PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY.

VOL. VII.

SESSION 1862-63.

Nos. I. to V.

EDITED BY F. GALTON, W. SPOTTISWOODE,
AND CLEMENTS R. MARKHAM,

HONORARY SECRETARIES.

Authors are alone responsible for the contents of their respective statements.

LONDON:

15, WHITEHALL PLACE.

1863.

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UNIV. OF
CALIFORNIA

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, STAMFORD STREET,
AND CHARING CROSS.

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N.B.—Home and Foreign Literary and Scientific Societies whose publications are exchanged with those of the Royal Geographical Society, are requested to note the following abstract of the Regulations of the General Post Office with reference to matter sent by Book Post :—

Every packet must be sent either without a cover, or in a cover open at the ends, so as to admit of the enclosures being removed for examination. For the greater security, however, of the contents, the packet may be tied *across* with string, but must not be sealed, and should have the words "Book Post" marked in legible characters above the address, in all cases in which there is a postal arrangement for the transmission of printed matter between the two countries at reduced rates.

It is also particularly requested that all MSS. intended for publication in the Society's Transactions be written only on one side, for the convenience of printing.

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ELECTED 25TH MAY, 1863.

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PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

SESSION 1862–63.

First Meeting, Monday, November 10th, 1862.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*Sir Rutherford Alcock*, K.C.B.; *Rev. W. B. Boyce; Captain H. Mangles Denham*, R.N.; *Captain J. George Don Marshall; Commodore Goyens Greville Wellesley; John Peter; H. P. Archibald Buchanan Riddell; John Westwood; and Frederick Woolrabe, Esqrs., were elected Fellows; and thirty-six new Fellows were proposed as Candidates for election.*

ACCESSIONS.—Among the Accessions to the Library and Map-Rooms since the last Meeting were—several splendid Maps of the Austrian Survey, presented by the Vienna Imperial Geographical Society, through the Chevalier de Schwartz; Blakiston's 'Five Months on the Yang-tsze;' Worm's 'Earth and its Mechanism;' United States Reports of Explorations and Surveys for Railroad from the Mississippi River to the Pacific, vol. xi.; Trap's 'Statistical and Topographical Description of Denmark' (in Danish), 5 vols.; Scott's 'Danes and Swedes;' 'Voyage of the Novara,' vols. ii. and iii. (in German); Soldan's 'Geografia del Peru,' vol. i.; Gumpach's 'True Figure and Dimensions of the Earth,' &c.; Transactions of various Home and Foreign Societies; Parts 5, 6, 7 and 8 of Philip's Imperial Library Atlas; Eton College Modern Atlas; 12 Sheets of the Topographical Map of Sweden; 12 Sheets of the Map of Russia; Carte du Liban du Corps Expéditionnaire de Syrie en 1860-61, by the Dépôt de la Guerre; Ethnographical Map of Eastern Europe; Continuation of Government Map of Bavaria; Ethnographical Map of Finland; Carnbée's Atlas; Ordnance Maps and Admiralty Charts, &c.

EXHIBITIONS.—Portrait of Mr. McDouall Stuart, the Australian Explorer, 2 boat-models found in the centre of Australia by that discoverer; Medallion Portrait of the late Mr. W. J. Wills, and Pistol belonging to the same gentleman; specimens of Australian woods; and several Planispheres and Maps, by the Chevalier Ignazio Villa, were exhibited.

The PRESIDENT stated that during the recess a large map of Australia had been prepared; which, while enabling the names of the principal rivers and towns to be seen from all parts of the room, would in some sort be worthy of the remarkable explorations which were taking place throughout that immense portion of our possessions. He congratulated the Society upon the session being opened with papers on that vast continent. It was a continent to which, as a geographer, he had always attached the greatest interest. He admired the Australian colonist for his zeal and vigour, and particularly for his loyalty and attachment to the old country. He made this observation because, somehow or other, it had recently become the fashion to talk of "secession." It was only among a few people, it was true, still the question had been mooted; but he knew perfectly well, from constant communication with friends in Australia, that there was not in any part of the British dominions a people more attached to the Crown and to their mother country than the Australians. He hoped, indeed, that the day was far distant when these glorious colonies should be separated from us. The papers to be read in the course of the evening would include a communication from Sir Henry Barkly; and as there were many distinguished Australian gentlemen in the room—two or more of them who are or have been Governors of these great colonies—he hoped to hear an ample discussion of the subject.

The Papers read were—

1. *The Lower Course of the Burdekin River in Queensland.* By G. ELPHINSTONE DALRYMPLE, Commissioner of Crown Lands in the Kennedy District.

THE author has now completed his examination of the Lower Burdekin River, extending from Leichhardt's Station in S. lat. 20° 37′, E. long. 147°, to its mouth in Upstart Bay, S. lat. 19° 42′, E. long. 147° 30′, including a course of 110 miles. The river is undivided until 15 miles from the sea, when a large branch leaves it on the northern bank, and enters Upstart Bay on the east side of Bowling Green delta; a second similar branch is given off a few miles lower down. The Burdekin is not a navigable river, for even boats cannot ascend it more than 9 miles from the sea. The general character of its bed consists in large reaches of water, alternating with sweeps of red sand, and connected by a shallow stream of 50 feet in width. The whole of the lower Burdekin runs through a richly grassed open forest of the finest pastoral description.

The second Paper read was—

2. *Extracts of a Despatch from His Excellency* SIR GEORGE BOWEN *to the* DUKE OF NEWCASTLE, *in reference to the voyage of Captain Norman, and the routes of Mr. Landsborough and Mr. Walker, dated Queensland, March 15th*, 1862.

"I HAVE the happiness to report that Her Majesty's Colonial steamer *Victoria*, Captain Norman, anchored yesterday in Moreton Bay, on its return from the exploring expedition to the Gulf of Carpentaria.

"It will be within your Grace's recollection, that the *Victoria* was to remain for six months in the Gulf of Carpentaria, as the *point d'appui* of the land expeditions commanded respectively by Mr. Landsborough and by Mr. Frederick Walker; the former of which was to accompany Captain Norman by sea in the tender *Firefly*, while the latter was to proceed overland from Rockhampton to the head of the Gulf. Accordingly the *Victoria* left Moreton Bay on the 20th August, 1861, with the tender *Firefly* in company; the latter vessel having on board Mr. Landsborough and his party, with thirty horses, stores, &c. The two ships arrived off the entrance to the Great Barrier reef on the 1st September, but were separated in a heavy gale from the south-east. On the 7th September the *Victoria* found the *Firefly* a complete wreck on one of Sir Charles Hardy's Islands, the crew and passengers, and 27 of the horses, having, however, reached the shore in safety. The *Firefly* was abandoned as past all repair, by her own master, when Captain Norman took the hull in hand, and the crew of the *Victoria* succeeded after great labour in getting it afloat, patching it up, and reshipping the surviving horses. The hull was then taken in tow. In crossing the Gulf of Carpentaria, the hull of the *Firefly* laboured so much that it was feared the horses must be abandoned, and with them the main hope of the expedition. Fortunately, however, the gale, after blowing for 36 hours, went down, when the crew of the hull was reinforced from the steamer, the pumps were cleared, and the leaks kept under, until the *Victoria* reached the Investigator Roads on the 29th September. The trees marked and the wells dug by Flinders nearly sixty years ago, were discovered on Sweer's Island, close to this anchorage. The necessary preparations having been made for disembarking Mr. Landsborough and his party, the horses were towed by the boats of the *Victoria* about 20 miles up the River Albert, where 25 were safely got on shore on the 17th October. The hull was then moored in the stream as a depôt. Much labour and care were required to get the disabled and leaky hull up the river, as it appears that in this part of the Gulf of Carpentaria there

is only one tide during the 24 hours, and that high water is always at night.

"On the 16th November, Mr. Landsborough started on his first exploration. He proceeded about 200 miles in a south-westerly direction, towards the centre of the Australian continent, and returned to the depôt on the 19th January. His Journal reports the discovery of much valuable country. After recruiting his horses and party at the depôt, Mr. Landsborough again started with provisions for 4 months, on the 10th February, intending to make his way overland to the settled districts of Queensland.

"In the mean time Mr. Walker had arrived at the depôt on the River Albert on the 7th December, having made his way overland from Rockhampton in 104 days. He proceeded at first in a westerly direction as far as the Barcoo (Mitchell's Victoria) River, when he struck north-west to the Gulf, keeping, it seems, about 100 miles west of Mr. Gregory's track, on the North Australian expedition of 1858. Mr. Walker was attacked by the natives on several occasions; and it is mentioned that he found "Terry's breech-loading carbines," with which his party had been provided, to be peculiarly serviceable. He also reports the exploration of much valuable territory lying within the western boundary of Queensland, *i.e.*, the 141st meridian of longitude. But the great success achieved by Mr. Walker was in his discovery, on the bank of the River Flinders, of the tracks of Messrs. Burke and Wills, the leaders of the overland expedition from Victoria.

"Captain Norman replenished Mr. Walker's stores with supplies for four months. Mr. Walker started on the 20th December from the River Albert, determined, if possible, to follow up throughout their whole course the returning tracks of Burke and Wills.

"Captain Norman informs me that the mouths of the Rivers Albert and Flinders, like those of most other rivers in Australia, are obstructed by bars, on which there are only 4 or 5 feet of water at low tide, with from 8 to 12 feet rise and fall. Both these rivers, however, are noble streams, navigable for above 30 miles for vessels of considerable burden. In all human probability English settlements will arise on their banks at no distant period, and will form the outlets of the rich pastoral and agricultural country of the neighbouring interior. The climate of this district, though very warm, appears to be very healthy.

"Captain Norman advises me again to press on Her Majesty's Government the urgent necessity which exists in the interests of humanity, and of the general commerce of the empire at large, for the formation of a settlement at Cape York, and for the completion

of the survey of the north-eastern coast of Australia by means of a small steamer. But I have addressed your Grace at length respecting these two undertakings in several previous despatches, stating at the same time how liberally the Government of Queensland is ready to contribute towards the expenses of both."

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3. *Extracts of a Despatch from His Excellency* Sir George Bowen *to the* Duke of Newcastle, *in reference to Mr. Landsborough's first Route to the South-West of Carpentaria, dated Queensland, April 12th*, 1862.

"I have the honour to forward herewith two copies of the Journal kept by Mr. Landsborough (the Queensland explorer) on his recent expedition, also a copy of the chart of his route. It will be seen that Mr. Landsborough, starting in a south-westerly direction from the left bank of the Albert River, towards the centre of the Australian continent, penetrated as far as 20° 14′ 5″ s. lat., and 138° 17′ E. long., thus reaching a point 250 miles south-east of the point reached by McDouall Stuart on 27th August, 1860, and about 320 miles north of the farthest point reached by Captain Sturt on the 8th September, 1845. Finding no trace of Messrs. Burke and Wills (to search for whom was the primary object of the expedition), Mr. Landsborough returned by a somewhat different track to the depôt on the Albert River. It has been truly observed, in an Australian publication, that the 'cheerful alacrity with which he resumed his arduous labours, the moment his party had been strengthened and provisioned, proves that his heart was in his work.'

"The country traversed by Mr. Landsborough on his recent journey consisted at first of thinly-wooded and well grassed plains, which were suffering from drought at that period of the year (height of summer), but which bore marks of being occasionally inundated. Farther on towards the interior the travellers, after crossing some basaltic ridges overrun with desert-grass, came upon fine open plateaux, lightly timbered and covered with rich pasture, to which the name of "Barkly Table-land" has been given, in honour of the Governor of Victoria. Much of the upland as well as of the lowland country is reported as well suited for cotton cultivation, while vast tracts are admirably adapted for pastoral purposes. It has been suggested that, inasmuch as the rainfall on the north-eastern coast of Australia occurs at a season when the territory skirting the southern portion of the Gulf of Carpentaria generally appears to suffer from drought, it is probable that a

system of migratory settlement may hereafter be adopted with advantage to the flocks and herds which will eventually occupy both regions. A belt of table-land would seem to stretch from east to west between the 18th and 19th parallels of south latitude; and in the mountain barrier which separates it from the plains of the seaboard are the sources of most of the affluents of the Albert, Nicholson, Flinders, and of the other rivers flowing into the Gulf. Messrs. Burke and Wills, as well as Mr. Landsborough, crossed this table-land, and were much struck with the beauty of its landscape, the richness of its vegetation, the amenity of its climate, and the indications which it presents of the existence of mineral wealth. Although it is within the tropics its elevation is sufficient to insure a mild temperature; while the peculiar formation of the country, with deep basins surrounded by chains of hills, would render comparatively easy the construction of reservoirs to hold the great annual fall of rain. On the whole, this region holds out the promise of being ere long overspread by that tide of population which is gradually creeping up the eastern seaboard of Queensland, and which will naturally flow round towards the Gulf when it reaches the York Peninsula.

"The projected establishment of a settlement at Cape York, and the proposed temporary annexation to Queensland of the territory sketched above, will vastly accelerate its colonization by securing to the intending settlers the advantages of certain communication, of armed protection, and of regular civil government."

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4. *Extracts of a Despatch from His Excellency* SIR H. BARKLY *to the* DUKE OF NEWCASTLE, *in reference to Messrs. Burke and Wills, Mr. Landsborough, Mr. Walker, Mr. Howitt, and Mr. McKinlay, dated Melbourne, April 23rd*, 1862.

"I AM happy to be enabled to state that Her Majesty's colonial steamer, *Victoria* has since returned from her voyage, bringing the most satisfactory account of the operations both of the party under Mr. Landsborough, which she carried round from Moreton Bay, and of that under Mr. Walker, which travelled overland from the Fitzroy River, and reached the appointed rendezvous on the Albert early in December, after discovering traces of Mr. Burke near the mouth of the Flinders, the river he was supposed to have struck.

"A full report of this most important and interesting journey will be found in the Parliamentary Papers which I enclose; as also of the expedition to the South-west, on which Mr. Landsborough, as

arranged, started shortly after arriving in the Gulf, and from which he was driven back by want of water at the end of three months, after penetrating about 200 miles. A map of both routes is appended to the Reports.

"Ignorant of the fate of Burke and his companions, Mr. Walker, of course, lost no time, after replenishing his stores, in returning to the Flinders with the view of following up the tracks he had found, whithersoever they might lead him. He left on the 20th December, and has not since been heard of; but as he had five months' full rations, and expected it would take him four at least if he had to go the Cooper Creek Depôt, there is no reason to fear as to his safety. On returning from his attempt to reach McDouall Stuart's tracks in the south-west, Mr. Landsborough likewise felt it his duty to proceed in quest of Burke, although Captain Norman of the *Victoria*, who had been placed in command of the whole expedition, was very reluctant that any needless risk should be run, and gave his assent solely on the ground that the first party might possibly miss the trail.

"Mr. Landsborough would leave the Albert about the middle of February, and cannot therefore be looked for until two months hence, unless, following an erroneous idea which he seems to have imbibed, that certain tracks seen far to the eastward by Messrs. Cornish and Buchanan, of Queensland, were those of Burke (instead of, as is far more probable, notwithstanding the lapse of time, those of Leichhardt), he finds his way back to Brisbane without coming to the depôt on Cooper Creek at all.

"To guard against every contingency, however, instructions have been sent to Mr. Howitt to remain at that spot until tidings as to the safety of both the return parties from Carpentaria are obtained: and as that gentleman has skilfully contrived to open up communication with the out-settlements of South Australia, from which he is enabled to procure ample supplies, there is no doubt of his holding his ground till directed to retire.

"At the date of the last accounts he was about returning from Mount Hopeless to endeavour to ascertain what had become of the expedition under the South-Australian leader McKinlay, which has not been heard of since January; and as he has established most friendly relations with all the Cooper Creek tribe of aborigines, there is every prospect of his being able to afford aid if needed.

"Your Grace will thus perceive that the country between Lake Torrens and the Gulf of Carpentaria is likely to be thoroughly explored in almost every direction; whilst the further it is examined the less reason there appears to be to suppose that any great por-

tion of it is hopelessly barren, or even ill-suited for pastoral purposes. Walker passed through much rich volcanic soil; whilst Landsborough describes even the poorest and driest he traversed as "fair sheep country."

"It only remains that I should notice the highly valuable Report made by Captain Norman himself on the whole expedition, including his ascent of the Flinders River in boats for nearly 50 miles; and it will be impossible, I am sure, to peruse his Journal without perceiving, in spite of the modest and plain language in which it is kept, that to the prudence, energy, perseverance, and skill of this officer the successful issue of the voyage and the safety of the exploring parties are mainly due.

"But for the exertions of himself and those under his orders in getting off the *Firefly* tender when wrecked in Torres Straits, and towing her round to the Gulf, the horses on board must have been lost, and the designs of Mr. Landsborough frustrated; whilst to his timely forethought, in at once putting all hands on reduced rations after the delay and loss of stores occasioned by this accident, is solely to be attributed his ability to keep his ship a month at least longer on the berth than was anticipated, so as to admit of that gentleman's return to the Albert, and also his being enabled to supply both expeditions with fresh supplies for a five months' return journey overland."

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5. *Extracts of a Despatch from His Excellency* SIR GEORGE BOWEN *to the* DUKE OF NEWCASTLE, *in reference to Mr. Landsborough's arrival at Menindie, and Mr. Walker's arrival at Port Denison, dated Queensland, July 8th*, 1862.

"I HAVE the honour herewith to transmit a copy of the letter in which Mr. Landsborough, the Queensland explorer, reports his arrival in the settled districts of New South Wales, with the entire party under his command, 'in safety and in good health,' after having crossed the Australian continent from the Gulf of Carpentaria.

"This eminent success will be most important in its results to the progress and settlement of this colony, while it is very gratifying to myself and to the members of my Government, as Mr. Landsborough (a resident for many years past in Queensland) was selected by us, and his equipment and instructions were prepared under our personal directions and supervision. The safe return of this exploring party and of that under the command of Mr. Walker (which reached Port Denison in Northern Queensland a short time back) are also subjects for general congratulation. It will be remembered

that the primary object of both expeditions was to search for Messrs. Burke and Wills, the Victorian explorers; and it would have been sad indeed if the Australian wilderness had swallowed up fresh victims, and especially if men had perished while seeking for other men who had been already long dead.

"Mr. Landsborough's triumphant and comparatively easy success proves, moreover, that for Australian exploration a practical 'bushman' as leader, and a lightly-equipped party, are to be preferred to costly and unwieldy preparations. Some judicious remarks have been published by a perfectly impartial witness, a public writer in the colony of New South Wales, which bore no small share in the recent expeditions. They are as follows:—'Few disasters have happened to expeditions headed by practical bushmen. Experience seems to show plainly enough that that sort of ability which is only to be acquired by long residence on the outskirts of civilization is, after all, the best qualification for an explorer. Scientific knowledge, courage, and enthusiam, are excellent qualities; but, even when possessed to the full, they do not compensate for the absence of practical experience of bush life.'

"It has been farther remarked, with equal truth, that since the lamentable fate of Burke and Wills had left no object to be gained by following their footsteps, it is a subject for congratulation that both Walker and Landsborough failed to trace them; for by the independent journeys into which the last-named explorers have thus been diverted, they have added largely to our previous knowledge of Australian geography. Landsborough's route lies intermediate between those of Burke and Walker. Five separate routes have now been traced from the settled districts to the head of the Gulf of Carpentaria; those of Leichhardt and of Augustus Gregory by the valley of the Burdekin; that of Walker from the River Alice on the Western water-parting; that of Landsborough more westerly still; and that of Burke from Cooper Creek to the River Flinders. When what is now known of the interior of the North-eastern quarter of the Australian continent (forming the territory of Queensland) shall have been fully delineated, there will not be much blank space left on the map of this colony. 'The main features of the physical geography of this district have now been determined, and all that remains is to fill in the details. This will soon be done by the squatters, who have before them the encouraging assurance that the land is well grassed and sufficiently watered. Grass and water—these are the two great requisites for pastoral occupation. Let these be furnished, and Australian colonization can enter upon its first phase.'

"The able writer from whom I have already so largely quoted sums up thus:—'The process of discovery has been expedited, first, by the successful journey of Burke and Wills, and, secondly, by the two expeditions that were sent out to look for them before their untimely fate was known. The result has been to show that Queensland possesses an immense range of good pastoral country, and, as the laws hold out sufficient inducement to squatters to take up the land, the future prosperity of that colony is placed beyond all doubt. In fact, there appears to be no large amount of desert or sterile country within its territory. There are considerable patches of "scrub," of sand, and of stony ground, but nothing that is worthy of being called by the name of a desert.'

"On the whole, the recent discoveries have not only opened a safe and easy route from the already settled districts of Queensland to the new territory lately annexed to its north-western boundary (between the 141st and the 138th meridians of longitude), but they have, in fact, practically added to the known resources of the British empire in Australia millions of acres, presenting a fresh and noble field for English capital and enterprise."

The PRESIDENT said this Expedition of Mr. Landsborough was projected in Victoria, at the suggestion of the Governor, Sir Henry Barkly. The despatch of Sir George Bowen described the remarkable journey which Mr. Landsborough afterwards made from north to south, completing, for the first time after the great Expedition of Burke and Wills in the previous year, the extraordinary feat of traversing entirely the continent of Australia. In mentioning the names of Burke and Wills it was his duty to say, though Burke was at the head of the Expedition, that equal merit was due to Wills, as a daring, adventurous, and successful explorer. The Gold Medal of the Society was awarded to the representatives of Burke, for it could only be given to the head of the party; but at the same time every geographer felt that a medal was equally due to Wills, as the astronomer and geographer of the Expedition. He had obtained the consent of the Council to write to the father of Mr. Wills, stating expressly their conviction upon this point, and the regret that they had not two medals to give, or they would certainly have presented one to Wills.

The PRESIDENT then read portions of a letter from Sir Henry Barkly, under whose government the Landsborough Expedition from Victoria emanated. It was from this colony of Victoria that Captain Norman was sent with two vessels round to the Gulf of Carpentaria. That was the commencement of the series of successes of which they had just heard the details. In his letter Sir Henry Barkly alluded to the reception of the present of a gold watch, which the Society made to that fine old soldier, King, the only survivor of the Expedition of Burke and Wills.

The PRESIDENT added that he had taken the liberty of informing the Premier of the existence of Cape Palmerston in Queensland, of which his Lordship was not cognisant; and, as two important rivers had been discovered to the north of it, he begged to call their attention to the spot. With regard to the observation immediately preceding, he was happy to see present Sir Richard McDonnell, the Governor, who had recently returned from South Australia; and he would ask him to explain the objects he had in view in

sending out Mr. McKinlay, who appeared to have deviated from the instructions he had received, and, like a true bushman, to have found his way through in a different direction. They had heard in the course of the evening of the great exploration of Stuart, which also took place under the auspices of Sir Richard McDonnell. That explorer was the first to reach the watershed of the north, but he did not absolutely reach the sea. He understood that Governor Kennedy, of Western Australia, was also in the room. It was under his government that Frank Gregory made most remarkable explorations on that side of the continent. Though the subject of Western Australia had not been touched upon, he hoped Governor Kennedy would give them some account of what had been done in that colony, so that they might have in one view the great additions to our geographical knowledge which had been made by these various adventurous explorers.

Sir Richard McDonnell, late Governor of South Australia, said, in reference to the excursion of Mr. McKinlay, it appeared from a telegram lately received that that gentleman had come out on the east coast of Australia, near Rockhampton. The instructions to Mr. McKinlay were that he should, after an exploration from Adelaide to the east, make for Central Mount Stuart; then he was to examine the west of Lake Gregory, and to search in the adjacent country for gold, which Mr. Stuart had stated was likely to be found there; he was then to return to Adelaide if he met with Mr. Stuart, whose destiny was now a subject of very great anxiety, and if he did not meet him near Central Mount Stuart, he was to return south to Adelaide. It was only fair to anticipate that McKinlay, who was a very able and experienced bushman, would be able to give very good reasons for his deviation from the route which it was intended he should follow.

He might observe with reference to the name of Stuart, which is given to the mountain that was considered by its discoverer, Mr. Stuart, to occupy the most central point of the continent, it was a proof of the modesty which is so often allied to true greatness, that when Mr. Stuart brought the map to him he called it "Mount Sturt." He, however, thought it was only fair, as he did not see Stuart's name upon any part of the map, that he should insert another letter, and give this mountain the name of Stuart.

The Papers which he had heard read had brought most vividly and satisfactorily to his mind a truth, of which he had long been convinced. He knew there had been great advocates for a desert in Central Australia, and great advocates for large central seas; but he thought that, before the light of recent experience and increased knowledge, both the deserts and the inland seas were fast disappearing. He was surprised to read in Australia some accounts of the proceedings of this Society, in which great stress had been laid on the magnitude of an inland sea reported by Mr. Stuart, which was in his opinion identical with Lake Gregory, and was part of Lake Torrens, the original horseshoe lake that Mr. Sturt gave upon his map. Mr. Stuart had now left on a great expedition, the entire cost of which was defrayed by the South-Australian Government, on the condition and understanding that all maps and charts, and in fact everything of discovery connected with it, were to become the property of the South-Australian Government; and he was very naturally surprised to find that in London there were many persons who possessed the information of the existence of a large inland sea, with which the Government, who had fitted out Mr. Stuart, were totally unacquainted. He imagined that that inland sea was fast drying up: in fact, he did not see any great reason for the advocates of the inland sea to congratulate themselves upon it; it is a mere depression of land which at one time was found by Mr. Goyder full of fresh water, and at another time by Mr. Stuart and others just a basin, with a little liquid brine in the centre. No doubt at one time, as the members of the Society were well aware, it was supposed that there was a large horseshoe around the inhabited

and settled districts of South Australia, which barred all ingress into the interior, and that to advance into it was to advance into a region of slush, liquid brine, and mud. All this has disappeared. We now knew of three crossings over it. He had himself crossed over and had gone a considerable distance north, and he was one of the first that went across. It had long been a matter of great interest to him to know what was in the interior of Australia, and, as far as he knew, it was neither that rich country nor was it so barren as many had been in the habit of supposing. There were, however, materials enough for the development of wealth hereafter; but he imagined that development would be slow, from the purely pastoral character of the country. He would advert to a fact in which he felt a just and natural pride, namely, that the Government of South Australia, with which he had recently been connected, was the first to give life and impetus to those movements which, commencing with the explorations of Mr. Stuart, had been succeeded by those of Burke and Landsborough. It was to the colony of South Australia, neither so wealthy nor so populous as Victoria and New South Wales, that we were indebted for this new movement, for there had been an apathy about these matters since the explorations of Mr. Sturt many years ago. The instructions given to Mr. Stuart by the South-Australian Government, which differed widely from those given by the colonists of New South Wales and Victoria to their explorers, were that he should make his way to the Victoria River, and not towards the Gulf of Carpentaria. He might appeal to their common sense whether it was not of very great consequence to this country, to open a direct route by the island of Timor with our Indian possessions, in connection with a river which is more navigable than any to be found at the Gulf of Carpentaria. The distance was many hundred miles shorter between Victoria River and Adelaide, and there was a large amount of stock ready to cross the continent, consisting of cattle, sheep, and horses, which have become great articles of commerce with India. It was evident by a reference to the map that it was much easier to pass up Lake Gregory to the Victoria River than to take the cattle and sheep to the Gulf of Carpentaria, from the shores of which there was a long and somewhat dangerous navigation. If cotton was to be grown in any part of Australia with success, it would be eminently so in the neighbourhood of the plains near the Victoria River, which were exceedingly fertile in consequence of an alluvial deposit; and he had no doubt, if a communication with India were established, that part of Australia would become the site of a very flourishing colony. The Society should bear in mind that South Australians had always had before them the idea that their explorations should connect Adelaide with Victoria River. It could not be denied that they were moved to these considerations somewhat by motives of self-interest, and he had no doubt the South Australians thought that eventually they might establish a telegraph, by the nearest route to the Victoria River, with India and Europe, much more readily than by the circuitous route which has been before the public for some time. When that plan was read before the South-Australian Government, he had influence enough with its ministers always to say, "When we see the reason why we cannot go straight across the continent, we will then consider why we must go two or three thousand miles round." He hoped, on Mr. Stuart's return, he would be able to satisfactorily prove the practicability of the scheme to which he had alluded.

He had heard with very great pleasure an observation which had fallen from Sir Roderick, to the effect that he could not understand any people in this country talking of a severance from colonies which had always manifested the most loyal disposition towards the mother country. Having administered the government of several of Her Majesty's colonies for the last thirteen or fourteen years, he must say that nothing was more painful to his feelings than the levity with which that subject had been treated by some of the highest in the land. In the Australian colonies there was a depth of feeling and a depth of affection

for the mother country, which was in no way better evinced than when there was suffering at home, to the relief of which the colonies were always so ready to subscribe. If the colonies did not add to the power and strength of this country, it would be simply because our statesmen did not know to avail themselves of them. It would not be the fault of the colonists, but the fault of those who ought to be able to make use of the connection in a manner to increase the power of the mother country, by uniting in one common brotherhood the different members that compose this great empire. He assured the Society that nothing could be more untrue than that there is any talk in Australia of severance from the mother country: they never discussed such a subject—nothing could be more unpopular. If any one were to broach such a subject, he would be scouted by every one. It was only at home, he said, and occasionally in Parliament, that such things are mentioned. He must say, having filled the responsible position he had for so many years, he was happy to embrace this early opportunity of expressing the great pleasure with which he had heard the President make that observation, and the great pleasure with which he had listened to their expression of sympathy with that sentiment.

