Neither am I fitted to do so; and I will therefore leave it alone, especially as one with more facility of expression is to follow me. Our noble Chairman has told you that Lieutenant Greely has done us the unique honour of making his first public appearance before this Society, and in the Scottish capital; and for that the members of the Society owe him a deep debt of gratitude. I ask you to express your appreciation of that honour, and of the profound pleasure you have had in listening to his story of the latest work in the Arctic regions by awarding him a very cordial vote of thanks.

Mr. Goschen, M.P., in seconding the Motion, said:—

My Lords, Ladies, and Gentlemen,—I rise with great pleasure to second the vote of thanks which has been moved by Mr. Thomson. I do not think that it was necessary on the part of Lieutenant Greely to apologise as a soldier for any possible want of literary expression in the views which he was about to place before us. If all soldiers and sailors could express themselves as he has done, the deeds of arms of soldiers and of sailors would need no civilians to describe them. At the outset of his remarks Lieutenant Greely gave us a historical sketch, then he passed to the dramatic incidents of his stay in those icy regions, and he concluded with laying before us the philosophic and the scientific results of his work; but you may remember that in the first part of his observations he dwelt, as your noble Chairman had also done, upon the Scottish Geographical Society and its work. I think, while Lieutenant Greely was speaking, though there are a large number of geographers in this room, the great majority of us must have been suffering

under a sense of the vastness of our ignorance. And I would wish, before I say another word or two about Lieutenant Greely, to congratulate Scotland on the formation of this Society, and say how deeply I sympathise with the spread of geographical knowledge. All that fell from Lord Rosebery in that respect I most cordially indorse. I do not know how it is here in Scotland, but in our public schools in England the crass ignorance with regard to geography is unworthy of a commercial and a military nation. I do not know that we are much worse than our neighbours across the Channel—for I heard this remarkable story once, that in an interview between President Grant of the United States and a most distinguished French General of high position, General Grant had spoken of San Francisco. "Oh, I know," said the French Marshal, "in Australia, you mean." He was corrected by his aide-de-camp, who said to him, "No, General, in California"—on which General Grant turned round, and slapping the aide-de-camp on the back, said, "Here is a fellow who knows everything." Ladies and gentlemen, it is unworthy of a country like the United Kingdom that we, who carry our flag into so many regions, and not only the flag of war, but the flag of civilisation, should know so little of so many distant regions to which our countrymen go. And in our public schools, and all our schools, if tales of daring and science, such as we have heard to-night, were placed more frequently before our boys and our young men, I believe it would assist in bracing them to their duties, and in raising their moral tone. I, as an old First Lord of the Admiralty—I expect that it is in that capacity I have been asked to second this vote to-night—heard with the greatest pleasure those most emphatic and cordial terms in which Lieutenant Greely spoke of the work done by our own sailors. I have seen something of Sir George Nares—and, in fact, I saw him two days before he started on that famous expedition to which Lieutenant Greely adverted—I saw the spirit in which that expedition went forth : I saw the smiling, cheerful countenances of the men going on that somewhat dangerous, if not desperate, expedition, and I rejoice to think that the United States and Great Britain and Ireland vie with each other in these brilliant feats, not of arms, but of science. I rejoice to think of all that has been done. No one can have listened this evening, without feeling stirred, to that wonderful tale of heroism and endurance. No one could have been unmoved when the lecturer told us how the men had stood by each other, how in times of trial all their best qualities were brought forth ; and I do not wonder that it is pointed to as a result of these expeditions that they raise the manhood of those who are engaged in them, and not only that, but they will raise the emulation of those to whom these deeds are told. It has been a great honour to Edinburgh, I am sure, to have received in this way what may be called the first-fruits of the tale which Lieutenant Greely has told. I congratulate you, and I congratulate all who are here, on what we have heard to-night, and I am quite sure that if there is one man in the United Kingdom who would begrudge Lieutenant Greely any reputation for the great deeds which he has been able to accomplish, there are certainly not two in the United Kingdom. I trust that the generous appreciation of the deeds of other countries will always be a characteristic of our race ; but if there is generous appreciation of the work of other countries, generous appreciation of the work of our cousins in America ought certainly to be amongst us. And I would even venture to hope that there must be some mistake or misunderstanding in the incident which Lieutenant Greely has pointed out, because I know enough of naval men to know that they are as generous as they are brave, and that they would be the first to resent any credit that was given to themselves at the expense of the explorers of other nations. I have had great pleasure indeed in being present here to-night ; and I thank the Geographical Society for having paid me the honour of asking me to second the vote of thanks on such an interesting occasion.

The Motion having been heartily carried,—

Lieutenant Greely, in responding, said :—I will not weary your patience by

entering into any lengthy acknowledgment of the very cordial and hearty vote of thanks which has been extended to me. Neither will I enter into any discussion as to the question of which I spoke, and to which Mr. Goschen has referred, further than to say that I heartily and thoroughly believe, as he does, that if there are two men in the United Kingdom who are of that mind, there certainly are not many. I think that the hearty appreciation which I have given to the labours of these officers, and the acknowledgment I have made of their fairness and justice—particularly of Sir George Nares and the officers of his expedition,—show that I have looked at the matter in a proper light. I do not give the thought of the writer of the article in my words: I quote his own language, and I give the page and the book, so that "he who runs may read."

Mr. Alex. Buchan proposed, in the following terms, the election of Lieutenant Greely as an Honorary Member of the Society:—

I have a very pleasant duty to perform, and that is to move the election of Lieutenant Greely as an Honorary Member of the Society. At the last meeting of Council the following resolution was passed: "That, at the Anniversary Meeting of the Society, Lieutenant Greely, United States Army, be elected an Honorary Member of the Society." It has been my business to look into a great deal of the work done in the Arctic regions, and to meet with three of the leaders of these expeditions; and I will say that the expedition commanded by Lieutenant Greely yields to none that I know of for the high excellence of its work. There are special results of his expedition which show the most patient and continuous observation and the keenest perception of nature; and the means which Lieutenant Greely adopted in carrying out his work were altogether admirable. In this expedition Lieutenant Greely has shown himself to be a leader of men, as well as an administrator of affairs, of a very high order; so that in electing him an Honorary Member of this Society, we elect not only a high-class discoverer, but a very wide man all round.

Professor James Geikie briefly seconded the motion, which was then announced by the President as unanimously adopted.

ASKJA: THE GREAT VOLCANIC CRATER OF ICELAND.

By James Wight.

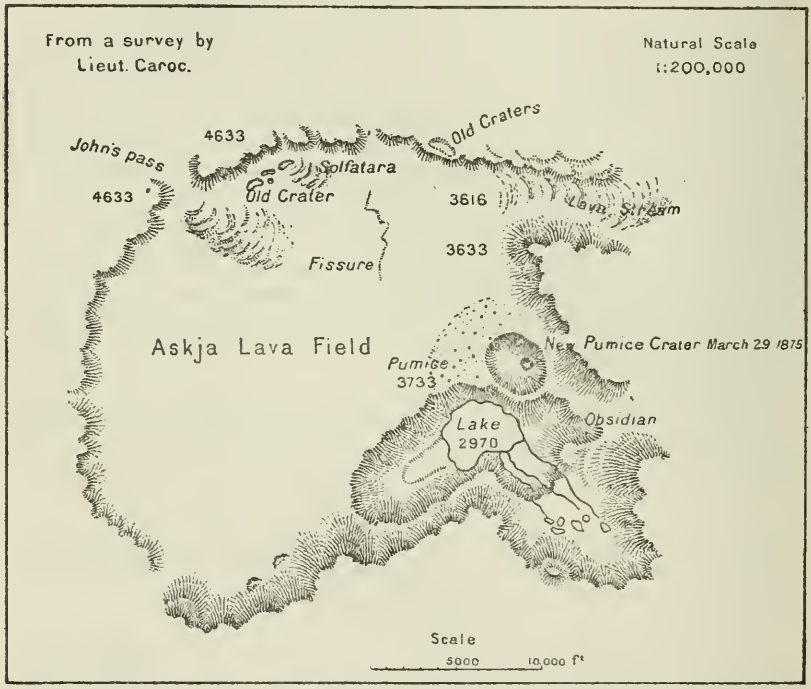
It is only ten years since this volcano was discovered, its existence having been before unknown, even to Icelanders; and there is no record of its eruptions—which, from internal evidence, it is certain, have been numerous and extensive—until 1875, when a great outburst took place, and considerable destruction was done.

Dyngju-fjöll, the Bower Mountains, in which this crater is situated, is visible from the northern habitable parts of Iceland; but 30 to 40 miles of the dread lava-desert of "Odathahraun"[1] (Odádahraun), around which still linger superstitions of trolls and outlaws, was a sufficient deterrent to the very small curiosity of the patient but apathetic Icelander.

[1] This, as well as some of the other proper names, has been spelt phonetically.

I have the honour to be the first foreigner who has crossed that desert and visited that volcano, and the first to give any account of it in Britain,—in two newspaper articles, published in the *Glasgow Herald*, October 1875. Since then, the subject has been three times treated of before the Royal Geographical Society in London: in 1876 by Mr. William Lord Watts, in 1881 by Mr. W. G. Lock, and in 1882 by Mr. Delmar Morgan. I trust, therefore, a short account of it and of my recent journey will be found of sufficient interest to members of the Scottish Geographical Society.

On 4th January 1875, a great earthquake was felt in the north of Iceland; and immediately after, there was seen in the Dyngju-fjöll



Mountains steam and smoke by day, and reflection of fire by night. This continued very violently for some days, to such an extent that it was seen at Reykjavik from the 9th to the 12th of January; but so little was known of the interior, up to that date, that it was supposed that Skaptar Jökull was in eruption. The Skaptar Jökull is a volcano, or rather volcanic range, to which (in Reykjavik) eruptions have been attributed whenever smoke was seen in central Iceland, but which has been dormant for a very long time.

On my arrival in Reykjavik, in the beginning of June 1875, I heard of the outburst in the north; and, as by that time its exact locality was sufficiently ascertained, I determined to make an attempt to visit the

scene,—before the time when the steamer was to call for us at Akureyri. I crossed the country by the longer postal route—the western dales—which took me eight days' riding. (I have since then crossed by the shorter route, *via* Kalmenstunga and Grimstunga Heithi, in six days,—which was very rapid travelling.) On my arrival at Akureyri, at ten o'clock on a Monday morning, I found I had only six days at my command; but, obtaining a new guide and a fresh team of ponies, I started the same night. I forded the Skjalfandafljot (Shimmering Flood) about noon next day, and arrived at Skutussathir, on the south-west corner of Myvatn (Fly Water) Lake, at 9 P.M. on Tuesday. Finding next morning that my team of ponies were too tired to proceed, I, with much trouble and delay, hunted up another team of three, and a local guide, with whom I started at 4 P.M. on Wednesday. A great sand-storm (Mold Reikur) was blowing in the desert; and, standing on the grass-land to windward of it, we could see the great brown clouds, hundreds of feet high, as far as the eye could reach. Into this we had to ride; but my guide provided "goggles" of glass and fine wire gauze, without which it would have been impossible to proceed. How the ponies managed I cannot tell, for the fine sand penetrated everywhere.

After a hard ride of six hours, we arrived at the eastern outburst in the desert of Myvatns Oræfi; and found all quiet. From our standpoint at the south-west end of the erupted lava, it presented a long line along the sandy plain, from north to south, with, at the north end, one oblong mound, or two mounds with a curtain joining them, about 200 feet high. Southwards again, were a single mound and a double mound; and, lastly, nearly at the extreme south, and opposite to us, a single mound. All were conical, with fire-scathed crater vents, standing like rocks in the sea of shattered lava; the side of the one nearest us was steaming from heat and moisture, whilst a great patch of sulphur was already deposited upon it. These latter cones were from 40 to 60 and 70 feet high. They were all formed by the violent eruption of the gases, which carried to a great height, amidst columns of smoke, red-hot stones, scoriæ, ashes, and dust. These, falling down all round, produce this conical form, while the liquid lava wells up from the rifts and flows far over the plain. But the lava in our immediate neighbourhood, and as far as the eye and the glass could reach, had the appearance of having been disrupted by the action of water instantaneously converted into steam; and so was piled up—not scattered—on the site of its molten bed, to a height of from 6 to 14 feet, in pieces of from 1 to 4 and 10 cubic feet, pretty regularly, but so loosely that I found it very dangerous to cross in an attempt I made to reach the southern cone before mentioned. The heat (on 29th June) from beneath this broken lava was still so great as to be alarming, in the event of slipping into a hole, and was such that, a sulphur fumerole coming up, this loose lava was set on fire, and made a great patch of blue flame about 40 feet in diameter.

There is another feasible theory, viz., that this loose lava had been

disrupted by gases when in a semi-molten state, at the site of ejection in the central rift, and then *pushed* along over the surface of the sandy desert to the place I saw it at, by subsequent floods of lava, which had welled up and flown over quietly without disruption.

In addition to the scoriæ ejected, which formed the mound-craters above mentioned, there had been an eruption from some of them of a very light black ash, which floats in water. This had been carried by the wind to the point I examined (I had no time to ride round the vast bed), and was deposited on the sand alongside the lava-bed to a depth of 4½ to 6 inches. There were also large quantities on the top of the bed of loose lava, covering up the interstices between the pieces, and giving way when stepped upon, which went to prove that it had been ejected long after the lava *here* had been placed *in situ*.

On 18th February 1875, or forty-six days after the earthquake, lava was first seen to be welling out of a great rift, or partial subsidence, in the desert of the Myvatns Oræfi, which is variously stated to be 3 to 4 miles broad, and 12 miles long; and the area of lava ejected is estimated to be from 14 to 20 miles long and 1 to 4 miles broad. Professor Johnstrupp of Copenhagen, who was sent out, in 1876, by the Danish Government, estimates the amount of lava ejected at this spot at 10,000 millions cubic feet. Lock, comparing it with the area of lava erupted by Hekla in 1845, which was computed at 14,400 millions cubic feet, says it ought to be three times greater, or 30,000 millions cubic feet.

The eruption continued for two or three months, during which, on 29th March, the great pumice eruption from Askja took place, enormous quantities of which were carried by west and south-west winds over great tracts of country to the eastward, and far out to sea. This date corresponds with Easter Monday, on which day I was told there were great eruptions of scoriæ and ashes, forming partly the cone-craters in Myvatns Oræfi. At this place the eruptions seem to have ceased from the end of April until 15th August, when they were resumed. Mr. Watts, who turned back from Storuvelir to see them, gave a most graphic description in his admirable little volume *Across the Vatna Jökull*, mentioning, among other things, that one of the crater cones had its height increased 50 or 60 feet in one night by the violent ejection of clinkers, ashes, and bombs, while, around, there flowed out the gleaming white lava-flood.

All who have witnessed this unite in believing that the internal fires covered a wide area, and that there was a subterranean connection between Askja and Myvatn, which their simultaneous action goes far to confirm. In short, it is held that the lava ran out from Askja at the lower level of Myvatn, 30 or 40 miles distant, where there was a much thinner surface-crust through which to force its way; and that the pumice ejected at Askja is the residual silicious scum of this lava, as the obsidian is the vitreous scum.

To see this other great volcanic vent was now my object. We had seen the column of smoke at intervals during the last three days; and,

turning back, after a rapid ride, we again arrived at Skutustathir, at 6 A.M. on Thursday, where I payed off my eastern team.

After a few hours' rest, I started with my original team, now refreshed, and with a young priest, who professed to be able to guide me on our way to Dyngju-fjöll. We arrived at Svartákot the same evening; and the next morning, at six, started on a long, hot, and toilsome march across the great lava desert. We went all round the north of the mountain range to the north-east corner, over a high spur of the mountain, and then down into a deep rift at its base, which was so weather-worn and covered with sand that it told no story. From here we climbed a steep ascent and reached the level of what is now known as the lava-stream, about one-half to three-quarters of a mile wide, the bed of which is covered with heaps of broken lava, from 8 to 16 and 20 feet high. On the north side it is bounded by mountain walls, which have the appearance of having only recently been fire-scathed and sheared perpendicularly; and on the south side by mountains about 1000 feet above the level of this floor, forming a steep slope, covered all over with pumice. Beyond this mountain-wall rose, in solemn silence, the enormous column of smoke, thousands of feet high, and extending from one-half to three-quarters of a mile; away in the far east the impressive white line of the Vatna Jökull, and a great snowy prominence towering over and as if beyond it. In the snow-covered foreground was the vast tract of the pumice, tracing its desolating course to the east.