Sir Charles Nicholson, Bart., said that during the last eleven months he had had an opportunity of visiting a portion of the north-east coast, as far as the new settlement of Port Denison. This was the extreme northern point of colonization on the eastern coast at present. The progress of settlement in Queensland along the coast had been very rapid and was most encouraging. A most magnificent country had been discovered, and the estuary of two or three rivers had also been lately traced. It was thought when Mr. Dalrymple fell in with the Burdekin, that a navigable mouth of the Burdekin might be found somewhere about Cape Upstart; but it had since been ascertained that the estuary of the river consisted of a number of small branches, not any one of which was navigable by a boat. However the country around Port Denison is exceedingly fine, consisting of rich pastoral and open forest-land. He was there in December last, and he saw a party of young squatters who had been exploring as far as the table-land behind Rockingham Bay, what is called Leichhardt's Basaltic Table-land, about 100 miles to the west of Rockingham Bay. They had been absent five months in making this exploration, accompanied by a black boy, and of course they had to undergo a great many trials during that period. This, however, was a matter of course with those who are occupied in searching for runs. There was no doubt that the most successful explorers are the old bushmen who have been so engaged.

One of the most interesting tracts lately opened up is the valley of the Fitzroy. The Fitzroy River is certainly the largest tidal river that has been discovered, with the exception of the Victoria in the north-west, in any part of Australia. The Victoria River drains a tract of country of not less than fifty millions of acres, and the whole of that country is of the finest possible description.

Sir Richard McDonnell had just suggested that the great field for the growth of cotton was likely to be on the north-west near the Victoria River. Possibly that might be the case; but certainly a finer country and one better adapted for the growth of cotton could not be found in any part of the world than in the central and northern parts of Queensland. He might observe, as an interesting fact, that the growth of cotton is no longer a speculation in that country. There are now 200 bales of cotton shipped at Moreton Bay, which are expected daily in England. The legislature of Queensland had shown a most commendable anxiety to promote in every way the cultivation of this great staple, and in doing so they had perhaps transgressed against some of the maxims of political economy. For instance, they had offered a bounty of tenpence a pound upon sea-island cotton, and fivepence a pound upon all common cotton that might be grown in the colony within the next two years. The only thing the colonies are deficient in is the common want of labour.

With reference to the Papers which had been read, he would venture to ask Sir Richard McDonnell whether he was quite satisfied as to the fact of Stuart having reached the extreme point to the north laid down in his journal, because Mr. Landsborough and many of the best judges in Australia had very great doubt as to his having reached that point. He had been informed that Mr. Stuart was not expert in taking observations, and that, in point of fact, his calculations were formed on the mere "dead reckoning."

Sir Richard McDonnell said he must state at once that Mr. Stuart is an accurate observer, and is considered one of the best practical surveyors in South Australia. He was brought up to the profession.

Sir Charles Nicholson, in continuation, said he differed from Sir Richard McDonnell as to the route he had indicated being the great highway from India to Australia. He believed the only mode of access into the interior will be by following the dividing range. Now, one of the great results of Mr. Landsborough's journey was this: he demonstrated that the great eastern coast range, instead of being limited in the north to Cape York, bifurcates and extends towards the north-west, forming the watershed of the rivers which flow into the Gulf of Carpentaria on the north, and of the affluents of the Darling on the south. It is by following that dividing range, a great portion of which consists of open forest-land fit for pasture, that he believed will be made the great high road between West Australia and Australia generally, and India; because certainly, from the evidence we had of Mr. Stuart's account of the land, the country he passed through, if not a desert, is of a very unpromising character. There is a great deficiency of water, and it is a country not likely to be available for the transit of commerce or passengers. It is an unfortunate circumstance that none of the rivers which flow into the Gulf of Carpentaria are navigable. They all have bars at their mouths, and are consequently inapplicable to the purposes of commerce.

The Legislative Council of Queensland were very anxious to establish a settlement at the head of the gulf, and they obtained all the evidence available upon the subject. It appears that the greatest depth of water at the bar of the Albert, Nicholson, and Flinders, and of all the rivers that flow there, does not exceed 5 feet, and that the only safe anchorage is in Investigator Straits, just off Wellesley Island. He quite agreed with Sir Richard McDonnell, that the most eligible and interesting spot to which the attention of colonists should now be turned is the valley of the Victoria River. Looking to its proximity to India, to the fact that it is undoubtedly the largest tidal river in that part of the north coast, that the tide there rises some 30 feet, and that according to the evidence of Mr. Augustus Gregory there is a fine country there, it is most desirable that steps should be taken with a view of determining its character and forming a settlement in that place.

The Government of Queensland were quite alive to the interest attaching to all these great questions, and he believed that at this moment Sir George Bowen, influenced by the representations made at the instance of the Geographical Society, was at Cape York, with the view to form an establishment there. In this way the whole of the east coast might be said to be more or less occupied. It was proposed by Mr. Herbert, the Colonial Secretary of Queensland, who was now in England, that the local Government should form another establishment in Rockingham Bay. That would form the extreme settlement at present, the next point being Port Denison. One additional point of occupation between Cape York and Rockingham Bay would complete the chain of settlements, so that steamers could navigate the whole distance, and take in a supply of coal; in short, open up the whole of that coast.

He might also mention another fact with reference to the line followed by Burke and Wills. There are certainly some doubts whether they were quite so far to the west as they represented. Mr. Landsborough told him just before

he started on his expedition that he had fallen in with their tracks on some former excursions of his, made on his own private account, at a point to the east of the 141st meridian, and his impression was that they were much further to the east than they believed themselves to be.

He would just take the opportunity of adding his tribute of admiration for the zeal and ability of Mr. Landsborough. Among Australian discoverers he was as an explorer *facile princeps*. He had been engaged for years in bush-life; he had been out for months together, simply with a black boy, searching for country; and he possessed in every respect those qualities which are calculated to fit him for the task of the most difficult explorations.

He ventured, with great submission, to subscribe the impression of his opinion as to what had been said by Sir Richard McDonnell with regard to the feelings of attachment entertained by the whole of the Australian colonies towards the parent state, and the deep regret which he, in common with others, felt at hearing the speculations indulged in by various persons in England as to what can hardly be otherwise regarded than as a dissolution of the British empire. It was nothing more nor less than a proposition for abandoning those colonies in which there is as much loyalty and deep affection towards the institutions of England as there is in any part of Britain itself. He had been in Australia twenty-five years, and such a thing as separation was never alluded to in the colonies. It was only when he came to England that he heard gentlemen in high office and holding distinguished positions propound these theories, which, he was glad to say, are not in any degree responded to by the colonists.

Sir Stuart Donaldson said he was not going to take the part of South Australia against the North, or of Queensland against Victoria; but there had, in the course of the discussion this evening on Australian discovery, been what appeared to him a *casus omissus*, which they ought not to separate without noticing. Among the explorers to whom so much credit was due there was one name which had not been mentioned—that of the unfortunate Leichhardt. With all due respect to those whose names would no doubt become immortalised, he thought the name of Leichhardt ought not to be forgotten. He recollected the colony long enough to remember when Leichhardt went out—unaided by Government, with nothing but private subscriptions and his own indomitable pluck to guide him through the untrodden wilds of the North-Western interior—on an expedition in 1846. He was lost, to all appearance, and for eighteen months was never heard of. He not only went from the centre part of Queensland right up to Cape York, but he descended again to the south along the peninsula; he coasted the Carpentaria Gulf, and then went across all the northern watershed which empties inself into that gulf, until he arrived at Port Essington, where he was first discovered to be alive. His track, on the map, would appear three times the length of any except Landsborough and Stuart's, but it had not even been mentioned during the discussion. He desired to rectify the omission. He could not forget the sensation in the colony when it was thought Leichhardt was lost, nor the joy that prevailed at Sidney when the news came, "Leichhardt is alive!" Again he started from New South Wales, resolved to cross the entire continent or perish in the attempt, and has never since been heard of. Now that he was no more, the couplet of the poet on the possibility of finding Leichhardt's grave seemed to him to be singularly appropriate under present circumstances:—

> "How shall the pilgrim hail the hour,
> Beneath the drooping myall's gloom *
> To sit at eve and watch an hour,
> And pluck a leaf on Leichhardt's tomb!"

He felt he could not sit still and hear all these encouraging eulogies on modern

* *Myall*, the scented tree known as "violet wood."

explorers without alluding in a few words to the honour and glory of the man who, under great difficulties, and with no one's track to assist him, was one of the greatest and most successful explorers in the whole of Australia, and intreating this great assemblage, while honouring the living, not to forget the lost Ludvig Leichhardt.

The PRESIDENT begged to assure Sir S. Donaldson that before the next meeting the line of Leichhardt's route would be properly delineated on the map. And when delineated it would be seen that his excellent friend had somewhat exaggerated the amount of exploration of that most illustrious traveller. Leichhardt had received the gold medal of the Society, which would show the high estimation in which he was held by us. Besides Leichhardt, the name of Sturt had not been mentioned in the papers which had been read; and, for his own part, he considered Sturt one of the greatest of Australian explorers. They had not gone into the whole history of Australian exploration, but were confining their attention to the labours of Landsborough and Stuart.

MR. KENNEDY, the Governor of Western Australia, observed that he had lately returned from that almost unknown part of Australia called Western Australia, a district which, he believed, could justly boast of being less known than any other part of her Majesty's dominions. He expressed his regret at being unable to add much to their information respecting that portion of Australia; but this ignorance of Western Australia was no fault of his, for during the time he held the reins of government there had been no less than three explorations, more or less important. The first was undertaken towards the eastern district, directly from the west to the east, to the place called Mount Kennedy. That was carried out by a very enterprising band of young settlers, and they found a very fair country in that direction. Up to that time—and that was a matter of a year or a year and a half ago—it was believed that that part of the country was barren and unfit for settlement. He had, however, come to the conclusion (which was wholly the reverse of what had formerly been currently believed) that it was a fair country, and fit for settlement. Another exploration farther to the west and north was undertaken by Mr. Frank Gregory up the Gascoigne. During that expedition he discovered some very fair country. The same gentleman, within a very recent period, attempted to join his exploration from Nichol Bay with that towards the centre of Australia, reached by his brother, Mr. Augustus Gregory. He, however, failed in this attempt. But what he discovered had been fully placed before the Geographical Society by Mr. Gregory and by the official reports. Mr. Kennedy added, he had no doubt that a very large portion of that unknown tract would turn out to be perfectly suitable for settlement and habitation; and that, in all probability ere many years had passed, that now almost unknown part of Australia would become the happy homes of thousands of Englishmen.

Western Australia was generally supposed to produce very little; but he might be permitted to inform them that among other things it had produced those two very remarkable explorers, Mr. Frank Gregory and Mr. Augustus Gregory. If not born there, at all events they had been reared and educated in the colony. They learned their craft there before Mr. Augustus Gregory went farther east, and explored towards the Gulf of Carpentaria. He is now placed in a position in Queensland which no doubt would be occupied by him with honour to himself and advantage to the colony.

Western Australia had some very particular traits. They had succeeded in doing, what there was a very strong popular disbelief in in this country—they had turned thieves into honest men. He believed it was the only place and the only means by which such characters could be reformed. It was by a very simple process—because there was nobody to rob and nothing to steal. It was a known fact that upwards of 6000 or 7000 of these characters had been introduced into that part of Australia; and it was a fact which could be

vouched by statistical reports and records of the Colonial Office, that the percentage of crime was as low there as in any other part of Her Majesty's dominions. This arose from the simple reason that these men are compelled to work; compelled to earn their bread; and they had plenty of room to do so. If they had possessed the same advantages in this country, he believed a very great majority of them would never have been criminals at all. Western Australia also produced a remarkable kind of oyster, specimens of which he was happy to lay before the Society, and he was informed that their commercial value was about 140*l.* per ton. He believed if these could be imported into this country, and a commercial relationship of this kind established, that Western Australia would be almost as valuable as the gold districts of Australia. That the Western part of Australia was less rich than others was perfectly true, but he could assure the Society that there were many instances within his own knowledge of men who had struggled hard in this country for an existence—men of the very lowest class—who had succeeded in nine or ten years in obtaining 800*l.* to 1000*l.* a year for their clip of wool. In Western Australia there is plenty of room for labour, and it only required that part to be better known to encourage a larger emigration. Her Majesty's Government had always been most liberal in that respect. It was true they sent convicts, because the colony wanted them, but they at the same time sent as many free men and free women, which counterbalanced the convicts; and, as long as that was satisfactory to this country it would be satisfactory to these colonists: there is plenty of room for ten times as many.

He would just say one word in conclusion, and that was in corroboration of his friend Sir Richard McDonnell, that there is not in that country, as far as he knew, a shadow of a desire for severance from the mother country. He had never been in any part of the world where there was a deeper and more devoted loyalty than in that part of Australia which he had had the honour to govern. He had never heard a dissentient voice upon the subject; but on the contrary, whenever Her Majesty's name had been mentioned, it had always been received with as much enthusiasm as it would be in any assembly of Englishmen at home. He could not understand upon what ground it would be advantageous to have a noble country like that severed from the parent State in the days of its infancy. Such an agitation and such a proposal ought to be deprecated by every sane and honest man in this country. Australia, even as an outlet for our superabundant population, was invaluable; and by a proper and judicious management, by giving the Australians that which Her Majesty's Government, of whatever politics, had hitherto given them—fair play and right of self-government—he had no doubt that they would be as long and as warmly attached to the British Crown as any dependency which owns her sway.

The PRESIDENT expressed his regret that, owing to the late hour, they could not have the pleasure of hearing Colonel Gawler, whom he intended to have called upon, with regard to the question of separation from this country. If it had been stated that some person high in office had given expression to such a sentiment, he knew that Mr. Herman Merivale, the Under Secretary of the Colonies, had read an admirable paper before the British Association for the Advancement of Science, at Cambridge, in which he showed the utter futility of the notion of separation, and how injurious such a separation would be to the mother country. Mr. Merivale had argued the question upon broad statistical grounds; and, for his own part, he was happy to find, from all the authorities who had spoken, that there was not a seceder in the great continent of Australia.

Before adjourning the meeting, he must beg to congratulate them upon having had this interesting discussion on the anniversary of the birthday of the Prince of Wales. He mentioned this circumstance because His Royal Highness was the only heir-apparent—at least within the reach of his recollection in history

—who had made himself so good a geographer by his extensive travels. It was, therefore, well that they should wish him prosperity and long life. Above all, he hoped very soon to be able to announce that His Royal Highness would condescend to accept that post which was held by his illustrious Parent, and become, under Her Majesty, the Vice-Patron of the Royal Geographical Society.

The meeting was then adjourned to Nov. 24th.

Second Meeting, Monday, November 24th, 1862.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*General W. Marcus Coghlan; J. Lewis Franklin, and John Flint South, Esqrs., were presented upon their election.*

ELECTIONS.—*Colonel Thomas Addison*, C.B.; *Captain Bagot; Lieut.-Colonel G. Clement Baillie*, R.E.; *Captain C. E. Barrett-Lennard; General W. Marcus Coghlan*, R.A.; *Commander H. A. Fraser*, I.N.; *Captain C. Webley Hope*, R.N.; *Major-General Edward Macarthur*, C.B.; *Lieutenant Mervyn B. Medlycott*, R.N.; *Rev. John V. Povah; Captain Leveson E. H. Somerset*, R.N.; *Captain C. Freville Surtees; John B. Baillie; Lucas Barrett; J. Comber Browne; John Cargill; Walter Cope; Sedgwick S. Cooper; J. H. Eaton; William Eaton; Henry D. Erskine; John Fletcher; James Griffin; Samuel H. Hinde; William Kershaw; Chessborough C. Macdonald; George F. M'Dougall*, R.N.; *Daniel Mackinly; Francis Muir; Frederick Rasch; John Shaw; John Thomas; P. G. Van der Byl; E. Wingfield Verner; Samuel Woods; and Heathcote Wyndham, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since the former meeting were—Markham's 'Travels in Peru and India;' Brine's 'Taeping Rebellion in China;' Dhanjibbai Framji's 'Origin and Authenticity of the Arian Languages;' Barrett-Lennard's 'British Columbia;' Gether's 'Gedanken uber die Naturkraft;' Maps of the Victorian Mining Districts, Australia; Admiralty Charts, &c. &c.

EXHIBITIONS.—Several sketches of natives and zoological specimens, made by the East African Expedition; a sample of Abyssinian cotton, obtained by Dr. Beke, F.R.G.S.; and a specimen of lead from the Bight of Benin, sent by Captain R. F. Burton, F.R.G.S., were exhibited.

The Papers read were—

1. *Exploration of the Niassa Lake.* By DR. LIVINGSTONE and his Party.

AFTER establishing the members of the University Mission in the neighbourhood of Mount Zumbo, Dr. Livingstone proceeded with his party to explore the Lake Niassa. They carried a four-oared

boat in three weeks past Murchison's Cataracts, which extend through 35 miles of latitude, and launched her on the upper waters of the Shiré. They entered the lake on September 2, accompanied by a score of natives, and explored its western coast for 200 miles, travelling until they were compelled to return from want of food, due to the recent extermination of the northern coast tribes by savage warfare. Part of the expedition went on foot and part in the boat: the latter were never able to cross the lake or venture far from shore, owing to the suddenness and extraordinary violence of the storms. They ascertained its breadth by rough triangulation, whenever the haziness of the air allowed the opposite shore to be seen, but no certain knowledge was obtained in regard to its northern extremity. The lake has something of the boot-shape of Italy: it is narrowest at the ankle, where it is 20 miles, and broadens gradually to 50 or 60 miles. Its western shore presents a succession of sandy bays, each divided from its neighbour by a bold headland, with detached rocks, extending some distance out to sea. Much of the land adjacent to the lake is low and occasionally marshy: it is tenanted by water-fowl and some elephants. Eight or ten miles from the shore are ranges of high and well-wooded granite hills, nearly parallel to its course, and presenting in several places a magnificent succession of distances. The intervening plain narrows towards the north; where Dr. Livingstone turned, it disappears altogether. The depth of the lake is readily to be traced by the changing colour of its surface. A belt of bright green water fringes the shore, and varies in breadth from a few yards to several miles: beyond this is the deep blue water of the body of the lake. A sounding-line of 200 fathoms was found insufficient to reach the bottom one mile from shore. The temperature of the water is 72° Fahrenheit; its rise in the rainy season is 3 feet. Five affluents were seen on its western coast, of inconsiderable size: their united volume was far inferior to that of the waters of the Shiré.

Natives, of essentially one tribe and language, throng the southern portion of the lake. Their villages are so close together as frequently to form a continuous line of habitations. They are hard-working fishermen and good cultivators of the land: they were reasonably civil to Dr. Livingstone's party, and exacted no dues for the right of transit. The slave-trade is unfortunately active. An Arab had built a "dhow" (boat) on the lake, in the latitude of Ibo, for the purpose of ferrying slaves across. Dr. Livingstone's present endeavour is to transport a steamer to the Niassa for the purpose of checking this traffic as far as may be practicable, and also with the object of further exploration.

The PRESIDENT said the object of Livingstone, now that he had accomplished this remarkable journey in a small boat, after carrying it up the Shiré alongside the cataracts which had been alluded to, was to convey a small steamer, which the Government had placed at his disposal, by the same route from the Zambesi to the lake, in the hope that it would enable him to put an effectual stoppage to the slave-trade proceeding across these waters from the westward. Hordes of slaves are brought down from the interior, and carried across the lake at certain passages where the lake is narrowest. The most cruel part of the traffic is that when the lakes are passed; the slave-gangs are driven down to the coast, and lodged in the malarious recesses and bights at the mouths of the rivers, until the slave-ships are ready to take them away. In this way hundreds of them perish, as shown by the skeletons which have been found there. With a single small steamer, still better with two, Livingstone contends he could do more to check the slave-trade than by a number of large vessels stationed off the coast; since it is impossible for these to hunt out every little bay into which the slaves are driven. In this way, therefore, at much less eventual expense, Livingstone may be able to carry out this great object which he has at heart.

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2. *Letters from* CAPTAINS SPEKE *and* GRANT, *of the East African Expedition.*

THESE are dated at various times between February and September, 1861, during which interval the travellers encountered great difficulties, due to two independent causes. The country had been afflicted with drought and famine to an extent which made all traffic exceedingly difficult, and there were native wars on the occasion of a disputed succession to a chieftainship. As a partial consequence of these, the porters who accompanied Captains Speke and Grant were constantly abandoning their service, either fearing the danger or taking advantage of the general lawlessness of the land. The geographical additions to our knowledge are thus far of little importance. The movements of the travellers have been seriously embarrassed; Captain Speke has also suffered, and recovered from, an attack of weakening fever. The latest intelligence was the most favourable: the party were then encamped in S. lat. 3° 26′, interpreters had been procured, a sufficiency of porters had been obtained, and Speke and Grant were on the point of advancing towards the Nianza Lake. Robberies and desertions had materially reduced their funds; but Captain Speke's last letter, of September 30, 1861, was written in better spirits. He regrets that, as circumstances have turned out, he did not attempt the northern route to the Nianza by way of Kilimanjaro, instead of following his previous track.

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3. *Proceedings of* MR. CONSUL PETHERICK, F.R.G.S., *on the White Nile.*

MR. PETHERICK'S departure from Khartum was delayed so long, that the periodical winds of the White Nile had changed to his

disadvantage, and he was wind-bound to the north of the Bahr el Ghazal. Owing to the representations of the British Acting Consul-General at Alexandria, His Highness the Viceroy of Egypt had sent instructions to the Governor of the Sudan to forward such assistance as might be necessary to Mr. Petherick.

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4. *Letters from* SAMUEL W. BAKER, ESQ., F.R.G.S., *on his Travels by the Atbara River and its Tributaries, in Nubia, dated September 10th*, 1862.

THE author spent some months shooting in the neighbourhood of the tributaries of the Atbara River, the single confluent of the Nile, and visited a large amount of country that had previously been undescribed. The chief tributaries of the Atbara are the Settite, Salaam, and Angarep; he considers the former to be the parent of the river. These streams, which are copious near their sources in the high lands of Abyssinia and pour increased volumes of water during the rains, are barely capable of reaching the Nile in the dry season. They are absorbed in sands and lost in fissures. Even the Atbara itself dwindles down to an insignificant stream before entering the Nile. They traverse a land that has great natural fertility, and is cultivated for cotton. A curious colony of natives of Darfur, called Tokrowris, cultivate cotton extensively: they are pilgrims who have settled by the way, on their return from Mecca. The author desires to draw attention to these large and fertile districts as a possible source of an abundant supply of cotton. Mr. Baker had excellent sport in shooting elephants and other game. He dates his letter from Khartum, whence he proposed proceeding up the White Nile for the purposes of exploration. He speaks strongly of the wretched state of lawlessness into which the White Nile races have been driven by the unscrupulous conduct of the native servants of traders on that river.

The PRESIDENT said there were several other communications which there would be no time to read. They had received a few words from Captain Burton, who had ascended a mountain, which he calls the Elephant Mountain, in the Bight of Benin; then they had a communication from Mr. Moffat, brother of the late lamented Mrs. Livingstone, suggesting the employment of camels for explorations in Southern Africa; and they had received the following communication from the Foreign Office:—

"I am directed by Earl Russell to transmit to you herewith, to be laid before the Committee of the Royal Geographical Society, an extract from a despatch from the British acting Consul-General at Alexandria, relative to the difficulties in which Mr. Consul Petherick and his party were placed in the White Nile, according to information received from Khartum, on the 11th of August last.

"I am to add that, on the pressing representations of Mr. Consul Sanders,

the Egyptian Government has sent orders to the Governor of the Soudan to take such steps as may be necessary to render assistance to Consul Petherick."

When His Highness the Viceroy of Egypt was elected an honorary Fellow of the Society, he mentioned to His Highness the great service he might render to the cause of geographical science by assisting explorers, adding, "But, Sir, our operations extend beyond your frontiers;" upon which His Highness said, "I pray you to consider that my frontiers are very elastic." So powerful a man as he was, it was gratifying to find that his Government had at once supported us in this manner.

Adverting to the expedition of Captains Speke and Grant, the President said he much regretted that so long a history of misfortune had been read to the Society. It was necessary to explain the difficulties that had occurred, and it only showed the uncertainty that attends travel in Africa. On the first exploration Speke and Burton in seven months traversed the whole of the region from Zanzibar to the lakes, both of which they discovered; and now, though equally zealous, Speke had found the greatest difficulties thrown in the way of his progress, owing to the wars which have broken out among the different tribes. The condition of any portion of the interior of Africa at one season is not to be calculated upon for the next season. We could only join in the hopeful wish expressed by Speke in his letter, and in the belief that his energy and that of his associate will enable them to overcome all obstacles.

Should they ever reach Lake Victoria Nyanza, and get to the northern end of it, then the prospects would be most cheering; because not only has Consul Petherick gone up the river towards Gondokoro, but there are three adventurous ladies, who, having freighted a steamer at their own expense, are now proceeding beyond Khartum, up the Nile. From having that steamer at their disposal they are likely to shoot past Consul Petherick; and it is therefore not improbable that the first assistance which will be brought to Speke, if he arrives at that point of his destination, will be brought to him by ladies. It is quite an original adventure; he knew nothing like it in the history of modern travel.

Besides these two expeditions there was a third, which that intrepid explorer, Mr. Baker, was carrying out. Seldom had a paper been read which exhibited a greater amount of gallant and bold exploration on the part of a sportsman. Mr. Baker really went there in the first instance in search of wild animals, but it would be seen what an extensive addition he has made to our geographical knowledge of a large portion of Africa. He has done this entirely at his own expense, with no assistance from the Government; and if in future times the Society should desire to seek a man to carry out explorations in distant regions, Mr. Baker is one of the best men they could select for such a purpose.

As Colonel Rigby was present, the President took the opportunity of acknowledging how much geographers are indebted to him as Consul at Zanzibar, for the assistance he has rendered on all occasions to our African travellers.

Colonel Rigby said, as he was resident at Zanzibar for a year after the departure of Captain Speke, he could explain the causes of some of the unforeseen difficulties which the expeditionary party had met with. In the first place, shortly after Captain Speke left the coast, a famine of unusual severity occurred all over East Africa: so much so that the poor famished wretches came from the interior in search of food to Zanzibar; while towards the eastern shores of Lake Nyassa, ten able-bodied slaves were given in exchange for one bullock. The effect of this famine was to prevent supplies reaching Captain Speke from Zanzibar. Supplies of various sorts had been sent out, but neither these nor any letters had ever reached him from the time he had advanced a few days into the interior; the caravans not being able to

come down in consequence of the famine. Another cause was the serious rebellion which broke out at Zanzibar. A chief tribe there, who are all slave-dealers, rose in rebellion against the Sultan; and when that rebellion was put down with British assistance, most of the people engaged in it went over to the mainland, and they have spread themselves over the interior, making slaves of the natives, and selling them. He had received a letter from Captain Speke, written on the 28th of April, explaining the state of that country in consequence of these maranding Arabs from Zanzibar. He had also a letter from Colonel Pelly, dated in July last, stating that he had heard from Speke, who was at Kagwé on the 30th of September, 1861, and that he was sending up at his request a caravan of fifty men and goods. If Captain Speke had to await the arrival of those men at Kagwé, it would of course be a considerable time before he could advance to the north, to Lake Nyanza. It was a lucky circumstance that Mr. Petherick had also been delayed, otherwise he would have arrived south much sooner than Captain Speke's expedition could possibly do. A great many Arabs and Africans at Zanzibar have travelled over that country, and they all agreed that a very large river flowed into Lake Nyanza from the west, which they called, after the name of the country, Ougonda. They state that the Sultan of Ougonda is a very powerful chief, having a large army, and about 2000 war-boats on the lake. It is not known that any great river issues from the lake, either on the north, east, or south; but, from native accounts, he thought it probable that the River Juba comes out of the lake on the east coast. The Juba is entirely unexplored. The Baron Van der Decken, a Hanoverian, who is now in Eastern Africa, has written to Germany to purchase a steamer, and has applied to the Prussian Government for a company of sailors and marines, for the purpose of exploring the Juba. He has already reached the mountains of Kilimanjaro without any hostility on the part of the natives, and he is waiting at Zanzibar till this steamer arrives.

It must appear strange why the slaves who come down to the coast should be all brought from the west of Lake Nyassa. The reason is that the whole tract of country lying between the coast and the east side of the lake is almost entirely depopulated, from the effects of the slave-trade. The Arabs have recently built a vessel on the lake for the purpose of conveying them across. They are brought down to Quiloa, the great slave-port on the east coast, by the M'bisa tribes. They generally drive down young children when they can procure a sufficient number of them, after having put the men and women to death. They bring down 2000 and 3000 children in one caravan, and dispose of them chiefly at Quiloa. If the trade is not put a stop to, in a few years the whole of the rich country whence the slaves are brought, and which Dr. Livingstone has visited and described as producing such beautiful cotton, will become desert. Dr. Röscher was unfortunately killed by some robbers at nearly four days' journey from the east coast of Nyassa: the surviving servant returned to Zanzibar. The murderers were seized by the chief of that country and sent in chains to Zanzibar, where they were put to death.

In reply to Mr. Craufurd, it was stated by Colonel Rigby that of the slave-children brought down to Quiloa, about 15,000 had been taken north to the Persian Gulf and ports on the east coast of Africa, and 10,000 kept in Zanzibar; and, in reply to Colonel Sykes, that it would take four months at least before the convoy of supplies sent from Zanzibar could reach Captain Speke at Kagwé.

Colonel Sykes, M.P., observed that Captain Speke and Captain Grant were placed in a position of very great difficulty, in which their moral courage and physical endurance had been tried to the utmost. From two letters he had received from Captain Grant he learnt that with all their energy they have been brought to a standstill, and the object they had in view absolutely stopped. Captain Grant was separated for some months from Captain Speke,

and surrounded with difficulties. Under these circumstances the Society would make allowance for the impediments they had met with, for it would be found that nothing has been wanting on the part of these two resolute explorers. He still hoped that they might be enabled to make their way; but from the state of anarchy in which the country now is, the difficulties they have to encounter are no doubt very extensive and lamentable, and it may so occur that they will have to retrace their steps and return to Zanzibar.