I made an attempt to climb the mountain, which did not look difficult, but, the rotten, treacherous pumice, and the exhaustion produced by over-exertion, proved too much for me. This failure I was determined to retrieve; though it was not until ten years later that I undertook the journey—my seventh to Iceland.

I started on the 8th of July 1885, by the regular Scottish trader *Camoens*. The last accounts received of the state of the weather in Iceland were—"Snow to the water's edge;" but in a country with such a changeable climate this might not indicate more than a few inches of snow, which would rapidly disappear: so I was not deterred.

It was my intention to cross the island by the central or "Sprengisandr" route, having on two previous occasions crossed by the western routes. The Sprengisandr, or bursting sand,—so called from the numerous quicksands in the beds of streams which, running from the Jökull or Snow Mountains, go to form the great rivers,—was a route not devoid of danger, it being necessary to ford these streams in traversing it on ponies. It is considered best to approach this desert from the north, as the last habitation is only one and a half day's journey from Akureyri, while the last habitation from the south is at least four days from Reykjavik; in consequence of which one's ponies are very much fresher to cross the desolate middle passage when coming from the north, and they are better able to stand the hard work and scanty forage to be found there. But there is some difficulty in getting a guide in Akureyri, for, there being no roads, only landmarks are available. I therefore applied to my

friend Captain John Coghill, the travelling agent of the Leith and Iceland Company, who found for me Bjarni Gudmonson, a guide who had been twelve times over this route.

On arriving off the coast of Iceland we found that the snow had been very heavy and recent, large patches, such as are not looked for at that season of the year, still remaining on the mountains. The Jökull, or Glacier Mountains, were very white; and snow was still found in the clefts right down to the water's edge. The temperature was very low. On the passage round the north the captain, on more than one occasion, thought he saw ice-blink; but, fortunately, there has been no polar floe ice this year. Akureyri, where I arrived on the 20th of July, still retained a thoroughly wintry aspect. Here I met Captain Coghill, who expressed some doubts as to the practicability of the central route. One of the western routes had been barely passable ten days previously, and was found very risky.

As Captain Coghill himself intended going south by this central route for the first time, he had sent for a guide who lived on the southern border of the Sprengisandr, who, on his arrival at Akureyri, reported that it had taken him and another man five days to perform the journey from house to house—a journey which under ordinary circumstances could have been done in half that time. The captain—well known as the most daring rider in Iceland—therefore abandoned his project, and proceeded west. Though greatly disappointed, I was compelled to do likewise. I had not, however, intended to accompany him, but, after a day's journey south, to diverge to the east for the purpose of revisiting the Dyngju-fjöll volcano; therefore I resolved to proceed to Askja, back to Akureyri, and from thence by any practicable route.

On the 21st July, at 6 P.M., I started with my guide Bjarni and five ponies, two being for myself, two for the guide, and one for the pack containing provisions,—the pack and loose ponies being driven in front as we rode along. Sending the ponies round to ford the river, we crossed the fjord in a boat, and began the steep ascent of the familiar Vathlaheithi—a long rolling mountain, having an altitude of 2118 feet, and attaining its highest summit opposite Akureyri. The ascent was slow and toilsome; the track led sometimes over snow, which, lying in the narrow gorges, formed natural bridges, under which poured rushing torrents of water, and over which the ponies required some persuasion to make them cross. It took us four hours to reach the heath at the top and descend the other side to the ferry over the Fnjöska, a river which I forded twice in 1875, but which was now deep and very rapid, the left bank sloping to the water's edge and covered with grass, the right bank very steep, being 20 to 30 feet high, and formed of loose stones and sand resembling a railway embankment. The ponies, which were driven into the water, swam safely to the other side, although swept a considerable distance down stream; while we crossed in a boat which required considerable dexterity to handle rapidly.

It might be said that there are no trees in Iceland, and the reproach is hardly taken away by the two rowans or mountain ash trees (*Pyrus aucuparia*), 20 to 25 feet high, in Akureyri, of which the inhabitants are very proud. Here, however, on the slopes above the right bank of the river, we found one of the most charming bits of sylvan scenery in the country, a *Skogr* ("forest") composed of the dwarf birch (*Betula nana;* Icelandic *Birki* or *Birkjies*). It is a beautiful patch of green, many miles in extent, and a favourite summer resort for picnics of ladies and gentlemen from Akureyri, who are all riders.

We shifted the saddles on to fresh ponies, which, breaking into a ready gallop on the flat, frequent, and well-worn paths, brought us to the Kirkja of Hals (Throat), a shoulder of the hill to our right; and proceeded eastward, along the Ljosa-vatu Skarth (Pass of the Light Water)—so named from a beautiful lake at its eastern extremity. Fording a deep stream, the overflow of the lake, we descried in the distance a cloud of spray rising from the waterfall of Gothafoss, on the Skjalfandafljot, a glacial river which, at this point, falls with a thundering noise about 40 feet into the chasm beneath. There is now a bridge over this river above the falls, where I forded it in 1875. Instead of approaching the river, we struck a southerly course, passing the light water, Kirkja; and, after a rapid and steady ride along the broad and (for Iceland) fertile valley of Bardadalr, we drew rein at Haldorsstathr, at 4 A.M., thus covering about fifty English miles in ten hours, four hours of which were over mountainous ground.

I had stopped at Haldorsstathir in 1875. Besides obtaining a good sleeping-place, I now hoped to find out something about Jón of Vithikoer, whom I wished to have as a local guide to Askja.

Jón Thorkellson, or Jón of Vithikoer—by which name he will always be known—is the brave Icelander who, in the "deep-winter month" of February 1875, performed a journey to Askja on his own account, to inspect the scene of the eruptions; and brought back word to reassure his neighbours, who were in great fear of the possible consequences of the volcanic disturbances.

In his company, I started again on the 22d July at 6 P.M. Our caravan now numbered three men and seven ponies, one pony carrying a load of hay and a small tent. We were ferried over the Skjalfandafljot, which did not seem higher than usual, and, saddling up on the other side, we followed the right bank for the space of an hour, and, then steering south-east, arrived at Svartákot ("black river cot"), the last house on the borders of the Odáthahraun and the invariable starting-point for Askja. By midnight we reached the last pasture, situated on the Sudrá, or South River, a tributary of the Skjalfandafljot, where we unsaddled, and gave the beasts a short rest and a feed off the last grass they would enjoy until our return to the same spot. By two in the morning we were well into the barren undulating blackness of the Odáthahraun (Misdeed Lava-Desert), which is 1200 to 1500

miles in extent; and, at the very outset, we encountered fields of bleached skeleton stalks of probably dwarf willows (*Salix reticulata*) which had been killed by sand, drought, and wind. Soon we left the sand, and traversed a ridge of black, broken, rifted and tumbled lava. In the dim light it took fantastic and funereal shapes. It was painful travelling for the beasts.

These lava streams seem to have welled up from rifts, in a manner similar to that at Myvatns Oræfi. They have not all been burst asunder, but show great circles of the thick, viscid, moving mass of fluid fire, as it boiled and set, and burst up, and boiled again; the later boilings sometimes traversing channels under these rounded domes, which had been formed by the hotter lava beneath, running out from beneath the cooled and solid top on to a lower level. Several miles of these great domes suggest an enormous shoal of titanic turtles, stranded, their overlapping shells having become petrified ages and ages ago. Vegetation is virtually left behind; and yet, strange enough, we find in the sandy valleys, wherever there is the least shelter, little solitary patches of the moss campion (*Silene acaulis*) protected by any little bit of rock, and little tufts of the sea pink or thrift (*Armeria maritima*), both in flower, but very pale. Here also are found little branches of dwarf willow, and by its side, as if in its native habitat, the green blades of wild corn with last year's dead stalks. This last is the Melur of the Icelanders (*Elymus arundo arenaria*), the seeds of which they used in former days to grind for food.

About 6 A.M. the ascent became more steep; and, as we approached the snows above, rills of water were met with. There was neither snow nor water on the desert. The morning was clear, but not bright. In our ascent we opened out Bláfell and other great humps more to the east, all covered with snow, and, what was more noteworthy, the magnificent mass of Herthubreith ("the broad-shouldered"),—5447 feet—the virgin mountain of Iceland, which has never been trodden by human foot. In shape it is rectangular, about eight or ten miles long; on three sides are sheer perpendicular cliffs, measuring about 2000 feet to the base of the cone summit; and, on the fourth side, one-half is cliff, and the other or lower half a very steep slope. It has never been in eruption; and is pronounced to be of volcanic material but subaqueous formation. The Dyngju-fjöll peaks were more or less enveloped in white floating clouds, sometimes hiding, sometimes disclosing them; and, as we ascended towards them, we got on to the snow-line, speedily discovering a new phase in our journey. At 7 A.M. we reached a patch of scoriæ, and shifted the saddles to the ponies which had been reserved for the *Snio;* and, according to Jón, we should have arrived at Askja in from two to three hours. We resumed our march, now, right up into the snow region—Jón being on foot, as the snow was so soft. He said there had been a fall of two feet of snow as recently as six days ago. So our order of march was arranged in Indian file. Jón and the loose ponies went first, and the others in order of weight: thus I was relegated to the rear, and well it

was so, for the foot-prints of the preceding animals so solidified the snow as to render it more capable of bearing weight. But this was not always the case, as in many places we not only floundered but stuck fast until we were able to dismount in order to relieve the beasts. Bjarni and I then walked with linked arms, until we were breathless and compelled to remount.

We were now among the cloud-capped peaks, winding slowly between them, sometimes on the one slope, and sometimes on the opposite one. Jón knew his ground underneath, however, involving ascent and descent as we changed sides. At last we entered Cloud-land, or, as we thought, a dense bright moist-fog came down upon us, and effectually obliterated distant objects. We began to descend a very gentle slope between peaks. We saw a bit of black rock loom through the fog, and, shortly after, still higher up, another black speck, then a black patch ahead in the snow. On arriving at this spot, Jón announced it to be *Jón's Skarth*, or Jón's Pass, named in his honour as its discoverer. Thus, in a fog we had arrived, in a sense, at our journey's end. This was at 11.30 A.M. instead of at nine, as anticipated.

Things did not look well, however, for in the dense fog we could see nothing; but although fogs in Iceland are most treacherous, there was no danger of our getting lost, as, being a return journey, the beasts were capable of finding the way back over their own tracks. But it might have lasted for days; and therefore it barred all progress towards the object of my 1500 miles journey. Such were my thoughts—bitter enough—as we hastily unsaddled. Spreading out the fodder for the ponies, we unpacked some food for ourselves. Hoping against hope, we had rested here about fifteen or twenty minutes, when suddenly a sunbeam broke through a rift in the fog, and then, to our great joy and surprise, the cloud (for it was one of our early morning friends) rolled quickly away to the eastward, disclosing to us, bathed in brilliant sunshine, the magnificent panorama—white, solemn, and still.

Here we were at last, then, 4500 feet above sea-level. Five hundred feet below was the object of our quest, the Askja, the Casket [1] of the Bower Mountains, with its ring of jagged peaks, looking deceptively small in the rarefied atmosphere and monotone of white. To our left, behind us, was Dyngju-fjöll; eastwards, in the far distance, looking solemn, white, and ghost-like, and fading down to the distant right until taken up again by the glacial mountains of Arnarfells Jökull, rose Vatna Jökull. In the middle-distance was Trolladyngja (Trolls' Bower), and, on the extreme right, the black and pall-like wastes of the Odáthahraun.

Impressive as was the view, it was not our object to admire it. Askja, the great volcanic crater of Iceland, lying at our feet, was our immediate goal, and on it our gaze was concentrated. All around appeared to me silent and still; but Jón drew my attention to some great silent columns

[1] Principal Jón A. Hjaltalin, of Modruvellir College, translates *Askja* as *box*, and again translates *basket* into Icelandic as *karfa; askja*, therefore, means *casket* or *box*.

of white steam, which, at this distance (they being at the furthest end of the crater, five to six English miles off) seemed to stand in a sort of semi-circle. They were distinguishable with the aid of a powerful field-glass from the surrounding snow by being relieved against the fire-scathed colour of the cliffs forming the crater rim, which were 800 to 1000 feet above the level of its floor.

Let us now, from our present stand-point, attempt to describe this great crater basin. In outline it is roughly pear-shaped. At the crown of the pear, in the north-west, is Jón's Skarth, where we stand. Exactly opposite to us, in the south-east, is the apex or smaller point of the pear, round which are ranged the columns of steam. In the south-west there is a gap in the mountain ring, which was probably a very old outflow of lava; and in the north-east a very evident outflow of lava. I have already mentioned that this crater is surrounded by a mountain-ring, varying from 500 to 1000 feet high above the present floor. This mountain ring is 17 miles in circumference, and has its outer surfaces sloped and grooved in a manner exactly similar to the slopes of the Dyngju-fjöll Mountains, of which it forms a part. But the inner faces of this mountain-ring, or periphery, and also the north wall of the lava stream, *are cut sheer down;* and the fire-scathing of their surfaces is as evident as if but of recent date. This cutting down of the inner surfaces produces the jagged teeth-like peaks in the ring, where the grooves or gullies occur on the outside. The floor of the crater seems flat, but has really an inclination of 1 in 40 towards the lava stream in the north-east, and is covered with heaps of *débris* from 4 to 20 feet high. The area of this floor is 23 square miles; and the vertical section of it, laid bare by the great rift at the apex, shows that the floor of the crater must at one time have been 600 to 1000 feet lower or deeper than it now is, and that the present floor is formed by a multitude of lava floods, deposited there subsequent to a period when a mountain-mass, not less than 23 square miles in extent, and at least 2000 feet deep, had been melted down and run out into the Odáthahraun. In short, the story told is that one-half of the Dyngju-fjöll has been melted down, and that the outer skin only remains to tell the tale.

But we must make haste and descend to examine the scene of the seventy-five eruptions. I had been prepared for scrambling across on foot, as I did in the stream ten years before, but my experience of the ascent in the snow was much against this mode. I therefore asked Jón whether I might ride across the floor; and he, looking quietly around, said, "Yes, you can ride, but it will take two hours to get there." We saddled two ponies at once, and leaving Bjarni in charge of the team, we started down the very steep slope. Jón was leading his pony to make tracks for mine, but no sooner had we left the black floor of our resting-place, than we sank into a deep drift, which went to show that we had been standing on a mere shelf. I followed my beast down, on foot, and, much exhausted remounted when at the level of the floor.

The sun was now blazing hot, and the reflection from the snow very dazzling and trying to the eyes. I had not thought of bringing my "goggles" with me, but Jón put his on at once. We passed slowly along, floundering in the deep drifts between the unseen lava heaps; and very shortly, on our left, opened out the lava-stream, through which again appeared the great Herthubreith with glittering crest. I now recognised with what ease I might have entered this charmed circle in 1875, had my men known anything about it, or had time permitted exploration on my own account. Further on could be seen the inner face of the mountain I had tried to ascend, which formed a barrier of only a quarter of a mile between me and the Stör Helvita, the smoke of which I then saw rising thousands of feet high.

We plodded along, the left side freezing with cold, the right side scorching with the sun's heat; and, on approaching the line where, from the combined heat of soil and sun, the snow terminated, the mixture of pumice sand and snow was so soft that Jón and I had to abandon our ponies about a quarter of a mile from our destination, and, with linked arms, proceed on foot over the soft mud, which had been formed of the pumiceous sand and loam ejected ten years before. This heat in the soil arises from a *hver*, or hot spring, at the bottom of the pumice crater, of which subsequent mention will be made.

We proceeded slowly, ascending a slope of about 100 feet, formed of this sand. It became drier the higher we got, and at last we came abruptly on the edge of this enormous, yawning gulf. It resembled a mighty grave, out of which the steam columns, like titanic ghosts, seemed to emerge, and from which they seemed to be silently retreating. I say silently, for although Jón might have heard the noise of erupting steam, it was not audible to me.

In speaking of this wonderful place, I shall adopt Mr. Watts' nomenclature,—Askjagjá, "Casket Rift;" equally suitable with Svinagjá, "Swine Rift," and Almannagjá, "All Men's Rift;"—and, for brevity sake, shall employ only Gjá, to distinguish it from the Askja, in which it is situated. This Gjá, or stupendous hole in the crater floor, is in shape a sort of oval, or rather a parallelogram with rounded ends. It is about five miles in circumference, and lies across the wide part, where the apex of the pear-shaped crater forms a triangle, and is surrounded by its part of the mountain rim. It extends longitudinally from face to face of these cliffs, at the base of the triangle, but does not extend back to the apex of the triangle; for there is a considerable portion of the floor which remains unfallen, but is rifted and torn, and contains those hvers, or hot springs, constantly steaming, hissing and gurgling,—though we could not hear them.