Captain Speke in a part of his letter expressed regret that he did not take a different route, and instead of following their former route up to Nianza (and they have not got so far as Captain Speke did on the former occasion, for they have only got to Kagwé,) that they had landed at Mombas, and so cut into the northern head of the lake by the flank of Kilimanjaro. That would have shortened the distance one-half, supposing they could have passed the Kilimanjaro range. Beyond the mountain-range of Kilimanjaro no doubt the route is practicable, and if they had taken that route they might have avoided the difficulties which now beset them. It is a question also whether the Nianza could not be reached by the river Dana. Officers in the survey branch of the Indian navy having ascended the river for a considerable distance.

The PRESIDENT repeated what he had said, that it was impossible for Captain Speke and Captain Grant to advance at present as successfully as before, owing to the changed condition of the country and warlike relations of the inhabitants. If the present route had been found difficult, it was the route of Captain Speke's own choice. He had a high admiration of these gentlemen, and fully concurred in all that Colonel Sykes had said of them. With regard to those adventurous ladies who have gone up in a steamer from Khartum, he hoped Mr. Tinné would be kind enough to tell the meeting what he knew about them.

MR. TINNÉ said he had very little information to give with regard to what had taken place, and he feared that what he had to say would be of very little interest to geographers. These ladies are not scientific—they have only the virtue of a great love for travel. It is not the first exploit that they have been engaged in, but he believed it is the greatest that they have ever undertaken. Having arrived at Khartum, they did not find the place so agreeable for residence as they expected. It was their intention to have resided there during the four winter months, and to have made explorations from Khartum as their head-quarters, in different directions, including Abyssinia and Upper Nubia. Circumstances, however, obliged them to change their plans, and they proceeded up the White Nile in search of a site for a habitation; but, not meeting with any to their satisfaction, they were driven at last to the plan of hiring a steamer. Fortunately the Viceroy's brother, Prince Halim, who was once Governor of the Sudán, had a steamer there for his own use, and he left her there when he returned to Cairo, in charge of a French gentleman, who was his agent. The ladies were enabled to make a contract with this gentleman for the hire of the steamer. While one of the party returned to Khartum to negotiate and complete the contract for the steamer, the other two were left at Mount Hemaya, where they were still encamped at the date of the last advices in July, just as the steamer had arrived. He believed they intended to proceed immediately further up the river and to go to Gondokoro. If he received any further accounts, he would be happy to communicate the information to the Society.

What surprised him was, as there were accounts of Consul Petherick and of Mr. Baker up to August, that neither of these gentlemen in any of their accounts should have mentioned such a singular circumstance as a steamer at the disposal of any parties at Khartum, or that there was a party of ladies in their immediate locality.

His correspondents described the scenery of the White Nile as extremely beautiful, resembling in many respects Virginia Water, being finely wooded down to the water's edge, with many islands, distant mountains and highlands, water-lilies in the river, and all sorts of attractions for the traveller. He had not heard from these ladies anything of the dangers that had been mentioned in other accounts. In every letter he received they say, "We are perfectly safe; we place implicit reliance in the Government, and the only drawback is the continuance of the horrid slave-trade." The slave-trade was going on there, in spite of all that the Viceroy can do or the laws can say against it, from the causes that had been mentioned. He could only hope that public opinion would be brought to bear upon the Egyptian Government, and thus help to put a stop to this traffic.

The President adjourned the sitting to the 8th of December.

Third Meeting, Monday, December 8th, 1862.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATION.—*Walter Cope, Esq., was presented upon his Election.*

ELECTIONS.—*Captain Robert B. Baker; Captain Sir John Swinburne*, BART., R.N.; *Rev. Julian Edmund Woods; John Bramley-Moore*, M.P.; *Robert Holland; Horatio N. Lay; Edward Burnet Tylor; and M. W. Mills Whitehouse, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since received were—Baldwin's 'African Hunting;' Du Chaillu's 'Voyages et Aventures dans l'Afrique Equatoriale;' Wallich's 'North Atlantic Sea-Bed;' Report of the U.S. Colorado Exploring Expedition; Maps of the 'Novara's' Voyage round the World; Maps of the entrance to Chicago; Map of Japan, showing the route of Sir R. Alcock, from Nagasaki to Jeddo; Russian Map, from Pekin to Kiakhta; Johnston's Map of Australia, Eastern sheet; Stanford's Library Map of Asia, &c. &c.

EXHIBITIONS.—Several geological specimens from the Gold-diggings to the East of Kiakhta, as well as a Mongol rifle, obtained by Mr. Grant, and Relief Model of the island of St. Paul's, taken by the Austrian frigate 'Novara,' and presented by the Archduke Ferdinand Max, of Austria, were exhibited

The Papers read were—

1. *Narrative of a Journey from Tientsin to Mukden, in Manchuria.* By A. MICHIE, Esq.

THE author followed the coast and reached the Great Wall of China in six days from Tientsin. Here the mountains of the interior approach the shore; and the road to Manchuria, following the narrow plain between them, issues through the Wall at a well-guarded

gate, by the military station of Shan-hai-kwan. At this place the author was brought for the first time in contact with the Mandarins, who gave him willing assistance after his passport had been examined, though they were at first disconcerted at his arrival, and in doubt how to receive him. The road on entering Manchuria continues to follow the coast, and is barren and devoid of interest. After a distance of two days' journey, it reaches a vast mud-plain, barely elevated above the sea-level, and periodically flooded to a distance of 50 miles from the coast. Its surface is smooth, and caked, and whitened with efflorescence, and nothing but sea-birds live upon it. It resembles the low land at the mouth of the Peiho, on a largely extended scale. The author concludes from the existence of these flats, and also from the occurrence of numerous dry channels, that the whole of the Gulf of Pechili and the adjacent coast has been elevated within a very recent period. The appearance of the country improves considerably in the neighbourhood of the Liauho, where there is abundance of cultivation. The author visited Ying-tse, the newly-established port at the mouth of that river, and found a few foreign residents engaged in a limited trade. Here he left his baggage-waggon, and, transferring his effects to the back of a pony, travelled toward Mukden, which he reached in four days. The city appeared to him unlike anything he had seen in China, owing to the solidity of its architecture, the neatness and cleanliness of its streets, and the thriving appearance of its inhabitants. He compares it to Edinburgh, in the same sense that he compares Tientsin with Glasgow, and either Suchow, Hanchow, or Canton with London.

The inhabitants of Manchuria have an independent bearing that contrasts favourably with the enervated races of central China. They always travel armed, for robberies are said to be numerous, and the Government is weak. In appearance they seem to be Chinese rather than Manchus, for the natives have either been driven into the remote pasture-lands of Manchuria, or become absorbed by the Chinese immigrants. The few that are left are Chinese in language, manners, and customs, though there is little cordiality between the two races.

The material wealth of the country lies chiefly in its crops of pulse, but trade of all kinds is restricted by the cost of transport. Its climate is pre-eminently dry: it is extremely hot in summer and cold in winter, and the air is always pure and bracing.

The author met with no obstruction from the authorities, and was only occasionally inconvenienced by the curiosity of the mobs.

2. *Route from Pekin to St. Petersburg, viâ Mongolia.* By Charles Mitchell Grant, Esq.

After some years' wandering, Mr. Grant found himself at Pekin, whence he determined to attempt the overland route to Russia. He obtained Chinese credentials and a Russian *visé*, and started in a mule-litter, accompanied by two baggage-carts. He had few difficulties and little adventure before reaching the Great Wall. He passed caravans carrying tea to Russia, and met cases of rifles in large numbers coming from Russia, as part payment for the cession of the Amùr; and droves of ponies from Mongolia. Coal-pits were at work in the neighbourhood of Suen-hoa-foo, the head-quarters of the French Lazarist Mission in the north of China. His preparations for crossing the Desert of Gobi were made at Chang-kia-kow (called Kalgan by the Russians), which is an exceedingly important town, as all the Russian traffic passes through its gates. He says there is full employment for a sportsman in its neighbourhood in the pursuit of an abundance of wild ducks, antelopes and leopards. Here Mr. Grant dismissed his Chinese servants, who feared the cold of the Gobi Desert, and engaged two Mongols, with five camels and a cart, to take him to Kiakhta for 33*l*. He had also to procure a store of provisions for his own use, during the six weeks' journey before him. His party combined with four others, forming on the whole a caravan of 100 camels, under the leadership of a man whom they selected as their chief. The routine of travelling was as follows:—In the morning, two men on fast camels collected the herd, which were arranged in five files, for the purpose of being packed, a process that was completed in half an hour. They then started in one long row, each animal being tied by a cord six feet long, that led from its nose-ring to the gear on the back of the one that preceded it. Mr. Grant's cart was drawn by a single camel, and was of the rudest workmanship, without a particle of iron in its composition: its place was in the middle of the caravan, where he was attended by his two Mongols. In the afternoon some encamping station was reached; that is to say, a well of water without any neighbouring village. The camels were then again arranged in files, quickly unladen, and turned loose to graze, with their nose-cords fastened round their necks. A two-poled tent of 18 ft. by 12 ft. was next pitched; a bright hot fire of dry camel's dung was made in a grate in its centre, and a cauldron of water or snow boiled with pounded brick-tea. Each man carried a wooden bowl in his breast, which he used as a tea-cup. Then followed boiled meat and millet, also eaten from the bowls. The

chief of the caravan was the only Mongol who drank spirits, the others had simply water. Later in the evening the camels were collected and secured for the night; more tea was made, and pipes were smoked. The Llamas of the party chanted prayers every night, passing the prayer-book from hand to hand, that each might use it in his turn. Lastly the whole party huddled close to the fire and slept undressed, with their sheepskin-coats for a covering and their boots for a pillow. The cold at night was intense and variable: on April 6th, Mr. Grant registered 10° Fahr. below zero at 6 A.M., and usually on other days between +10° and +18° Fahr. The violence of the wind was remarkable in the desert of Gobi and in the north of China. The sailors' superstitious belief that whistling brings on a gale, is shared by the Mongols. Ourga, the capital of Mongolia, is the first town on the further side of the desert. The communication onwards to Kiakhta, occupies 4 days. Mr. Grant was, in all, 45 days from Chung-kia-kow to Kiakhta, during the whole of which time he tasted little else besides the provisions he carried. He considers no danger need be apprehended along the route he followed; but he would never recommend his countrymen to attempt it, as he did, alone. Mr. Grant's further journey to the Ural Mountains homewards is described in his Paper. He states that in his many travels he had never met with so much genuine hospitality and kindness as among the Russians. He discusses the proposed telegraph through Siberia, and looks forward to the time, at no distant date, when Pekin shall be connected telegraphically with London.

After the reading of the Papers on China, the PRESIDENT said he could not pretend to follow Mr. Grant in his varied excursion over so large a portion of the globe; but when he came towards the conclusion of it he felt himself somewhat at home, for he had also traversed the Ural mountains and descended the Tchussovaya River. He had also himself borne testimony, long before the Crimean war, to the hearty hospitality and kindness with which Englishmen are ever received by the Russians throughout those regions; and he was delighted to find that, after the close of a war which everybody now regretted, the same spirit of hospitality had been exercised towards Mr. Grant. To turn to the subject more immediately under consideration, we now learned from Mr. Grant that this so-called desert of Gobi is, in fact, a pastoral country. It is, to a great extent, clothed with grass; supporting numerous flocks and herds. It is not the ordinary route taken by the Russian caravans to and from China, of which they had just heard. It is a new route, which this adventurous traveller, depending entirely upon his own energy and his own means, has successfully traversed for the first time. He was glad to see present so many gentlemen connected with China, and he hoped they would favour the meeting with some information on the subject.

SIR HARRY PARKES said he thought the papers were exceedingly satisfactory in one respect, for they certainly established the efficiency and advantages resulting from the new treaty successfully concluded by Lord Elgin, one clause

of which gave to Englishmen and foreigners the right to travel through the length and breadth of that vast empire. It was also satisfactory to find that the passport which Mr. Grant obtained under the provisions of the recent treaty was sufficient to procure protection to that gentleman, that wherever he went the people received him kindly, and, on the whole, assisted him on his journey; and that in the outer dependencies of China, no less than in China itself, the people are not antagonistic to us as a race, and place no serious obstacles in the way of foreigners travelling through their territory. The countries described in the two papers which had been read are very interesting. In the first place, Manchuria is the cradle of Manchus (commonly known to us under the misnomer of Tartars) who conquered China upwards of two centuries ago, and continue to be the dominant race in that country. It is curious that that very country of Manchuria should have since become, in fact, almost a Chinese province; for the Chinese who now form the greater part of the population appear to have engrossed the province, and by peaceable means have almost reconquered the Tartars, who had previously conquered them. It was natural that in agriculture and commerce the Manchus would have to give way before the more industrious Chinese, whose profession is that of arms. He was afraid, however, that even in their own country, the cradle of the race, they exhibited the same martial degeneracy that is to be observed in the Manchu garrisons stationed in the different provinces of the empire. Mr. Michie said he saw nothing whatever of that strong military government, which we had been accustomed to read of, in the province of Shing-king, and that between Tientsin and Mukden he saw scarcely a hundred soldiers. Other travellers during the present year had crossed the same country, and they confirmed Mr. Michie's statement on that point. They spoke of the productive character of the country, and they also spoke of the numerous bands of robbers, who were mounted, and who seemed to career across the province, doing pretty much as they liked. He believed for a long period of time the Manchus tried to check as much as possible the immigration of Chinese into Manchuria; but lately, since the accession of the Emperor Taoukwang, the restrictions formerly imposed had been removed, and the Chinese have now penetrated very nearly up to the Amùr river, which we know is the present boundary of Manchuria. Not along ago, Manchuria was nearly twice the size it is now; but by the treaties of 1858 and 1860 between the Chinese and Russians, the greater part of the two provinces Kirin and Tsi-tsi-har have been ceded to Russia. In fact, they have, apparently without knowing what they did or the extent of the concession, given the whole of the sea-coast which they at one time possessed to Russia, and have excluded themselves entirely from the ocean. He dared say many would not regret the change, considering how little the Manchus have done to develope that vast tract, and how much in the cause of civilization and progress the Russians were likely to accomplish. Mukden has been built on the plan of Pekin. In fact, it is Pekin *in petto*. It looked very much as if they wanted Pekin No. 2 to be at hand, in case of their losing Pekin No. 1. Lately, however, Mukden has not been so well garrisoned and kept up as formerly; and we know that when we approached Pekin ourselves, in 1860, many of the Chinese Ministers protested against the Emperor going into Tartary, on this ground among others—that he would find all the population of the country beyond the Wall in a most disturbed and unruly state.

Looking at the two accounts given by Mr. Grant and Mr. Michie, he thought that the Manchus would compare favourably with the rival race, the Mongols. If we went back into the realms of history, we should find that they have fought against each other repeatedly. The Chinese have called in first the one, and then the other, and have pitted them one against each other on various occasions. The Mongols, however, with all their communication

with China, remain essentially a nomadic people, while the Manchus have acquired agricultural tastes and habits, are much more stationary than the Mongols, and have certainly done far more in the cause of literature and refinement. In their attempt to conquer China, the Mongols had to withdraw to their deserts after a period of eighty years; whereas the Manchus have kept possession for three times that period. But in Mongolia we observe the same great fact of the irrepressible Chinese settling down in this region which we were accustomed to look upon as a desert, and winning it from its nomade owners just as we see they have done on the other side in Manchuria. It appeared from Mr. Grant that Mongolia is not a waste tract, as has frequently been supposed. The first region entered beyond the Great Wall—inner Mongolia—is a very productive tract. Then we come to a plateau generally called Gobi, or desert, though the word Gobi appears to be applied to any tract that is not cultivated; at least, we do not find vast tracts of sand, and where there is no cultivation, it appeared to be hard pebbly plain. The plateau appears to be crossed, and a descent already commenced towards the Russian frontier, when we reach Ourga, the capital of Mongolia. Beyond that point we re-enter a better country, which is under cultivation, and yields cereals and grain; so that in crossing Mongolia we may divide the journey into three stages: the feeding-lands of inner Mongolia; then the central part, which we may continue to call by the name of Gobi, or desert; and then the third stage from Ourga to Kiakhta on the Russian frontier.

Mr. Grant had not only given us valuable information on the subject of that country, but he had also started a very practical question in which all England and, in fact, all Europe, had a very vital interest. It is the question of the speediest mode of communication with China, which he certainly thought, with Mr. Grant, might be conducted with much greater rapidity by the way of Russia than by our present route. The time occupied in communicating with Pekin by the usual overland route is at present not less than 55 days, and Mr. Grant says that, by means of couriers and telegraphs, this time might be very much reduced. We know practically that the Siberian route is already the quickest mode of communication, for the news of the Treaty of Pekin reached London *vid* Russia a week before it came by the ordinary route, and we thus got the news in some 37 days. If it be the case that, with the existing rude means of travelling across Mongolia, information could reach us earlier by that than by the present steam-route, although the latter is aided by the telegraph from Alexandria, of course it stands to reason that, with improved appliances, the superiority of the Russian route might become much more marked, and communication might be greatly accelerated. We know that the Russians, as fast as they can accomplish it, are carrying a line of telegraph across their own dominions, with the view of reaching the Pacific, so as to communicate with their possessions in America, and that a part of their project, which they intend to effect within the next twelve or eighteen months, is to carry a branch line from Irkutsk to Kiakhta. A line of telegraph from Kiakhta to Pekin, or to the Taku ports, would then suffice to complete telegraphic communication between Europe and China. The difficulty lies between Kiakhta and Pekin. On his arrival in this country he heard that this enterprise had been thought of and discussed, and that some progress had been made in carrying it out by Mr. Reuter. That gentleman had put some questions to him as to the district between Kiakhta and Pekin; and he only regretted that he had not possessed Mr. Grant's information, that he might have enlightened Mr. Reuter more than he was able to do. That gentleman had now an agent at Pekin; and if the Chinese Government could be induced to second the plan, we might hope that this means of communication might be carried out. But until the question is fairly put to the Chinese Government, it is impossible to say whether they will be able to give the desired effect to the proposition.

Our present information is imperfect both as to the extent of their authority over the tribes inhabiting outer Mongolia, and over those of inner Mongolia. Between Manchus and Mongols a natural feeling of jealousy exists; and this, combined perhaps with past experience of their own, may have influenced the Chinese Government in declining the assistance of a Mongol force which the Mongol Prince Sangkolinsin lately voluteered to march into China, first against the rebels, and subsequently against the Allies. Still he believed the Chinese rule over the Mongols had always been a lenient one, and that, on the whole, the Mongols feel attached to the present Chinese Government. Their plan is to have all the chiefs of the different Mongol tribes in their pay; they give them large sums of money, rank, and various other privileges, in return for a very nominal tribute. The people had the character of being exceedingly obedient to their chiefs, and of readily submitting to whatever their chiefs required of them. Therefore, it is possible that there might be a sufficient rule in that vast tract of country to secure the protection of a line of telegraph from injury.

MR. LAY said that there is certainly no country more entitled to the interest of the British public than China at the present moment. We have a very large trade with that country, out of which we make large profits. The trade at the port of Shanghai alone amounted to 29,000,000*l.* sterling in the year 1861; and the trade on the River Yang-tse-kiang in the first year after it was opened amounted to 4,000,000*l.* sterling. At the present moment, especially, the British people should show an interest in China, inasmuch as it is her hour of difficulty. By reason of her weakness and owing to the rebellion which exists in the country, China has shown a disposition to give access to foreigners; and it is our duty now to avail ourselves of that opportunity to introduce such reforms and improvements as will be beneficial alike to them and to ourselves. They had heard probably of the expedition which is being organised in this country to lend assistance to the Chinese Government. The object of that expedition is not only to strengthen the Government, but to be instrumental in introducing those reforms which will be our only security for peaceful relations with China. Prince Kung has shown a disposition, although struggling with great difficulties and with a strong party opposed to him, to avail himself of the services of Englishmen; and has given a promise that he will, in return for the advantages which he expects to gain from our assistance, adopt those reforms in his administration and introduce those improvements which will be our best guarantee, and gain us that access into China which has been hitherto denied to us. The country has suffered during the last few years partly from misgovernment at Pekin, and partly from the vastly increasing population, which the productive power of the soil is insufficient to maintain. There has been no outlet for that population. They have gone on increasing, and they must be fed; and, inasmuch as there is no rice to feed them, they rebel. He therefore thought that one measure to which attention ought to be drawn is, the organization of some scheme of emigration from China, so as to relieve the country of its surplus population, and colonise Borneo and other islands in the Indian Archipelago, where there are thousands of acres lying waste for want of cultivation.

A few words with respect to the Tae-pings. They are one of the parties giving the Government trouble at this time. He happened to be well acquainted with the men who formed the nucleus of the movement. Some of them some years ago were members of a Christian Union in Hong-Kong, and circumstances brought him into connexion with them, and led him to form a very unfavourable opinion of them. As members of the Union they were maintained by the money subscribed in this country. They represented themselves as coming from different provinces; and, according to the distance at which those provinces were situated from Hong-Kong, a sum of money was allowed to each

man, to carry him into his district and enable him to preach the Gospel and distribute tracts, each man receiving in addition a supply of Old and New Testaments. It came to his knowledge that these men never left Hong-Kong, and that they sold the Testaments to the Chinese printer, who in his turn resold them to the Christian Union, the Chinese printer receiving from 500 to 1000 per cent. upon each Bible. This is a fact which, he thought, should be known to the British public, and which certainly produced an unfavourable impression upon his own mind. He asked one of them, on one occasion, how it came to pass that they could reconcile themselves to this species of imposture; and asked him more especially as to the advantage of their change of name, as he found they were all under false names. He was told: "Well, possibly you have a Supreme Being, but we do not know; we worship him now here, and we gain a living by it. If it should happen by-and-by that he really does exist, and he calls us to account for any shortcomings of ours in respect to our profession or otherwise, our answer will be: 'You are quite mistaken; our name is not so-and-so, and so you will find if you will refer to the records of the village in which we were born.'" He thought with reference to the opinions we might entertain of the Tae-pings, that there was but one safe guide. If a disturbance occurred in Ireland, for instance, we should not expect the judgment of America, or Germany, or France, but we should ask ourselves what we thought of the rising. With regard to the Tae-ping rebellion, the question should be, What do the Chinese people themselves think of it? They surely ought to know whether these Tae-pings are worthy of confidence or not. Now, everywhere they have pronounced against the rebels. In no one case, so far as he knew, had they received any support or assistance from the people; and this he thought an unanswerable argument against them. As he said before, we went to China hoping not only to strengthen the Chinese Government, so as to enable it to give the protection that we require for our trade, but also to be instrumental in introducing the telegraph, which he thought a great lever by which to open the country to commerce. The first thing that should be done was, if possible, to introduce the telegraph-wire, and to connect Pekin with the provinces, so as to keep the Court informed of what transpires in the provinces. He hoped that, before twelve months should have passed, that—not the least result of the expedition with which he himself was connected—would be the first instalment of information that would be valuable to the Geographical Society.

MR. CRAUFURD asked Mr. Lay to describe the nature of the system under which the revenue is collected for the European trade, and the amount of the revenue.

MR. LAY said the system under which the revenue is collected at the twelve ports is this: the Chinese Government have appointed him, as Commissioner of Customs, to select for them officers who are placed at the ports. The revenue at Shanghai is at the rate of 1,000,000*l.* sterling by the last accounts. They had not the statistics for the other ports for the last year. The system has been in operation at Shanghai for seven years, and it has only been recently extended to the other ports; but he expected to collect some 2,000,000*l.* sterling, or probably more, from all the ports taken together. The great thing to bear in mind in our relations with China is, to show that we wish them to make a profit as well as ourselves; for it is only in that way that we shall make them willing to introduce those improvements which are so desirable.

MR. CRAUFURD asked what might have been the revenue before.

MR. LAY said that Shanghai last year collected a revenue of 800,000 taels; and, when he took the customs seven years ago, it was only one-third of that amount. He believed the revenue at the other ports would be in proportion.

CAPTAIN SHERARD OSBORN, R.N., said the Papers applied to a part of the world and to an element that he was personally little acquainted with. As a sailor he

ought to know more about the waters and rivers of China than of the land. What he had read of Chin-king and Manchuria confimed fully the observations they had heard from Mr. Michie. He looked upon that portion of Manchuria to which attention had been directed and of which they could best form an idea, by taking the area of Germany, with a population equal to that of London spread loosely over it, as destined to become a country of great importance in Eastern Asia. It is a great pulse and seed bearing district, and even when he was there at the first opening up of the Lake Petchili, he found the junks carrying down immense quantities of oil-cake to Shanghai and Swatow, so that by the aid of the oil-cake of that northern province was grown the sugar of the Southern States, and that fact was a remarkable proof of the circulation of trade going on in China. He did not think Newchang had answered the opinion we had formed of it, but he believed it would do so by and by. He believed that Manchuria was the Scinde of Eastern Asia, and that Newchang, like Kurrachee, might take time but would eventually become a most important place of trade. With respect to the forthcoming expedition, with the command of which he had been entrusted, he could assure the Society that he should ever bear in mind that he was a member of this Society, and he was sure that all who accompanied him would do all they could to contribute to the geographical knowledge of this vast empire. In the next place he could assure them that they would not forget that they were both Christians and English officers. Those who fancied they were going out simply to slaughter the wretched Tae-pings were grossly mistaken. He was actuated by nobler motives, and he hoped to see carried out, as had been suggested by Mr. Lay, the development of an organised system of emigration from China, as a safety-valve for its present troubles and miseries. It would be, he should consider it, the greatest feat of his life if, upon taking any one Tae-ping town, he should be able to say that not a single soul had been unnecessarily slaughtered. He felt convinced that if this country would give its aid in providing an outlet for the vagabondage, banditti, and bad characters of China, to another sphere of action, these vagabonds would become good Chinamen and useful subjects in some parts of the Eastern Archipelago, and that it would be found one of the most effective means of suppressing the state of rebellion now existing in that country.

The PRESIDENT said there were yet many gentlemen present capable of offering observations upon the subject, but as the evening was too far advanced to call upon more than one speaker, he would therefore ask his honourable friend, the Chancellor of the Exchequer, to state the impression which had been produced upon his mind by what had passed on the subject.

The RIGHT HON. WILLIAM GLADSTONE, M.P., said he had been, he was afraid, one of the most ignorant, but certainly not one of the least attentive or the least interested of the listeners. In the official situation which he at present had the honour to hold, he had very good reasons—some of them not of the most agreeable description, others more agreeable—to have the name of China deeply engraven upon his mind. In the course of the last two-and-twenty years the history of our relations with that country had been a very chequered history, and even those who took the most favourable view of the circumstances of that period must feel, he thought, that it presented much which we were compelled to regret—at any rate to regret some even of the measures into which we may think that we have been driven; but he trusted we had reached the dawn of a happier day. In some points, and in one in particular which he could not help relating, it had been his lot long ago to learn a lesson of wisdom from the Chinese. It was during the period of controversy on the Corn Laws. At that time, in the course of a regular official correspondence, there happened to come before him a document relating to the dues payable on the tonnage of vessels entering one of the Chinese ports. The vessel in question was laden with rice,

and the language of the letter was singular. It was couched in the tumid style which was usual, so far as we could judge through translations, and especially at that period, with official persons in China. It spoke with the utmost contempt of external commerce in general, saying it was a matter of perfect indifference to the people of the Celestial or flowery land—if that be the true rendering of the Chinese phrase—whether the outer barbarians chose to come there with their cargoes or not. That was the general rule which the Chinese functionary, whoever he may have been, laid down; but he said, "There is one marked exception to be made to the insignificance of foreign commerce in general, that is, in the case where a foreign ship enters our ports laden with food for the people." He therefore proceeded to lay down that that ship was to be admitted without the payment of any dues or charges whatever. He remembered the writer then wound up his letter with the words, "Your stupid younger brother sends his compliments." But it was really a matter worthy of remark that at the very moment when we were ourselves so blind to economical truths and to the practical advantage of the country as to think our wisest policy was to use restrictive measures especially against the admission of food from abroad—we, the first of the commercial nations of the world—at that very moment the poor Chinese were teaching us a lesson which at a later period we had learnt and had applied with advantage to the country, how happily all men knew. The President had asked him to testify to any impression made upon his mind by the discussion that had taken place. He confessed he had always had a very deep impression with respect to what one might call the ideal character of the traveller. It appeared to him that no ordinary qualities are required to make a man a good traveller. To travel with profit, even in neighbouring countries, is no easy matter; but when we come to circumstances such as those of Mr. Grant in a remote country, with physical difficulties and social difficulties to contend with, there is required a combination of qualities, a readiness of self-command, a patience, a resolution, an ingenuity, a sagacity—all forming an aggregate of demand upon the mind and body, upon the human faculties in general, which it is by no means easy to meet. He frankly owned he considered it one of the chief prerogatives of the inhabitants of this island that it has furnished to the world so large a proportion of energetic and enterprising travellers. What he had heard to-night, especially in the case of Mr. Grant, convinced him that the breed is not extinct, and that, aided greatly by the beneficial agency of this Society, we are still likely to furnish a large supply of persons both qualified and willing to undertake the exploration of what yet remains unexplored of the surface of the globe. But there was one consideration higher still, for in vain would all that energy, and all that sagacity, and all that self-command be shown in opening up places still unknown to us, if, when we arrived there, we were to carry with us the curses and not the blessings of civilization. He was confident, and he entertained a sanguine hope from what he saw and heard upon every side, that a much higher standard of moral and social duty—of duty incumbent upon us both as Christians and as men—was now beginning to establish itself in the public mind, than what had at certain periods been observed and maintained. He trusted that the power and vigour that were being devoted to the work of travelling will only be the pioneers of a process which will be the means of conveying to foreign countries, so far as it was in our power, the very best of the blessings we ourselves enjoy; and he would say in conclusion, if that general persuasion of his had wanted any special confirmation, he should have derived that confirmation in the fullest manner from the few simple, manly, energetic, and expressive terms in which his gallant friend (if so he might be permitted to term him), Captain Sherard Osborn, had been pleased to announce to the meeting the spirit in which he was about to undertake that mission on which he was shortly to set forth. He was sure he expressed the universal sentiment even while he was speaking in his character of an indi-

vidual, but not, he believed, speaking sentiments alien to those of the statesmen with whom he had the honour to be associated, if he said to Captain Osborn that with all their hearts they bid him "God speed." They were sure the name and fame of our country were safe in his hands, and they trusted and believed that when it pleased God he should come back amongst us, he would come back with a great accession to his personal fame and celebrity, and also with the credit and honour of having added to the character of England in that distant quarter of the globe.

The President then adjourned the meeting to the 12th of January, 1863.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Progress Report of the Exploration Committee of the Royal Society of Victoria for* 1861.

The Exploration Committee, in submitting their Annual Report, deem it sufficient to sketch merely in brief outline the main incidents which characterised the Victorian Expedition during the year. The glorious achievements, the severe sufferings, and the mournful losses, of the explorers caused universal admiration, anxiety, and grief, and have been recorded already so fully, and discussed so frequently in all their bearings, as to render their repetition now unnecessary.

It was stated in the report of the Committee for 1860 that the expedition had reached Menindie amply provided, and without any unusual difficulty.

The final departure of Mr. Robert O'Hara Burke (the leader), with the advance party from the Darling, took place on the 19th October, 1860. At Torowotto, on the 29th October, Mr. Wright, who accompanied him so far, left and returned to the Darling with the view of conducting the remainder of the expedition to Cooper Creek.

Mr. Wright reached Menindie on the 5th November, and on the 3rd December intelligence of his appointment as third officer and return to Menindie was received in Melbourne. The Committee considering the instructions originally given, ample to provide for any additional requirements which in distant parts of the country might be found needful, and believing that no letter through the ordinary channel could arrive at Menindie previous to Mr. Wright's departure, did not attempt to communicate with him regarding the expedition, at a distance of about 400 miles, as practically beyond their control.

On the particulars of Stuart's route reaching Melbourne, a despatch was forwarded conveying the intelligence to Burke. The disasters which befel the bearers of this despatch involved the necessity of affording them relief, and obliged Mr. Wright afterwards to reorganise his party. Mr. Wright finally left Menindie on the 27th January, and it is needless to recapitulate the difficulties which at a season so unfavourable were encountered by him in crossing the desert intervening between the Darling and Cooper Creek; those difficulties being much aggravated by scurvy, which prostrated several members of the party, and under which the scientific and enthusiastic Becker and his associates (Stone and Purcell) succumbed.

Whilst Mr. Wright and his companions were suffering from difficulties of no ordinary character, Burke and Wills, accompanied by King and Gray,

penetrated with rapidity to the Gulf of Carpentaria, and performed, in crossing the continent from south to north, an exploit so brilliant as to have few parallels in the annals of geographical discovery.

On the 16th December they set out from Cooper Creek, leaving Mr. Brahe, with three others, in charge of the depôt. After reaching the estuary of the Flinders River on the 4th February, they deemed it preferable to return on their own track, rather than avail themselves of the ready means of reaching the Burdekin settlements; induced to this decision possibly by a desire to relieve as early as practicable their companions at the depôt.

The return could not, however, be effected within the time originally estimated by Burke, and, through a most remarkable and deplorable accident, the depôt party quitted Cooper Creek on the very day (21st April, 1861) on which, exhausted from exertions and privations, Burke, Wills, and King returned; Gray having died on the journey, apparently from exhaustion, induced by scurvy.

Burke, Wills, and King, supposing that they in their weak state could not overtake the men who had just left the depôt, determined to rest, and proceed towards South Australia. By a mortifying series of disasters the explorers failed to reach any of the settlements towards Mount Hopeless, although they approached to within less than 60 miles of some of the stations. The unfortunate travellers were moreover missed by Mr. Wright and Mr. Brahe, who, on the 8th May, visited Cooper Creek from the camp at Koorliatto, but failed to observe any marks above the *cache* there, and therefore believed that it had not been touched. Accordingly they at once went back to their camp, as in their opinion the precarious condition of some of the members of their party demanded a speedy return to the settled districts.

Burke and Wills, after displaying the most heroic fortitude, fell under the privations to which they were exposed, and died, the former on the 28th, and the latter about the 26th June.

Meanwhile the Committee, anxious to receive intelligence of the explorers, held a meeting on the 13th of June, and fitted out a light party, under the leadership of Mr. Alfred William Howitt, to obtain news of the expedition, and, if necessary, convey succour to it. On his way to Cooper Creek, Mr. Howitt met Mr. Brahe, near Swan Hill, and returned to Melbourne with him, in order to receive further instructions, rendered requisite by the information obtained from Mr. Brahe. Mr. Howitt's party, having been reinforced to meet the emergencies of the case, immediately proceeded to Cooper Creek, and was successful in relieving King, who after most praiseworthy attention and devotion to his dying companions, was supported by the natives with a kindness and solicitude which should never be forgotten in our future dealings with the aborigines. The journals of the explorers, preserved by King, were saved and rendered available.

The Committee, on the arrival of Mr. Brahe in Melbourne, represented to the Government the desirability that nothing which could tend to afford relief to the missing party should be left undone, and the sanction of the Government was accordingly obtained for a search, by Commander Norman, in H.M.C.S.S. *Victoria*, along the north coast. Arrangements were also effected by the Committee, under the supervision and with the aid of the Queensland Government, for organizing a land-party under Mr. Landsborough, with the view of co-operating with the expedition by sea.

Furthermore, under the apparent urgency of the case, the Committee were induced to engage the services of Mr. Walker and his aborigines to search for any traces of the explorers between Rockhampton and the Gulf of Carpentaria, in case they should have returned, as might have been expected, by that route.

The *Firefly*, conveying Mr. Landsborough and his party, was unfortunately wrecked at Sir Charles Hardy's Group, but with no further loss than two

horses, and, through the aid of Commander Norman and crew of H.M.C.S.S. *Victoria*, the party finally reached the gulf shores, and formed a depôt on the Albert River.

Mr. Walker, on his way overland from Rockhampton, having struck Burke's tracks, on the Flinders River, came, in accordance with previous arrangement, to the rendezvous, and there obtained from Commander Norman the supplies necessary to enable him to follow up those tracks. Mr. Landsborough, pursuing the instructions furnished to him by the Committee, instituted a search for 200 miles south-west from the Albert, and was compelled from want of water to return to the depôt. Another party was organised by the South-Australian Government, under the command of Mr. M'Kinlay, with a view of searching the northern districts of South Australia, for the possible relief of the Victorian Expedition.

Finally, to perfect all arrangements, the Committee caused Mr. Howitt to renew his journey to Cooper Creek, for the purpose of re-establishing the depôt there, and maintaining it so long as the northern search-parties might stand in need of succour. On that officer devolves also the mournful duty of conveying, in compliance with a unanimous vote of the Legislative Assembly, the remains of the fallen leaders of the expedition to an undisturbed and honoured resting-place in the metropolis.

The exertions of the brave men now in the field for the purpose of conveying relief can be of no avail; nevertheless the Committee reflect with gratification on the prospect of these exertions tending to augment the geographical knowledge of the continent which we inhabit, and to promote the expansion of science, and the progress of civilisation and peaceful settlement. They refer, with no small degree of satisfaction, to the fact that the explorers of the Victorian Expedition have been the means of opening a path from the southern settlements to the northern shores, which they hope will, at no distant day, be made available for telegraphic communication, by way of Batavia and India, with the mother country; and they rejoice that now, through a broad belt of fertile land, a connexion has been established between the discoveries of Leichhardt on the Burdekin, those of Burke towards Carpentaria, of Stuart towards Arnheim Land, of Augustus Gregory towards North-Western Australia, and thence by the route of Francis Gregory to the northern tracts of Western Australia.

The important services rendered by King, the sole survivor of the ill-fated expedition, have not been overlooked by your Committee. From the date of Burke's death, in June, to the end of the year, a salary equal to that of the leader has been paid to him.

The Committee have also recommended him to the favourable consideration of the Government, and they have learned with much pleasure that it is the intention of the Government to apply to Parliament to grant him an annuity of 180*l*.

King has not as yet, your Committee regret to state, recovered his health, but it is pleasing to know that the sufferings and privations which he so heroically endured have in no respect lessened his zeal in the cause of exploration.

Your Committee have further the gratification to record that the Government have placed the sum of 4000*l*. on the Estimates, towards the erection of a suitable monument to the memory of Burke and Wills, this sum to be conditionally granted on the additional sum of 2000*l*. being raised by public subscription for the same object; and they would strongly urge on the members of the Royal Society to aid as far as possible any public measures that may be adopted for this purpose,

Your Committee have had the satisfaction of receiving Commander Norman, on the return from Carpentaria of the *Victoria*, after a very successful cruise, the results of which are now before the Society. The Committee are advised

of despatches from Mr. Howitt, dating from Mount Hopeless, to which place he had, in pursuance of instructions, paid a flying visit. On the receipt of these despatches, your Committee will promptly make such arrangements as may be necessary to provide for the possibility of Mr. Landsborough's party reaching Cooper Creek. They left Carpentaria two months after the departure of Mr. Walker, being provisioned for four months with supplies from the *Victoria*.

Having thus submitted a short narrative of the leading events of the past year, your Committee do not wish to conceal from themselves that their conduct, in connexion with the disasters which befel the Expedition, has been censured both by the public and by the Royal Commission which was appointed to inquire into the cause of these misfortunes.

The Victorian Expedition, though crowned with success as regards the extent and value of the country explored, having proved disastrous to human life, your Committee were fully prepared for that condemnation by the unreflecting public which invariably awaits the originators of enterprises similarly unfortunate. Anxious for the fullest investigation, your Committee hailed with satisfaction the appointment of the Royal Commission; and, while they freely admit that that body conducted its investigations with ability and impartiality, they confess they were scarcely prepared for the very grave censure which is conveyed in its Report.

While, therefore, your Committee believe that they are in a position fully to justify their own conduct, they feel that they are precluded from reviewing the Report of the Commission, constituted as it was, and they would prefer silently to submit to unmerited obloquy, rather than reflect on the memory of the lamented leader.

In justice, however, to themselves, as well as to the Society by whom they have been appointed, they are constrained briefly to express their own views as to the causes which led to such unfortunate results.

The fundamental principle which guided your Committee in all their arrangements was the formation of a safe base of operations by establishing a permanent depôt at Cooper Creek, and securing a communication therefrom with the settled districts.

According to instructions, all the efforts of the expedition ought in the first instance to have been directed to effect this important object. It has, therefore, been a source of great regret to your Committee that, in the ardour of his zeal to reach the goal of his ambition, the leader entrusted to others the equipment and stores which should have been taken up to Cooper Creek by himself. This and this alone, your Committee regard as the primary cause of all the calamities which followed.

Mr. Wright failed to reach Cooper Creek in time to relieve Mr. Brahe's party, not solely because he was too late in leaving Menindie, but mainly because he could not find his way there.

In his journal, dated 3rd April, Koorliatto, he says that he resolved on the following day to push on to Bulloo, which "from his northern position he conjectured would be Cooper Creek." From Koorliatto to Bulloo, a distance of 20 miles, Burke's track pursued a course some few degrees to the east of north. In places it was hardly perceptible, but no difficulty was found in regaining it. On arriving at Bulloo, no traces could be found of the advance party having camped there. Beyond Bulloo, which is described as a large "sheet of water extending some five miles to the north, the plains became extremely stony, and the track, turning rapidly to the west, completely obliterated."

From the absence of any certain indication that the leader had changed his route to the westward at this point, Mr. Wright felt convinced that Cooper Creek lay still further in advance, and he made two attempts, one north-

east and the other north-west, for the purpose of tracing the course of the track.

It is obvious, therefore, that Mr. Wright never could have reached Cooper Creek, even if he had followed up the leader immediately, as he was expected to do.

From Bulloo a west-north-west course was taken to Cooper Creek; this it was impossible for Mr. Wright to have discovered except from the tracks, which, unfortunately, from the extremely stony character of the plains, became obliterated at this very point: without them, and unacquainted as he was with surveying, it was impossible for him either to follow the party or ascertain where Cooper Creek lay.

The Committee regret that on their leaving Bulloo their instructions "that their route should be marked as permanently as possible, by leaving records, sowing seeds, building cairns, and marking trees at as many points as possible, consistently with the various other duties," were not observed.

Great allowances have been made for Mr. Brahe leaving the depôt at Cooper Creek, "because a responsibility far beyond his expectations devolved upon him." Your Committee are of opinion that similar allowances, though perhaps in a less degree, might have been extended to Mr. Wright, because, in accepting the command to convey the remainder of the party from Menindie to Cooper Creek, without any surveying knowledge to guide him, he was justified in expecting either that no great deviation would be made from a direct route between those places, or that such deviation would be sufficiently indicated in some conspicuous manner. Had Mr. Wright, on his arrival at Bulloo on the 4th April, exactly known his position and the distance from Cooper Creek, there is no doubt that at all hazards he would have conveyed his party there. On the 3rd April, in his journal, he expresses his anxiety and his determination to move forward, because "he feared Mr. Burke's stores acquired replenishment, and that any party left at Cooper Creek would be anxiously expecting his arrival." At this date the sick (Becker, Stone, and Purcell) were quite capable of being moved forward to Cooper Creek, a distance of 80 miles; and even had they been unequal to the journey, there was nothing to prevent Mr. Wright, who is admitted to be an experienced bushman, if he had known the direction in which Cooper Creek lay, pushing on there by himself, and communicating with the depôt party.

Reassured by the proximity of Mr. Wright's party at Bulloo, with medical aid and an ample supply of stores and equipments, your Committee cannot doubt that Brahe would have gladly held out for a longer period at the depôt.

Your Committee are not conscious of having justly laid themselves open to censure for omitting to urge Mr. Wright's departure from the Darling, sensible though they are of the error he committed in lingering there so long.

Mr. Wright returned to Menindie from Torowotto on the 5th November, and Burke's despatch did not reach the Committee until the 3rd December. They were impressed with the belief that Mr. Wright, in following out his instructions, would leave Menindie as soon as he possibly could; this despatch, therefore, appeared to the Committee to require no action on their part. Mr. Wright had not communicated with them, and his omitting to do so was conclusive evidence to their minds that he wished for nothing, and required nothing from them. Believing, from the tenor of the despatch, that Mr. Wright had left Menindie for Cooper Creek before the despatch itself reached Melbourne, it was clearly unnecessary, in their opinion, to open any correspondence with that gentleman.

The Committee were in receipt, up to the 10th of December, of letters from Dr. Becker of various dates: the latest being the 28th November, one fortnight later than was expected, they could not by any legitimate reasoning arrive at the conclusion, that, because he had not left on the 28th of November, one fortnight later than was expected, he would con-

us at the depôt on Cooper Creek. If I had known that there was to have been a depôt there, I would have gladly gone to it from the Thomson River. Now I intend proceeding down the river to Menindie, where I purpose, if necessary, to take the most advisable mode of letting Mr. Howitt know of our return from the Gulf of Carpentaria.

There is a camel on this run, which I will endeavour to get and take to Menindie.

Mr. Bourne, who is a good bushman and a good judge of country, has read this letter, and does not think that I have given a too favourable account of the country along our route from the Gulf of Carpentaria.

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3. *Extract of a Letter from* JOHN KENT, Esq., *to* Sir RODERICK MURCHISON, *dated Brisbane, Queensland, 17th August*, 1862.

I HAVE sent two tracings, showing Mr. F. Walker's route from the head of the Barcoo to the Gulf of Carpentaria; and as it is the first reliable information given of this portion of the north-eastern interior of New Holland, will prove interesting. It shows conclusively that it is not "all barren from Dan to Beersheba," and proves that if the interior be regarded as a plain, that its greatest elevation would be found at its north-eastern angle. The tropical rains must send down large quantities of water during the north-west monsoon from the nucleus on the granitic range in 19° S., 144° E.; and so long as the interior preserves the character of an elevated table-land, the streams would be perennial. I think there can now be little difficulty in explaining the water-worn appearances on Sturt's desert.

The recent explorations of Burke and Walker prove that between the meridian 138°, to the eastern coast, and south to the Barcoo, is included the most valuable portion of the interior of Australia. For its development, the immigration of Indian coolie labour is essential, and this object will be promoted by establishing a steam-route to Singapore (linking on with the Calcutta and Ceylon line) through Torres Straits; and as the attention of the great cotton interests of Manchester and Paisley is now directed to Queensland, it is much to be desired that they will forward the views of a company recently formed here for placing a line of steamers on that route.

The discovery of auriferous fields near Gladstone, and the Peakdowns of Leichhardt, show that the riches of the Australian Cordilleras are not confined to the southern and central portion; while the recently proved existence of many thousands of red oxide of copper on the surface, near the latter locality, indicate the extent of our mineral wealth.

I have lately drawn the attention of the Rev. W. B. Clarke to the fact that the eastern coast of New Holland is rising at the rate, say, of an inch per annum, as ascertained by the height of rocks in the Brisbane, above tide-levels, through a period of twenty years; and he assures me that to the south the same result has been inferred, though the observations have not extended through so long a period.

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4. *Partial Ascent of Um Shaumur in the Peninsula of Sinai in* 1857. By the Rev. FREDERICK HOWLETT.

MR. HOWLETT has communicated to the Society a coloured sketch of Um Shaumur, taken on the occasion of an attempted ascent to its highest peak. The following are the particulars of the route taken by his party. They left the Convent of St. Catherine's on camel-back at 8·45 A.M., April 30, 1857, and, passing through the Wadys Sebayah, Rotik and Rufferah, gained the top

of Nubk Jebel at 12·20, and obtained the first view of Um Shaumur in 25m. later. At 1·30 they rested for an hour, at a good spring under a rock in the Wady Ráhabah, 300 yards west of the track, and reached an excellent watering-place in a rocky glen, called Wady Ghadu, at 4·55. The next morning they started at 4·55 A.M., and, delaying an hour for breakfast, descended to the ruined convent of Tiwahat el Deir at 9·15. Thence they attempted the ascent, and reached the small central peak; but were checked by a rock that blocked the only access in attempting the main summit. They returned, and finally reached their former bivouac in the Wady Ráhabeh at 6 P.M.; and seven hours' travel in the morning of the next day brought the main body of the party back to St Catherine's.

There was a good sprinkling of aromatic herbs on the mountain, but no fennel was observed to justify the presumed derivation of the word Um Shaumur (Mother of Fennel); neither were any of the mysterious sounds heard, which are said to be of frequent occurrence in its neighbourhood. As regards the hypothesis once entertained of Um Shaumur being the Mountain of the Law, Mr. Howlett states there did not appear to be an acre of ground anywhere near Um Shaumur fit for the purposes of an encampment.

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5. *The Alps of Dauphiné.* By F. F. TUCKETT, Esq., F.R.G.S.*

FEW portions of the mountain system of Europe have been less thoroughly explored than the lofty group of peaks included between the rivers Durance, Drac, and Romanche, and occupying portions of the ancient province of Dauphiné,—the modern departments of the Isère and Hautes Alpes. The area of the entire massif may be roughly computed at about 1100 square miles; but the glacier-developing portion to which the accompanying map is confined, covers little more than half this surface. The mean elevation is very considerable, as the following statements and the general narrowness of the valleys would indicate:—4 peaks above 13,000 and under 14,000 feet; 17 peaks above 12,000 and under 13,000 feet; 29 peaks above 11,000 and under 12,000 feet. Its glaciers (primary and secondary) exceed 100; and under this head, as well as in the height and number of its summits, it may almost challenge comparison with the system of the Finsteraarhorn, though, as respects glaciers, the latter has certainly the advantage in size from the greater extent of névé, a result of its less precipitous formation.

From time to time notices of its topography and physical features have appeared, and the writings of Ladoucette, M. Élie de Beaumont, Professor Lory, and our own countryman, Principal Forbes, have called attention to many of its more striking peculiarities. Within the last four or five years various members of the Alpine Club have penetrated still further into its recesses, and a series of papers in the second series of 'Peaks, Passes, and Glaciers' give evidence of their activity and enterprise. Up to the present time, however, the absence of any reliable map, added to the really intricate relations of the principal summits and valleys, and the fact that few of the explorers had an opportunity of intersecting the district in various directions and studying it in detail, have rendered it difficult to arrive at a clear conception of the mutual relation of its parts.

Under these circumstances I ventured to think that a fresh examination by one who could avail himself of the labours of his predecessors would supply some desiderata, and I therefore devoted ten or twelve days of last July to this

* A photographic reduction of the unpublished M.S. map of Dauphiné, by the Dépôt de la Guerre, has been presented by Mr. Tuckett to the Society. His routes and corrections are marked upon it.

ten to eleven hours, traversing the ridge which forms the north boundary of the Glacier Blanc, at a height of 3308 mètres (10,853 feet), and descending precipitously to the Glacier d'Arsines. The views to the south and south-west of the Pelvoux, Alefroide, and Ecrins, and to the north-west of the Grande Ruine and Aiguille du Midi de la Grave (La Meije), are unsurpassed in sublimity and interest by any in the whole range of the Alps with which I am acquainted.

It is worthy of remark that in the case of each of the three passes just described, the névés of the Glaciers on the side of the Val Vallouise (the Glaciers Blanc and du Selé) are situated at an elevation of from 900 to 1500 feet above those of the reverse slope (the Glaciers de la Bonne Pierre, de la Pilatte, and d'Arcines)—a circumstance clearly attributable to the greater abruptness of the declivities of the latter, which prevents the accumulation of snow. I owe it to my guides, Michael Croz, of Chamouni, and Peter Perrn, of Zermatt, to state that my success was, in a large measure, due to their assistance; and I cannot conclude without a word in praise of the admirable efficiency of the knapsack sleeping-bag which constituted my almost habitual dormitory during my stay in Dauphiné. It was slightly modified in construction and material from a pattern kindly lent me by Mr. Galton, who imported the general idea from the Pyrenees.

Much yet remains to be accomplished in the way of exploration amongst the mountains of Dauphiné. I have done little more than introduce some sort of order into the confusion in which the district was previously involved, and shall be amply rewarded if I may be allowed to hope that I have contributed, in however slight a degree, to facilitate future research. Of the large number of lofty peaks enumerated in the hypsometrical table, none but the two highest summits of the Pelvoux and five or six others of inferior rank (used as stations by the officers of the État Major) have been ascended. A spirited assault was, indeed, made on the Ecrins by Messrs. Mathews and Bonney, a few weeks after my visit; but the state of the snow rendered it abortive, and the monarch of the group still remains as an incentive to the adventurous climber, whilst the Aiguille du Midi de la Grave (La Meije), the Alefroide, and a score of other lofty peaks, challenge attack.

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6. *Latest Intelligence from* Mr. BAKER *in a Letter to* J. ARROWSMITH, Esq., *dated Khartum, 8th Nov.*, 1862.

I LEAVE this on the 1st December with three vessels conveying my transport animals—four horses, four camels, ten mules, ten asses, with an escort of forty-five picked men all armed with double-barrelled guns and rifles, and about the same number of sailors. All my pack-saddles, leather-bags, &c., are so well arranged that I hope to have no trouble in rapid travelling. My animals are of various kinds for various work—thus, if the climate be unpropitious for some, it may nevertheless agree with the others. I have taken such care in preparing for the journey, to the minutest detail, that I trust to succeed.

Hitherto all attempts at an extended exploration beyond Gondokoro have broken down for want of means of transport, the expense of conveying animals from Khartum being very great. My expedition, as it sails from Khartum, will be able to disembark and march on the same day, if necessary. Thus I shall not lose a day upon the White Nile voyage, except at the junctions of the Sobat and the Gazal for observations. I shall push direct for Gondokoro, and from thence to the Cataract. At the last point I shall disembark, and order all the boats to return to Khartum, while I proceed on my land-journey.

My first point will be the ivory dépôt of one Andrea Debono, which is the

farthest spot yet reached, and is, I imagine, in about 3° 30′ N. lat. From his men I hope to obtain some information of the adjacent country; but I shall push on, ever south, keeping as near the river as possible until, I trust, I may reach its source. This I hope to accomplish by the end of March. The rains commence at that time in Gondokoro; thus I have no time for delay as I *must* reach the Equator, if possible, before they begin. I shall there construct a zareeba or camp, secured by a stockade, as head-quarters during the rainy season, from which, when weather permits, I may make a reconnaisance of the adjacent country until a return of the dry weather allows further progress. My first objects will then be the Lake Nyanza and traces of Captain Speke. Should I happily reach the Lake, I hope to return to Khartum by striking toward the east, and then, by a northerly course, to reach the head of the Sobat, in the Galla country; in which case I shall construct canoes and descend the river to Khartum. I take tools for this purpose, and also a German carpenter who has been many years in Africa, and who formerly accompanied the Austrian mission to Gondokoro.

Mr. Petherick's vessels and reinforcements are nearly ready, and, when loaded with supplies, they will accompany my boats to Gondokoro, forming a total of six vessels with about two hundred men. I shall hurry these up the river, and I trust I may find him and his party safely arrived at Gondokoro after the unpleasant journey during the last rainy season. He suffered great loss in stores destroyed by the rains and by the leakage of his boats. Further progress being impossible during the south wind, he returned all boats to Khartum, except one, and proceeded by land to Gondokoro, where he determined to await reinforcements

I have advised the British Consul at Alexandria of the frightful state of affairs upon the White Nile caused by the slave-hunting expeditions of Khartum, in which unfortunately Europeans as well as natives are engaged. This slave-hunting is the cause of all my difficulties. Both Turks and Europeans of Khartum, with few exceptions, being in its favour, together with all Arabs, Syrians, &c., *without* exception, an Englishman is looked upon by this fraternity precisely in the point of view from which a magistrate is regarded by the swell-mob of London.

Mr. Petherick's journey up the White Nile happened to be at the season when other boats were returning; thus one of Andrea Debono's boats loaded with slaves, in charge of the nephew of this estimable British subject, fell directly into his hands. Of course he captured the slaver, and sent him to Cairo; but this has united all classes against him in Khartum, from the Governor down to the commonest White Nile cut-throat.

As Mr. Petherick is the only Englishman in the Soudan, with the exception of myself, the non-discerning public of Africa conclude that I must have some connexion with him: thus I share in the odium which his capture of the Maltese has produced; and for a considerable period I could not obtain a single man, neither could Mr. Petherick's agent engage one for him.

By representations made by the Austrian Consul (Mons. Natterer), and also by me, to the Governor, he was almost forced to issue a proclamation against the slave-trade. This had the effect of frightening the men employed, and they immediately engaged themselves both to Petherick and to me as required.

The spirit of the Egyptian authorities is, however, openly manifested, as the Governor of Khartum (Moosa Pasha), instead of giving the assistance which my firman, sealed by Said Pasha, demands, assumes a totally passive attitude; and I must seek boats from private individuals, at great expense, as I am unable to obtain them from the Government without a responsibility which I decline to accept. I asked for one Government officer to take charge of the boats on the return voyage, without which the crew would assuredly

take to slave-hunting in my absence. This small demand was refused. Thus I must contract for boats to deliver me at the Cataract, the Government declining assistance in a most uncourteous manner. An application made by the British Consul at Alexandria shared the same fate, while French travellers receive assistance in Government troops and cavasses.

I shall, D. V., succeed in perfect independence. It is merely a question of pocket, patience, and perseverance—all of which I shall devote to the object in view. My watch I fortunately got repaired here, and I also purchased two others; my instruments are all in good order, and I possess Nautical Almanacs to the year 1864, inclusive: thus, with good health, and God for my guide through unknown parts, I trust, my dear Sir, to add my mite to geographical science.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

SESSION 1862–63.

Fourth Meeting, January 12th, 1863.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Captain L. H. Bagot and Edwin Adams, Esq., were presented upon their election.*

ELECTIONS.—*Commander Edmund R. Freemantle*, R.N.; *the Hon. Robert H. Meade; Commander Edwin A. Porcher*, R.N.; *Captain Frederick Sayer; John Osborn Balfour; Wilfred Blunt; William Fuidge; Robert S. Gladstone; C. Mitchell Grant; Allan Lambert; Duncan G. Forbes MacDonald*, C.E.; *Alexander Michie; Champion Wetton; and George Worms, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Donations to the Library and Map-Rooms since the former Meeting were—Magnetical and Meteorological Observations made at the Government Observatory, Bombay, in 1860; Cuny's 'Journal de Voyage de Siout à El-Obéid;' 'Plans of new System of Chinese Telegraph Signals,' by Comte d'Escayrac de Lauture; Hahr's Statistical Maps of Sweden, &c.; Roosen's Map of Norway; Maps of Australia, showing discoveries of Landsborough and M'Kinlay; Black's General Atlas of the World, new edition; Black's New Map of Scotland; continuation of Dufour's Map of Switzerland; Philip's Imperial Library Atlas; Admiralty Charts; Ordnance Maps, &c. &c.

EXHIBITIONS.—Models of Deep-Sea Sounding Machines, by Dr. Wallich; Model of Floating Cylinder for laying Telegraphic Submarine Cables, by Captain H. J. Selwyn, R.N.; specimens of Rattan Telegraph Cables, by Mr. Duncan, were exhibited.