There is no doubt—for there is abundant evidence to prove—that this great mass has sunk down and caved in to some enormous hollow in the bowels of the mountain formed by the outflow of molten lava through a subterranean channel at some distance; and it is not unreasonable to believe—the universal opinion of all who have seen it—that the vacuum

was really produced by the outflow of lava at Myvatns Oræfi, already described. Askja, on fire beneath, ran out 30 to 40 miles to the north; the pent-up gases burst up the floor; it sank down into the burning abyss; and then began the hideous turmoil and battle of the elements, fire and water, which I might have seen, and which Mr. Watts, twelve days after my visit, saw and described so graphically in *Across the Vatna Jökull.*

Standing upon the cliffs, near the apex of the triangle, he says:—

"Suddenly a fearful crash made us stand aghast—it seemed as if half the mountain had tumbled in upon the other side of this horrible valley, and for some time we could see nothing for the dense clouds of steam which seethed up before us, and the heavy rain of loam which was falling; while the hideous shrieks, groans, booming, and screaming sounds rose from all parts of this terrible depression, the bottom of which was now utterly obscured.

"Again and again came a crash and a roar from the opposite side, and also, occasionally, from the side we were standing upon.

"The sides of the crater (Gjá) were evidently falling in, and huge wide cracks, even where we stood, showed us that our position was not altogether a safe one. . . . About a mile away to the north we could see the rim of the crater (Gjá) at a great depth beneath us, and while we were looking at it a great crack opened upon the margin, and a huge slice slipped with but little noise into the crater (Gjá), deep down beyond the range of vision."

From this Mr. Lock infers—

"The disrupted mass did not sink at once to its present level, but subsided slowly, possibly continuing to do so as long as lava streamed forth in the Myvatns Oræfi."

Mr. Watts describes what he saw about the middle of July: the outflow of lava at Myvatns Oræfi, however, had ceased by, at least, the end of April, and was not resumed until 13th August. I am, therefore, of opinion that the subsidence took place at once and for all; that it occupied a smaller area than at present, but had a much greater depth; and that the diminution of the depth and the increase of the area has been caused by the pent-up gases and steam, so rending and dislocating the rim as to detach and precipitate vast masses of rock. This area is now about 5 square miles, and the depth of the surface of the disrupted mass, from its original level, is stated by Professor Johnstrupp to be 740 Danish feet.

In 1876, when the Professor visited Askja, there was a lake of warm water at the bottom of the Gjá nearly circular in form, 4400 Danish feet in diameter, and, it was said, about 300 feet deep. In 1878, according to Mr. Lock, the lake had increased in size, so that its water then covered the whole surface of the subsidence to a considerable depth; and, in 1880, the water had risen about 40 feet since the year 1878. The lake is there now, and appeared to me very much of the dimensions stated by the Professor in 1876; but I imagined it was partially covered with ice and snow, and am certain its waters were at least half a mile from the cliff base forming the northern wall of the Gjá, and fully more from the eastern end of the Gjá.

Mr. Lock says, and Jón repeated on the spot, that there was no water

there at the time of Watts' visit. In the shape of a lake there certainly was none: no peace or time was afforded for either solids or liquids to find a permanent resting-place. But there was water; and so he describes some of its action:—

"I was presently disturbed by a peculiar rushing sound. . . . It was a huge column of water springing up from a fissure in the bottom of the crater (Gjá), which, being ejected in a slanting direction, almost described an arc rising to a much greater height than even the level of the spot we were encamped upon (the eastern cliff, say 1500 feet above the bottom of Gjá). It was of course converted into spray long before it reached such an elevation; and falling with great violence upon the opposite edge of the valley, caused a great portion of the wall of the crater (Gjá), at that point, to fall away with a prodigious noise, the concussion of which produced a series of avalanches in various other parts of the volcano (Gjá)."

We are not entitled to doubt Mr. Lock's statement as to the water of the lake; but where has it gone since 1880? The supplies in the shape of snow have been pretty regular, and there is no *apparent* outlet. May it not be converted into steam by the hvers, and so become dissipated in the atmosphere?

There, however, lay the lake—looking small and blue from our vantage ground. We stood on the edge of the cliff forming the northern wall of the Gjá, looking down which, 700 feet below, we could easily discern the numerous stratifications of the many lava floods which had raised the floor to its present level. The bottom of the Gjá, mud-coloured pumice, was smooth and sloping gently toward the water from the north, but with a much greater slope, and from a greater height at the east end. It was so smooth that one could easily have slid down; but I did not descend; I was quite satisfied with the dimensions given by the eminent Danish savant of 1876, and with the plan of the Gjá by Lieutenant Caroc (now Captain) of the Danish Navy, who accompanied him,—a copy of which is given with this paper.

We now turned our attention to a great round aperture on our left, at the south-east of the crater, and the north-east corner of the Gjá, but not within the Gjá, although quite close to it. We had to ascend a considerable slope of pumiceous sand in order to arrive at its mouth, where we had to lie down so as to look over the ledge. We found it to be perfectly circular in form, widest at the mouth, as an inverted cone; about 150 feet in diameter at the mouth, and 50 feet in diameter at the bottom; the sides perfectly smooth from the pumiceous sand of which it was composed. This is the Pumice Crater, from which was ejected, on 29th March 1875, the enormous quantity of pumice, which, carried by the wind, destroyed many pastures, and was borne far out to sea,—where I saw it floating. Recalling to my mind the pumice I saw in 1875, on the other side of the mountain, a quarter of a mile distant from it, I pictured to myself a stupendous *mitrailleuse*, shrieking forth its gases and more solid, but very light, materials in pieces of enormous dimensions. It has now a hver steaming and blowing near its bottom, rippling some

greenish water and sending up a great volume of steam, forming the first on the left of the array of steam columns, which at irregular intervals stand all round the cliffs behind the Gjá, but not inside it.

We had accomplished our purpose, and I was satisfied. Gathering some specimens of pumice and loam to compare with the specimens I had collected in 1875, we turned back; and, with quite as great toil as before, regained our team on the ledge at Jón's Skarth. Saddling up, we proceeded, on our return, in the same order as before; but Jón was mounted. Where we floundered before we floundered again, but we arrived at the pasture of Sudrá at midnight on Thursday. After a three hours' feed for the ponies, and three hours' sleep on the ground for ourselves (during part of which it rained), we arrived at Haldorsstathir at 9 A.M. on Friday morning, after an absence of thirty-nine hours.

We arrived at Akureyri on Saturday morning, and found the rivers swollen with melted snow and mountain streams converted into roaring torrents; so that, on my further journey west, I had to make long detours for ferries, swimming the ponies, instead of fording as I had done before.

THORODDSEN ON THE LAVA-DESERT IN THE INTERIOR OF ICELAND.[1]

By J. W. M'Crindle, M.A., M.R.A.S.

Iceland, in respect of its physical structure and its peculiar general aspect, is one of the most remarkable countries in the world. Amid its frozen solitudes, fires from the under-world have raged with a force and a frequency elsewhere wellnigh unparalleled. The island, indeed, consists of an elevated plateau formed mainly by masses of lava, which have been ejected from a great multitude of volcanoes. As Nature is unable, from the rigour of the climate, to cover over the naked deformity of this lava with a growth of vegetation, the island, except in the level tracts with which the coast is belted, and along the course of certain valleys, presents the general character of an unredeemed waste, totally unfit for human habitation. It abounds with lava-streams and with vast glaciers, with rifted rocks and yawning chasms. Here it is drenched with the hot spray of boiling springs, and there blackened with showers of scoriac ashes. It is, moreover, convulsed with earthquakes and volcanic eruptions of fearful violence. Its long winter is of Arctic severity, and, even during its brief summer, it is visited with furious storms of snow and hail. This description applies with peculiar force to the district in the interior called 'Odádahraun (Odáthahraun), of which till lately very little was known even by the natives themselves, who dreaded not only the difficulties and dangers which had to be encountered in traversing it, but were further influenced

[1] Based on Herr Thoroddsen's Paper in *Petermann's Mitteilungen*, No. ix., 1885.

by a superstitious belief that it contained fertile oases inhabited by whole colonies of outlaws descended from criminals who had escaped thither from justice in the days when the laws of the island were of Draconian severity.

The first attempt to explore this secluded region for scientific purposes was made in the years 1838 and 1839 by Björn Gunnlaugsson, the well-known cartographer of the island. He has unfortunately left no record, either printed or written, of his expedition, but has merely entered in his map the results of his observations. Provost Sigurdur Gunnarsson, who was his companion, made frequent journeys into the interior, and his works, along with Gunnlaugsson's map, are the head sources of information regarding it. A Danish naturalist, J. C. Schythe, encouraged by the success which had attended Gunnlaugsson's undertaking, attempted himself, in 1840, an exploration in company with Gunnarsson, but they were unable to pursue their investigations, having been baffled by the dreadful weather which exposed them to unspeakable hardships and privations.

No further expedition was undertaken till the great volcanic eruption of 1875 turned the attention of the world to this desert region. While the volcano was still active, an Englishman called Watts made his way to Askja, after having traversed the Vatna-jökull; and in February, 1876, a native of the island, Jón Thorkelsson, was deputed by a newspaper proprietor to report upon the phenomena of the eruption. An expedition, moreover, fitted out by Denmark under the conduct of Professor Johnstrupp of the University of Copenhagen, arrived in the summer of 1876, for the purpose of examining the volcanoes in the north part of the island. The Professor made a thorough exploration of Askja, while a survey of the valley belonging to it was undertaken by Lieutenant Caroc. The volcanoes in Sveinakjá and at Myvatn were on this occasion also examined. A visit was subsequently made to Askja by two Englishmen, Lock and Morgan, of which an account is given in the *Proceedings* of the Royal Geographical Society of London for 1881. In 1880 some peasants of Myvatn and Bárdardalur travelled round the desert in search of some stray sheep, and in the course of their wanderings discovered the grassy tracts of Gæsavötn and Vonaskard.

In spite, however, of all these visits, the knowledge of the geography and geology of 'Odádahraun remained extremely imperfect. Gunnlaugsson, in his map referred to, had indicated merely its main features, and up to the present time little was known of it in detail. As for its volcanoes, even Askja itself, which had oftenest been visited, was not very accurately known.

Taking all this into consideration, Th. Thoroddsen, who had been a member of the Danish Expedition of 1876, was induced to make a fresh exploration of the desert, and to make it as thorough as the slender means at his command would allow. This design he carried into effect in the summer of 1884, and he has contributed to the current volume of Petermann's well-known geographical publication an account of all the incidents of his expedition, and of the results of the observations which he had been able to make.

The foregoing particulars we have gathered mainly from his introductory remarks, and we proceed now to notice in brief outline the facts of most interest and importance which are brought to our cognisance in the narrative he has supplied. The area embraced in the explorations he describes is that which is included between the rivers Skjalfandafljót and Jókulsá, which both flow northward, and between the north part of the island which lies between the mouths of these rivers, and the great ice-field called Vatna-jökull in the south. It lies therefore between the 16th and 18th degrees of longitude west from Greenwich, and between 64° 30′ and 66° of N. lat.

After completing at Akureyri the preparations for his journey, Thoroddsen left that place on the 2d of July, and proceeded to Myvatn, where he spent some time in examining the volcanic phenomena of that remarkable district. The longest excursion he made was southward to Ketill, when he took the opportunity of ascending the lofty heights of Bláfjall and Sellandafjall. On the 16th of July he left this neighbourhood, starting from Reykjahlíd with a view to reach the interior and explore the hitherto unknown districts lying in the east of 'Odádahraun. On his route would lie the lofty and beautiful range of the Herdubreid Mountains. He had, however, first to cross the great plain of Myvatnsöraefi—a cheerless waste, what with its fields of lava, its volcanic depressions, and its shifting sands. Here is the crater Sveinagja which, in 1875, poured out a mighty stream of lava, and there are other craters besides. The south portion is entirely destitute of vegetation, and it is only in the north that some grassy patches are to be found, to which sheep are driven for pasturage. The weather was cold, and sand-storms and snow-storms, blowing alternately, made travelling extremely disagreeable. The route, which was at first easterly, ere long ran southward, and in a parallel line with the river Jökulsá. A convenient place for rest and refreshment was found when the neighbourhood of Herdubreid was gained. Here was a verdant piece of ground with wells of water situated on the edge of a lava-stream. The vegetation was comparatively luxuriant, so that the ponies were for a considerable time found in provender. The surrounding country is strikingly beautiful. Close at hand the Herdubreid lifts up its mighty ridges, which form part of the most magnificent mountain region in all Iceland. To the southward can be descried the level expanse of the Vatna-jökull robed in snow, while to the north there stretches away a boundless plain, which at sunset is suffused with glowing colours of unspeakable loveliness. Here, too, at mid-day, when the sun happens to be shining, can be seen exhibited in the airy firmament the manifold pictures of the Fata Morgana—the plain with its little lakes, the masses of rock which gird them round, houses also, and long caravans of beasts of burden.

The first excursion which Thoroddsen made from this encampment was to a huge volcano called Dyngju (or Kollóta Dyngju), one that had never yet been trodden by the foot of man. It lies to the north of Herdubreid,

and was reached in a journey of four and a half hours. It consists entirely of lava, and has the shape of a regular dome. The lava along the slopes assumes the most fantastic forms—here rising up in lofty pyramids —there engirdling yawning chasms, or combined in stalactitic clusters. Great fissures, moreover, are to be seen, with mouths of craters on the sides. During the ascent, snow began to fall, and when the summit was reached it was found to be covered with snow and ice. The principal crater, which was filled up with lava, measures about 500 mètres (165 feet) in diameter. While he was walking over the lava field here, Thoroddsen came, all unawares, upon the edge of a precipitous abyss, which seemed to him to be a newly-formed crater, with a cavity to the depth of 150 or 200 mètres, and with a diameter of about 150. Its slopes are extremely steep, and are covered from top to bottom with a snow-white incrustation of ice looking like chiselled marble. The sight of this awful abyss was most impressive. To the south of the volcano, or rising from its base, are several hills of tufa, one of which (Brædrafell) is crested with a row of mighty tufa pillars, which gives it the appearance of an enormous porcupine. It was more than two hours after midnight before the party returned to the encampment.

Southward from Herdubreid a range of mountains, called "Tögl," stretches away to southward, from which a stream of lava has found a passage through a deep fissure down to the river Jókulsá. Herdubreid itself is on all sides surrounded with lava-streams, though it is not itself volcanic. A view was obtained from its highest peak of the volcano of Kverkjöll, which rises from the edge of Vatna-jökull. Its huge mass is rent from top to bottom with an enormous fissure, through which a glacier descends to the lava plain below. On the 22d of July an excursion was made to explore the chain of Herdubreidafjöll (north from Dyngju), which no one had ever yet visited, and which was not to be found entered on any map. The road led to a little hill on the Jókulsá, at a point where formerly a ferry to Mödrudalur must have existed, and then to a *terrain* full of cliffs, where our traveller was surprised to find a row of very old stone pyramids, which he concluded must have been marks of a bridle-path made use of in former ages. The mountain he found difficult to ascend, and he had sometimes to creep along on all-fours. No trace of vegetation was anywhere to be seen, but there was abundance of lava ejected from numerous craters lying everywhere about.

On the 25th of July, Thoroddsen was again in the saddle, bound now for the well-known volcano of Askja, which he approached from the east by a route which had never hitherto been taken. He noticed on his way that the lava from the eruption of 1875 had become entirely covered over with pumice-stone, and that, in consequence, all rifts and holes had quite disappeared. He describes Askja as a flat or hollow-shaped valley, with an environment of steep cliffs in the centre of the northern side. It was once a deeper depression, but discharges of lava from numerous craters on the side of the mountain had gradually filled it up. The edge of the

volcano is about 250 mètres (820 feet) above the bottom of the valley, while Dyngjufjöll (in the north) stands 1400 mètres above the level of the lake. In the south-east corner of Askja a considerable depression occurs, whose northern and western walls show clearly in section all the lava-streams that cover the valley. At the bottom of the depression there appeared in 1876 a little round lake of warm water about 1300 mètres in diameter. This lake is now at least double its original size, and covers the entire bottom. In the year referred to, the depth of the depression down to the lake was 232 mètres; but since that time the surface of the water has risen 82 mètres, while its temperature has been reduced from 22° to 14° Centigrade. On the slope to the south of the lake, and close to the water, are several craters and clefts, from numerous crevices in which, aqueous vapours come steaming out with a hissing and roaring noise quite alarming. Little rills of warm water come trickling down from the clefts into the lake. In the eruption of 1875 enormous masses of tufa, basalt, and pumice-stone were discharged from the different craters.