The Papers read were—

1. *Ocean Currents on the North-East Coast of South America.* By J. A. MANN, Esq., F.R.G.S.

THE current or ocean-stream setting along the north-east coast of South America, from Cape St. Roque to the West India Islands, known as the Guiana current, is supposed to run continuously in a north-west direction, at a rate varying from 1 to 4 knots per hour.

In this paper is given an account of a voyage of the brigantine *Monte Christo*, from Cayenne, in French Guiana, to Paranahiba in Brazil, in July and August, 1862, from which the author considers that the current was at that time reversed in a most unmistakeable manner. The departure was taken from "Ile la Mer," one of the islands known as "Remire" off Cayenne, on the 26th; the wind blowing east, with which a direct northerly course was made until the 30th, when the position of the ship was 7° north, and in the same longitude as Cayenne. On this date the wind changed to the south, and continued to blow from that quarter to the S.S.W. until the 7th of August, when the ship's position by dead reckoning was 42° 14′ W., and an Austrian ship that was spoken, gave the position as 27° W. It was not discovered until some days after, when a second ship was spoken, that the latter was the actual position. From this it appears that for eight consecutive days the *Monte Christo* was drifted at the rate of 4¾ knots an hour in an E.S.E. direction, diametrically opposite to the usual flow of the stream. Throughout the remainder of the voyage, extending over a further period of fourteen days, the same current was experienced. The captain of another ship, the *Loyal*, which came into Paranahiba some days after, having a chronometer on board, had abandoned his observations believing his chronometer to be out of order. Also while sailing on board the French man-of-war steamer *Alecton*, from Surinam to Cayenne, the author met with the same phenomenon, leaving little room for doubt that the current was reversed throughout, and for a considerable time.

Mention is made of unusual winds, south and S.S.W., at Surinam. These coming up from the Cordilleras, were very patent, causing influenza and colds; and for some time previous similar complaints had been prevalent throughout the West Indies.

The PRESIDENT said there was present that distinguished geographer of the seas, Captain Maury, who had recently arrived from America, and who was perhaps better acquainted than any other individual with the currents and tides of the Atlantic. Any observations he might offer upon the subject would be extremely gratifying to the Society.

CAPTAIN MAURY said he had scarcely come prepared to say anything at the Meeting, because, as they might well imagine, his mind for the last year or two had been occupied with subjects entirely different from ocean currents. In fact, much to his regret, he had now very little to do with the sea. Mr. Mann, in his interesting and philosophical paper, set out with a remark that is perfectly correct, and which every physical geographer who has attempted the study of the ocean has no doubt felt to be painfully true,—that these currents were most capricious things: they not only sometimes cease to run, but they occasionally turn and run backwards. The Gulf-stream is one of the most marked and interesting phenomena of the sea. When he was at Bermuda, on his way to England from South Carolina, he had the pleasure of meeting there the officers of some of Her Majesty's ships who had been cruising on the North American station for several years. One of them told him, as corroborative of what Mr. Mann had said, that he had found the Gulf-stream, on his passage from Halifax to Bermuda, actually running to the southward and westward. It struck him as being very singular. The temperature of the water was all right, but his reckoning was all wrong. So, when he went back he thought he would try it again, taking care to verify his instruments. Singularly enough, he found the Gulf-stream not running in its usual course, but running backwards. That the Gulf-stream is this capricious thing of creation needed no other evidence than the singularly mild winter we are now enjoying in Great Britain. In studying ocean-currents we have to look at what they do in the long run, because there are many exceptional cases. The case of the Guiana stream, mentioned by Mr. Mann, is almost as peculiar a phenomenon as that of the Gulf-stream running backwards. The current is well known among all Brazilian navigators; and consequently, when they wish to sail from Para, at the mouth of the Amazon, to Rio de Janeiro, they make a stretch to the northward and westward until they get up to 25° or 30° N., and in longitude 60°; then getting into the trade-wind they go south again. Thus they dodge those very currents to which Mr. Mann had drawn our attention. Since he had been in England he had received one of the most valuable contributions to our knowledge of the currents of the Equatorial Atlantic that he had ever seen. It was the result of a great deal of patient observation and research by Mr. Capella, the head of the Meteorological Observatory at Lisbon. That gentleman has constructed a wind-chart of the Equatorial Atlantic between the coast of Africa and the coast of America; he has discussed hundreds of observations, and he has established a well-marked current just on the north of the equator setting to the east, and another equally well-marked current just to the south of the equator setting to the west. At the same time he discussed the force of the wind; and he has found, just a little south of the Cape de Verd Islands, taking the form of an ellipse, a region in which the north-east trade-wind blows with the greatest force; and so in like manner he finds between St. Helena and Cape St. Roque a region where, as Jansen had shown, the south-east trade-winds blow with the greatest force. Now, if we have so many exceptions with the winds which have so much to do with currents, we may well expect to find occasional exceptions in the currents themselves.

The PRESIDENT, in presenting the last letter he had received from Dr. Livingstone, took a brief review of his operations on the Shiré river, and said that, pending the delay of carrying his vessel to that river from the Zambesi, he had gone northwards along the coast of Africa to the mouth of the river Rovuma. As that river lies to the north of all territories to which the Portuguese lay claim, Dr. Livingstone was anxious to ascertain how far commercial enterprise could be established between its mouth and the countries watered by the Shiré. He then read the following letter;—

"River Rovuma, Oct. 10, 1862.

"MY DEAR SIR RODERICK,—We have just returned from a month's boat exploration of the Rovuma River. We turned at long. 38° 3′ E. and lat. 11° 13′ S.; so, assuming the longitude of the anchorage to be 40° 30′ E., and lat. 10° 28′ S., we went about 114 miles, as the crow flies, from the coast. Adding our longitude and latitude together, we went 156 miles up the river. It was unusually and excessively low, and entailed frequent dragging of the boats at the crossings. When the water split up into three channels the work was grievous; but having chosen the dry season, when we cannot do much in the Zambesi, we put 'a stout heart to a stey brae,' never stopped except on Sundays, and after 15 days up and 10 down find ourselves rather tired and brown.

"The bed of the river is about three-quarters of a mile wide. It is flanked by a well-wooded table-land, which looks like ranges of hills, 500 feet high. Sometimes the spurs of the high land come close to the water, but generally there is a mile of level alluvial soil between them and the bank. So few people appeared at first, it looked like a 'land to let;' but, having walked up to the edge of the plateau, considerable cultivation was met with, though to make a garden a great mass of brushwood must be cleared away. The women and children fled; but calling to a man not to be afraid, he asked if I had any objection to 'liquor with him,' and brought a cup of native beer. There are many new trees on the slopes, plenty of ebony in some places, and thickets of brushwood. The whole scenery had a light gray appearance, dotted over with masses of green trees, which precede the others in putting on new foliage, for this may be called our winter. Other trees showed their young leaves brownish red, but soon all will be gloriously green. Further up we came to numerous villages, perched on sandbanks in the river. They had villages on shore, too, and plenty of grain stowed away in the woods. They did not fear for their victuals, but were afraid of being stolen themselves. We passed through them all right, civilly declining an invitation to land at a village where two human heads had been cut off. A lot of these river-pilots then followed us till there was only a narrow passage under a high bank, and there let drive their arrows at us. We stopped and expostulated with them for a long time; then got them to one of the boats, and explained to them how easily we could drive them off with our rifles and revolvers, but we wished to be friends, and gave about 30 yards of calico in presents, in proof of friendship. All this time we were within 40 yards of a lot of them, armed with muskets and bows, on the high bank. On parting, as we thought, on friendly terms, and moving on, we received a volley of musket-balls and arrows, four bullet-holes being made in my sail; but finding that we, instead of running away, returned the fire, they took to their heels, and left the conviction that these are the Border ruffians who at various points present obstacles to African exploration—men-stealers, in fact, who care no more for human life than that respectable party in London who stuffed the 'Pioneer's' life-buoys with old straw instead of cork. It was sore against the grain to pay away that calico; it was submitting to be robbed for the sake of peace. It cannot be called 'black mail,' for that implies the rendering of important services by Arabs; nor is it 'custom dues.' It is robbery perpetrated by any one who has a traveller or trader in his power, and, when tamely submitted to, increases in amount till wood, water, grass, and every conceivable subject of offence is made occasion for a fine. On our return we passed quietly through them all, and probably the next English boat will be respected. Beyond these Makonde all were friendly and civil, laying down their arms before they came near us. Much trade is carried on by means of canoes, and we had the company of seven of these small craft for three days. They bring rice and grain down to purchase salt. When about 60 miles up, the table-land mentioned above retires, and we have an immense plain, with detached granite rocks and hills dotted over. Some rocks then appear in the

river, and at last, at our turning point, the bed is all rocky masses, four or five feet high, with the water rushing through by numerous channels. The canoes go through with ease, and we might have taken the boats up also, but we were told that further up the channels were much narrower, and there was a high degree of probability that we should get them smashed in coming down.

"We were on part of the slave-route from the Lake Nyassa to Quiloa (Kilwa), about 30 miles below the station of Ndonde, where that route crosses Rovuma, and a little further from the confluence of the Liende, which, arising from the hills on the east of the Lake Nyassa, flows into Rovuma. It is said to be very large, with reeds and aquatic plants growing in it, but at this time only ankle-deep. It contains no rocks till near its sources on the mountains, and between it and the lake the distance is reported to require between two and three days. At the cataracts where we turned there is no rock on the shore, as on the Zambesi, at Kebrabasa, and Murchison's Cataracts. The land is perfectly smooth, and, as far as we could see, the country presented the same flat appearance, with only a few detached hills. The tsetse is met with all along the Rovuma, and the people have no cattle in consequence. They produce large quantities of oil-yielding seeds, as the sesame, or gerzelin, and have hives placed on the trees every few miles. We never saw ebony of equal size to what we met on this river; and as to its navigability, as the mark at which water stands for many months is three feet above what it is now, and it is now said to be a cubit lower than usual, I have no doubt that a vessel drawing when loaded about 18 inches would run with ease during many months of the year. Should English trade be established on the Lake Nyassa, Englishmen will make this their outlet rather than pay dues to the Portuguese.

"We return to put our ship on Nyassa, by the Shiré, because there we have the friendship of all the people, except that of the slave-hunters. Formerly, we found the Shiré people far more hostile than are the Makonde of Rovuma, but now they have confidence in us, and we in them. To leave them now would be to open the country for the slave-hunters to pursue their calling therein, and we should be obliged to go through the whole process of gaining a people's confidence again.

"It may seem to some persons weak to feel a chord vibrating to the dust of her who rests on the banks of the Zambesi, and thinking that the path thereby is consecrated by her remains. We go back to Johanna and Zambesi in a few days. Kind regards to Lady M., and believe me ever affectionately yours,

"DAVID LIVINGSTONE."

The second Paper read was—

2. *Survey of the Physical Condition of the Atlantic Sea-bed, with special regard to the Establishment of Telegraphic Communication between Europe and America.* By G. C. WALLICH, Esq., M.D.

IN support of the view that the amount and kind of information heretofore possessed by us regarding the bed of the Atlantic, are altogether inadequate to meet the requirements of Oceanic Telegraphy, Dr. Wallich called attention to the fact that, up to the present period, only one reliable line of soundings has been taken to the southward of N. lat. 55°; and in this line only 41 soundings

occur along the central deep-water area of 1300 miles; the unexplored intervals varying in extent from 30 to 70 miles. Laying stress on the purely arbitrary nature of the evidence on which it has been asserted that the sea-bed is free from those alternations of outline which characterise dry land, Dr. Wallich proceeded to show that continuous mountain ranges might be present within such intervals, and yet necessarily be overlooked; it being very obvious that the detection of a steep gradient must depend on more than one observation as to depth. Now, although no very sudden irregularities in outline can be deduced from a profile of the sea-bed based on such distant measurements, it is hazardous in the extreme to assume that they do not or cannot exist. The sounding of 100 fathoms reported by Lieutenant Sainthill, R.N., within about 32 miles of the position at which Captain Dayman reported a depth of 3000 fathoms, may be cited as one out of many examples in corroboration of this view.

Dr. Wallich then enumerated the various kinds of observations he deems essential in a Survey for Telegraphic purposes; the principal ones being directed towards the procural of accurate information regarding the depths of water, the nature and depth of the submarine deposits, and the temperature, density, pressure, and chemical constitution of the water at various depths. In order the more effectually to carry out these observations, Dr. Wallich has invented several new forms of apparatus, which he exhibited.

Passing on to the means requisite for carrying out his proposed method of survey, Dr. Wallich recommends that Government should specially equip two steamships; that these should sail in parallel courses, removed only two miles from each other; and that they should sound alternately, at intervals of 5 miles, on each margin of the two-mile longitudinal belt thus defined. Hence, whilst the interval between any two soundings on the same line could not exceed five miles (that is, taken by the same vessel under ordinary circumstances), there would only be an interval of two and a half miles between the soundings taken on alternate lines. Having indicated how an adequate exploration of dangerous or doubtful areas might be effected by approximating the soundings much more closely to each other, and taking advantage of information elicited at each step, he suggested that Captain Dayman's line of soundings should form, as it were, the base of operations, and be taken as the centre of the two-mile longitudinal belt to be surveyed. By this means the two-and-a-half-mile diagonal intervals would be again reduced by about a half, wherever one of Captain Dayman's soundings might chance to come into play.

With regard to the period requisite to complete such a survey, Dr. Wallich stated that, allowing, at a most liberal estimate, four hours for each sounding and its concomitant observation, and three sets of observations per diem, and reckoning the extent of the deep-water area to be scrutinised at 1200 miles; each ship would effect 240 soundings in eighty days. But further allowing fifty soundings for exceptional cases and lateral deviation if demanded; with forty days for coaling, and twenty-five during which the state of the weather might render it difficult or impossible to carry on operations successfully; the total number of days would amount to 165, or five and a half months. If, however, we reckon three hours, instead of four, as a fair average term for each set of observations, and four sets to be taken daily (all other conditions remaining the same), each ship would be enabled to complete its 300 soundings in 140 days, or five months. Under either circumstances, supposing the expedition to start between the 15th and 30th April next, as recommended, the survey would be completed before the middle of October at the very latest.

Summing up the benefits likely to accrue from this mode of survey, Dr. Wallich pointed out that we should have no less than 640 reliable observations upon an area of the Atlantic of which we know no more at present than can be gleaned from one-sixteenth of that number; and thus establish a basis upon which the contour of the entire basin of the Atlantic might hereafter be approximately mapped out. In conclusion, he said, the task is unquestionably arduous, and its execution may prove costly; but there it was staring us in the face: a task either to be grappled with manfully and mastered, or else to be left unfulfilled for our successors to carry out.

The PRESIDENT reminded the Society that Dr. Wallich accompanied Sir Leopold M'Clintock in his exploration, and had since published the results in natural history obtained by the expedition, by which he had thrown light on the nature of the animals found at the bottom of the sea, and on the great varieties of soils and subsoils which exist there. The ingenious instrument which he had invented and explained enabled him not only to tap the soft strata, but absolutely to bore the rocks at the bottom of the ocean. Seldom had they had a paper more directly connected with the highest objects of physical geography than the one which Dr. Wallich had brought under their consideration. He had properly told them that unless they make this preliminary survey before any attempts are made to lay down telegraph cables they may find themselves involved in great difficulties. Whether or not any adventurous persons chose to undertake this survey previous to laying down a cable, the Council of the Royal Geographical Society thought it was the duty of a great maritime nation like Great Britain to become as intimately acquainted as possible with the bottom of the sea between England and America, with the view of telegraphic communication being established on a sound basis.

REAR-ADMIRAL SIR EDWARD BELCHER said, as this was a subject more

immediately connected with surveying, he, as senior surveying-officer in England, felt it his duty to answer that portion of the paper. The project of Dr. Wallich would answer very well for a passage across the Irish Channel. But his experience in searching for shoals even within 100 yards of his own ship for six weeks and fourteen hours a day, and the difficulty of finding a rock no larger than the President's chair, led him to the conclusion that any such survey as that projected would cost an immense sum of money and entail an amount of labour which few men would be willing to undergo. At these great depths, while the lead was getting down the vessel might have drifted five, six, or ten miles. It frequently happened in crossing a line of soundings that the wind was blowing on one side, and the line ran out at the weather-beam of the vessel at such a rate that it was utterly impossible to get back again to the spot where the paying-out commenced. It appeared to him that the best course for laying down a cable was that of short lengths, carried from spot to spot, along a line of water where they would find, not the deepest soundings, but a muddy bottom and an absence of mountains and hollows. Such a line as was proposed a year or two ago, from the Hebrides or the Orkneys to the Faröes, thence to Iceland, and then to Greenland, could be laid down at a comparatively trifling expense, with less risk of losing any great portion of the cable, and with greater facility for making an accurate survey of the bottom; whereas to run a cable right across the Atlantic was a project which few telegraph authorities thought desirable. With respect to soundings, he had a long experience in the years 1835 and 1836, and a very accurate instrument was then produced, not only for bringing up the bottom, but also for determining the temperature at a great depth. That instrument was a cylinder within a cylinder, made of stout bell-metal, with a valve opening inwards by pressure at the bottom. The two cylinders, when they went down, slid close home to each other. At a depth of 1200 fathoms the action of the water would force open the valve, and fill the whole interior with water. As you drew the instrument up to the surface the expansion of the water inside was so great that it would burst the vessel but for the provision of the second cylinder, which, slipping out and elongating the internal chamber, doubled the space for containing the air evolved from the water. He used this instrument from the year 1836 to the year 1847 without any difficulty, and without the slightest derangement even of the delicate thermometers that were within. And as to bringing up soundings, he believed there were very few men who could show so many shells as he possessed, brought up from depths of 1200 and 1500 fathoms. He thought, before the question was mooted of applying to Government to carry out a line of soundings at an enormous cost, that they should seek the opinion of scientific men whether it was better to carry a line straight across the Atlantic, or to have four separate stations for the cable.

ADMIRAL ELLIOTT believed, if they carried out the plan proposed by Dr. Wallich and obtained an accurate description of the bed of the sea, that they would be no wiser with regard to the laying down of a telegraph-cable. It was idle to suppose that they could thread their way across the Atlantic in the way proposed, and avoid the mountains and hollows that might exist at the bottom. He believed if they were to carry on the survey for a hundred years that they would still have to run the same risks that at present beset the laying of the cable. Moreover, he agreed with Sir Edward Belcher that the proposed plan of sounding could not be carried out, and he should prefer the method recommended by that distinguished officer instead. To hold in abeyance any attempt to establish telegraphic communication with America until the ocean-bed throughout the entire distance had been accurately sounded would, in his opinion, be an error. Let them be satisfied with the information already obtained, and lay down the cable at once, and if it lasted only two years it would repay the outlay and confer a great public benefit. He did not think the failure of the last cable attributable to the irregularities of the sea-

bottom, but to the great weight of the cable, and to its not having been sufficiently tested before being put on board ship.

CAPTAIN SELWYN, R.N., said Captain Dayman's accurate surveys, on account of his diagrams not being thoroughly understood, had given rise to a supposition that a precipice existed off the shores of Ireland. It had fallen to his lot, in company with an officer of the Admiralty high in the Hydrographic Department, to measure the distance in miles between the soundings and the depth in fathoms. The result was, they arrived at the conclusion that the descent was a little less than the descent of Holborn Hill. Now, it could not be imagined that a cable could be injured by being laid on a descent of that kind. As the extreme depth was about a thousandth part of the extreme length, taking this at 1650 miles, it followed that the depth might be represented by the thickness of a sheet of foolscap paper compared with its length. If there existed anything to cause abrasion, it was utterly impossible to say where they were to avoid it, or where they were to seek it. If they once found a shoal in the ocean, they would have the greatest difficulty in ever finding it again. By no possibility could a man pass over a line which he had once surveyed, with a certainty that he was within five miles of it. Not the best instruments, not the most accomplished navigators, would enable them to find their way out of the fogs of Newfoundland with such accuracy as that. Therefore, it appeared to him they were combating theoretical difficulties, while they had before them real difficulties to be met with. Captain Selwyn alluded to some of these difficulties with respect to the laying of different kinds of cables, and then suggested a shorter route for the deep-sea line by making use of the Newfoundland Bank, which at a certain point, 300 miles this side of Newfoundland, had a depth of water varying from 30 to 200 fathoms.

After some remarks from MR. WEBSTER in favour of laying down the deep-sea cable as the most effective mode of ascertaining the nature of the ocean-bed, Dr. Wallich briefly replied in defence of the plan he recommended, and the Meeting was then adjourned.

Fifth Meeting, Monday, January 26th, 1863.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

ELECTIONS.—*Lieutenant Francis Duncan*, R.N.; *Major Frederic John Goldsmid; Captain Edward Menzant; the Rev. Frederick Trestrail; Major Quintus Vivian; John Gardiner Austin; Alfred Barry; Thomas Moseley Crowder; John Emslie; William Gillett; Charles Harvey; Moss Joshua; Frederick John Jourdain; George Macfarlane; J. A. Olding; Frederick John Walker; George C. Wallich*, M.D.; *Frederick G. A. Williams; and John Wright, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map-Rooms since the former Meeting were—'Journal of Landsborough's Expedition in Australia;' 'Mercantile Navy List for 1863;' Lees' 'Six Months' Season of the Tropics;' 'Ordnance Survey;' 'Map of Route from Kiachta to Pekin,' &c. &c.

EXHIBITIONS.—Several Japanese Native Maps were exhibited at the Meeting from the Admiralty, Lady Franklin, &c.

The Papers read were—

1. *Proposed Route Across the Isthmus of Kraw.* By Captains FRASER and FORLONG; communicated by Dr. DUNCAN MACPHERSON, M.D., F.R.G.S.

DURING his tour on circuit to the Provinces of Taoof and Mergui, Lieut.-Colonel Fytche proceeded as far as the Pakchan River, the southernmost boundary between the Tenasserim Provinces and Siamese Territory, ascending the stream to a distance of 15 miles. Captain Fraser and Captain Forlong availed themselves of the occasion to explore the direct route from the village of Kraw to the Port of Tayoung, on the Gulf of Siam, a distance of only 30 miles, and lying in about the same parallel. Their report and maps show that there is no high land opposing difficulties to engineering skill to prevent the establishment of an easy means of communication between the Bay of Bengal and the Siamese Gulf, thereby not merely facilitating intercourse with Bangkok, but opening a short route to the further east, which would soon become a highway of considerable traffic.

The numerous deposits of coal which are known to exist in the southern portion of the Tenasserim provinces, warrant a belief that similar deposits will be found in the neighbouring regions, which up to this time have been very little explored.

The steamer *Nemesis* anchored about 15 miles up the River Pakchan, in 5 or 6 fathoms of water. The banks are steep and densely wooded, with a stream running between them of about a mile in breadth at this part. There are some 6 fathoms of water over the bar at the mouth. On the right or British bank are the tin-mines of Mulleywoon, which are said to be workable to any extent to which money and labour are procurable. On the other side are the tin-mines of Rahnong, worked by the Siam Government.

The party left the steamer in a native boat, with a flood tide; proceeded up this river, and at 4 P.M. on the 1st April arrived at Kraw, a Shan village of some fifty houses, with a few Chinese inhabitants. On the 2nd of April they commenced a route-survey across the isthmus. There is a good level cleared road for the first two miles, and to the third mile it rises and passes along the right bank of the Kraw River. The forest on each side consists of bamboos and trees. Up to a little short of the eighth mile the road follows the course of the Kraw River, and is difficult. At the eighth mile they arrived at the watershed of the country, a small grassy plain. The Kraw River runs thence west to join the Pakchan at Kraw; and a

quarter of a mile further on, the river called the Bankren flows to the Gulf of Siam on the East.

At Tasan is a zayat similar to that at Kraw, with a few houses and dry cultivation. The party continued to cross and recross the Tseoompyoon River to the tenth mile. At 17½ miles they reached Assay, another zayat, and were glad to rest for the night. At the 22nd mile they came to the end of the hills, and entered upon a fine open country, with patches of jungle, garden and paddy lands, capable of any amount of cultivation. Here the hills stretched away to the southward, and seemed to run east, parallel with their course. At the 23rd and 25th miles they crossed another river of 120 feet in breadth, the margin of which was much cultivated. At about 30 miles from Kraw they recrossed the Tseoompyoon, where it is about 200 feet broad, and arrived at the residence of the chief civil authority of the district. Tseoompyoon is a large place of some 400 or 500 houses, with a water communication of 20 miles with the Gulf of Siam. Here there is a rise and fall of tide of about 6 feet.

At 2 A.M. on the 4th April they proceeded down a very winding stream to the mouth of the river opening into the Gulf of Siam, where they arrived in about 3½ hours with the tide. There is a bar across the mouth of the River Tseoompyoon, with only 1½ fathom over it at low water. There would be no difficulty in making wharves for large ships, it seemed, nor, in constructing roads from Tseoompyoon to this place. They computed the distance from Tseoompyoon to the sea-shore to be 21 miles, making the total distance from Kraw to the shore of the Gulf about 50 miles. At 7½ A.M. the same day they returned to Tseoompyoon, surveying the river roughly, and passing Tayoung about 4 miles from the mouth.

On the route from Kraw to Tseoompyoon they were struck with a remarkable change of geological series. They had observed, as they emerged on the plains of Tseoompyoon, some remarkably abrupt hills, which proved on examination to consist of sedimentary rocks—and all the islands of the Gulf seemed of the same formation —worn into smooth rounded tops, but with perpendicular sides. The rocks across the Pass were mostly a quartzose sandstone.

The Paper stated that the saving in time between Calcutta and Hong-Kong by this route would be 93 hours; and that 56 hours would be saved from Ceylon to Hong-Kong. While coasting it rom Calcutta to Hong-Kong, and touching at four ports, viz., Akyab, Rangoon, Moulmein, and Kraw, 34 hours would be saved over the present route, *viâ* Singapore.

From Ceylon to Kraw, and thence direct to Calcutta, *two extra* English mails might be carried in 9½ days to the mouth of the Hooghly, necessitating only one extra steamer between Ceylon and Aden, to meet the Bombay mail. The capital required for construction was calculated not to exceed 700,000*l*.

[The paper and maps are printed in full in the Journal of the Asiatic Society of Bengal, iv., 1862.—ED.]

Mr. CRAWFURD said he had never visited the locality of the projected railway, but he knew pretty well what the nature of it was. Though this peninsula was called by the authors of the Paper a strip of land, it was in extent about twice the size of Ireland, containing an area of 60,000 square miles. The greater part of it was thick forest, and the land was not by any means fertile except in minerals, a little tin, iron, and gold.

He could not, however, agree with the authors of the Paper in believing that the projected plan was in the least degree feasible; on the contrary, he was sure it was impracticable. The distance from shore to shore was 65 miles, of which 15 miles were described to be navigable by the so-called Pakchan River. This in reality was not a river, but an estuary of the sea, with only four or five fathoms of water for half the distance, and but a fathom and a half on the bar at low water. Then came the projected railway of 50 miles, at the terminus of which, on the eastern side of the bay, there happened to be no harbour at all. Such a terminus would never do to carry on the great trade of Europe and India with China and Japan. Then, with respect to the monsoons, the rough monsoon in the bay of Bengal is the south-west monsoon, just the very opposite of that which prevails in the China Sea and along the whole of the eastern coast of the Malay peninsula, where the north-east was the boisterous one; its strength is frequently that of an eight or nine knot breeze. A ship could not with safety lie at the terminus, and even a small vessel of about 120 tons, we find from the Paper, had not been able to come inside the bar.

He was afraid these gentlemen had not taken a very clear view of the question of expense. They assumed that the cost of constructing the line would be about 5000*l*. per mile. This he believed was less than one-half the cost of any single line of railway in this country, and about one-third of the cost of a single line in India. The country is a desolate one: the labour, the iron, and everything would have to be imported, for there was nothing to be obtained there but plenty of wood and stone. No doubt the land could be bought cheaply enough; perhaps the King of Siam, to whom it all belonged, would give it to them for nothing, and it would be worth nothing when they got it.

The object of the Paper was to show that the proposed plan would shorten the route from England and India to China by fifty-six hours. This was not much to gain for the expense of constructing a railway at the estimated cost of a third of a million of money. These gentlemen imagined that the transit of goods across the isthmus would be performed in twelve hours; that is to say, that cargoes could be landed, and transmitted and reshipped, all in twelve hours. It was idle to suppose that with one of Green's or Dunbar's ships of two or three thousand tons, it would be possible to accomplish this in twelve hours. The example of the Suez railway, which they quoted, would not apply. Nothing was sent out by that route but valuable commodities, such as high-priced merchandise, gold, silver, and jewellery; and nothing was brought back but raw silk, elephants' teeth, and India shawls. All the bulky commodities still went round by the Cape of Good Hope, as they have been doing from the days of Vasco di Gama.

As to the alleged dangerous navigation of the straits of Malacca. The straits

of Malacca are about 500 miles long and about 300 miles wide at the broadest part. There are no storms: there are variable winds and squalls, called "Sumatras," because they always blow from the coast of Sumatra, which last about a couple of hours. The Peninsular and Oriental Company have been carrying the mails by this route for the last eighteen years. During that period their ships have made between 600 and 700 voyages through the straits, and have met with only one accident, which was caused by two of their ships running against each other in the dark, when one of them went to the bottom. The merchants of Calcutta and Bombay send their opium to China by this route, and out of 300 voyages made by their steamers not a single loss has occurred. Steamers belonging to the Royal Navy are constantly passing and repassing through the straits of Malacca, and he had never heard of one of them being lost. For the last ten years also the Dutch Government have been sending a vessel once a fortnight, and during the whole of that time have never lost a vessel. He, therefore, took it for granted that the navigation of the straits was not so dangerous as had been alleged.

CAPTAIN ANDERSON said he visited Siam in 1826, when he heard of a tradition among the natives that there had been originally a canal across the isthmus of Kraw. He agreed with Mr. Crawfurd that the line of country was not suitable for a railway, though it might be for a light road.

With respect to the straits of Malacca, he could speak from experience that the navigation, though dangerous to a certain extent, was not dangerous so far as the harbours were concerned. He had navigated the straits thirty-seven times, and had never met with an accident.

The shortening of the passage to China by the proposed route might be very desirable for the trade of Bengal, but it was not an object of national importance. He believed there were better means of getting to China. One was a proposal by Captain Spry to go overland from Eastern Pegu to Hong-Kong, to make a tramroad part of the way, and to take the telegraph the whole way. He had also himself submitted a project to Government to open a communication with China by the Irrawaddy and Assam, which he believed would be the best route.

The PRESIDENT thought Mr. Crawfurd and Captain Anderson had given sufficient reasons for not advocating this project. The gentlemen, however, who had made this exploration had placed before the Society for the first time a map of the physical geography of a region which was before unknown, and for this they were well entitled to their thanks.

The second Paper read was—

2. *Visit to the Island of Tsusima, near Japan.* By LAURENCE OLIPHANT, ESQ., F.R.G.S.

THE Island of Tsusima, which forms one of the entrances to the Inland Sea of Japan, lies eighty miles to the westward of the Straits of Simonesaki. Mr. Oliphant's duties led him at once to its capital, Fatchio, a town of 10,000 inhabitants, where he spent an evening in a diplomatic interview, but was jealously restricted in his movements. A subsequent cruise round its coasts afforded materials for many interesting observations. The whole island is the private property of its Prince, who maintains a garrison of 300

men at Chusan, on the Corean coast, and is bound to the Government of that country and to Japan by relations that are still insufficiently understood. He enjoys a monopoly of the trade with Corea, which furnishes a large proportion of the gold in currency in Japan. The formation of Tsusima is volcanic. It is about 35 miles long by 8 or 10 broad, and its total population is 30,000. It is bisected by a fiord of water running into innumerable creeks of great and sudden depth, where all the navies of the world might lie concealed, and even moored to the trees. The shores of these lanes of water, which invited an exploration that Mr. Oliphant had no leisure to give, are thinly inhabited by fishermen. A virgin forest clothes the hills to their summits, 1670 feet above the sea-level. The fauna of Tsusima are said to resemble those of the Manchurian coast rather than the fauna of the islands of Japan.

The PRESIDENT congratulated the country on possessing diplomatists such as Mr. Oliphant, who had given so lucid an account of a territory which was quite new to us. When he visited these islands he was still suffering from the wounds he had received in the performance of his duties in Japan.

SIR RUTHERFORD ALCOCK said Tsusima was an object of some interest to him when he was in Japan, and also to the Government, because they had reason to know that the Russians had for some time been there with their ships, and had made it a sort of careening port where they made extensive repairs. This attracted the attention of Government, who were anxious to know what was the special attraction at Tsusima, and whether it was an advantage that could be fairly shared by other nations. The reports of Mr. Oliphant and others fully convinced him that if we were in search of a magnificent harbour in these seas, which could be made defensible against attack and be a place of resort for fleets in distress, there was no place which could be chosen with so much advantage. The Russians seemed to find it a very pleasant place; but he believed they had since quitted it and left it to its original proprietors.

He saw some charts on the table which would amply repay inspection, and for which the Society was indebted to that most enterprising geographer, Lady Franklin. If ladies were eligible to be Fellows of the Royal Geographical Society, he thought that lady ought to be elected by acclamation. He had the pleasure of receiving Lady Franklin in Japan on her way home to England on her return from America. These maps which she had brought home were chiefly interesting from the evidence they afforded of the progress which the Japanese had made in trigonometry and topography. One was a plan of Jeddo, a city as large as London, 20 miles in circumference: it was most elaborately laid down, and he knew from practical experience that it was exceedingly accurate. Again, when Captain Ward, of the *Actæon*, was making a survey of a portion of the coast, certain surveys were produced by the Japanese Government to show what they had done themselves. Captain Ward was so astonished at the perfect accuracy of the lines, that he immediately put back in order to obtain copies of these surveys, which were ultimately given. These charts enabled Captain Ward to abridge his labours very much, for by whatever means they had been constructed, he found that they could be entirely relied upon. He did not think the natives made them by our method, and if not, they afforded an idea of the astonishing skill, ingenuity, and perseverance of these people.

From what he had seen of the Japanese, he had great hopes of them, if we could only get over one great difficulty that lay as a stumbling-block in our

path, and that was the existence of a rampant feudalism, such as that which flourished in Europe in former times. The mass of the people had attained a degree of material civilisation which rivalled our own in many respects. They have order and law established among themselves; they have a most elaborate system of mutual responsibility. In arts and manufactures they rival Birmingham, Manchester, and Lyons in many of their products: and yet side by side with all this material civilisation there is a military class of feudal nobles who exercise great power and influence; and it is this which constitutes the great difficulty in the way of all foreign nations who have entered into political and commercial relations with them.

The largest of the islands they call Nipon. Japan is a name not used by the Japanese themselves. The name is derived from two words, juh and pun, "the day-dawn or place of the sun." The Dutch when they came wrote it Jipan, but J they pronounced as our Y. The Japanese have softened the sound, for they speak the softest language out of Italy, and they have turned the J into N. The natives in speaking of their country always call it "Nipon," just as we, in speaking of our country, call it "England," because it forms the largest division of the whole territory.

The PRESIDENT, in the name of the Society, returned thanks to Lady Franklin for these admirable maps.

COMMANDER BULLOCK, R.N., said he could bear strong testimony to the great value and correctness of the Japanese charts. Upon close examination it had been found that every town, mountain-range, valley, post-road, every river and island, and sinuosity of the coast, in every part was delineated with extreme accuracy. These charts, obtained by Sir Rutherford Alcock at the request of Captain Ward, had been the means of enabling us to anticipate the survey of these coasts by at least twenty years.

With regard to Tsusima, the Russians look upon it as a point of extreme importance: they say it is a positive necessity to have a harbour of this kind as a resort for their ships, as it lies midway between the Amur and the coast of China; and for that purpose they established a depôt there. It is well known that our whaling-ships to the Pacific frequent a port on the north-west side of the island, where they go for wood and water and refit.

In reply to Sir Rutherford Alcock as to how the Japanese effected the surveys referred to, Captain Bullock said an endeavour was made to find that out from the six Japanese officers who accompanied the surveying expedition of Captain Ward. They repudiated all connection with the Jesuits or the Dutch, and they gave the following story; he did not vouch for the correctness of it:—A ruined merchant, somewhere in the middle of the last century, having gained some acquaintance with mathematical instruments from Europeans, thought he would undertake a survey of the islands. This occupied him a period of fifty years, at the end of which time, having presented the charts to his Government, he was restored to his former wealth and to honour. All their positions are accurately correct; their latitudes were never found more than a quarter or half a mile in error. Siebold had informed him that he had no knowledge of the existence of these charts, which had been drawn at Jeddo on three different scales. He has probably, therefore, compiled his chart of Japan, which is an exceedingly correct one, from a smaller edition of the same work, the larger ones being very rare, and said to have been almost all destroyed at the great fire at Jeddo a few years since.

It may be useful to add that Tsusima has a climate milder than that of the surrounding coasts and seas, in consequence of being situated in the Kurosiwa or Gulf-stream of Japan, which has a temperature 10° above that of the neighbouring seas. It is, however, not quite free from snow in winter.

CAPTAIN MALCOLM, R.E., said, when he was in Japan, he made the acquaintance of Colonel Von Siebold, of the Dutch Engineers, commonly known as Dr. Siebold, who showed him some original Japanese surveys of

1786, and told him that in years gone by (about 100 if his memory was correct), a Russian officer had been exploring the coast, and had instructed some of the natives in the art of surveying. There was an Astronomical Board at Jeddo, the President of which Siebold had instructed in astronomy, in taking latitudes, longitudes, &c.; and under his auspices it is believed all the good maps are published.

The PRESIDENT said as no other gentleman wished to speak on the subject of the Paper, he desired to make a communication respecting the exploration of the White Nile. Most of them had seen in the papers the report of the loss of Mr. Consul Petherick and his wife. He had only heard of the loss of this truly enterprising man from the papers. It was a melancholy subject for them to consider, and the loss was deeply to be regretted. The Council of the Society, seriously impressed with the importance of carrying out the enterprise which Mr. Petherick had in view, that of carrying up provisions to the succour of Captains Speke and Grant in the country above Gondokoro, and knowing that that most adventurous person, Mr. Baker, after exploring the tributaries of the Atbara River, was about to proceed on his travels in that direction, resolved to request him to undertake the mission that had been accepted by Mr. Petherick, in case that bold explorer should be no more, and to place at the disposal of Mr. Baker for that purpose the balance of the sum of money which remained in hand out of the subscription raised by geographers in this country to furnish Mr. Petherick with the requisite means.

While upon this subject, he begged to add that he had been informed by Mr. Tinné that the adventurous ladies, of whom mention had been made on a previous occasion as having hired a steamer at Khartûm with the intention of ascending the White Nile, had, according to the last accounts, gone for a whole day of steaming beyond Gondokoro, the station which Mr. Petherick had fixed upon to deposit provisions for the use of Speke and Grant. The names of these ladies would be made known hereafter among those of the ardent explorers of the day. They had returned to Khartûm, where they arrived on the 24th of November, and at that time Mr. Baker was about to proceed on his expedition. He had, therefore, every hope that in the end sufficient supplies might reach Speke and Grant, and that at some future meeting they might be able to report the happy termination of an expedition in which the Geographical Society took so deep an interest.

Sixth Meeting, Monday, February 9th, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Captains E. R. Fremantle*, R.N., *and C. E. Barrett-Lennard, were presented upon their election.*

ELECTIONS.—*Commander William Arthur*, R.N.; *Commander Charles J. Bullock*, R.N.; *Captain John Clayton; Captain Richard Bulkeley Pearce*, R.N.; *Colonel R. C. H. Taylor; Edward Armitage; William Broughall; Richard Corbet; William Eames Heathfield; James Macbraire; and W. H. Wylde, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since the former meeting were—'Memoirs of the Geological Survey

of India;' twelve sheets of 'Siebold's Atlas,' from Captain Malcolm, R.E.; 'Ethnographical Map of Finland;' Admiralty Charts, &c. &c.

The PRESIDENT.—In opening this meeting, I have a communication to make, which I am sure you will hear with very great satisfaction. Those of you who are in the habit of attending will recollect that our first meeting of the Session happened to fall on the day set apart for the celebration of the birthday of the Prince of Wales, and on that occasion I expressed the hope that ere long His Royal Highness would consent to fill the place occupied by his lamented and illustrious father, as the Vice-Patron of the Royal Geographical Society. I also said that seldom had a Prince become so qualified for such an office, inasmuch as His Royal Highness has travelled over larger tracts of the globe than many of us who are here assembled. I am happy now to be able to announce that I have recently received a letter from General Knollys, in which he states the great gratification which it affords His Royal Highness to accept the distinction, particularly as it was a post which had been occupied by his illustrious Parent.

The PRESIDENT said he ought also to make a communication with reference to the fate of the enterprising traveller, Petherick. He wished it were in his power to dispel the reports of his death, which seemed to have reached Alexandria in some way through the natives. He had no great comfort to offer either to those who were interested in the success of the expedition, or to the friends and relatives of Mr. Petherick, except this, that by the last letter received from Mr. Baker at Khartûm, it appeared that Mr. Consul Petherick, after sending back his water-logged boats to Khartûm, containing his injured provisions, had expressed his determination to go forward on foot; and that instead of proceeding to Gondokoro, or due south, he had deviated to the westward, to a place which he had visited for trade in former years. Probably he had gone far to the west, and had got into a country which was very difficult to traverse at that season, owing to the inundations of various streams and rivers. This deviation from the line which he was expected to take, might explain why no trace of him had been discovered by the adventurous ladies who had gone up from Khartûm, beyond Gondokoro; and it afforded the only ground of hope he could offer, that Mr. Petherick might still be heard of, and that the report of his death was premature. Mr. Tinné, who had been so kind as to communicate all the information they possessed respecting these ladies, would read a short extract from a letter which he had received from one of them relating to Mr. Petherick.

Mr. TINNÉ read the following extract:—

"Khartûm, Dec. 1, 1862.

"The Petherick expedition, of which you no doubt have heard, does not, so far, succeed.

"They left so late that contrary wind from the south had set in against them, and brought them at last to a stop at the Catholic Mission of the Keks.

"They were obliged to leave their boats there with all the fine things they had brought with them from England—iron, conveyances, provisions, &c.—and go by land under a thousand difficulties to Niambara. We could not

learn for certain what had become of them, but negroes told us they had been drowned in crossing a river. I do not know if this be true."

The Papers read were—

1. *Report on the Countries in the neighbourhood of the Niger.* By DR. W. B. BAIKIE, M.D., F.R.G.S.

DR. BAIKIE advocates the immediate formation of a trading station and a consular establishment on the banks of the Niger. He states that it would secure preponderance and priority for English commerce, and would form a basis for English influence in Central Africa. A permanent establishment would serve to keep rude tribes in check, while it would be far from unpopular with the more settled population. It would afford the missionary and the philanthropist a centre for their Christianizing and civilizing endeavours, and finally it would bring to a practical conclusion the various Niger expeditions. He considers the present to be a most favourable time for such an establishment; ground has been secured and occupied, the foundation of a market laid, the navigation of the river has been opened from the confluence upwards, and there is a general feeling among the natives that we are at length really going to take such a step. He considers the confluence to be decidedly the best position for an establishment. It is the most central, is easily reached from the sea, is the point of convergence of many roads from the interior, is already a recognised market-place, and has proved to be healthy during Dr. Baikie's residence of two years.

Extracts from numerous despatches by Dr. Baikie have been printed by the Foreign Office, and are ordered by the Council of the Royal Geographical Society to be placed in their library. Some of them refer to the country whence cotton may be obtained, in which respect Bonu and Nupe are preferable to Yoruba, because in the former three-fourths of the labouring population are free to raise and sell their own crops, while in Yoruba the chief production is in the hands of large traders, who would infallibly add to their slaves in the event of an enlarged demand. Most of the extracts are purely geographical, and extend or correct Dr. Barth's deductions from native hearsay, or his own observations. Baikie gives the following data on the anomalous rise and fall of the Niger, which was first observed by Barth and minutely discussed in vol. v., p. 5, of that traveller's work. The observation of four years at Busa showed the maximum height to be attained at the end of September; early in October the river begins to fall; during November it falls rapidly; it slackens towards the end of December, and is stationary in January. Between the end of January and the end of

February there is a second rise of from 4 to 16 inches. The rains mostly fall at the end of September, and the reason of the delayed rise of the river lies in the length and sluggishness of its course. In these general ideas Baikie agrees with Barth, whom, however, he appears to have partially misunderstood (as explained in a letter recently received from Dr. Barth.—ED.).

The Benuwe and Niger are called at their confluence the dark and the white river, and the appellation is just, at the season of low water, for the difference of hue between the two streams is strongly marked at that time, and their waters keep distinct for several miles.

[The latest news of Dr. Baikie, who had left the Niger for the interior, has been brought back by Lieut. Lefroy, R.N. That officer proceeded with H.M.S. *Investigator* up the Niger to Rabba, which he reached on September 12. Thence he made his way by a five days' journey to the camp of King Massaba, where he remained a week. After returning to his ship a messenger from the King reached him on October 9, stating that news had been received from Baikie, who was on his journey back. Unfortunately the rapid fall of the waters of the Niger made it impossible for Lieut. Lefroy to retain his vessel any longer in that portion of the river.—ED.]

The PRESIDENT reminded the meeting that Dr. Baikie went out upon this African expedition nearly eight years ago, and that the *Pleiad* steamer, in which he and his party were embarked, was lost in going through some of the rapids, very nearly at the point from which he last wrote. In no way discouraged by the loss of the vessel, and saving what he could from the wreck, Dr. Baikie set himself down in the midst of these wild people; and ever since then he had been sending expeditions to the right and left, besides carrying out two expeditions himself to the north-west and the south-east. This perseverance on his part was highly creditable to him, and it showed that the Government had really selected a man capable of accomplishing their behest, and of doing justice to the British name in those regions.

Mr. CRAWFURD said great credit was due to Dr. Baikie for his perseverance, industry, and zeal; but, in his opinion, his judgment was not equal to his industry. The station he had recommended for a settlement on the Niger, in the seventh or eighth degree of latitude, where the temperature was at 80° or 90° on the average the whole year round, was not a place for Europeans to live in.

The PRESIDENT observed that Dr. Baikie had been there eight years.

Mr. CRAWFURD thought he must be a very lucky man. At all events he understood Dr. Baikie was in delicate health, and exceedingly anxious to come back. With respect to the productions of the country that had been spoken of, he should be glad to know what they were. Palm-oil was certainly a valuable commodity, and we imported into this country as much as two millions' worth per annum. Of ivory, though England was one of the greatest consuming countries in the world, our import and export annually did not equal 100,000*l*. Cotton had also been mentioned. Did anybody expect that the negroes would ever grow cotton? The cultivation of cotton required capital, ingenuity, intelligence, protection to life and property; and could

these things be expected from a people in a state of barbarism and slavery? No country in the world was capable of producing cotton in any considerable amount, of a quality fit for our manufacturers, except the Southern States of North America; and, of all countries in the world, Africa was the last that he should expect would ever produce cotton for such a purpose. Then there remained gold-dust, of which but a trifling quantity was produced, merely the washings from the sand. For all these reasons he thought it would be impolitic to form a settlement, as proposed by Dr. Baikie.

Mr. GALTON said that, although the individual items might not be large, there was a considerable amount of trade of one kind or another on the West African coast. Various thriving *entrepots*, of which Lagos was commercially the most important, were dotted along the seaboard the whole way from the Gabún to the Senegal. The proposal was that an additional settlement should be established by this country upon the Niger, where the opportunities of trade appeared to be greater than were now enjoyed anywhere along the coast. Confessedly, the West African trade was not of first-class magnitude; but it was not a settlement of first-class importance that Dr. Baikie recommended, merely a small trading establishment. Such an establishment, bringing with it, as it would, all the advantages of European and Christian influence, was a project that he considered might be reasonably entertained on more grounds than one.

The PRESIDENT said, even allowing that all Mr. Crawfurd's objections were valid, we were still deeply indebted to Dr. Baikie for making us acquainted with the physical geography of this remote region.

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2. *Notes on Madagascar.* By LIEUTENANT OLIVER, R.A.

THE Queen of Madagascar having died in 1861, and being succeeded by her son Radama II., a change was made in the policy of that kingdom. Europeans, who had been previously refused admittance, were freely invited to the capital; and our Government sent in the first instance a message of congratulation, and more recently a mission, in which Lieut. Oliver took part. Their duty was to convey an autograph letter of Her Majesty to the King of Madagascar, accompanied by suitable presents. The distance from Tamatave to the capital occupied eighteen days; the Mission travelled in palanquins carried by strong and willing porters, and traversed a country that seems mainly to be uncultivated, largely wooded, and to consist of such deep and slippery clay as to make progress exceedingly difficult after rains. A ridge of 5000 feet was crossed before coming in sight of the capital. The higher Malagese functionaries have adopted a quasi-European mode of life; the troops attempted European discipline, costume and arms, and the bands played European airs. Mr. Ellis, the distinguished missionary, had a congregation of 1000 Christians in the town, and there were six other congregations of a nearly equal size. Lieut. Oliver shows reason to doubt whether the extension of the Christian profession is the result of much sincere conviction.

The PRESIDENT said Lieut. Oliver is an officer surveying in the Mauritius. He was also anxious to survey Madagascar, and to bring forward in a future communication many interesting and valuable details respecting its physical structure; and he had requested the Royal Geographical Society to aid him in this endeavour. The Council had accordingly authorised a request to be made to His Royal Highness the Commander-in-Chief, to extend Lieut. Oliver's leave of absence for a short time, in order that he might prosecute his researches. No doubt many present were well acquainted with that most charming description of Madagascar given us by that distinguished missionary, the Rev. Mr. Ellis. It must be said to the credit of the missionaries that they had instructed the natives in the rudiments of reading and writing. The Malagasi language was never written until our missionaries went there. The Rev. Mr. Ellis, after an absence of many years, on his return found to his surprise, on disembarking, the native aide-de-camp of a general writing a despatch at the dictation of his superior officer, to be sent to a distant part of the island. It was a proof of the diffusion of writing among these people since the introduction of the art by the missionaries. Mr. Crawfurd would tell them something about the Malagasi language; that gentleman, who had written the first dictionary of the Malay language, having discovered a considerable mixture of that language in the Malagasi. It must be a subject of great interest to naturalists, including geologists, that this great tract of land, separated by a short distance from Africa, should be so entirely different in almost all its natural productions, particularly in its plants, while many of the animals of Africa were totally unknown there. It had therefore been supposed, theoretically, that this tract of land had been, by former convulsions of nature, separated from the countries to the east, and that, though so near to Africa, it has never had any close connection with that continent.

Mr. CRAWFURD said, in the course of his studies he had had occasion to look into the question of the geography and the philology of Madagascar. The subject that he specially wanted to bring under notice was the presence in the Madagascar language of a very considerable body of Malay and Javanese words. That was a very remarkable circumstance, for how these words came there it was difficult to explain. The nearest point of the Malayan country was 3000 miles distant. He should premise by saying that the people of Madagascar are not Malays, nor do they bear any resemblance to them. They are, in fact, negroes; but negroes of a particular description. They are negroes in the same sense that Portuguese, and Lapa, and Englishmen, Germans and Spaniards are Europeans, and in no other. They are slender in their form. Their facial angle is not so acute as that of the ordinary negro. Upon the whole it seemed to him that they are incomparably more advanced in civilization than the people on the opposite coast, although at a distance of no more than 240 miles. A proof of their civilization is that a single language pervades the whole island. This is never found to be the case except where there is a considerable amount of civilization. Another proof is, that as long as we have known the country it has been ruled by one authority, and tolerably well ruled for negroes. Like all other negroes, they are ignorant of letters. No negro nation has ever invented an alphabet. To return to the Malagasi language, he found nearly two hundred words of Malay origin, all of them genuine Malay words, easily discoverable, although disguised by a foreign pronunciation. The language was totally distinct, not only from Malay, but from every other language of Africa. Compound words are to be found in it, of eight, nine, and ten syllables; and in one case he discovered a word of eleven syllables, which would require twenty-three letters to express it. In this respect they are the opposite of the Chinese, who have never yet learned to put two syllables together, their whole language being monosyllabic. Of the Malay words that are to be found in Malagasi, he would first mention the

numerals. The numerals extend from an unit up to one hundred thousand, all taken from the Malay language. Now the common negroes of Africa, such as those met with by Dr. Livingstone for example, can hardly count beyond ten, and very rarely up to a hundred. But here we find these people under the instruction of the Malays, in whatever manner the Malays may have reached them, able to count up to one hundred thousand; and he might add, as a still more curious fact, that the words for "ten thousand" and for "one hundred thousand" are borrowed from the Sanscrit, through the Malay or Javanese. This shows that the migration of the Malays took place after the Sanscrit language had been introduced in considerable amount into the languages of the Malay Archipelago. Among other Malay words that are to be found in the Malagasi are the word for a year and the word for a month. The words for "rice," "rice-field," "rice-mortar," and for "cocoa-nut," "yam," and "capsicum," are pure Malay words, from which he presumed that for the rice, the cocoa-nut, and the other vegetable productions, they were indebted to the Malays. His notion of the way in which these Malay words were brought into Madagascar was this—that a fleet of Malay pirates had been tempest-driven from their own coast, and not able to make their way back; that they had been caught in the south-east monsoon, which blows south of the equator, and had made for the first land that lay in their way, which of course would be Madagascar; that in that way they arrived in sufficient numbers to protect themselves, in the first instance, against the natives, then afterwards imparted to them a certain amount of instruction, and conveyed to them a knowledge of the cultivation and use of these vegetable productions, and finally became absorbed among them by intermarriages. The Malay language had not extended beyond Madagascar, for he had looked carefully into Bishop Colenso's grammar and dictionary of the Zulu language, and he did not find a single Malay word in them.

Mr. CONSUL TAYLOR said, he wished to add his approval of what Dr. Baikie had proposed in the previous paper. He had been in the Niger and Tschadda, in command of the *Pleiad*, in 1854, and had been to and from and residing more or less in various parts of Africa since 1844. He believed there were very many advantages to be derived from establishing a commerce on the Niger. He disagreed with Mr. Crawfurd's opinion that Africa was the last country to which he should look for cotton. It possessed a most suitable soil and climate, abundance of labour and of water-communication, and it was the birthplace and natural home of the cotton-plant. If it was meant that Africa could not, without an influx of capital, produce as much cotton next year as America did before the war, he quite agreed in the assertion; but he maintained that cotton could be produced in Africa if we went there to seek it. Mr. Taylor pointed out the small area on the map, near Cape Formosa, 200 miles in length, by 100 in depth, from which we obtained palm-oil of the value of a million and a half every year, and asked what might we not expect from the whole of that vast continent if the necessary facilities for trade existed?

The PRESIDENT closed the sitting with the announcement that M. Jules Gérard, the celebrated Algerian lion-killer, who was present, was about to undertake an expedition into Africa. He proposed, in the first instance, to go to the country of Dahomey, thence to Ashanti, and finally to explore and follow the so-called Kong Mountains, of which nothing definite was known, to the British colony of Sierra Leone. Should he succeed thus far, and his health permitted it, he hoped to penetrate from Sierra Leone into the interior, and examine the sources and upper portion of the Niger. It was a great undertaking to accomplish; and, as this distinguished Frenchman was partially assisted by our Government, he hoped he would be able to bring back some useful and important knowledge.

Finally, the PRESIDENT announced that, in consequence of numerous com-

plaints received from Fellows of the Society who cannot obtain seats at the Evening Meeting, the Council call attention to the Rule (Chap. v. Sect. 3, Par. 2):—

"Visitors, if introduced by Fellows, may be present at the Ordinary Meetings; but the privilege of introducing Visitors shall be limited to *one* only, and should a Fellow desire to introduce a second, he is requested to apply to the Acting Secretary for a special card of admission;" and the Council have further resolved,—

"That no Visitor, excepting those *personally* introduced by Fellows, be admitted to the Room before 8·15 P.M."

The Meeting was then adjourned to Monday, February 23rd.

Seventh Meeting, Monday, February 23rd, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Commander Charles J. Bullock*, R.N.; *the Chevalier Duprat; Alfred Barry; Antonio Gabrielli; W. E. Heathfield; S. H. Hinde; George Macfarlan; and John Thomas, Esqrs., were presented upon their election.*

ELECTIONS.—*Major Francis J. Rickard; Arthur Anderson; James P. Brown; A. Bertie Cator; John L. Ellerton; Robert Gillies*, C.E.; *Rowland Hamilton; Loton Holland; James H. Kerr*, R.N.; *James E. McConnell*, C.E.; *Frederick Pearson; John Ritchie; George M. Robinson; William A. Ross; H. Duncan Shrine; and James Thomson, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since the former meeting were—Hughes' 'Geography of British History;' Adams' 'Geography Classified;' Wills' 'Successful Exploration through Australia;' continuation of Philip's Imperial Library Atlas; Clark's Map of the Holy Land; Admiralty Charts, Ordnance Maps, &c. &c.

EXHIBITIONS.—Several diagrams illustrative of the Formation of Icebergs in Greenland; Clark's Map of the Holy Land; Railway and Geological Maps of the United Kingdom, by S. Clarke, &c. &c., were exhibited.

The Papers read were—

1. *Rupert Land, the Colony and its Limits.* By CAPTAIN MILLINGTON H. SYNGE, R.E., F.R.G.S.

THIS paper opened with an allusion to those read before the Society by the same author (*vide* vol. xxii. 'Journal'), which treated of the physical geography of the interior of British North America, as

demonstrating the feasibility of a communication across it from ocean to ocean. The features of the country were therein described, and the fact of an unbroken natural navigation was shown to exist between the Atlantic and Pacific; as also, by way of the Mackenzie River, between the Arctic Sea and either of the above oceans. Telegraphic intercourse was now about to be established between Canada and British Columbia by the joint efforts of these colonies, and an open intercourse would inevitably follow.

The intervening country was now used merely for hunting purposes, and it was alleged that the remunerative character of the fur-trade would be destroyed by the opening of the country. Its present holders were accordingly averse to the impending steps in that direction. It was not the intention of Captain Synge to recapitulate his former arguments on the advisability of opening the country, but to complete the examination of the case under the aspects of historical and political geography.

The first mention of Rupert Land—and Rupert Land, whatever that may be, is the country over which alone any claim can be advanced by a corporate body—occurs in the charter granted by King Charles II. to a company styled that of "Adventurers trading to Hudson Bay." With the Restoration the spirit of maritime adventure had revived, and the prosecution of an enterprise for the discovery of a short passage to the South Sea was again ardently desired. This object had fired the genius of Columbus; had led to nearly all the brilliant enterprises by which America was discovered, seized, and settled; became subsequently an object of research in a more and more northerly direction, until it finally assumed the name of the North-West Passage. To prosecute this search was the object of the applicants for the charter and also of the King. The grant is specified to be for this purpose, as conducive to the good of the whole people. It is also specified that Rupert Land is to be "a colony," and governed in harmony with the laws of England. This grant is worded so as to convey a monopoly of trade and of land upon the seas and borders of the supposed Passage. Read by this light—that of the day in which the charter was granted—it is obvious that its array of geographical phrases is made for the purpose of legal exhaustion of terms necessary in order to prevent any trespass upon the monopoly; but the whole is bounded by the condition of proximity to the supposititious Passage by the express terms of *coasts and confines*. There is also an *excepting* clause, viz. that the country be not at the time granted to or possessed by the other subjects of the King, or of any other Christian prince or state.