In the middle of the southern or pumice crater there yawns an abysmal chasm across the masses of pumice-stone adjoining the wall of rock, and reaching quite down to the water's edge. This crater is in consequence difficult of access from the lake, and can only be reached by a long detour along the rim of the rock over an obsidian cleft, which runs in a southward direction a little beyond the pumice crater. The surface of the lake is constantly covered almost everywhere with masses of pumice-stone drifting to and fro, and the slopes of the hills, owing to the presence of sulphurous evaporations, are variegated here and there with patches of green and yellow sulphur. This deposition of sulphur is in full play on the southern crater.

The sight of this great theatre, whereon the action of volcanic forces had been so fearfully displayed, appears to have vividly impressed the imagination of our author. The scene, he says, is one which cannot fail to have an overpowering effect on the spectator. The deep profundity of the vast depression, with its lake of green-tinted water in tranquil repose,—the innumerable volumes of vapour, which burst forth from every crevice, stunning the ear with their deafening roar,—the clammy edges of the surrounding hills,—the piles of snow, and the vast glacier plains—all combine to form a scene which the pen of a Dante or the pencil of a Doré could alone adequately represent. No one, he adds, who has once stood on the edge of the depression can ever afterwards forget the spectacle which is there presented to his view.

The excursion occupied altogether thirty-six hours, during which he was either travelling on foot or riding, and before he could regain the encampment he could scarcely hold himself erect, so much was he overpowered with fatigue and drowsiness. After a few shorter excursions he set out (July 28) on the return journey to Myvatn, by way of the northern parts of 'Odádahraun, and reached his destination on the evening of the second

day. The ground over which he had to pass was at first full of fissures and depressions, which were dangerous traps for the feet of the horses, and when this was traversed the way was then blocked by a great lava-stream, which forced the party to make a long detour in order to go round by its southern extremity. This lava-stream had been produced by the eruption of 1875. The heat here was so oppressive that it produced a torturing thirst which there were no means at hand to relieve.

At Myvatn, Thoroddsen spent a week at a farm-steading in order to rest and refresh his ponies. At the end of that time he started on a second expedition in order to explore the western and eastern parts of 'Odádahraun. He took with him nine ponies and two guides, one of whom was the aforementioned Jón Thorkelsson, who had a good knowledge of that district. During this tour, which occupied half a month, the party suffered much from the unsettled state of the weather and the prevalence of snow and sand-storms. The distance traversed was 380 kilomètres, and, yet, only three grass-clad patches of ground were met with in the whole course of the journey. The route was at first to southward, and lay along the west bank of the river Skjálfandafljot, which was crossed in the neighbourhood of a deep lake called Ishólsvatn. In former times the land was here to some extent cultivated, but its productive power has gone, and nothing is now to be seen but gravel and quicksand. Here the tent was pitched, and an excursion was made to ascend the now extinct volcano of Trölladyngja, one of the largest of the dome-shaped lava hills in Iceland. The soil was soft and yielding, and the ascent difficult over the masses of snow and lava. The work of measurement also, which was begun as soon as the summit was reached, was interrupted by a dense mist and drifting snow. The crater is of an elliptic shape, 1100 mètres in length, and 380 in breadth. It is filled with ice and snow, and divided into two by a ridge of lava which overtops the snow. On the following day an excursion was made southward, along the banks of the Skjálfandafljot. Here there were no high hills, but only low downs of quartz. From the western edge of 'Odádahraun tiny rills of water, which trickle out from quagmires, find their way into the great river. A hot spring was discovered with water at a temperature of 35°·5 C. (91·5 Fahr.) There is another still warmer at Marteinsflœda. At evening the party reached Vonarskard, and quartered for the night at Gæsavötn, where there is a little lake and some vegetation, which is, however, but scanty, and consists chiefly of the Arctic willow (*Salix herbacea*) and some small kinds of grass fringing the borders of some small wells that discharge into the lake. Their temperature ranges from 5° to 7° C. (41° to 44·6 Fahr.), while that of the atmosphere is about, or under, zero. The scantiness of the vegetation, as compared with its former luxuriance, is no doubt due to the gradual exhaustion of the volcanic activity by which it had once been stimulated. It was with the utmost difficulty the ponies could find grass enough to satisfy their hunger. The weather, too, was piercing cold, and the whole aspect of nature chill and dreary. Animal life is fast dis-

appearing from the locality, and the living creatures that were seen could be easily counted: three birds, four or five spiders, and one mite. A wondrous stillness reigned here all round; the birds flew past with noiseless wing, and the silence was broken only by the roar of the glacier-torrent, and the howling of the wind round the clefts on the edge of the glacier.

On the 17th of August the party left Gæsavötn, and took their way eastward along the northern skirts of the Vatna-jökull, which reaches an elevation at its highest point of 1900 mètres above the level of the sea. A halt was made at Kistufell, in order to refresh the horses, now jaded by the severe exertions of the trying march. The poor brutes, too, had to be put upon very short commons, as the provender was nearly exhausted, and Hvannalindir, the next place where a fresh supply could be procured, was still a long way off. At this halting-place there was afforded a striking proof of the terrible force of the south wind in the cliffs of dolerite found in its neighbourhood; for, on their southern face, they are seamed with regular furrows from being constantly struck by chips of stone when high winds are prevalent. The southern part of Kistufell is completely spanned by a mighty glacier, which, stretching from the glacier-field of the Vatna-jökull, reaches to the very plain, and fills all the space between Kistufell and Kverkfjöll. This glacier is certainly one of the largest in Iceland. The view obtained from Kistufell of this mighty mass of ice is described as being most impressive from its extreme wildness and grandeur. It is for the most part covered over with sand and large pieces of rock, so that from a distance it looks like a plain of gravel or a lava-stream, which, if the fall of snow be but slight, retains its own colour of grey. The edge of the glacier consists of *débris*. Towards the east of Kistufell its floor is at its strongest, and here also it is cloven with numberless fissures which have transformed its surface into an indescribable chaos. The glacier at this part is studded over with pyramids of ice fully 30 mètres in height, covered over with quartz-gravel, and separated each from each by wide chasms. Further to the east the ice-pyramids lose in height, but are at the same time more fantastic in their shapes. Here, below the limit of the glacier, there stretches a plain of bare loam and gravel, permeated by numerous streamlets of a whitish colour, scattered about in all directions. The march along the edge of the glacier was difficult and slow, the ponies frequently sinking down even to their bellies in the soaking ground, and daylight had waned before the party had yet passed the limits of the glacier. They had consequently to encamp on its edge, where they spent a most miserable night. Next day the Jókulsá River was reached at an early hour, and at a point where it is split into eight or nine arms, and can thus be crossed without much difficulty. On the banks a welcome sight met the eye, that of some plants, among which were specimens of the *Oxyria digyna* and the lovely *Chamenœrium latifolium*. Not far from the eastern bank of the river, up towards its source, rose the volcano of Kverkfjöll, now in full and near

view. From this stretches away northward a long chain of volcanic mountains, which exhibit phenomena that are reckoned among the most peculiar in Iceland. On the eastern side of this range lies Hvannalindir, which the party reached about mid-day. Here was found grass enough for the horses, and here a halt was made for three days and a half. In the vicinity of the encampment there were found on the edge of a lava-stream the ruins of several huts, which, it was conjectured, had probably been built in former times or occupied as places of refuge by outlaws. Several excursions were made for the exploration of the localities around. One of these was made to Kverkfjöll, but the dreadful severity of the weather made an ascent of it impracticable. On the 21st of August a furious snowstorm raged, and on the following morning the return journey to headquarters was begun. The Jókulsá was recrossed with some difficulty at a point where its waters had become united into a single stream. Westwards from its left bank, which was now reached, there stretches, for a distance of twenty kilomètres, a plain of quicksand, and the passage through this was found to be the most unpleasant part of the whole tour. A storm was unfortunately blowing, which darkened the air and pitilessly pelted the ears of the luckless travellers with gravel and chips of stone. They would indeed have lost their lives, had it not been that the wind was blowing from behind them. In the midst of Valdalda pumice-stone again made its appearance, and here also was discovered in the midst of the sand a large lake of glacier water which had only recently been formed, probably by streams issuing from Kistufell. The lake also receives tributary waters from the south-eastern parts of Dyngjufjöll. After much toil the volcano of Askja was next passed, and thereafter a halt for the night was made on the most northern spur of Dyngjufjöll. Next day, after the northern slopes of this mountain had been traversed, and Jonsskard had been gained, a comparatively easy route was followed, that which led to Svartárvatn, the same which had been taken by Professor Johnstrupp and his party. Bardadalur was reached towards evening of the same day, and Thoroddsen's journey through the lava-desert, properly so called, was thus brought to a happy close.

After a few days' rest our indefatigable traveller started on a third and final expedition. Proceeding again to Myvatn he travelled thence to the north-east with a view to explore the northern course of the Jókulsá. He reached that river by way of Reykjalid and the agricultural steading of Eilisvatn, and saw Dettifoss, the greatest and most imposing waterfall in all Iceland. Here the full flood of the Jókulsá is precipitated to the depth of 107 mètres into an abyss of narrow limits where the waters bubble and hiss and roar, and then pursue their course along the bottom of a prodigious volcanic fissure which extends as far as 'As, a distance of 20 kilomètres. At Svnadalur, the scenery is described as being strikingly picturesque, its gigantic rocks, its deep craggy ravines and bush-grown declivities, all combining to impart to it a wild romantic beauty such as is seldom met with elsewhere in the island. At 'As, the extreme verge

of the plateau sinks down into the alluvial plain formed by the river towards its mouth, where lies Asbyrgi, celebrated through all Iceland for its exquisite beauty.

From this place Thoroddsen made his way to Húsavik, and from thence to Akureyri, which he reached on the 4th of September. He had travelled for nine weeks, of which five had been spent in uninhabited parts, where his tent had been his sole shelter.

THE CAROLINE ISLANDS.

By Thomas Muir, LL.D., F.R.S.E.

The reader who has an accurate conception of the geographical position of New Guinea, and the newly baptized Bismarck Archipelago, may readily acquire a tolerably correct idea of the whereabouts of the Caroline Islands. New Guinea, we know, lies like a gigantic saurian between Australia and the equator, stretched at full length in a N.W. and S.E. direction, its head almost just reaching the equator, and the tip of its tail going slantwise across the line of 10 degrees south latitude. Roughly speaking, then, the Caroline Islands are to the N.N.E. of New Guinea, and occupy a situation north of the equator corresponding to that which New Guinea and the Bismarck Archipelago occupy to the south, none of them quite reaching the equator, and those which are furthest north being just beyond the line of 10 degrees north latitude. In other respects the occupants of these two belts are a wonderful contrast. New Guinea belongs to the front rank among the large islands of the world, and its neighbours of the Bismarck Archipelago are not by any means diminutive; the Caroline Islands, on the other hand, are but tiny specks dotted over a vast extent of ocean surface. Almost due north of the head of New Guinea, the sprinkling, if we may so speak, begins, giving us first the Pelew group, which, however, has been often viewed as distinct from the Carolines; then, after a break, the scattered group which includes Yap, Ngoli or Matalotes Islands, Uluthi or Mackenzie Islands, and Sorol or Philip Islands; then, after another break, a long succession of small clusters, Wolea or Ulie Islands, Swede Islands, Los Martires and Enderby Islands, Namonuito or Lütke Islands, Hogolu or Truk Islands, the Mortlock Islands, and others; then there is a break once more, and we come to the Seniavina group, of which Ponape or Puynipet is the chief; and finally, after passing a straggler or two, we reach Kusaie or Ualan, the extreme eastermost of the long chain. In our survey, we have traversed from west to east 2000 miles of ocean, and have confined ourselves within a belt 300 miles broad at the greatest. To the west of the belt lie the most southern islands of the massive group of the Philippines; to the north of the middle of the belt lie the isles of the Marianne or Ladrone group; and to east and south-east are the Marshall and Gilbert Islands, closely resembling the Carolines themselves. Though

there are in all somewhat over 500 of the Caroline Islands, the greater number are merely atolls. It is better to enumerate them as consisting of 48 groups, each group comprising an island and several surrounding islets. The total area is most insignificant when compared with the vast surface over which they are spread; it is not accurately known, but has been estimated at 1200 square miles—that is to say, about one-fifth of the area of Yorkshire. The largest of the archipelago is Ponape, one of the most easterly, which is compact in shape, having an area of about 14 miles square, and a coast line between 50 and 60 miles long. The next is Yap, one of the most westerly, which is rather over 20 miles long, but is narrow and deeply indented. These and three others are estimated to contain about two-thirds of the entire area of the archipelago.

The appearance and physical structure of the islands can be dealt with in very few words. Of the total 48 groups, 43 are flat and composed of coral; and five, which have just been referred to as having the greatest area, are mountainous and composed of basalt with coral round the base. In Ponape, for example, the mountains attain a height of between 2500 and 3000 feet, giving rise to pretty streams, and, being wooded to the summit, are very beautiful as seen from the sea.

The Carolines are said to have been first discovered by the Portuguese in 1525; the Spaniards followed in 1543, and navigators of both nationalities frequently touched at some point of them during the remainder of the sixteenth century. Their present name was first given to them in 1686, and was in honour of Charles II. About that time, the Spaniards resident in the Philippines and the Mariannes acquired some topographical and other knowledge regarding the group; and in 1705 an imperfect map, embodying this knowledge, was sent to Pope Clement XI. Kotzebue visited them in 1817, Duperrey in 1824, and Lütke in 1827-8. To these three navigators, and to Freycinet and Dumont d'Urville, we are indebted for the first accurate accounts of the islands and their inhabitants. Several of the explorers were ignorant of the work of their predecessors; consequently many of the groups bear two names, and some of them have three.

A most important and, as we are bound to believe, exceedingly interesting part of their past history has been lost. On more than one of them there still exist massive ruins which have been a puzzle to modern ethnologists. Ponape is in this respect the most notable. Captain L. U. Herendeen of San Francisco, who visited the island a few years ago, writes as follows:—"The island is surrounded by a reef, and between the two there is a broad ship channel. At places in the reef there are natural breaks, that serve as entrances to the harbours. In these ship channels there are a number of islands, many of which are surrounded by a wall of stone five or six feet high; and on these islands there stand a great many low houses, built of the same kind of stone as the walls about them. The natives on the island do not know when these works were built; it is so far back in the past that they have even no tradition of the struc-

tures. Yet the works show signs of great skill, and certainly prove that whoever built them knew thoroughly how to transport and lift the heavy blocks of stone. Up in the mountains of the island there is a quarry of the same kind of stone that was used in building the walls about the islands; and in that quarry to-day there are great blocks of stone that have been hewn out ready for transportation. The natives have no tradition touching the quarry—who hewed the stone, when it was done, or why the work ceased. They are in greater ignorance of the great phenomena about them than the white man who touches on their island for a few hours for water. There is no doubt in my mind that the island was once inhabited by an intelligent race of people, who built the temples and forts of heavy masonry on the high bluffs of the shore of the island, and that, as the land gradually subsided, these bluffs became islands. They stand to-day with a solid wall of stone around them, partly submerged in water." Captain Maxwell, of H.M.S. *Emerald*, found, in 1881, "enclosures within enclosures—on one islet four complete squares, one within the other —with walls in some places 35 feet high and upwards of 12 feet thick, built of great basaltic prisms (many of them 12 feet by 2 feet 6 inches), laid regularly tier upon tier; each tier being at right angles to the one below, and the interstices filled in with coral and rubble." Mr. Doune, American missionary on the island, considers "the ruins to be those of old chiefs' residences, built in days when chiefs were more powerful, and the population more numerous than now." Captain Maxwell, who also visited Strong Island, found similar ruins on the small islet of Lélé, where the king lives. "The walls there are some 20 feet high, having been in former times probably as high everywhere, and 12 feet thick, and are built of enormous basaltic rocks, which must have been brought from a distance, and have cost much labour and ingenuity to raise them to their present positions." Dr. Pease, of the American Mission, says that the king has always lived on Lélé; that the population, now about 300, amounted in former times to ten times that number; and that these forts were built for royal defence, and to overawe the main island.

The climate of the Caroline Archipelago is of course tropical. There are said to be two rainy seasons, one in January, and the other in August; but it is scarcely necessary to distinguish the seasons into wet and dry where the climate is so prevailingly moist. Europeans find it far from disagreeable, and it is not known to be unhealthy, unless in certain low situations near the coast.

Many of the islands are wonderfully fertile, producing all the usual fruits and vegetables of Micronesia in abundance—bread-fruit, bananas, cocoa and various other palms, oranges, sweet potatoes, etc., etc. The cocoa-nut palm is, of course, most flourishing on the flat coral islands. In the mountainous islands the coast is usually beset with mangroves, which are succeeded inland by fruit trees, and these again, as we ascend, by forests, in which various species of ficus are prominent, *myristica* (nutmeg), *citrus*, *eugenia*, etc. Ferns also grow in extraordinary luxuriance.

In regard to the minerals of the five large islands there seems to be no definite information. In Yap the precious metals are reported to have been found.

The people resemble the well-formed, brown, and comparatively intelligent Hawaiians and New Zealanders; but are evidently a mixed race, —Malay, Maori, Negrito, Papuan, and even Chinese and Japanese elements having been detected. Captain Maxwell describes the inhabitants of Strong Island as a most gentle, amiable, and intelligent race, with a complexion lighter than that of the Marshall islanders further to the east. The natives of Ponape, he says, are particularly pleasant and good-looking, with more refined features than those of any natives he has seen. They do not, however, dress so well as the people of Strong Island, their principal article of clothing being the grass petticoat. The inhabitants of Yap, according to another writer, "are of a comparatively light complexion. The men are tall, and often handsome. They tie their long black hair into a knot, and frequently let it down to amuse themselves with combing it with a long wooden comb. Their bodies are elaborately tattooed. Their legs look as if they were encased in tight pantaloons, and they seem to have on woven vests of a deep-blue tint. The women are lighter in hue than the men, and wear their long black hair in bands, exactly resembling those worn by English ladies from 1830 to 1850, They cover the backs of their hands and their fore-arms with tattoo marks, so that they appear to have on long woven mitts. Their dress is a short petticoat of shreds of bark reaching below the knee, and their principal decoration white flowers, thrust into the bands of hair that hang in front of their ears. As a rule, both sexes go bareheaded; but the men occasionally wear a sharp crowned hat of Chinese fashion. As is usual in the Pacific islands, adjacent tribes are at constant feud with each other, and wage war almost continuously with one another in the approved Pacific fashion of murdering stragglers of the opposite party." The total population of the Carolines is not over 20,000, of which Yap alone contributes 8000, and Ponape 5000.

They are great traders, both among themselves and with Europeans. In Ponape and at Tomil Bay in Yap there are small European trading stations where the natives obtain iron goods, tobacco, spirits, bottles, etc., giving in return trepang and cocoa-nut oil.

They also show considerable constructive power both in house and canoe building. The Yap canoes are of very graceful design, and have curved ornaments at head and stern, which remind the visitor of Venetian gondolas. The natives build enormous houses, roofed in and walled at the sides with mats, and construct stone piers or jetties of great length. Some of their villages are remarkably picturesque. The dwellings stand on mounds of earth, often nearly 100 feet square, the sides of which are cased in with stones. Against these earthen platforms the rich men deposit the extraordinary money which is found, perhaps, only in these islands. "It is composed of large discs of arragonite, often of great size. Six

feet in diameter, 12 inches in thickness, and an estimated weight of three tons are not uncommon dimensions. The largest known piece is said to be 9 feet 4 inches in diameter, 15 inches thick at the hole in the centre, and 7 inches at the edge. The weight of this was estimated by an American trader, who helped to move it, at four tons and a half. This money is not used as a medium of exchange, but for purposes of ostentation, the richest men being those who can pile most of it against the earthen platforms on which their houses stand, and as a ceremonial present on solemn occasions, like the bits of seventeenth-century European glass called money in the Pelew Islands and the tamboa or whale's teeth of Fiji. The arragonite quarry is in the harbour of Malakat, at Korror Island, in the Pelews. At that place about a hundred Yap men are allowed by King Abba Thoul to reside for the purpose of quarrying the stone."

The language of the Caroline Islanders is hybrid, like the race. The grammatical constructions resemble those of the Maori, but Malay influence is also evident. In some of the islands two languages are in use, the polished and the vulgar, one for addressing superiors and the other for inferiors.

In each group of islands there is a chief who is paramount. In war he has unlimited authority, and exercises it without stint; in time of peace his occupation is gone.

The people have no religion of their own. The nearest approach to it is a belief in the continued activity around them of the spirits of the dead. The lifeless body is held in great respect, and is sacredly preserved until it falls to pieces.

Missionaries were first despatched to the islands in 1710 by the Jesuits of Manila. Nothing, however, was accomplished at that time, for all the members of the mission were massacred on arriving at the Pelews. In modern times two missions have been and are at work, one Spanish Roman Catholic and the other American Protestant. It does not appear that either has as yet had very marked success.

The Carolines have been generally spoken of as belonging to Spain. Text-books of geography and standard works of reference so place them. From all that can be learned, however, Spain never exercised territorial rights in them, or indeed ever had any settlement upon them. In 1875 she proposed to exact duties on goods imported into them, but both England and Germany denied her right, and she refrained. Early in the present year she expressed the intention of sending a couple of vessels to plant her flag on the principal islands of the archipelago, but the intention was not then carried out. Somewhat later, England and Germany indirectly and incidentally showed that they held to their old ground in regard to the claims of Spain; for, in the agreement between these two countries as to the partitioning of New Guinea, there is a clause to the effect that England recognises the paramount importance of German trade in the Caroline and Marshall Islands, and Germany makes the like recognition in regard to English trade in the Ellice, Gilbert, and other

groups. No such recognitions had any relevancy in a document dealing with the apportionment of the islands of the Pacific, unless as a possible guidance in settling the validity of future annexations. Shortly after this came the news of the hoisting of the German flag on several of the Carolines—news which inflamed the Spaniards and led them to despatch war-vessels to Yap, where German war-vessels also almost simultaneously arrived. Then came diplomatic protests and negotiations, and ultimately the Pope was called in as common friend and arbiter to help in arriving at an amicable settlement of the difficulty. So far as can be at present learned, the result is likely to be a confirmation of the Spanish sovereignty, tempered by important concessions to German commerce.

[A sheet of maps to illustrate the Caroline Islands dispute between Germany and Spain has recently been published by W. & A. K. Johnston. Detailed accounts of the islands have appeared in the *Gazette Géographique*, *The Times*, the *Mitteilungen* of the Geographical Society of Vienna, and other serials.]

LIEUTENANT A. W. GREELY,

United States Army.

Honorary Member, Scottish Geographical Society.

Lieutenant Greely, who at the meeting of the Society on November 19th was appointed an Honorary Member of the Society, was born at Newbury Port, Massachusetts, in 1844. At the age of seventeen he enlisted in the Volunteer Army, at the beginning of the civil war in the summer of 1861, and served through several great battles of the rebellion. He was thrice wounded. At the end of the war, he attained the rank of Captain, and was brevetted Major for his services. He was one of the officers selected from the Volunteer Army for retention in the regular service, which he entered with the grade of Lieutenant. In 1868 he was assigned duties in the Signal Office—one of the bureaux of the War Department,—to which he has since been attached. In connection with the Signal Service, he has also been attached to the staff of General Angus; and he was for some time engaged in constructing, organising, and managing several divisions of the United States military telegraph lines. In 1873 he examined the Mississippi, Missouri, and other great rivers, with the object of determining their characteristics in relation to dangerous floods and overflows. Later, he was employed preparing official weather predictions for the United States, and also in editing and preparing the Office publications in connection with the Signal Service and International Observations.

His appointment as leader of the U.S. Arctic Expedition was made by the late President Garfield. Lieutenant Greely was led to accept this appointment on account of the interest he had always taken in meteorological research in connection with his work in investigating and discussing meteorological observations in the northern hemisphere.

PROCEEDINGS OF THE SCOTTISH GEOGRAPHICAL SOCIETY.

The first Annual Business Meeting of the Society was held in the Merchants' Hall, Edinburgh, on November 4th. Mr. John Cowan of Beeslack, Vice-President, took the Chair.

The Annual Report of Council was read by the Secretary, and on the motion of the Chairman, seconded by Professor Calderwood, it was adopted by the Society.

The next Resolution, moved by Mr. Alexander Buchan, and seconded by Mr. Coutts Trotter, ran as follows :—

"(1.) That the President and the Vice-Presidents be re-elected, with the addition of the following Vice-Presidents, viz. :—The Earl of Crawford and Balcarres ; Sir William Muir, Principal, University of Edinburgh ; Sir Charles Aitchison, Lieutenant-Governor of the Panjab ; William Mackinnon of Balnakill.

"(2.) That the Honorary Secretaries, Editor, and Treasurers be re-elected, and that Mr. William C. Smith, LL.B., Advocate, be elected Honorary Librarian, and Mr. John George Bartholomew, Map-Curator, of the Society.

"(3.) That in room of Members of Council retiring at this time, the following be elected Members of Council, viz. :—W. Scott Dalgleish, M.A., retiring Honorary Librarian ; Edward Cox, M.A., Dundee ; Sir Alexander Christison, Bart., M.D. ; Sir Michael Connal, Glasgow; Colonel Dods ; Dr. Robert W. Felkin, F.R.S.E. ; Rev. George A. Smith, M.A., Aberdeen ; W. Orr Leitch, Greenock ; David Stewart, M.A., Lord Dean of Guild, Aberdeen ; and that the following Members of Council be re-elected :—Professor Roberton, LL.D., Glasgow ; Principal Peterson, Dundee ; David Patrick, M.A. ; A. B. M'Grigor ; Rev. A. Gray Maitland, Crieff ; Dr. Thomas Muir, Glasgow ; Professor Calderwood ; T. R. Buchanan, M.P. ; H. J. Younger ; Alexander Buchan, M.A. ; Dr. Hugh Cleghorn."

This Resolution was unanimously adopted by the Society.

Mr. Harry Young of Cleish proposed a vote of thanks to the Chairman ; and, on the motion of Mr. J. B. Sutherland, a similar compliment was accorded to the Merchant Company of Edinburgh, for placing their Hall at the disposal of the Society.

The first joint meeting of the Society and the Philosophical Society of Glasgow was held in the Lecture Hall of the latter Society, Glasgow, on 18th November. Papers were read by Dr. George A. Turner, *On the Verification of Traditions regarding the First Peopling of certain Islands in the South Pacific*, and by Mr. Arthur Kay, on *Notes on South Africa and the Africanders*. After the Papers, a Local Committee was nominated by the Members of the Branch, for approval by the Council in Edinburgh.

The Second Session of the Society was opened in the United Presbyterian Synod Hall, Edinburgh, on the evening of 19th November. There was a very large attendance of Members and their guests. The Right Honourable the Earl of Rosebery, President of the Society, presided, and the speech which he delivered on the occasion, together with the speeches made on the conclusion of Lieutenant Greely's Paper, have been given in another part of the *Magazine*. On the conclusion of the proceedings, Lieutenant Greely was elected an Honorary Member of the Society.

The following night, Lieutenant Greely addressed the Glasgow Branch in the Queen's Rooms. Dr. Blackie was in the Chair, and there was only a comparatively limited attendance of Members. Lieutenant Greely's Paper was substantially the same as on the previous evening in Edinburgh. Professor Drummond moved, and

Professor M'Kendrick seconded, the vote of thanks to the Lecturer; and Mr. Joseph Thomson took charge of a similar motion to the Chairman.

On Monday evening, the 23d November, Lieutenant Greely read his Address before the members of the Dundee Branch in the Kinnaird Hall. Owing to its local interest in Arctic matters, the meeting, which was well attended, gave Lieutenant Greely a very hearty reception. In the course of his Address, Lieutenant Greely introduced several fresh incidents, which he had reserved for this Meeting, and took occasion to dwell upon the little-known exploits of the whalers, expressing the hope that some writer would be found to perpetuate them in the annals of Arctic exploration. Admiral Maitland Dougall of Scotscraig presided. The vote of thanks to the Lecturer was moved by Principal Peterson, Convener of the local Branch, and seconded by Captain Clayhills Henderson of Invergowrie. Mr. Weinberg was intrusted with the vote of thanks to the Chairman.

Lieutenant Greely's concluding Address was given in the Music Hall, Aberdeen on Thursday evening, 26th November. The Right Honourable the Earl of Aberdeen, Vice-President, took the chair, and the meeting was a very full and enthusiastic one. Professor Donaldson moved the vote of thanks, which was seconded by Dr. Beveridge; and Lord Provost Matthews moved the vote of thanks to the Chairman.

Special recognition is due to the Local Secretaries and Committees, for their zeal in the arrangements of the several meetings.

GEOGRAPHICAL NOTES.

EUROPE.

Professors of Geography in France.—*The Société de Topographie* held its general yearly meeting in the great amphitheatre of the Sorbonne, on November 8th, 1885, under the presidency of M. Ferdinand de Lesseps. M. de Lesseps devoted the greater part of his address to the services rendered by topography in general, and by the Society of Topography in particular. The ten years' history of the Society (it was founded in 1876) may be summarised as follows:—Alone of all the Geographical Societies, it has given steady attention to the methods of geographical instruction. Thanks to the circular of the Minister of War (6th June 1883), which it called forth, courses of lectures have been opened under its direction in all parts of France. M. Ludovic Drapeyron, General Secretary since the formation of the Society, has, in order to establish a complete and well-arranged system of geographical education, proposed the creation of a National School of Geography. In one of the meetings of the Senate on July 31st, 1885, M. Bardoux, formerly the Minister of Public Instruction, recommended this scheme, which had been highly approved, to the Government. And lastly, the Society of Topography is about to organise a great Topographic Exhibition, the first of its kind, which will be held in the Palais de l'Industrie in 1887. After M. de Lesseps, M. Drapeyron read a paper on *Professors of History and Professors of Geography.* It was on May 15, 1818, that Professors of History and Geography were first instituted; a special examination, dating from November 18, 1830 (suppressed in 1850 and restored in 1860), permitted the regular recruiting of their number. As was to be expected at a time when this department was not as yet organised, geography was sacrificed to history. The little geography that was

taught was historical geography, while physical geography is the geography that has since come to the front. In 1852 and 1857 they drew up fine programmes, issued excellent circulars, one of which was, it would seem, inspired by Élie de Beaumont; but they did not always create professors *ad hoc*, and they assigned to this subject one class per fortnight. It was in its turn suppressed in 1867. Thus a science, which, in preference perhaps to others, would deserve both in France and elsewhere the epithet national—for it is for any nation its surest safeguard—had been in the university reduced to nothing when the disasters of 1870 arrived. Since then, the public authorities and the nation itself have shown that they understood the importance of geography; but the higher teaching of geography presents the same incoherence, the same poverty, as formerly, in spite of the indisputable excellence of our few Professors of Geography. It is this deplorable state of matters that the National School of Geography would bring to an end, for it would create the teaching *personnel* which we require. It is plain now that the same masters cannot teach with equal chance of success History, which is mainly a matter of erudition, and Geography, which is mainly a matter of science. Afterwards, M. Paul Combes spoke on *the Influence of Man on the Topography of the Globe*, and M. Schrader on the structure of the Pyrenees (which he rendered clear by means of an ingenious instrument, the "orograph," by landscape photographs, and reliefs). The Grand Medal of the Society was bestowed on M. le Colonel Goulier, who (said M. le Commandant Richard) had thrown great light on French topography by opposing empirical methods, and studying and popularising rational methods and instruments for rapid surveys and for surveys of extreme precision. He had trained thirty generations of officers at Metz, and afterwards at Fontainebleau. The Minister of Public Instruction's prize was bestowed on young Labergère, a pupil of the Chateauroux course.—*Revue Scientifique*, 14th November, 1885.