The country at the present day attempted to be claimed under these terms embraces, however, the whole head-waters of the Red River and of the Saskatchewan. These countries are in no wise contiguous to Hudson Straits, and they were occupied by the French or by those who inherited the French pretensions, not by the Company of Adventurers.

This enlarged claim rests exclusively upon a very strained interpretation of the word "rivers." The inland navigations of America are by great lakes, and not by rivers. Besides, the word "rivers" is sufficiently clearly shown to signify the embouchures necessary to give rights upon the *confines* of the Straits, first, by the express use of that term; secondly, by the excepting clause; and thirdly, by the total omission of any reference to a land frontier as determined by a watershed. Historical geography entirely corroborates this view, for no exclusive claims to either the trade or land of the interior was set up until the whole of the traders into these regions were amalgamated into one body after the great conflicts with the North-West Company of Canada. During these conflicts the Hudson Bay Company advanced no pretensions of right to a monopoly. All the public instructions both of the Home and Colonial Governments decide that an equal right existed on either side within legal limits, and it was only subsequently to the amalgamation that it became the common interest of all to set up these pretensions under the only document giving semblance to a right on which these enlarged claims could be based. The French posts extended to Fort Piscayac, on the Sackatchewan, besides others seen by Mackenzie as far as Athabasca Lake.

The country required for the purposes of establishing the overland transit, in the first instance, was not within the limits of Rupert Land; but Rupert Land was a grant in trust for the purpose of attaining the objects of that short and rapid communication.

The PRESIDENT said the object of the author of the Paper was to see established free communication between the two great British possessions upon the east and west of North America. The communication involved other considerations of international law and of the effect to be given to the wording of charters and treaties, upon which few of those present were competent to speak. Fortunately he saw his friend Dr. Travers Twiss near him, and he would ask that gentleman to offer a few observations upon the subject.

Dr. TRAVERS TWISS said, assuming that the Hudson Bay Company had under their charter a power to throw impediments in the way of a passage, whether by telegraph or railway, through the Rocky Mountains, there was still a higher power at home which could remove those impediments; therefore he did not at all despair of overcoming them, assuming that they did exist. In addition to the legal and geographical question, there was also the historical view, which was not precisely as Captain Synge regarded it. The real difficulty which arose in regard to almost all charters and treaties of boundary resulted

from the disposition of diplomatists to take a river as a boundary, which, when traced to its head sources, threw everything into confusion. A difficulty of this character arose between ourselves and the United States, when we came to trace the head-waters of the rivers that were to separate the north-east boundaries. In the grant to the Hudson Bay Company, the phrases "land upon the rivers," "territory upon the rivers," were made use of. It has always been understood, both in grants and treaties, when these words are used, that they mean all the land upon the rivers up to their head-waters—up to the high lands where they take their rise. Assuming for the moment that in the grant to the Hudson Bay Company all the land upon the rivers was included, we then had to trace the head-waters of those rivers; and it would be found, precisely as it was discussed at the Treaty of Utrecht, that we should have to commence with Lake Mistassinnie, then come to the Lake Abbitibis, then to the Rainy Lake—the waters of which flow into the Lake of the Woods, and thence into Lake Winnipeg, and finally find their way into Hudson Bay. From the Rainy Lake we must trace a line to the Red Lake, follow that up to Lake Travers, which is at the head of the Red River, in lat. 45°, and thence keep on to the lowest sources of the Saskatchewan, in lat. 49°. Thus we get the real geographical boundary, or the head-water-line, of the grant to the Hudson Bay Company, inasmuch as all these rivers flow northwards, and find their way, through a most intricate navigation, ultimately into Hudson Bay. Of course the grant was limited, if it proved to conflict with a previous grant, or with land in the occupation of other countries. Besides the Hudson Bay Company there was the *Nouvelle France* and the *Louisiana* companies, which had been formed by the French. A great contest arose between us and the French in this part of the country, and the first war was concluded by the Treaty of Ryswick, in which the French King recognised the title of William III. to the throne of England; and in return for that William III. recognised what we call the *uti possidetis*, agreeing that the land should remain as it was possessed by the French, no question of right or title being raised. But when we came to the Treaty of Utrecht, in 1713, the French King agreed, not to cede, but to restore, to Queen Anne "all the Bay and Straits of Hudson, and all the coasts, rivers, &c." Commissioners were to be appointed to mark out the boundaries, not landwards, in regard to the sources of rivers, but coastwards; for the real question was, in fact, to determine the extent of Hudson Bay, that portion of water into which these rivers flowed. Those Commissioners were never appointed: consequently no boundary was ever determined under that treaty between the English and French possessions. Now, the question which Captain Synge raised about the French possessions extending indefinitely northwards, was the great argument used by the United States Government against ourselves in 1846, in connexion with the Oregon boundary, in regard to which it claimed to have succeeded to the French rights in Louisiana, which originally belonged to the French, and who really penetrated as far north as the Athabaska Lake, where Mackenzie, in his first great exploration, discovered the remains of two small French settlements. The Americans claimed 49° as the boundary, alleging that that was the line agreed upon at the Treaty of Utrecht as the boundary between the English and French possessions, and claiming to have succeeded to the French title under that treaty. But in 1763, after the siege of Quebec, when the whole of Canada was ceded to us, the French Governor, the Marquis de Vaudreuil, named the Red Lake, where the waters commence to flow northwards, as the northernmost point of Canada; and therefore, so far, conceded that the political boundary of the French possessions did not extend higher than the Red Lake. He now came to what really was the meaning of the charter of the Hudson Bay Company. That charter gave the Company all the country, all the coasts, and all the rivers flowing into Hudson Bay and Hudson Straits. Whatever questions might arise as to that definition, about the rivers there was no diffi-

culty whatever, because after the Treaty of Utrecht all the rivers flowing into Hudson Bay were conceded to be British rivers. It seemed to him, therefore, that the historical view was opposed to what Captain Synge had stated, further than the fact of the extension of French settlements of hunters as far as the Lake Athabaska. Nor was the argument quite consistent with the legal interpretation of the word "rivers." At the same time what he had told us was extremely interesting, because of the great prospective importance of that country; it possessed enormous mineral wealth, which would one day be explored and worked.

Captain SYNGE expressed his satisfaction that the question had been taken up in the manner in which it had been dealt with by Dr. Twiss. The opening of the country as a route to the Pacific appeared close at hand, and it was this circumstance that gave so great, immediate, and practical an interest to the subject. He had been greatly struck eleven years ago when first bringing before the Society the physical geography of the country of interior British North America, as proving the feasibility of such a route, and the particulars of the direction-posts and characteristics of the latter, that the discussion which ensued instantly took the form of an attack on the Hudson Bay Company. He subsequently found all those who were in favour of the country were strongly under the impression that the Company was the obstruction really in the way. Now he himself at that time knew the Hudson Bay Company only by name. He had not then examined the charter at all. Satisfied that no such antagonism existed between the assumed proprietary of so magnificent a territory and those who were strenuously seeking to develop its resources to the utmost, he brought this view under the consideration of the Board of the Company; but without effect. The reply practically amounted to this—that the fur-trade was remunerative and met all their desires. The Company had not, however, been content with a passive opposition. They were, in fact, in many forms the vigorous opponents of every effort to open up the country. The position was, therefore, this:—The Company apparently most interested in the success of the efforts he and others were contending for, were the most resolutely hostile to all those efforts. There appeared, therefore, but one alternative as a solution of this line of conduct. Either we must be entirely mistaken as to the value of the country and of the route, or tenure of that country by the Company was invalid. He had purposely confined himself as much as possible to the geographical investigation of the limits of Rupert Land, and had intentionally glanced as briefly as possible at the historical confirmation of the limits as he had sketched and believed them to be; but he hoped he had shown it to be beyond dispute that Rupert Land was held as a trust only, and that the object of that trust was identical with that which gave its present interest to the question, viz. the opening of a communication with the Pacific. He could not adopt the principle contended for by Dr. Twiss, that the inland navigations of North America came under the category of rivers. The great lakes were not the St. Lawrence. Under any circumstances all the interior country, as he had shown he trusted, sufficiently clearly, however briefly, came under the excepting clause. The Hudson Bay Company evidently had no claim to it; nor, until recently, had they advanced any under their charter. In 1817, when the Hudson Bay and the North-West Companies were brought face to face, the Hudson Bay Company made no pretension to monopoly; they did not call upon the Government to protect them: but the most peremptory instructions were sent by the Home and Colonial Governments that the conflicts of the Companies' servants were to be put a stop to, and all impediments raised on either side against any traders or others of the King's subjects were to be removed. If their monopoly dated from 1803, how could they claim it under their charter? The question could not be avoided, for the settlement of the

country, shown to be imminent, could not take place without the grant and transfer of land. It became indispensably necessary therefore to inquire with whom, if with any one but the Crown, a title to grant lay, and to what that title amounted and over what it extended. To effect a legal transfer there must be a legal title. That title, if legal, extended over Rupert Land. Hence the interest and importance of the question—What are its limits?

The PRESIDENT, in thanking Captain Synge for his communication, said the Geographical Society, happily, were not called upon to settle that question.

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2. *On the discharge of Water from the Interior of Greenland, through Springs underneath the Ice.* By DR. H. RINK, of Greenland.

DR. RINK calculates the yearly amount of precipitation on Greenland, in the form of snow and rain, at 12 inches, and that of the outpour of ice by its glaciers at 2 inches. He considers that only a small part of the remaining 10 inches is disposed of by evaporation, and argues that the remainder must be carried to the sea in the form of sub-glacial rivers. He shows that copious springs of fresh water boil up through the sea in front of the glaciers that advance into it, and states that their positions are conspicuously pointed out by flocks of sea-birds, which invariably hover over them in evident search of some food, whatever it may be, which they always find there. He also specifies a lake adjacent to the outfall of a glacier into the sea, which has an irregularly intermittent rise and fall. Whenever it rises the sea-springs disappear; when it sinks they burst out afresh, showing a direct connection between the springs and a sub-glacial river. Arguing from what has been observed in the Alps, he concludes that an amount of glacier-water equivalent to 10 inches of precipitation on the whole surface of Greenland, is no extravagant hypothesis, and he accounts for its presence partly by the transmission of terrestrial heat to the lowest layer of the ice, and partly from the fact that the summer heats are conveyed into the body of the glacier, while the winter cold never reaches it. The heat melts the surface-snow into water, which percolates the ice, while the cold penetrates a very inconsiderable portion of the glacier, whose thickness exceeds 2000 feet.

The PRESIDENT said this was a most important communication. Dr. Rink brought before them the most convincing proof of the truth of what had been long established by the labours of Agassiz, Forbes, and Charpentier, and other geologists, that glaciers were simply frozen rivers; and, in showing that these frozen masses move to the coast, he has calculated that about one-sixth of their whole volume really consists of water. The subject was of great interest, particularly to persons who, like himself, happened to have been born in the north of Scotland; because geologists had recently satisfied themselves that all the northern part of Scotland has been under pre-

cisely the same conditions as Greenland is now, covered in its centre by great snowy frozen masses, which advanced towards the coast, and emptied themselves by glaciers. They were fortunate in having valuable illustrations of Dr. Rink's Paper, furnished by Colonel Shaffner, who went out with the first expedition to determine the possibility of establishing telegraphic communication with these countries, and to ascertain the nature of the difficulties in approaching these great glaciers. It was the latter difficulty which had been particularly adverted to by the author of the Paper: and he described how in one of these great masses of ice they even found an interior lake. This was a point exceedingly interesting to geologists, for they had recently had under discussion the subject of the parallel roads of Glenroy, in the Highlands, where it seemed impossible to account for certain terraces of gravel at different altitudes, except upon the supposition that there was once an interior lake there, which was barred up by a glacier. This icy lake spoken of by Dr. Rink seemed to throw some light upon the subject. As his friend Professor Ramsay the President of the Geological Society, who had written most ably upon glacial action, both in our own country and in the Alps, was present, he should be happy to hear his observations on the subject.

Professor RAMSAY said the study of glacial phenomena had been for many years a subject of special interest to him, for, as geologists knew, much of the northern hemisphere had at one time been as deeply buried under ice as Greenland was now. He believed that all those appearances which thrust themselves on glacialists wherever they went in the north of Europe, would never be clearly understood until they had been studied in Greenland by a man who, besides being a mere student of ice, was thoroughly conversant with all the glacial phenomena of that period of time when the northern hemisphere was, to a great extent, covered by ice. This ancient ice-covering was positively true; for all the phenomena that glacialists are familiar with in Switzerland, from the days of De Saussure downwards, are as clearly written upon the rocks of our own island, of the Scandinavian peninsula, of the Black Forest, of the Vosges, of the highlands of Scotland and Wales, as they are upon the Alps in places which the ice only left, as it were, last year. Until people went and saw what was going on in Greenland, which was now undergoing the very same process that our own island underwent, there would inevitably be a great many phenomena which we could not clearly understand. The Paper was an exceedingly clear exposition of some part of these phenomena, but he was bound to say it was an exposition of what most men who had studied ice were familiar with. The author wished clearly to show that the country was drained by ice, but drained not by ice alone, but by water flowing under the ice. Everyone who had visited the glacier of the Rhone, or the glacier of the Aar, or the Glacier du Bois, must have seen a ready-made river from under the ice flowing out upon the land. Dr. Rink explained that the same ready-made rivers flowed from under the ice as it floated out to sea, and rose to the surface, as it were, in boiling springs. This rush of water was due, not to the circumstance merely of springs rising out of the rocks underneath the ice, but more to the circumstance that the ice a few feet below the surface, even in the extremest cold of the most Arctic winters, was always just about melting temperature. Dr. Sutherland, who went in one of the voyages in search of Sir John Franklin, observed that the surface of the ice in extreme Arctic regions, unlike the surface of the ice in the glaciers of the Alps, is much more rugged, because the extremest cold never penetrates down below a depth of 8 or 10 feet. To that depth all ice is frozen below the temperature of 32°; but below that depth, even in winter, the temperature is always at 32°, a little more or less, and the lower strata of ice flowing faster than the upper, the upper strata are broken in this irregular manner. Some years ago Dr. Kane showed that all the winter through, from underneath a glacier which he estimated at 3000 feet in thick-

ness, a stream of fresh water was constantly flowing. Here, therefore, we had a confirmation of the observations made by Dr. Rink, which in this respect are not new, though he has brought it before us in a very prominent manner.

Dr. Rae said one of the glaciers he visited had been evidently an ice-giving-off glacier at one time, but the quantity of mud formed from the trituration of the rocks by ice-action, and carried down by the rivers of which Dr. Rink had spoken, had probably filled up the head of the fiord, so that the ice had not had depth of water enough to float it off. With regard to the number of birds seen at the "springs" usually found near the edge of an ice-blink, the birds went there to feed on certain small marine insects resembling very minute shrimps, which on the Arctic coast are almost invariably found where fresh water flows into the salt. These insects being brought to the surface by the flowing upwards of the fresh water through the salt, in consequence of its less specific gravity, are easily caught by the gulls and other waterfowl.

Mr. Robert Chambers said, in his opinion, this Paper and the former Paper of Dr. Rink only partially illustrated the great glacial subject. He thought this glacier spoken of resembled the sub-aerial glaciers which are found in Alpine regions, only that it was spread over a wider extent of country. They had only to imagine the sea about 3000 feet higher than it is round the Alps, and they would have the *Glacier du Bois* discharging itself into the sea in the same way that this Greenland glacier was now doing. What he wished more particularly to remark was, that the early general glaciation of the northern regions, by which the surface of those countries had been moulded, and which was chronicled in Scotland by the boulder clay, was, in his opinion, independent of such explanations as this.

Colonel Shaffner explained the diagrams he had prepared, representing the various glaciers, fiords, and icebergs on the coast of Greenland.

The Meeting was then adjourned.

ADDITIONAL NOTICE.

(Printed by order of Council.)

1. *Extracts from a Letter of* Samuel W. Baker, Esq., F.R.G.S., *to* Rear-Admiral the Hon. Henry Murray. *Dated Khartûm, 24th Nov.*, 1862.

"The steamer engaged by the adventurous Dutch ladies returned from Gondokoro on the 19th instant, bringing unsatisfactory news of Petherick. He left Abookooka (in the Kytch country) about the 15th July. The steamer left this spot about 31st last month (October), thus *three months and a half* had elapsed since Petherick's departure. From Abookooka he had been obliged to force porters for the land journey. He left the greater portion of his stores at Poncet's depôt at that place, and returned to Khartûm three boats with an immense amount of effects damaged by the rains. Instead of proceeding direct to Gondokoro from Abookooka as I had supposed, by a route said to be firm ground, he went to his ivory establishment in the Jamberra, on the Djour, in a s.s.w. direction. This route is said to be almost impassable during the rains, as the tract of country is intersected by numerous large *khors* or rivers and deep morasses, which are at that season flooded. Since

his departure only three or four of the large number of his porters have returned to Abookooka, and they reported the country to be in a flooded state, and that it was impossible to proceed; most likely these rascals had bolted. Beyond this there was no news.

"In this country beyond all others, success in exploration depends upon a knowledge and choice of seasons: delay is fatal. The north wind is fickle until about the 20th November, and even then its force is hardly felt beyond the Sobat junction. Boats leaving this on the 1st December are said to reach Gondokoro as soon as those which start a fortnight earlier, as they carry the wind with them throughout the route. The rains, which do not set in here until August, commence at Gondokoro, and further south, early in April. Thus a successful passage to Lake Nyanza depends upon a start from Gondokoro, not later than 1st February. Leaving Khartûm on 1st December, I should be at the foot of the cataract beyond Gondokoro by the 20th January: *i. e.* fifty days, including stoppages for observations at the Sobat and Bâhr Gazal junctions. This cataract is nine hours' steaming from Gondokoro, by the account kept by the Dutch ladies, and the river is very free from windings; thus the last point to be reached by boats must be upon the fourth degree of N. lat., as nearly as possible, or about 50 miles south of Gondokoro. I shall only remain at Gondokoro a couple of days to discharge my store of corn at the depôt, and I shall at once push on to the cataract and there disembark. Without losing a day unnecessarily, I shall then march for the Nile sources.

"The actual distance from the cataract not exceeding 240 geographical miles, allowing 20 per cent. for deviations of route, will make the journey to the equator about 340 statute miles. Say that I leave the cataract on the 1st February, and that near the equator the rains begin on the 15th March; I have some forty days' dry weather to depend upon, which should bring me there without difficulty—the average being under 9 miles per diem. At the last point attainable before the rains I shall make a fortified camp, and make all snug for men and beasts. During the fine intervals in the wet season I shall make excursions to all points, leaving half my men at the head-quarters. If I get into a good shooting country I have no fear, as the excitement of the chase and the abundant supply of flesh keeps all men in good humour, and ensures the friendship of the natives.

"I have worked incessantly to arrange my expedition with order. The great difficulty in these countries is to establish a regular discipline among the men. Forty of my men are armed with double-barrelled guns and rifles; forty-five form the escort, including one captain and four chourkes, one of the latter to every ten men. I have put them all in uniform, without which it is impossible to discipline them; there is one drummer and one ensign: and I can safely say that a greater set of blackguards never followed the English flag. One great blessing in my intended route is this; when once past the ivory traders' establishments my men dare not desert, as the natives would murder them on the road back. I have expended much trouble in procuring transport-animals, including horses, camels, donkeys, and mules; but I have been disappointed in the expected purchase of ten of the latter, and they are difficult to procure. In all I have twenty-eight animals, and I shall take another couple of donkeys in the cabin if I cannot find room for them elsewhere. With thirty animals I can travel independently of porters, who are the curse of explorations.

The instruments you kindly lent me are in excellent order. I have three watches, which I pack in cotton wool, secured in a small tin-box: thus I trust they will keep their health; but there is a regular epidemic among watches in these parts.

"From inquiries I have made of traders, black, white, and brown, I am of

opinion that the source of the Nile will be found as nearly as possible upon the Equator. I do not believe that the Lake Nyanza has anything to do with the river. The latter must be the effects of innumerable drains from high lands on this side (north) of the lake. I expect to arrive at a network of mountain-torrents, which though dry at certain periods, bring the entire rainfall of the mountains to the main river during the wet season.

"The Atbara brings to the Nile the rainfall of Abyssinia, supplied by the Settite or Tacazzy, the Salaam, and Angarep rivers. The Rahad and Dinder also drain the westerly portion of the Abyssinian range into the Blue Nile, while the latter brings the main supply from the mountains adjoining the Galla frontier. The Sobat without doubt rises in the south-westerly corners of the Galla country bordering the Berri, as the ivory hunters speak of a river about eighteen days' journey east of Gondokoro. This must be one of the Sobat arteries coming from the same elevated land which supplies the White River direct. The Djour runs parallel with the White River west from Gondokoro, evidently coming from the same high land. Thus by analogy one may presume that the main Nile is supplied by the northern watershed of the great chain of highlands running through Abyssinia, the Galla country, and equatorial Africa; and that the Nyanza and other lakes of Central Africa are reservoirs from the southern watershed of the same highlands, at a level so low that there is no escape for the accumulated waters.

"The Sobat runs out so suddenly upon the cessation of the rains that a boat is left in the mud without depth of water for a return to the White Nile. This proves that equatorial mountain-torrents supply that river: in my opinion the White Nile has a similar origin. The steamer with the exploring Dutch ladies (La Baronne Tinné, her sister, and daughter) has been unable to ascend the Sobat for want of fuel. Its course is through vast treeless plains of high grass. With determined pluck they used all their furniture for fuel, in the hopes of reaching some spot of forest, but at length with exhausted fires they floated slowly to the White Nile."

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

SESSION 1862–63.

Eighth Meeting, Monday, March 9th, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Rowland Hamilton, Esq., the Rev. F. Trestrail, and the Rev. C. R. Gordon, were presented upon their Election.*

ELECTIONS.—*Brigadier-General John R. A. St. George*, C.B.; *Colonel Charles Sawyer; R. Brinsley Sheridan*, M.P.; *D. J. Kennelly; A. H. Barford; H. Bayley; John Burns; J. Duncan Campbell; R. R. Carew; Spencer Chapman; Frederick P. Dalgety; J. Vesey Fitzgerald Foster; Frederick Gascoigne; Edward William Jeffreys; George Scovell; George Stanton; and Robert Swinhoe, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since the former meeting were—Stanford's New Map of Australia, constructed by A. Keith Johnston; Admiralty Charts, Ordnance Maps, &c. &c.

The PRESIDENT said before calling upon the Secretaries to read the Papers he had a communication to make, giving some slight hopes that Mr. and Mrs. Petherick might be still alive.

A letter had been received by Mr. Lennox Cunningham, of the Foreign Office, from Mr. Sidney Smith Sanders, H.M. Consul at Alexandria, stating that no reliance was placed there upon the incoherent reports of the death of Mr. Petherick, and enclosing a copy of a letter from the wife of a French merchant at Khartûm, dated the 4th of December, in which the writer gave as the latest information of the movements of Consul Petherick and his party that they had passed into the interior of the country with a great many porters, whom they were obliged to manacle at night, and that wishing to cross a branch of a river they might have been upset and drowned; "but," added the writer, "the uncertainty as to their being saved or drowned is still in suspense."

The Secretaries would now read the itineraries of those adventurous Australian explorers, Stuart, Landsborough, and M'Kinlay.

The Papers read were—

1. *Explorations from Adelaide across the Continent of Australia.* By J. McDOUALL STUART.

THIS expedition proceeded along the previous route until they reached the point attained by Mr. Stuart in 1861, from which he was obliged to retire in consequence of the inability of his small party to penetrate further.

The dense scrub that had in 1861 formed an insurmountable barrier was penetrated after six weeks' incessant labour, and the other side was reached in safety and without loss.

On getting into clear country again and taking observations, they found themselves in lat. 16° 40'. Ten miles further on, or lat. 16° 30', they struck on a large river, apparently a branch of the Roper River, which they followed down until its confluence with the main stream, known as the Roper River. They found that it took its source in some rocky and hilly land, through which they crossed several creeks running in a north-east direction, until they reached the table-land in lat. 13° 50' and in long. 132° 30'. They crossed this table-land and came upon a large river with a strong current, running through well-grassed country, admirably adapted for grazing and agricultural purposes. The river ran in a north-west direction, and the party followed its course for a considerable distance, until in lat. 12° 50' and long. 131° 40' it changed to due north. On this course they travelled for about 30 miles, and then struck due east for about 10 to 15 miles; after which due north to the seaport in Van Diemen Gulf, which was reached on the 24th July, 1862; and on the following day they planted their flag on the beach amid great cheering from the party.

The point on the coast reached was a promontory marked on the Admiralty Charts as being 30 miles east of Cape Hotham.

The river, which they followed, ran about 40 miles parallel with a river marked on the map as the Adelaide, the difference in the longitude being only from 6 to 12 miles. Stuart passed through much good country, well fitted for agricultural and pastoral purposes. Leichhardt had previously seen this tract, and noticed it in terms not less favourable. Even in the scrub water seems to have been found in sufficient quantities to satisfy the wants of all the party, including the horses, obviating any necessity for carrying a supply from camp to camp beyond Newcastle Water.

They were not nearly so fortunate on the return route, being more than two whole days before they obtained a necessary sup-

ply—the only occasion on which they were inconvenienced by its want.

Their provisions held out till the latter part of their journey, when they were compelled to sacrifice three of their horses for food.

Mr. Stuart met M'Kinlay at the Kapanda Station; and at the Adelaide Station Mr. Howitt's party were among the first to welcome him home after his laborious but successful mission.

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2. *Exploration of the Interior of Australia.* By Mr. LANDSBOROUGH.

MR. LANDSBOROUGH, who had previously (Proceedings, vol. vii. p. 5) explored south-westerly for 300 miles, started from the Gulf of Carpentaria on the 10th February, 1862, following the Leichhardt for some distance, and turning off near the falls in a direction E.S.E. over a grassy country. This terminated in some picturesque hills, among which it was thought that a sheep establishment would be well placed. Beyond the hills there was more wood and less pasture. The Flinders was crossed on the 19th, followed for some time, and finally left on the 1st March in lat. 20° 3′. Near Mounts Little and Brown the river is deep, and seems perennial. The country is probably thinly inhabited, as the first native was seen on 1st March. The rains in this month were heavy, and rendered the ground soft and difficult. The pasture continued good, with sufficient wood for fuel; but the country would not bear a great amount of live stock, and both water-tanks and annual grass sowing would be necessary. While still on the Flinders a blue range of mountains was visible, and named Branston Range; another mountain was named after Frederick Walker. On the 22nd March the party encamped on the Jardine Creek, an affluent of the river which they had followed so long. On the 26th, while tracing out the neighbouring creeks, draytracks were seen, probably those of persons who have occupied Bowen Down, a district discovered two years previously by Mr. R. Buchannan. On the 29th the party reached Landsborough Creek, leading to Thomson River, where Landsborough came upon an old camp of his own. About lat. 22° 58′ they also fell in with some fine looking natives, who said that they had seen an exploring party, but no camels. Further on the natives possessed some iron tomahawks, which they said they got from another tribe on the river to the southward. Continuing their course in a S.S.W. direction, and partly under the guidance of natives, some of whom, however, seemed disposed to be hostile, the party

on the 15th April reached a creek which they named Dunsmore, and which led them on the 17th to Cooper River. The country passed through and explored during the next four weeks in the neighbourhood of the same river was generally of an indifferent character, and towards the east the horses on more than one occasion suffered from want of water. Marks on many of the trees showed that it had been visited. On the 21st of May they reached the station of a settler on the Warigo River; and thence passed by Bumaranah on the Darling on the 2nd of June, to Menindie and Melbourne by the usual route.

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3. *Explorations in the Interior of Australia by the Burke Relief Expedition, under* Mr. J. M'KINLAY.

THE South Australian Burke Relief Expedition was originally organised with the view of ascertaining the fate of, and affording relief to, that portion of the Burke expedition which perished upon Cooper Creek, after achieving the task so unsuccessfully undertaken by previous explorers. It left the South Australian capital on the 14th of August, 1861, and reached the confines of the settled districts on the 26th of the following month. On the 27th of September the party, consisting of nine whites and two natives, with twenty-four horses, four camels, twelve bullocks, one hundred sheep, and a dog, crossed Lake Torrens, and fairly commenced their arduous task. Though not at that period occupied, the country to the north of Lake Torrens had been visited by many of the settlers upon the southern margin; and one of them undertook to guide the party to the first of a series of fresh water lakes, about fifty miles in advance. It took several days to reach Lake Hope, as the heat of the weather completely knocked up the bullocks; but by the aid of the camels the expedition was extricated. During the stay of the party at the lake district, an excursion was undertaken with the view of ascertaining the truth of a report that some whites were living upon a raft in one of the creeks in the vicinity. On the banks of the creek were marks of a European encampment; the dung of camels proving that it must have been one of Burke's, while *en route* to or from the Gulf to Cooper Creek. The remains of one of the party, since ascertained to be Gray, and showing traces of a violent death, were found slightly covered with earth and boughs; and at a little distance two holes very like graves. A subsequent visit to Cooper Creek left but little doubt about the fate of Burke.