Chamonix and a Monument to De Saussure.—From the *Club Alpin Français, Bulletin*, No. 7, October 1885, we learn that a committee has been formed to arrange for the erection of a monument to the great Swiss geographer and naturalist. As far back as 1834, 9th July, M. Chenal of Salanches, ex-member of the Sardinian Parliament and advocate, of Chambéry, fearing that he was on the point of death through inflammation of the lungs, caused by exposure to a violent storm on the Col des Aravis, had his will hastily drawn up by a local notary at the châlet. One of the clauses bequeathed, to the commercial authorities of Chamonix, 4000 livres de Piémont, for the construction of a granite monument "to the memory of Bénédict de Saussure, the first to make known my valleys, and to give them the celebrity they justly enjoy. Chamonix reconnaissant." M. Chenal died January 27, 1881; the commune, authorised on 16th August 1883 to accept the legacy, voted an additional sum of 4000 francs; and a subscription list has been opened, in order that the monument may be worthy of its situation and its subject.

Glaciers of the Alps.—In the *Jahrbuch des Schweizer Alpen-Club*, M. Forel, dealing with "The periodic variations of the glaciers of the Alps," concludes that (1.) Glaciers may continue to decrease in winter, although preserved from all surface ablation. (2.) The rate at which glaciers flow in their middle portion may be twice as much one year as another. (3.) In the Alps are counted thirty-four glaciers whose retrograde movement has ceased in the last ten years and given place to a state of augmentation. The most marked advance has been that of the glacier of Zigiorenove, which has gained 400 mètres (1310 feet) in 1883-4. This figure is all the more striking as the rest of the glaciers of the Val d'Hérens appear to be still decreasing. (4.) Several glaciers still diminishing at their extremity have gained in thickness in their higher parts. The increase of the volume of the Rhone

glacier in 1882-3 is calculated at 40,000,000 cubic mètres (1,412,000,000 cubic feet). (5.) The tendency to increase seems to be slowly propagating itself from west to east of the Alps. No glacier in a condition of growth has been discovered to the east of the Orteler.

ASIA.

Lycia.—Dr. Tietze, the eminent Austrian geologist, contributes to the *Jahrbuch der K.K. geol. Reichsanstalt*, 35 Band, II. and III. Heft, a detailed account of his observations in Lycia (Asia Minor). Having spent a day (April 27th-28th) at Makri, the ancient Telmessos, he next proceeded (29th) to Yali Bay, whence he travelled inland to Gyöl Bashi, where the Benndorf expedition, to which he was attached, were exploring the archæological remains of the district. After some brief excursions to Kash (Kassaba), and westwards to Sidek and Säret, he sailed with Herr Benndorf to Adalia (Satali, the ancient Attaleia), and had the opportunity of seeing the coast under the peculiar influence of a solar eclipse (19th May). Having returned from Adalia, he visited Myra and Dembre; and, in company with Dr. Emanuel Löwy, passed up the Dembre Chai to Kassaba, crossed the Susuz Dagh by a route never followed by any previous European traveller, and advanced to Gyombe, at the foot of the Ak Dagh, and finally to Elmalü, the largest modern town within the limits of ancient Lycia. From Elmalü (30° E. long.), he struck south again to the Avlan Gol, thence across the watershed to the Bashkoz Chai, which was followed to the plain of Fineka, near its mouth. He next visited Rhodiapolis, and the eternal fire of the Chimæra; and there bidding good-bye to Dr. Löwy, who proceeded to explore the ruins of Phagelis, returned by Fineka and Dembre to Gyöl-Bashi. It is impossible, in the form of a note, to give more than the briefest indication of the interest attaching to Dr. Tietze's observations. In a general introductory sketch of Lycia, he shows how imperfect our knowledge of the country still remains, and dilates on the magnificent coast scenery produced by the limestone mountains, descending with unusual boldness to the sea. Makri lies at the southern end of a well-protected bay. "The small peninsula which forms its western side, and the somewhat higher hills to the north on the other side of the broad valley opening from the east, consist of serpentine, and are characterised by a striking brownish-red colour, peculiar to most of the Lycian serpentine mountains: while the mountains to the south of the harbour, and to the south of the peninsula, are of limestone, and form a remarkable contrast with their grey tints. This difference of landscape effect is enhanced by a difference in the hill-slopes and in the vegetation; the limestone is clothed with deciduous trees, the serpentine frequently with conifers." In the mountains on the north side of the harbour are deposits of chrome ore, with which, since 1879, the English firm of Patterson, in Smyrna, yearly load six to eight steamers of 1000 to 2000 tons burden, the annual value of the export being £26,000. The ore is particularly rich—C. von John's analysis giving 60·23 per cent. of chromoxyde, and 13·23 per cent. magnesia. The rock tombs of Telmessos, which lie south-east of Makri, are hewn out in a limestone declivity, and the sarcophagi found in the neighbourhood are of the same material. Dr. Tietze thinks the usual opinion as to the Eocene origin of the Lycian limestone of questionable validity. He was greatly struck by the beautiful situation of Adalia—westward, on the left hand, the boldly jagged outlines of the Lycian mountains, on the east the quieter ridge of the Pisidian Taurus, both clothed in their upper regions with shining fields of snow, and, between these contrasting side-scenes of the background, the abrupt edges of the Pamphylian plain, broken by waterfalls rushing into the sea, and crowned by the picturesque walls and

battlements of a mediæval-looking fortress, slim Turkish minarets, and clustering houses embosomed among the most luxuriant gardens. This coast belt, and the plain to the north of Adalia, is probably the most extensive fresh-water deposit of limestone tuff which (with the exception of the sinter formations of Maragha in Persia), is to be anywhere found in the countries contiguous to Europe. Like previous explorers, Dr. Tietze failed to find any fossils except those of vegetable origin. After treating of the island of Kekova, with its nummulitic limestones, he proceeds to describe the marmorescent limestone employed in the construction of the heroon of Trysa (Gyöl-Bashi), registers a series of interesting observations as to the earthquakes which evidently helped to reduce the building to its now ruinous state, and enters into a special study of the *terra rossa*, which appears in Lycia as in other limestone regions. The Dembre Plain, bounded on the east side by the Beimelik range, consists mainly of post-tertiary rocks. On its north-western edge, on the right bank of the stream, lie the ruins of Myra, with its remarkable rock-tombs excavated in the steep limestone cliffs. While most of these tombs are situated in most inaccessible positions, some of them have the appearance (and the same is strikingly true of the very ancient Christian church of St. Nicholas) of having sunk beneath the level of the plain. Instead of a subsidence of limestone cliff and solid building, Dr. Tietze sees here an instance in proof of the æolian or sub-aërial accumulation of the loess asserted by Richthofen. As the level of the loess is about 13 feet above the pavement of the church, which probably dates from the fifth or sixth century, the deposition must have taken place at the rate of about 1 foot per hundred years. The upper part of the Dembre chain presents a somewhat unusual peculiarity of structure. In the heart of the Kassaba basin, and actually in its lowest region, to which the waters converge from left and right, there exists a water-parting. As already mentioned, the route from the Dembre valley to the Elmalü plateau was a new one. It gradually ascends to Akguyu (where it enters the limestone formation), and thence to Kalyn Han, beyond which stretches a plateau with a very gentle acclivity. From the pass over the Susuz Dagh the scenery is that of a magnificent mountain landscape ; beyond the valley of Gyombe rises, to a height of 10,000 feet, the range of Massikytos. At Han Kizilar Alan-ghu (Kizlar Alan Khan), we pass from the limestone into a region of white marl. Gyombe is the summer residence of an extensive population, which ascends annually from the hot coast-belt of Lycia to find water and pasturage for their live stock. Elmalü (Apple-town) is the most populous place in modern Lycia, and forms, with its luxuriant gardens, quite an oasis amid the bare and treeless mountains. The stream which drains the extensive swamp to the south-west of the town is large enough to require a bridge not far from Dudenkoi, but shortly afterwards it disappears bodily into a cave at the base of the limestone mountains. Avlan Gol, into which the Akchai or Gyombe River discharges, has probably subterranean outlets ; and Dr. Tietze believes that the Bashkoz River, which lies on the other side of a considerable ridge, is partly fed from this source. Passing by the visit to Limyra and to Rhodiapolis (the ruins of which, with a Roman theatre of some size, lie on the top of a hill), we come to the chapter on the Chimæra. The eternal fires to which the ancients gave this name (probably the Phœnician *Chamirah*—" burned "), issue from serpentine and picrite rocks, consisting of olivine and augite. They appear to have been burning for at least 3000 years. There is no trace of petroleum or naphtha on the surface, and it is doubtful whether any could be reached by boring. Dr. Tietze concludes his elaborate paper (which is nearly as interesting to the geographer and the historian as to the geologist) with a survey of the formations and the mountain-structure of Lycia.

The New Cable in the Persian Gulf.—We have the satisfaction of announcing (says the *Times*) that the new telegraph cable between Bushire and Jashk, in the Persian Gulf, has been successfully laid. On the 8th of October we stated that the steamship *Dacia*, with Colonel Bateman-Champion, R.E., the Director-General of the Indo-European telegraphs, and Sir Henry Mance, C.I.E., the electrician, had started from the Thames with the first portion of the cable. We have subsequently inserted an account of some of the perils which were encountered by them in the Bay of Biscay and in the Suez Canal. The steamship *International* left England with the other half of the cable a few days after her consort, met her at Jashk on the 12th inst., when the operation of paying-out was commenced, and the whole cable, 530 miles in length, was laid in perfect condition on the 20th inst.

Siam.—We are indebted to the energy of H.M.'s representative in Siam, Mr. Ernest Satow, for a valuable "Commercial Report" (Siam No. 1, 1885), which contains a detailed and interesting account, with illustrations, by Mr. W. J. Archer, of the production and manufacture of silk in the province of Kabin, in the eastern corner of the Menam delta. This industry appears to be entirely in the hands of the Laos and Cambodian races, to the exclusion of the native Siamese. Two varieties, apparently, of the mulberry are used, said to resemble the black and the white mulberry of Europe, but this is not very clear. The production might, the writer considers, be indefinitely increased, and the value besides enhanced by improved methods of reeling, the drawback being the apathy and laziness of the people, for neither the corvée, nor the taxes, of which they complain, are considered by Mr. Archer to be heavy.

The report also contains some interesting notes on other industries, with full returns of the exports and imports at Bangkok, by Mr. Vice-Consul French. On the general question of trade, Mr. Satow points out that British commercial interests in Siam are to those of the rest of the world, "in steamers, as 8 to 1; in exports, as 9 to 2; in imports, as 2 to 1," and he adds, "It is further to be noted that the import duties are only 3 per cent. *ad valorem*. If Siam proper were to pass into the hands of any European Power with protectionist tendencies, it cannot be doubted that the tariff would be greatly increased, and it is by no means improbable, if we are to judge by what has been proposed with regard to the trade of Tonquin, that differential duties would be imposed to the disadvantage of British trade."

Mindanao: The Philippine Islands.—From a Paper on the inhabitants of South Mindanao, contributed by Alexander Schadenberg of Glogau to the *Zeitschrift für Ethnologie*, we extract as follows:—The names of the various Malay tribes in Mindanao—Mandayos, Tagacaolos, Bagobos, Calanganes, Vilanes, Samales, Sanguiles, etc., are to be explained rather by their local position than by any ethnographic distinction. Manobo, which sometimes appears as a tribal name, is simply a word meaning 'man,' used in such compounds as Manobo-Mandayas, and Manobo-Vilanes. Along with Otto Koch, Herr Schadenberg remained from December 1881 to May 1881 in a rancheria of pagan Bagobos, in the neighbourhood of the Apo volcano, the highest peak in South Mindanao. These people live in little settlements, sometimes numbering as many as two hundred fighting men. Their huts are generally built on eminences from which a good outlook can be maintained. They are polygamous according to the extent of their means. Slaves are kept, but are generally treated well. Tattooing on hands, breast, and legs is common among both men and women, the designs being of the greatest variety. The operation is usually performed, not by the Bagobos themselves, but by the Atas, a tribe with Negrito blood in their veins.

The Bagobos believe in the immortality of the soul, and in future rewards and punishments. In order to reach heaven the soul of the dead must pass through ten stations, named each after its patron deity—Pelubatan, Siring, etc. The tenth station is the heaven, Pangulili, where the most powerful of the gods, Ugismanama, is in command. A vocabulary of Bagobo words and a list of birds found in South Mindanao are appended to Herr Schadenberg's article.

Samal: The Philippine Islands.—The same Paper by Alexander Schadenberg contains a detailed account of the inhabitants of the island of Samal, situated in Davao Bay in lat. 7° N., and measuring about 30 miles broad by 65 miles long. The Jesuits built a convent on the island in 1873; but the people fled before the excessive zeal for the rite of baptism which these missionaries displayed. The station had to be given up in 1876, and Herr Schadenberg himself, in 1882, saw the ruins of the convent. He describes the remains which he discovered in various sepulchral caves on the coast of Samal—on the Strait of Pagiputan, at Pangubatan, at Punta Libud, and Punta Tinagundagat; and gives an elaborate comparison of the cranial measurements of the present Samales with those of the bodies buried in the older caves.

Polar Station at Mouth of the Lena.—N. D. Yurgensa gives, in the *Izvycstiya* of the Imperial Russian Society, a preliminary report about his expedition and its work between 1881 and 1885. The position of the following points has been determined:—The station on Sagastyr, 73° 22·8′ N. lat. 126° 35′ E. long.; village of Ary Bykoff, 72° 8·3′ N., 129° 9·2′ E.; Cape Bykoff, 71° 57·9′ N., 129° 5·7′ E.; north-east end of the island Dunai, 73° 55·6′ N., 124° 33·5′ E.; Ortostan, 73° 34·5′ N., 125° 22·1′ E.; village of Turakh, 72° 59·5′ N.; village of Balkalakh in the mouth of the river Olenek, 72° 55·6′ N., 119° 50·8′ E.; the mouth of the river Tit, 71° 59·3′ N., 126° 49·9′ E.; Bulun, 70° 44′ N.

AFRICA.

Journey to Harar and the Northern Galla Countries.—On January 29th, 1885, Dr. Philip Paulitschke and Dr. von Hardegger set out from Zeyla, on the Gulf of Aden, at the head of a well-organised and well-equipped expedition, with the object of making their way to Harar and the Galla countries. The route they selected led through the country roamed over by the Eyssa Somali, *viâ* Henssa, Soumadou, and Bia Kaboba to Jaldessa; and from this last point through the territory of the Nole Galla to Harar. The travellers were fortunate enough to gain the favour, and even the assistance, of Abu Bakr, the powerful chief of the Eastern Danakil, and Egyptian Governor of Zeyla. The environs of Zeyla, a place of about 2300 inhabitants, situated on a coral reef projecting into the sea, consist of flat sands, covered with *Salsula clavifolia* (the ash of which contains 45 per cent. of soda). This plant, the only green thing visible, serves to bind and hold the loose sand together. Soon after passing the first station, Warabol—on account of its water supply an important halting-place for caravans travelling to and from the coast—the route began to ascend, traversing a region of sandhills, and after that a district thickly planted with *sirman* and *auss*. The sandy waste ceased at a place called Dadab or Mandaa (630 feet above sea-level), being succeeded by masses of stone—hornblende, porphyry, etc.—strewn thickly over the surface of the ground. In this part of the journey a number of streams or wadys were crossed, which flowed in a north-east or east direction, their valleys being for the most part closed in by low ranges of hills (2000 to 2500 feet high).

In the neighbourhood of Henssa the first Somali graves were met with. That nomad people bring their dead alongside the caravan routes, so that the graves form

the most striking guide-posts along the way. The body is enveloped in cotton clothing, and buried on an eminence overlooking the track. Large stones are set up around the grave, the largest at the head, besides which as many more are erected as the deceased slew of his enemies during his life. Moreover, masses of stone are heaped up over the grave itself, but this custom seems to be dictated by the desire to guard against the depredations of the hyænas, which abound in those regions. The grave is then surrounded by a kind of palisade or fencing of sharp-edged stones, arranged as circles or ellipses, as curves or anchors, or similar figures. Flat stones are placed in the immediate vicinity of such cemeteries, to receive the multifarious offerings of relations and friends. Henssa (1180 feet above the sea) is the meeting-place of several wadys, the waters of which, during the rainy seasons, have eroded deep beds in the surface of the ground; in some places the width reaches 70 to 100 yards, and the erosion a depth of 65 to 100 feet, the bed of the stream being choked with huge masses of porphyry and hornblende. And these large blocks of stone serve to form pools, where clear sweet water can be found at all times, even in the driest season. The moisture of the place favours the growth of tamarisks, eucalypti, palms, *goderh* trees (called by the Somali *sojer*); and entices such animals as the Ethiopian boar (emgallo), dwarf antelopes (digdigs), bustards, and vultures. Henssa, being situated on the edge of a hilly country, has considerable rainfall.

Proceeding south-westwards from Henssa, the travellers found the path growing narrower and more rocky, and gradually rising, till they passed from the stony plateau into a valley shut in on all sides by hills. This valley, Abukr Ali, was the pasture-ground of large herds of sheep, owned by the Eyssa Somali. This tribe is the most north-westerly of their race, and occupy a volcanic mountainous region between 42° 7′ and 43° 3′ E. long., and between 9° 7′ and 11° 3′ N. lat. They pasture their herds as far northwards as the Gulf of Aden, and on the Gulf of Tadjura they have the eastern tribes of the Danakil for neighbours. In the south they have pushed back the Gallas to the foot of the Galla Mountains; but on the east and west they are being hemmed in by the Gadaburssi and the Danakil respectively. According to their own belief, they are slowly dying out. They trace their origin to an ancestor, Eyssa, who, they hold, immigrated from Arabia with his three sons, Eley, Hole, and Haulla Gade. From these three brothers the three tribes, or clans, of the Eyssa Somali claim to be descended. They number now, altogether, probably from 65,000 to 70,000 souls. They lead a nomadic existence, and are engaged in constant war with the Danakil and Gadaburssi. The people are poor, possessing nothing but their stock of sheep; they have no industry, and there exists no trade worth mentioning. Money is not in use among them; Islamism is only a superficial graft upon their savage habits, and they stand at the lowest level of civilisation. Their women are however faithful, and the men are persevering in labour. Polygamy prevails, but the women go about unveiled, and enjoy freedom of movement. The female part of the population perform all labours connected with the building of their huts (*gurgi*), fetching water, the care of the children, and pasturing the flocks; whilst the male portion only occupy themselves with the breeding of sheep. Milk is the principal article of sustenance; the people are ignorant how to make either butter or cheese; flesh is eaten very seldom, and nearly always on the occasion of some religious festival.

South of Soumadou lies the finest part of the country owned by the Eyssa, the valley of Beydanot, which is filled with semi-tropical vegetation. Giant acacias, mimosas, creepers, *nôt*, aloes, euphorbiæ, and *sirman* flourish so luxuriantly and thickly as in some places to shut out the sunshine from the caravan route. Among

the birds, finches, jays, and *frugivores*, were the most conspicuous. This valley is fenced in on the south by a range of hills, upon which the torrents of rain that have flowed down their sides have had a curious effect. The outer layers of stone have been stripped off from their upper parts, and lie like a collar or wreath round the hills half-way up their sides. These masses of detritus are of a deep dark-red colour. Leaving the Wady Beydanot, the travellers ascended a plateau, 2625 feet above sea-level, covered with blocks of felspar and quartz, and entirely destitute of vegetation. The next station was Bia Kaboba, an important junction of some caravan routes. From this place the aspect of the landscape became totally altered. The hot, rugged mountainous country was left behind, and a wide expanse of prairie land entered upon, which slopes away gradually towards the west, where two mountain systems, Elles and Anfirlaba, rise up from the plain. Herds of gazelles and antelopes were browsing over the face of the country; and the air was laden with the fragrance of cinnamon, carried from the forests that clothed the foot of the hills on the north. The prairie is covered with an immense number of gigantic ant-hills.

In these elevated districts the rainy season commences in February. A west wind, sweeping across the plateau, meets the skirts of the north-east monsoon, which penetrate inland, and the clouds then strike against the mountains of the Galla country to the south. During the march from Henssa to Bia Kaboba, the temperature ranged between 81° and 90° Fahr. at noon, and at night it seldom sank below 66°. From the station of Dallaimaley the travellers obtained a fine view of the Galla Mountains, which, in contrast to the bare, light-coloured stony peaks of the hills in the country of the Eyssa, were covered with vegetation, and so had a sombre appearance. Immediately to the south were the mountains in the land of the Nole Gallas, overtopped by the long ridge of the Konduka; and before them lay the plateau of Wordji (495 feet above Dallaimaley). Just before making the ascent of this plateau, the expedition crossed the Khor (or Wady) Kotto or Kottu, 100 to 150 paces wide—the widest they had hitherto encountered. The plateau of Wordji was climbed by a difficult rocky path during a violent storm of rain. The surface of the plateau was strewn with low blocks of basalt, which in many places enclosed patches of fine soil, though of a darkish colour. The only vegetation consisted of a few acacias. At the northern foot of the Galla Mountains the expedition came across some gigantic tortoises, one of which, when captured, had to be transported on the back of a mule. Similar animals, of much the same size, were also met with near Bubassa, south of Harar.

New Republic (*Nieuwe Republiek*).—This is the name of the independent State proclaimed on 16th August 1884 by the Boers, who had obtained a cession of territory from Dinizulu, and took him and his country under their protectorate. L. J. Meyer, the military leader of the Boers, was chosen first President, and D. J. Esselen, Secretary of State. The camp toward the Transvaal borders was selected as the site of the capital, to which was given the name of Vrijheid (Freedom). The 2,710,000 acres of land were distributed into 400 farms, and appropriated by those who had shared in the campaign. In an assembly held on 8th January 1885, it was determined at once to occupy the whole territory towards the British Zulu Reserve, with other 400 farms, for a breadth of 10 miles. The property of all the mission societies—English, Norwegian, and Hermannsburg—which had been spared by Panda and Ketchwayo, was confiscated. The country of the New Republic extends along the coast of the Indian Ocean from St. Lucia Bay to the mouth of the Umvolosi (Zwart Rivier, *i.e.* Black River). As will be recollected, the British flag was hoisted at St. Lucia Bay on 18th December 1884; and

the German Government, instead of supporting the claims of Herr Einwald, who had obtained from Dinizulu a district of 100,000 acres on St. Lucia Bay, agreed to recognise the British right of occupation, which was based on a treaty between the British commander Cloete and the Zulu chief Panda. The Boers of the New Republic, maintaining that Panda had assigned this district to the Boers as far back as 14th February 1840, ignored the British annexation, declared St. Lucia Bay a free port for all nations, and, in spite of the re-erection of the British flag on 20th June 1885, put up to public sale, on October 2nd, 300 lots of ground for the formation of a settlement on the disputed territory. The area of the New Republic is now estimated at 5000 square miles. See *Petermann's Mitteilungen*, 1885, xi., where, on p. 426, will be found a small map by D. H. Haevernick, showing the boundaries claimed by the Boers.

Stella Land.—This name, as we learn from a note on p. 428 of *Petermann's Mitteilungen*, 1885, has nothing to do with the Latin *stella*, star, but, as Herr A. Merensky states, a corruption of the Dutch *Stille Land*—that is, the land which the Boers had occupied in peace (*in stille*).

AMERICA.

The Wapsianas of Mr. E. im Thurn.—In the *Boletim da Soc. de Geographia de Lisboa*, 5th Series, No. 3, we find that the curiosity of the Portuguese geographers having been excited by Mr. im Thurn's mention of a tribe, the Nicari-Kurus, on the Brazilo-Guianian frontier, who seemed to him to be of mixed Brazilian and Indian (Wapsiana) descent, and to speak a rather corrupt Portuguese Creole. Senhor Luciano Cordeiro applied to the Secretary of the Brazilian Section of the Lisbon Geographical Society for further information. In reply to the Sectional Secretary, Edward A. de Brito e Cunha states that Wapsiana is, he believes, a corruption of Oapichana, and that Dr. Ladislau Neto derives it from *Uapé* "Indian of the Rio Negro" and *xana* (*chana*), an element appearing in such other names as Icri-xanás, Kiri-xana, Kiriri-xana, etc., and probably meaning "false, black." He forwards a paper by Sr. Feliciano Antonio Benjamin, ex-member of the Commission of Delimitation between Brazil and Venezuela, from which we abstract as follows:—The Rio Branco (White River) is formed by the junction of the two rivers Uraricuêra and Tacatú, in 3° 1′ 48″ N. lat. and 17° 16′ 37″ W. long. from Rio de Janeiro, the position of the fort of S. Joaquim at the mouth of the Tacatú, on its left bank. The Uraricuêra is formed by the junction of the Auarys and the Paruimé, which take their rise in the Serra Parima. After flowing in a general north and south direction, it falls into the Rio Negro opposite Cravoeiro. When the water is high the river is pretty easily navigable, even for small steamboats, which can run up a distance of 180 miles from the mouth. At this point there is a reach full of rapids, the passage of which is difficult at all seasons, even for canoes. Above this reach there follows about 40 miles of free navigation, up to the S. Joaquim Fort. When the waters are low the whole course of the Rio Branco becomes difficult for the larger craft; but it is at that very period of the year the river presents its most animated aspect, owing to the arrival of natives from the Rio Negro and the head waters of the Rio Branco, for the purpose of catching fish and turtles, and collecting turtles' eggs. About 36 miles below Fort S. Joaquim, the forests give place to extensive plains, which extend north to the base of the Serra Pacaraima. This champaign district is the most interesting in the whole valley, being occupied not only by the civilised population of the river, but also by several Indian tribes—Macuchis, Arecunas, and Oapichanas; though no trace remains of the Paravilhanas, Aturahis, Amaribás, etc., mentioned by Manuel da Gama Lobo de Almada, who

explored those regions in 1787. Some of these tribes may have migrated to other regions, as seems to be the case with the Caripunas, now known to the inhabitants on the Upper Madeira; others of them have almost certainly become entirely extinct. The Arecunas dwell about the head-streams of the Majary, Parimé, Surumú, and Mahú, and have little intercourse with the whites; while the Macuchis and Oapichanas are largely employed by the settlers of the Rio Branco in transporting their cattle by means of great heavy boats, which pass the rapids of the river with great difficulty, and go as far as Manaus. Between the Macuchis and the Oapichanas there always reigns a certain antagonism and mutual distrust, even when they form part of the same boat's crew. Sober, patient, and resigned, they too often suffer through their simplicity in dealing with the more unscrupulous whites. They live in great *malocas*, several families together, to the number, it may be, of one hundred persons. Neither the Macuchis nor the Oapichanas have the barbarous custom of deforming any part of the body; but some pierce the lower lip with a very small hole, like that made in the ears of civilised girls. In speech the two tribes, judging by the mere sound of the words, are very different from each other. The Macuchi loves rough, aspirated, and guttural sounds, and run the words into each other; the Oapichana, on the other hand, is sonorous and distinct. Senhor Benjamin gives a brief vocabulary of each.

Canadian Transcontinental Route.—The first through freight train, says the *Canadian Gazette*, Thursday, November 26, that ever crossed the North American Continent entirely through British territory, was one that very appropriately carried a consignment of Imperial naval stores, sent from Halifax, Nova Scotia, to Esquimalt, on Vancouver Island. The train, which left Quebec at 7 A.M. on November 16, arrived at Burrard Inlet at 6.25 P.M. on November 22, accomplishing the journey across the continent (3053 miles) in six and a half days.

Alaska.—The journey from the Yukon to the Copper River projected by Dr. W. Everette has not been carried out, as neither white men nor Indians were willing to take part in so dangerous an expedition. Lieutenant H. T. Allen, on the other hand, has ascended the Copper River, crossed the American Alps on snow-shoes, and then followed the Tannah to its junction with the Yukon—a great feat in geographical exploration.—*Petermann's Mitteilungen*, 1885, xi., p. 432.

AUSTRALASIA.

Mr. Forbes's Expedition.—A recent letter from New Guinea mentions that Mr. H. O. Forbes had arrived there, having met with much attention from Sir P. Scratchley, H.M.'s High Commissioner. After visiting Messrs. Lawes and Chalmers, the missionaries, Mr. Forbes decided to start for Sogeri, a mountain district lying inland from Port Moresby, and there to await the arrival of his party from Australia.

MISCELLANEOUS.

Recent Research on Great Ocean Basins.—In his evening lecture on the Great Ocean Basins, delivered at the Aberdeen Meeting of the British Association, Mr. John Murray, Ph.D., Director of the *Challenger* Commission, gave a popular *résumé* of the whole subject of oceanographical research. The lecturer commenced by sketching the historical development of marine investigation, showing how gradually the importance of such work became generally recognised; and went on to tell what advances have been made in the last twenty years by means of the surveying ships and scientific expeditions of the various European nations and of the United States.

The surface inequalities of the globe are relatively small. From the summit of the loftiest mountain to the bottom of the most profound abysm yet sounded is a vertical distance of only 10 miles, which would be represented on a 1-foot globe by a groove $\frac{1}{10}$th of an inch deep. Continental land, with an average elevation of 900 feet above sea-level, covers $\frac{2}{9}$ths of the earth's surface, and forms a region of remarkable constancy. The transitional area, where almost all change takes place, runs along the coasts of continents, and extends from 60 to 300 miles seawards; it occupies $\frac{1}{9}$ths of the earth's surface, embracing all shallow seas where there are motion and light down to the bottom and where animal life is abundant, as well as the cliffs and shelving shores, and all deep water where terrigenous deposits are being laid down. The remaining $\frac{6}{9}$ths, or one-half of the surface of the world, is occupied by the abysmal area of the oceans, where the depth varies from 2 to 5 miles, with an average of about $2\frac{1}{2}$. It forms vast undulating plains, broken here and there by sharply-sloping volcanic cones, which, when they reach the surface, constitute oceanic islands, either purely volcanic or partially composed of corals and oceanic limestones. No sedimentary rocks like those found on continents occur on these islands, nor are such ever dredged from the sea bottom beyond the limits of the transitional area. The existence of a great Antarctic continent is proved by the masses of sedimentary rocks (schist, gneiss, granite, sandstone, and compact limestone) which have been brought up in dredges near the southern ice barrier. The nature of the sediment on the bottom is determined partly by the depth, and partly by the animal life in the surface layers, which is again conditioned by the physical effects of ocean currents and climate. Where *diatoms* (microscopic plants secreting a siliceous envelope) are plentiful on the surface, as in some parts of the Southern Ocean, they form a large constituent in the deposit on the bottom, whatever be the depth, and this deposit is known as *diatom ooze*. Similarly, where the minute siliceous-skeletoned animals called *radiolaria* fill the fresher surface-water of the mid-Pacific with life, *radiolarian ooze* covers the bottom. It has been computed that 1 square mile of equatorial water contains, taking account only of the upper 600 feet, sixteen tons of carbonate of lime as the delicate shells of pteropods, heteropods, and other pelagic molluscs, and as the smaller and more compact tests of foraminifera such as *Globigerina*. On the bottom in these regions *pteropod ooze* (*i.e.* deposit containing some pteropod shells) is only found when the depth is relatively small; when the depth is greater, *globigerina ooze* occurs, but in abysmal depths (over 3 miles), although the surface-waters may be teeming with the same calcareous organisms, there is no calcareous deposit in course of formation—the bottom is covered with *red clay*. The reason is that sea water dissolves shells as they slowly fall through vast depths of it,—the delicate, large-surfaced ones going first, and then the more compact. The red clay which carpets the abysmal regions is composed of the non-calcareous constituents of shells left undissolved by sea water, of volcanic ashes and *débris* carried by winds and currents on the surface to long distances from their place of origin before they get water-logged and sink, and in part of cosmic dust. The ear-bones of some extinct species of whales and the teeth of archaic types of sharks are often, amongst the red clay, found embedded in nodular masses of the oxides of iron and manganese. The absence of any strata comparable to red clay from terrestrial geology is a strong argument for believing in the permanence of the great ocean basins and masses of continental land. The solvent action of sea water on carbonate of lime also accounts for the formation of coral islands in a manner which indicates that the regions where they are most numerous are areas of great permanence, not of uniform subsidence as is demanded by Mr. Darwin's theory. The water forming the ocean contains a great number of salts in solution, but in all parts of it the proportion of the various constituents to the total salts is the same. The only difference is in salinity, or the

amount of water in which a given quantity of the invariable mixture of salts is dissolved. Atmospheric gases and carbon dioxide are absorbed by sea water, and are present even at the bottom of the deepest oceans, playing a most important part in animal life, which, although sparingly represented in some places, is nowhere wholly absent. The surface of the sea has a temperature varying from 95° to 28° F., according to position and climate, but the diurnal and annual ranges of temperature are everywhere much smaller on the sea than on land. This gives rise to the phenomena of land- and sea-breezes, of the changing of the monsoons in the Eastern seas, and to the unequal distribution of atmospheric pressure and humidity, which in turn originate the trade-winds and regular ocean surface-currents. Below the surface the temperature falls steadily until, in the open ocean, at a depth of half a mile, 40° F. measures the heat in the water in all latitudes. On the bottom the range over the whole abysmal area is about 5° F., and the average temperature there about 35° F. Though surface currents may be rapid, the translational movement of the water of the ocean as a whole is particularly slow and massive. The phenomena of partially enclosed seas illustrate this, for inside such a sea the temperature down to the bottom, whatever the depth, remains constant, being that of the water of the open ocean at the depth to which the top of the barrier cutting off the sea from the general oceanic circulation reaches.

NEW BOOKS.

Ancient Rome in 1885. By J. Henry Middleton. Edinburgh : Adam and Charles Black, 1885. *Price* 21*s.*

Mr. Middleton, like the well-read scholar that he is, has prefaced his work with a goodly list of the more important authorities on the archæology of Rome ; but it is not too much to say, that in clear and business-like exposition of his subject, he yields to none of his many predecessors.

The opening chapter on "The site of Rome, and building materials employed in Rome," is a most interesting example of scientific topography ; showing by well-selected facts how the physical conditions of its position influenced the growth of the City of the Seven Hills. It had not always a claim to this poetic number. "The various hills and ridges of Rome were once more numerous and very much more abrupt than they are now. At an early period, when each hill was crowned by a separate village fort, surrounded by hostile tribes, the great object of the inhabitants was to increase the natural steepness of the cliff, and so render access more difficult and defence easier. In later years, when the various villages and races which formed the city of Rome were united under one government, and the whole group of hills was surrounded by one extensive circuit wall, the very physical peculiarities which had originally made its hills so popular, through their natural adaptability for defence, became extremely inconvenient in a united city, where architectural symmetry and splendour were, above all things, aimed at. Hence the most gigantic engineering works were carried out, with the object of as much as possible obliterating the natural unevenness of the site. Tops of hills were levelled, whole ridges cut away, and gentle slopes formed in the place of abrupt cliffs."

The coloured *Map of Modern Rome, showing the Municipal Scheme for the enlargement of the City* (W. & A. K. Johnston), which forms the frontispiece of the book, and, still more, the large-scale plan of the *Forum Magnum*, lithographed in eleven colours by M'Lagan and Cumming, is worthy of high praise for clearness and delicacy of execution.

The Cyclades, or Life among the Insular Greeks. By J. Theodore Bent, B.A. Oxon., Author of *Genoa : How the Republic rose and fell*, etc. London : Longmans, Green, and Co., 1885. Pp. vii. and 502. No Index.

Pressure on our space has delayed the present notice of Mr. Bent's delightful and permanently interesting volume. Choosing for exploration one of those regions of Europe which, by a curious combination of circumstances, have been left untouched by the great currents of modern life, he has returned with a very cornucopia of fresh and suggestive facts. The islands with which we are made acquainted are Seriphos, Siphnos, Kimolos, Melos, Anaphi, Santorin (or Thera), Ios (Nio), Sikinos, Pholygandros, Mykonos, Tenos, Andros, Syra, Naxos, Paros, Antiparos, Kythnos (Thermia), Keos (Zea), and Amorgos. There are other islands in the beautiful archipelago between Europe and Asia, about which we should all like to learn something more than has yet been told us by the few English works, now wellnigh out of date, to which we can refer ; and we are sure that if the question were raised as to who should undertake to visit them in the general interest, the unanimous voice of his readers would declare in favour of Mr. Bent. When a new edition of *The Cyclades* is called for, the publishers would do well to give in the text maps of several of the more interesting islands, the features of which cannot be shown on so small a scale as that of the general sketch-map. That such a book should be published without an index is preposterous.

North Borneo : Explorations and Adventures on the Equator. By the late Frank Hatton, Fellow of the Chemical Society, and Associate of the Institute of Chemistry of London, Member of the Chemical Society of Berlin, and of the Straits Settlement Branch of the Asiatic Society, and Scientific Explorer in the service of the British North Borneo Company. With Biographical Sketch and Notes, by Joseph Hatton, and Preface by Sir Walter Medhurst, Commissioner of Emigration to the British North Borneo Company, and late Her Majesty's Consul at Shanghai. Illustrated. London : Sampson Low, Marston, and Co., 1885. Pp. vii. and 342, including Index. *Price* 18*s.*

This volume has a double interest. It is a record of a piece of fresh exploring work in a long-neglected part of the Indian Archipelago, and, alas ! at the same a mournful monument to the memory of the youthful pioneer. The story of Frank Hatton's brief but promising career had already been made familiar in its main outlines by the papers contributed by his father to *The Century Magazine*, 1885, and *The English Illustrated Magazine*, 1885. The present volume has not lost its *raison d'être*. A severe critic might perhaps feel that the biographical portion would have occasionally gained by compression, but where is the critic who, being at the same time a man, will try the outpourings of a father's love and sorrow by a scientific standard ? Frank Hatton was born at Horfield, Gloucestershire, a suburb of Bristol, on the 31st of August 1861, his father being at that time editor of the *Bristol Mirror*. Before he was ten years of age the family had removed to Durham, to Worcester, and finally to London. By the explosion of a gunpowder barge on the Regent's Canal, in 1874, he was "hurled from his bed and deposited in the middle of the room amidst the *débris* of a shattered window ;" and while the house was being repaired his parents sent him to a French school near Lille, where he remained two years. A year or two more at King's College School was followed by a regular course of chemistry and mineralogy at the School of Mines. On 17th September 1881 Frank Hatton arrived at Singapore on his way to Borneo, having accepted the post of scientific explorer to the North Borneo Company, and by November 19th he was on his way, along with Captain Harrington and Mr. Witti, for the Sequati

and Kurina Rivers, two small streams which enter the sea on the north-west coast of Borneo, not far from the north point of the island. The object of this first expedition was to examine the oil shales which Mr. Witti had discovered in November 1880. "With proper machinery to get out the shale, I should think that 100 gallons of oil could be turned out daily; however, this can only be ascertained by distillation of the shale in Labuan," is the entry in Mr. Hatton's Journal, Saturday, December 2d. He found that both the Sequati and the Kurina (printed "Kurnia," by the bye, in *New Ceylon*) were known as Sequati. The Kurina, for about 1½ mile inland, is described as a fine wide river, lined with trees, not very deep. The Sequati proper rises in a swamp. Northwards as far as Kaliga Point the coast is formed of the same sandstone, coloured with oxide of iron, which extends from opposite Labuan to Sequati River; but at that point begins a grey limestone containing veins of quartz and overlaid by a ferruginous yellow clay; and this continues to the base of the promontory which ends in Sampanmangio Point. At Kudat, in January, Mr. Hatton found a very rich ironstone in the hill where the Kudat workmen get their water—"I should think 50 to 60 per cent. of iron, or even more." He was next led, by a report of the existence of coal, to visit the sources of the Tertipan, which rises in a hill about 700 feet high, but found the natives had mistaken *serpentine* for coal. Two months and a half (1st March to 15th June 1882) were devoted to the exploration of the Labuk River, and to an overland journey from Bendowen (on the Labuk) to Bongon, in which the route crossed the grass-covered plain of Danao; and then followed three months' (25th July to 13th October) hard work in the districts of Kinoram and the Marudu. From this journey Mr. Hatton arrived at Kudat "quite done up," having his leg so bad that he could not walk; but, by January 1883, we find him again proceeding to the exploration of new territory. He succeeded in ascending the Kinabatangan, and then its tributary, the Pinangah; but he was foiled in his attempt to cross southwards to the Segama, and was obliged to descend the Kinabatangan, and make for the Segama mouth by sea. The exploration of this latter river (since made better known by Mr. Walker's discovery of gold) went forward with good success till, on the evening of the 1st of March 1883, at a spot about 60 miles up stream, the devoted pioneer fell dead from the accidental discharge of his own rifle.

Such is the dry *résumé* of a very interesting record. It is a pity that the volume was not revised by a competent geographer. On p. 240, Kina-Balu and Nabalu both appear in such a way that only a careful reader will have any suspicion that the two are one; and Nabalu occurs once or twice elsewhere without any explanation. Kina Bulu, on p. 79, is a less important variation; but if Habalu, on p. 209, is a misprint for Nabalu, it is doubly misleading, especially as it is indexed Habalu. The map, as is so often the case with maps appended to English books of travel, seems only to have been superficially adapted to the work. Some of the author's statements are contradicted by the map, and a considerable number of names mentioned in the text seem to have escaped the cartographer.

Jottings from the Pacific. By the Rev. W. Wyatt Gill, B.A. London: Religious Tract Society. *Price* 5*s.*

This is the third small volume of the kind which we remember to have proceeded from this author's pen, not including his valuable *Myths and Songs of the South Pacific*. It is to be regretted that Mr. Gill does not combine and collate in a single book the mass of valuable information he has collected. He is a careful observer, and has much to tell of a state of society, and strange customs and practices, now almost forgotten. Some of this we find in the present volume, as well as some curious notes on the habits and appearance of some of the more characteristic plants

and animals of the Pacific, a subject to which he has given some attention. The volume also contains certain specimens of the preaching of the native pastors; their illustrations, drawn from the objects and scenes around them, are often ingenious and pointed, though sometimes, to our ideas, incongruous.

New Guinea: An Account of the Establishment of the British Protectorate over the Southern Shores of New Guinea. By CHARLES LYNE. London: Sampson Low and Co.

Mr. Lyne accompanied Commodore Erskine's expedition as special correspondent of the *Sydney Morning Herald*, and, though we can hardly admit his claim to have "seen a great deal of New Guinea and its people," he had exceptional opportunities of visiting the various points of the South-Eastern coast at which the squadron touched, and he made the most of his opportunities. He bears testimony to the substantial changes brought about by the missionaries in the last few years, but beyond the few spots where their influence reaches, perpetual warfare and cannibalism seem to prevail. The appearance of this coast, and the ways and character of its inhabitants, have been described before, but for those interested in the subject Mr. Lyne's account of what he saw is clear and minute, and forms a pleasant record of the cruise and its objects. It may be noted that he takes an unfavourable view of the capabilities of the country for European settlement.

The Chersonese with the Gilding off. By EMILY INNES. 2 vols. London: Bentley.

These volumes hardly come within the definition of geography. They are a plain and straightforward, but not the less telling narrative of the personal experiences, and, as the title implies, discomforts of a residence in an out-station of the Malay Peninsula. The Government bungalow, built on piles on a mud-swamp which was constantly under water, and its surroundings, are graphically described. Being cut off entirely from European society, the author had exceptional opportunities of studying the Malay character, and her observations on the subject are interesting. The English are respected, and their personal devotion to the people is gratefully appreciated, but they are not, the author thinks, liked politically, for the Protectorate system induces an influx of the energetic hard-working Chinese, by whom the indolent, lazy Malay is being rapidly elbowed out.

Souvenirs de notre Tour du Monde. Par HUGUES KRAFFT. Paris: Hachette et Cie.

This tour includes a visit to the principal localities of Northern India, whence the travellers—a party of four young Frenchmen—proceeded, by Ceylon and Java, to China and Japan. The style is uniformly good, and the volume a handsome specimen of French typography and editing. It contains also some good photographs, and a few small but beautiful maps. Without going below the surface of things, it contains much lively but painstaking and intelligent description, with some amusingly free criticisms on Anglo-Indian and Dutch-Indian society. The Japanese journey is perhaps the best part of the book. Besides other excursions, the party traversed both the coast and inland routes between Tokio and Kioto, and, though the observations are only of course those of a passing traveller, they contain some interesting details, pleasantly written from a very sympathetic point of view.

Ocean and Air Currents. By THOMAS D. SMELLIE. Glasgow: John Smith and Son, 1885. Pp. 21.

The author of this pamphlet describes an experiment which he will exhibit to any one interested in the subject on calling at 209 St. Vincent Street, Glasgow. It consists of setting a circular vessel containing water in rapid rotation, and shows

that the water always lags very slightly behind the rotating vessel. Arguing from this he maintains that the rotation of the earth is not fully taken up by the aqueous and aërial oceans, which by their lagging set up strong westerly currents. These currents, modified by coasts and other conditions, constitute the main features of ocean circulation, and account for the Trade Winds.

This theory is not satisfactorily made out. There is probably some truth in it ; but the writer greatly under-estimates the value of thermal differences in producing motion in masses of water, nor is he abreast of recent researches in ocean physics.

In view of the full treatment of the subject of oceanic circulation, which is shortly to be published by the *Challenger* Commission, no opinion as to the absolute merits of this little book can be safely formed. That the rotation of the earth is a very powerful factor in regulating ocean and air currents is undoubted, and if the dynamical conditions of the rotating cylinder are found to be applicable to the globe with its ocean film, Mr. Smellie may congratulate himself on his work : whatever the result may be, he has chosen an opportune moment for publishing his speculations, and they will doubtless be taken into account in future investigations.

NEW MAPS.

EUROPE.

BALKAN PENINSULA—War Map of the ——, clearly showing Servia, Bulgaria, and the Seat of War. Scale 1 : 2,380,960.

Edinburgh : John Bartholomew. Price 6*d.*

TURKEY IN EUROPE—Special War Map of ——, and the Tributary and Independent States of the Balkan Peninsula, with various inset Maps, by T. Ruddiman Johnston, F.R.G.S. Scale 1:1,267,200.

Edinburgh : Ruddiman Johnston and Co., Limited. Price 1*s.*

ASIA.

DELTA OF THE LENA.—Provisional Map, prepared by the Lena Expedition of the Imperial Russian Geographical Society (Russian, in the *Izvyestiya*).

This map, representing the territory between 119° 30′ and 137° E. long., and between 70° 30′ and 74°, is especially noteworthy for the clearness with which the relief of the hills along the banks of the Lena is rendered, and for the distinction made between sites completely, and sites partially, determined by astronomical or magnetic observations. The river below Bulun coincides much more nearly with 127° than 128° W. long.

AFRICA.

KAMERUN-GEBIRGES—Der Sud-Abhang des ——, nach Dr. H. Zöller's Originalkarten und Berichten, sowie allen vorhandenden Quellen. Entworfen und gezeichnet von P. Langhaus. Scale 1 :200,000.

Petermann's Mitteilungen, Jahrgang 1885, *Tafel* 18. *Gotha : Justus Perthes.*

" NEUE REPUBLIK "—Von. Dr. H. Haevernick. Scale 1 : 2,000,000.

Petermann's Mitteilungen, Jahrgang 1885, *seite* 426.

This is a sketch map of Zulu Land, showing the limits of the " New Republic," and generally illustrating the South African question in that district.

NORTH AMERICA.

HUDSON STRASSE—Die Eskimo-Länder nördlich der ——, zur Uebersicht der neuesten Aufnahmen unter Captain Hall, Schwatka, Spicer und Keeney, Boas und Anderen. Scale 1 : 600,000.

Petermann's Mitteilungen, Jahrgang 1885, *Tafel* 19. *Gotha : Justus Perthes.*

INDEX.

In the following Index the ALPHABETICAL ORDER *is adhered to throughout. The more important references are indicated by deeper type in the figures. Names of Books are in italics.*

CONTRACTIONS.

Isl.	= island.	*tn.*	= town.	*trib.*	= tributary.
R.	= river.	*tr.*	= tribe.	*rev.*	= Review—in the *Magazine*.

MAPS AND ILLUSTRATIONS.

MAPS.

ERRATA.

Page 50, note *Herm, for* 1884 (Feb.) *read* 1885 (Feb.).
,, 51, note *Crete, for* Gortyra *read* Gortyna.
,, 74, line 14, ,, Taneta ,, Taveita.
,, 131, ,, 10, ,, Girislek ,, Girishk.
,, 135, ,, 6, ,, Hulla ,, Huilla.
,, 135, ,, 13, ,, however ,, he says.
,, 142, line 10, *for* Jules *read* Léon.
,, 159, ,, 20, insert *and* between *Kungryu-eli* and *Adam-elan*.
,, 245, line 13, *read* only by its massive dimensions.
Page 253, line 5, *for* urkoment *read* Turkoman.
,, 336, ,, 10 h bottom, *for* miles *read* kilome.
,, 390, note *Pan, etc., read* ex errore quam ex comme.
,, 510, line 8, Hule *read* Hull.
,, 568, ,, 4 bottom, delete *at*.
,, 589, ,, 19, Sand Salvador *read* San Salva
,, 629, line 9 165 *read* 1640.
,, ,, ,, 25, Kverkjöll *read* Kverkfjoll.
,, 631, ,, 13 bottom, *for* 9.·5 *read* 95·9.

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