In the course of December the main camp moved to a double

lake, called Appocaldradille. From this point a scout was undertaken to both north and east without finding water for 50 miles. The party consequently moved on to a deep creek, called Appanbara, where, however, they endured much suffering from heat and bad water. After the first rains in February, it was thought practicable to traverse the stony desert. For some days the route lay along a creek called "Cariduro" (probably Eyre Creek of Captain Sturt), where several traces of Burke's party were found. At this period of the journey the main difficulties were due to the floods, which rise very rapidly, and render the whole country a sea either of water or of treacherous mud. Forced by the flood to continue in a north-east direction, over an undulating stony country, the expedition came at length to vast grassy plains, bounded by volcanic hills, among which were obtained some of the most striking views on the journey. On the 7th of May the party reached the gorge through which the Leichhardt flowed towards the Gulf. On the 20th the camp nearest the sea was made, at a point where the tide rose 8 or 9 feet, and where sea anemones floated past in large numbers. On the 21st the expedition commenced its return *viâ* Port Denison; and on the 2nd of August, after great fatigues and the loss of most of the cattle, the first station in the settled districts was reached.

The PRESIDENT said that after perusing the diaries of these explorers he was astonished at the difficulties which they had overcome, arising from the want of water for many days and the loss of their horses and camels. The results only and the favourable termination of their journeys had been placed before the Meeting. In order to appreciate the importance of their labours their diaries must be read *in extenso*. He hoped some gentlemen connected with Australia would speak to the great merit of these explorations.

SIR CHARLES NICHOLSON, Bart., said the Papers which had been read gave a very clear and accurate summary of the explorations of these adventurous travellers. He had known Mr. Landsborough for several years, and he believed among the whole of the explorers of the Australian continent he was *facile princeps*; he had known him go into the bush, accompanied by only a single native black boy, and be absent for three or four months traversing a country where no European had ever been before.

The results of Mr. Macdouall Stuart's exploration were certainly very interesting; but in awarding to him the praise which was due to his successful exertions, they ought not to forget the first and greatest of all Australian explorers, the lamented Leichhardt, who twenty years ago made an exploration from Sydney along the whole of the east coast below the Gulf of Carpentaria as far as Port Essington. It was entirely undertaken on his own private resources, assisted by a few of his friends, and it was certainly one of the most remarkable, most extensive, and most successful enterprises ever undertaken in Australia.

With reference to the district lately traversed by Mr. Stuart, north of the northern boundary of South Australia, it was not, strictly speaking, within the jurisdiction of any one of the colonies. In the mean time settlers were pressing out in that direction. Several large parties were about to start from Melbourne and Adelaide with the intention of forming a settlement in that country. It was certainly most desirable that Her Majesty's Government should take some

steps with the view to the organisation of a separate and independent colony in that region. There was every inducement to the occupation of that country. It appeared that there were large tracts of land of the finest possible description available for pasture and agriculture, and therefore capable of being immediately taken up, while on the shores of the ocean there were immense areas suitable for the growth of cotton and various tropical productions. There were rivers accessible to vessels of considerable size. With all these inducements to settlers, unless some decided action were taken by the Government, this country would become a complete Alsatia: people would be migrating thither from the different colonies, taking possession of tracts of land without law, order, or authority among them, and he conceived that the greatest embarrassments and difficulties would ensue in consequence.

It was urged with great propriety that the establishment of colonies ought not to be made a charge upon the Imperial funds. As an Australian colonist, he in common with all his Australian friends believed that this colony of Stuart's Land might be established and placed upon an efficient footing without one farthing expense to the Imperial Treasury. The people who were ready to go there and take up the country were prepared to pay their licences and assessments and to make purchases of land in suitable positions that might be selected for townships. In this way a large and sufficient revenue could be raised to meet the expenses of a local government.

With regard to the Victoria River, it appeared to be the largest tidal river in Australia, the tide rising in it some 30 or 40 feet. With respect to the Roper River, there must be some little discrepancy between the account given by Mr. Stuart and that given by Dr. Leichhardt. In 1844, when Leichhardt crossed all these rivers, the Flinders, the Albert, the Nicholson, and the Roper, he was able to ford the whole of them, therefore it was difficult to conceive how they could be regarded as rivers capable of receiving vessels of any great size.

MR. MARSH, M.P., also bore testimony to the great merits of Dr. Leichhardt, and then referring to the remarks of Sir Charles Nicholson, said he was afraid that gentleman was a little too sanguine about the capabilities of the interior of Australia. His own idea of the interior of Australia fluctuated between a swamp and a desert—sometimes it was one and sometimes the other, according to the seasons.

He was led to this conclusion not only from the history of the colony generally, but from his own observations. For instance, near where he lived there was a large lagoon two or three miles across: very often that lagoon was dry for two or three years together, and at other times it rose to what is known as the present high-water mark. But above that point there was another high-water mark, perhaps some eight feet higher. Between these two high-water marks were trees of very great dimensions, which would have taken forty or fifty years to grow, and which were all dead. What conclusion must be drawn from this? That between these two high-water marks there was no water for any long period between forty and fifty years; that then the water rose to such a height and remained there such a time as to kill these trees. He believed this to be the case with a great part of Australia. Being somewhat of a meteorologist, he had observed that during some seasons the wind from the north-west was always hot and dry, and at other times it would be damp and bring more or less rain. The conclusion he drew from this was that the country to the west over which Stuart and others had passed was sometimes a very wet and swampy country, and at other times perfectly dry and desert. He was, therefore, inclined to think that a great deal of this country which appeared to be very good, the people having passed it at a favourable season, would turn out to be worthless after all. Another circumstance which led to the same conclusion was that there was no elevated land there, and without elevated land there could be no regular streams and no regular supply of water. It also appeared to him,

that although this country came within the wind of the monsoon, it did not come within the rains of the monsoon; and this conclusion seemed to be confirmed by Gregory, who at 150 miles in the interior from the north-west cape of Australia put it down as desert, at the very point where the height of the monsoon ought to blow.

He might also observe that, in the papers read to them, although the explorers crossed the country at a favourable season, the general cry was "Water! water! water!" They came to fine country where their horses could feed, and yet the cry was "Water!" It therefore became a question how far this country would stand being stocked. Everybody who had been in Australia knew that when you first went on to a run and stocked it, no matter what the season was, if there was no water there was plenty of grass, because nothing had eaten it up. But when you came to stock it with 3000 or 4000 sheep, the country would not stand it; they ate up all the herbage, there was no shade for the ground, the violence of the sun and wind got into it, and rendered it more dry and arid than it was before.

MR. SAUNDERS, alluding to the remarks of a previous speaker on the influence of the monsoon upon Australian climate, said he thought it might be demonstrated that the solstitial action of the sun across the centre of Australia was the *cause* of the north-west monsoon. In approaching and receding from the tropic, the sun is vertical for 60 successive days within the belt of 3½ degrees of latitude, between the parallels of 20° and the tropic. In passing from the lat. of 20° to the equator, the sun only occupies the same length of time; so that he is vertical over the 3½ degrees next to the tropic six times longer than he is over any equal part of the remaining 40 degrees of his course. One result of the solstice is much more intense heat within latitudes subject to it than elsewhere. This was quite sufficient to account for that divergence of the ordinary course of the wind from the south-east trades to the north-west monsoon. He should like to remind the Society that there were two other names that deserved to be held in remembrance among the earlier explorers of Australia. One was that of the late Sir Thomas Mitchell, whose accounts of the country beyond the Barcoo were thought to be almost too enthusiastic to be true, but which the present concurrence of evidence proved to be within the mark. The other was Captain Stokes, who with a boat's crew succeeded in penetrating within the shores of the Gulf of Carpentaria, and unfolded those beautiful lands to which twenty years ago he gave the name of the "Plains of Promise." His language was also believed to be exaggerated; but Landsborough, M'Kinlay, and others had confirmed his description of the country in the most emphatic manner. It should be remembered, too, that Captain Stokes who discovered the Albert was also the first to explore the Victoria River. The recommendation of Sir Charles Nicholson that there should be a separate and independent administration for North Australia he held to be of the greatest importance, partly on the ground of the nature of the population which would be attracted to that region; for in all probability there would be a large Asiatic element to deal with there, demanding a system of administration unsuitable for the European population of the more southern colonies.

MR. CRAWFURD dissented from the views of Sir Charles Nicholson about the capabilities of this newly-explored region for colonization by Europeans, and more especially for the rearing of sheep. Even Mr. Stuart stated that he found the shores of the Gulf of Carpentaria a marshy country, and everybody knew that a marshy country was not fit for sheep. He once had a favourable opinion of Queensland for the growth of cotton; but he begged to renounce that opinion, for he was certain Queensland could never compete with the southern States of America. European labour would be too costly, and it was a mistake to suppose that labour could be imported from the Eastern Archipelago; for those

islands, with the exception of Java, were underpeopled, and the natives would never be got to work. With respect then to the recommendation of Sir Charles Nicholson that Government should form a new colony in North Australia, he hoped the Government would do no such thing, for no European community would be able to live and labour in a region which was within from 10° to 15° of the Equator.

MR. TORRENS said he had recently returned from travelling through the settled part of the coast line, and he therefore felt emboldened to contradict the last speaker in every respect. First, upon the point of forming a colony on the northern coast, he was persuaded, whether the English Government took the matter in hand or not, that a settlement would be founded there in a very short time. He had no doubt stock-holders would soon be on the tracks of Stuart and M'Kinlay, who had been enabled on a first exploration to take cattle and sheep up with them. Three months ago M'Kinlay told him that he took his sheep up there with the greatest ease, that they continued in excellent condition, and that he lost but one ewe on the entire journey, and this he had to leave behind because it was lambing. This was a practical refutation of the opinion of the last speaker that sheep cannot be grown on the Gulf of Carpentaria. Anybody acquainted with Australia knew that it was the first explorer who had the greatest difficulty in providing for his stock, owing to his not knowing where to find water, whereas those who followed his tracks had the advantage of his previous exploration and knew with certainty where they could hit upon water. In illustration of this, he might mention that a large region in the neighbourhood of Lake Torrens, which Mr. Eyre upon his first exploration pronounced to be worthless, was now some of the finest sheep country in South Australia, and grew very large quantities of stock.

He agreed with Sir Charles Nicholson in thinking that it was desirable for the British Government to establish a local government in North Australia. He certainly should regret to see that portion of country inhabited by an Asiatic population; and if there were high table-lands there, such as he had recently ridden over in Queensland, it would be one of the finest climates on the face of the earth for the European race.

He was fully persuaded of the truthfulness of Mr. McDouall Stuart, who described the country as having continuous ranges, and stated that only on one or two occasions had he to pass a single day without water for his horses. From his own knowledge of Australia he was certain that, if a person travelling there for the first time could say thus much, a man who had been settled in the country long enough to look around and explore the water-courses never need pass a day without water.

From the adaptability of the country for colonization, he thought a colony might be founded there without costing Great Britain a shilling, and he endorsed unhesitatingly what had been said, that the colonists of Australia did not desire one shilling to be expended in founding colonies in that part of the world. There would always be found capitalists ready to advance the first outlay upon the security of the Crown lands of the country; and upon such a system he yet hoped to see a colony founded in Northern Australia so as to prevent those disastrous consequences arising, not only to settlers but to the natives, which would certainly arise unless order and good government and British institutions were imported into that country.

MR. ALFRED WALLACE said he had never visited Australia, but he was well acquainted with some of the adjacent countries which had been alluded to in the course of the evening. He would, therefore, state a few facts, the result of his own experience, which might guide them in forming an opinion as to the availability of Northern tropical Australia for colonization. Two points had been mentioned on which he wished to offer an observation: one was that labour could

be obtained from the Indian Archipelago, and the other that sheep-farming would probably succeed in that district. With regard to the first point, he quite agreed with Mr. Crawfurd in saying that there was not the slightest hope of obtaining any labour from those islands. The inhabitants were exceedingly few in number and they were extremely lazy: it was impossible to make them work, even in their native islands, and they would not leave their own country to labour elsewhere, except perhaps to live on the seacoast and obtain their livelihood by fishing. The only people who could do the labour were the Chinese; but there were many difficulties connected with them which would not perhaps render the importation of the Chinese advisable. The next point was that the district which it was proposed to colonise was not only tropical but almost equatorial in its character, the Victoria River being in 15° south latitude. He did not believe they would find any country in the world within 15° of the Equator in which the European wool-bearing sheep could exist; consequently the colonists who went to that part of the country with the intention of commencing sheep-farming would be exceedingly disappointed, because even in the more favourable island of Timor, which closely resembled Australia in its physical characteristics, the sheep had no wool. Sheep brought from Australia for the purpose of experiment began to lose their wool after they had been there a year, and in a tropical climate like that they made no fat, which was the only other commodity for which sheep were valuable. Therefore if the wool turned to hair, and if the fat went away, he did not see how sheep-farming could be carried on with success.

SIR CHARLES NICHOLSON, Bart., said no such proposition had ever been made as the importation of native labour from Timor; and as to the possibility of sheep living within the tropics, he believed at this moment there were upwards of a million of sheep actually being pastured within the tropics in the highest possible condition.

MR. HOOD thought some of the gentlemen who had addressed the Meeting were very much astray with regard to the prospects of North Australia. Mr. Marsh seemed to think that the monsoon could not be depended upon in North Australia. He was quite correct, because for several years the tropical rains never reached so far south as Rockingham Bay. But that very fact made tropical Queensland more valuable as a pastoral country and capable of being inhabited by Europeans. In the tropic of Capricorn, at the river Harris, which is about 800 feet above the sea, in the month of September ice has been found two inches thick at twelve o'clock in the day. This peculiarity in the climate from the great radiation makes it exceedingly healthy for the human race, and an excellent country for sheep. This newly-discovered part of Australia promised to be valuable not only as a wool-producing country, but in many other ways. Considerable quantities of gold had been found at several points. There were also large outcrops of copper, in one instance presenting a mass 2000 yards long, 28 feet wide, and 6 feet in height. No one could well conceive the hardships and difficulties which beset first explorers, owing to the uncertainty of procuring water. Landsborough's expedition had been conducted with almost more success than any other had ever attained; but he thought the palm ought to be given to Mr. Stuart.

The PRESIDENT said before he closed the Meeting that he was very happy indeed to find Australian gentlemen of such intelligence as Sir Charles Nicholson and Mr. Marsh testifying to the great desirability of establishing a colony upon the north coast of Australia. He was proud to think that many years ago he had advocated the establishment of a colony on the northern coast, so that Great Britain might be in possession of the four sides of that vast continent. Mr. Augustus Gregory's expedition had successfully demonstrated that sheep could flourish in that region. He took a large flock of sheep there; they

remained there eight or nine months, and no sheep died. And yet this was the country which Mr. Crawfurd and Mr. Wallace both said was unsuitable for sheep. Those gentlemen spoke from their experience of India and of the Eastern Archipelago; but they had forgotten the law of isothermal lines. They had forgotten that India was subtended by the ocean, which conveyed heat to lands in the latitude of Madras, while in the very same degree of latitude, south of the Equator, there were great tabular masses of land, which tempered the heat. We had in this physical fact the explanation why sheep and other animals could flourish in that latitude in Australia. The testimony of Australian gentlemen who had visited the country confirmed this fact. To return to the question of establishing a colony in North Australia, he would point out that at the mouth of the Victoria River there was the largest bay along the whole coast, capable of affording an anchorage for large fleets. He had already directed the attention of Government to the subject, for he certainly agreed with Sir Charles Nicholson and his Australian friends that it would be advisable to establish some sort of government there, inasmuch as numerous colonists would be flocking there, and, unless some authority were established, the results might be lamentable.

Ninth Meeting, March 23rd, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*The Rev. Thomas Scott, and H. D. Skine and A. H. Barford, Esqrs., were presented upon their Election.*

ELECTIONS.—*Captain Hugh Talbot Burgoyne*, R.N., V.C.; *Lieutenant the Hon. John Carnegie*, R.N.; *Lieutenant Charles James Forbes Smith; Rev. Richard Greaves; Rev. Henry F. Tozer*, M.A.; *Philip Anstruther; Christopher N. Bagot; George C. Brodrick; John Henry Challis; Edward Henry Leveaux; R. Jasper Moore; and Thomas Turner, Esqrs., were elected Fellows.*

ACCESSIONS.—Vol. xxi. of the Transactions of the New York State Agricultural Society; Ordnance Map of Montenegro; Map of the Isthmus of Kraw, presented by Mr. Wise; and the 12th Part of Philip's Atlas, &c., &c.

The PRESIDENT read a letter from Mr. W. Finke, of Adelaide, announcing that the colonists are fully alive to the importance of the discoveries made by Stuart. A private company had already been organised for the transport of stock (sheep, cattle, and horses) overland to the newly-discovered country on the north coast, in Van Diemen Gulf. The party will start in April, overland; and a vessel with supplies will be sent round to meet it on the north coast.

The PRESIDENT said that he had long advocated the desirableness of having some British settlement upon that great north coast of Australia—the only coast of that vast region upon which there was no British settlement. Although a great many years ago they had marked upon the map of the Society of Useful Knowledge the colony of "North Australia," no such colony had ever been formed; but now these spirited colonists of South Australia had been induced, by the vivid and no doubt accurate descriptions of one of their own countrymen, to set out on this expedition to establish themselves there by sending a ship round, and also by sending overland cattle and stock. He had mentioned that circumstance because he was sure from what fell from his Grace the Duke of Newcastle at their last Anniversary, that as the British colonists showed so much vigour and desire to occupy that country, the British Government would ere long apply to it those laws and institutions under which British people were placed.

The President then proceeded to state that the first paper to be read was one by Major Goldsmid, entitled 'A March from Kurráchi to Gwadur.' That country had hardly ever been explored by Englishmen. It was, however, well known to the ancients in the time of Alexander the Great. Major Goldsmid had been deputed to examine that line of country with a view of establishing the electric telegraph. It was the last link of communication of that great line, to the overland portions of which Sir Henry Rawlinson had called their attention at the last meeting of the session of 1861, when he pointed out the great importance of such a line from Constantinople to the British settlements in India. Major Goldsmid, in reading his paper, would allude to some curious archæological data connected with that country, and point out how much was known of it in times somewhat remote. Colonel Patrick Stuart, under whose direction the whole of that great and important line of electric telegraphic communication had been carried out, was present, and they should be very happy to hear some account of it from an officer who was so much distinguished in India, and of such immense service during the mutiny, in which he, in fact, subserved all the great purposes of their commanders, and without whose aid their successes might never have been obtained. Having also Sir Henry Rawlinson present, they would have such a discussion on the paper as would show its great importance.

The Papers read were—

1. *Exploration from Kurrdchi to Gwadur, along the Mekran Coast.* By Major F. GOLDSMID, F.R.G.S.

THE Expedition, of which the following is a report, was sent to survey a route near the coast of Mekran, from Kurráchi to Gwadur, with a view to a line of telegraph to be thence carried on through the territory of the Imâm of Muskat, and finally either through Persia or by the valley of the Tigris to Constantinople and Europe. The journey was made between December 12, 1861, and January 29, 1862.

The country bordering on this coast, and included between 62° and 67° E. long., may aptly be described as a bare and cheerless desert, occasionally intersected by low hills, with a scanty and purely periodic supply of water.

The entire route may be conveniently divided into four parts:—

		Miles.
(1.)	From Kurráchi to Sonmeani	45½
(2.)	„ Sonmeani to Hormara	172½
(3.)	„ Hormara to Pusint	91½
(4.)	„ Pusint to Gwadur	80½
	Total	389½

1. The road to Sonmeani, though difficult in some places, is in dry weather passable for all loaded beasts. Water is obtainable, and indeed plentiful, at all the halting-places for small parties; other supplies must be brought from Kurráchi.

2. The road presents many difficulties to travellers from its circuitous length; the necessity for carrying all supplies from Sonmeani, the uncertainty of obtaining water at some of the halting-places, and the extremely rugged nature of the path, especially between Hingor and Hormara.

3. The road from Hormara to Pusint is at no place very difficult, though by no means through a level country. It is true the country about the Kalmat River is an extensive plain, but during rainy weather this becomes impassable, and it is consequently safer to proceed by the base of the Tullar Hills.

4. There is but one journey in which any difficulty may be experienced between Pusint and Gwadur, that of the Kurwat. The hills, through which its course lies, are of salt mud, intermingled with flaky strata of sandstone and gypsum. Their altitude is not great nor their slopes sudden, consequently for telegraphic purposes no insurmountable obstacles need be anticipated.

Great antiquarian interest attaches to the whole line of coast from Kurráchi to Bushire, and further westward. Names to be found in Arrian, Strabo, and Ptolemy, remain to the present day with little change. Of these may especially be cited Malan and Kalmut. Gwadur is supposed to mark the site of the Alam Bater of Ptolemy. The first mention of the place to be found in later years is in the Commentaries of Albuquerque. That conqueror, when at Ormuz, was requested by the Ambassador of Eumuel to assist the Persian Government to recover "Guardara" from a rebellious vassal who held it by force.

The PRESIDENT was happy to find that not the least important portion of this valuable communication was comprised in the last two pages, which contained the correction to a great extent of the physical geography in the course of the rivers, their names and their relative positions; thus making it a strictly geographical communication.

SIR HENRY RAWLINSON said, the paper was interesting in two different

points of view—firstly, with regard to its own geographical merits; and secondly, as giving some actual and tangible information on a considerable portion of the great line of the overland telegraph, of which previously they knew nothing. Major Goldsmid had truly said that this was almost a *terra incognita* before. Mr. M'Leod, he believed, was the only Englishman who had ever penetrated the country, and his observations upon it had never been published. Two years ago, when collecting statistical details with regard to the itinerary of the line, he found the greatest difficulty in getting any information regarding this particular portion, and was, in fact, obliged to rely on the reports of a native agent, who zigzagged about the country between Scinde and Gwadur in different lines, and whose reports were published in the 'Asiatic Journal,' at Bengal; but the reports were so very full of typographical errors, and altogether written in so confused a manner, that it was impossible to derive from them any real information as to the geography of the country. All this had been satisfactorily got over by the labours of Major Goldsmid. He had advanced into a country which before was unknown, and which in all the maps they found almost a blank. He had shown that it was perfectly practicable for a telegraph; and more than that, that the actual preparations for such a telegraph were now being made. The second point of interest referred to the question of telegraphic communication between England and India; and although on a previous occasion he had the honour of explaining in some detail the course of such a line, still, as a considerable period had elapsed since that time—nearly two years—a good deal of it would have fallen out of their recollection. They would see on the map a red line drawn from Constantinople showing the proposed line of telegraph as far as Kurráchi. He did not know whether the public were aware, or whether the Meeting was aware, that over nearly one-half of this line—over a very considerable portion of it at any rate—the telegraphic wire had been in actual working-order for nearly two years. He saw before him a gentleman who had a partner in Bagdad, the city of the Caliphs, and who conversed daily or weekly with him by telegraph. That was an actual proof of what could be done. The distance from London to Bagdad was greater than from Bagdad to Kurráchi. The portion they had heard described was being now laid down, and there thus remained only to fill up the gap from Gwadur to Bagdad, concerning which he hoped to hear some particulars from Colonel Patrick Stuart, who was entrusted with constructing the line. An alternative line was also under consideration. It was well known to all practical people as a point of the greatest possible importance to have alternative lines, in order that, if one broke down, there should be no interruption of communication. It was only after telegraphic communication was once established that its full value was recognised; and if telegraphic communication were thus once established with India, and all the mercantile transactions between the two countries depended on one line, it might be understood what excessive loss, disappointment, vexation, and, he might say, ruin there would be if any sudden interruption occurred. He therefore believed that the public generally would be inclined to support the Government in dealing with an alternative line, and endeavouring to provide against the possible stoppage of communication when once established. The general line now under discussion was to run from Constantinople through the Turkish empire to Bagdad, and thence to Kurráchi. As far as Bagdad it was in working order; but between Bagdad and the Persian Gulf there was a line of country which was peculiarly difficult, not to the engineer, but politically, because it was in the hands of certain Arab tribes, who were perhaps the most unruly and troublesome people in all Western Asia. Those tribes were never quiet for two years together; and if the work depended on the Turkish Government alone, the line could never be carried through the country. He believed, however, that the Turkish Government would be content to leave arrange-

ments, in a measure, in English hands; and there was thus a hope that the Arabs would, as they had often done before, fall in with our views, and perhaps help, not only in laying down the line, but in preserving it, on receiving a certain payment for their services. That, however, was not a certainty. He had no doubt the line would be laid; but whether it could be preserved intact was a matter of doubt. The shores of the Persian Gulf presented another difficulty. The most convenient point for carrying the line would be the mouth of the Euphrates; but that locality was excessively unhealthy, and the maintenance of a permanent European establishment there was almost impossible. They might, however, have European attendants during the healthy months, and then natives might be left in charge. Beyond this point the line was to be submarine; and at present their experience of submarine lines was far from satisfactory. Improvements, however, were being made daily, and it was hoped, by superior methods of insulation, to arrive at some certainty of result; but at present, as they all knew, submarine lines were liable to constant interruption. He was moreover given to understand that when the submarine line was once established, there would be no occasion for any intermediate station—that it would not indeed be necessary that the lines should be laid down in small divisions, and that any political embarrassment arising therefrom would be thus avoided. It would be quite possible to send messages from the marine terminus at the mouth of the Persian Gulf to Bunder Abbas, if not to Gwadur itself. At the mouth of the Persian Gulf there was certainly to be a repeating station. In order to provide against accidents, they were also considering an alternative line, which, in his former paper, he took to be the main line, thinking the other would be found to be absolutely impossible. The alternative line made a considerable angle if continued from Bagdad; but they must remember that distance was of no great consequence in telegraphic communication, as far as time was concerned; its only disadvantage being the additional expense for wires and material. It was proposed then to run the alternative line from Bagdad to Teheran, and thence southwards to Bushire. It had been intended at one time to extend it down to the mouth of the Persian Gulf; but that part of the country was now found to be impracticable: consequently the line would run merely to Bushire; and it was still his impression that ultimately this communication through Persia would be found to be the line upon which the greatest dependence was to be placed. Its only disadvantage was its being in the hands of a foreign country, and thus liable to political dislocation; but so long as matters remained *in statu quo*, messages could be sent with perfect safety. He would only remind them, in conclusion, of the real importance of the work. They had been talking about telegraphic communication with India for many years past, and yet year went on after year and nothing was done. In the mean time the Russians were running their line right through Asia, and had approached nearly to the Chinese frontier: their line from St. Petersburg indeed would in a very short time extend to the mouth of the Amúr and to Pekin. It seemed strange that Russia should be thus able to carry her lines to this vast extent with comparatively little object in view, and that the mighty empire of England, with her great Indian dependency, which had been often said to be the brightest gem in her crown, should not be able to accomplish a telegraphic line between the two counties. He congratulated the Meeting in particular, and the country in general, that preparations were at last being made for the construction of the line, and also that its formation was entrusted to so thoroughly competent an officer as Colonel Stuart.

COLONEL PATRICK STUART said, the first real physical difficulty of the line commenced at Hinglaj, and it was still doubtful whether a land line could be practically constructed there, and kept up in a way that would be reliable as an unsupported link in such an important chain of communication as that

between India and Europe. That contingency had been provided for to a certain extent, because the tract of country that really offered those difficulties was not more than 16 to 18 miles in length. There was a bold headland of from 1400 to 1600 feet in height, which he visited last year, overhanging the sea; and between it and the sea it was impossible to carry the line. The cliffs, from their sandy formation, were continually falling down in loose lumps which would destroy any line that might be carried along the surface below. A submarine cable 20 miles in length, coated with india rubber, was sent out some months ago, which would, if the difficulty of carrying the line inland continued to be the same, be laid under water along that part of the coast. Sir Henry Rawlinson had mentioned as a wonder that the Russians were able to carry out their lines so quickly. The fact was the whole country was their own; they had to ask no permission. We had been able to commence, and to set to work; and if there had been no political difficulties, it would have been done long ago. These difficulties could not in every case be got over; but it so happened along the whole of that coast the conditions generally were more favourable for a submarine cable than, with the one exception of temperature, any known coast in the world. The sole objection might be that the depths were a little too small. In the Persian Gulf they had a depth rarely exceeding 50 fathoms, and the average depth along the line was from 25, 30, to 38 fathoms. With regard to the cable proposed to be laid between Gwadur and the mouth of the Gulf the difficulties were a little greater, because at a distance of from 8, 10, 20, or 25 miles from the coast the bottom, although uniformly of soft sand, increased very rapidly in depth, and the cable would have to be laid rather tortuously in order to keep it within the depths selected as necessary. If the Persian line could not soon be completed, it was proposed to have a terminus near the mouth of the Euphrates, and at a point to which river steamers could always have access; and it was hoped that by this means we might be brought within two days' communication of India. Even if the Arab tribes could not be conciliated, communication would be delayed only by the time the steamer would take to run from Bagdad down the Tigris. It was always recognised as a most important thing to diminish, as far as possible, the temptation that the stores offered to pillagers. Partly with that view, and also to prevent oxidization, the wire was covered with zinc. This the Arabs were unable to weld, or to use for tying up bundles, on account of its thickness. It had another advantage; being the only metal in that country that was galvanized, it could always be recognised if stolen. If all went on well, long before this time next year the whole line throughout, including the part from Bagdad down to Lower Mesopotamia, would be completed, and the duplicate line through Persia in a few months later.

CAPTAIN CHAMPNEYS said he had travelled with Colonel Stuart from Bushire to Shiraz, and thence to Teheran, and along that line they met with no difficulties of any description. The necessary arrangements were now being made with the Persian Government to carry out the line.

The second Paper read was—

2. *On the Harbour of Sedashagur; and Remarks on the Sea Ports of India.* By Inspector DUNCAN MACPHERSON, M.D., F.R.G.S.

BEGINNING at Calcutta, we find the East India Irrigation Company engaged in great works from the Ganges to the Mahanuddy, near Cuttack, a river already navigable for small craft near its mouth.

Further south, at Coringa, the mouth of the Godavery has been so far improved, that ships of large burden can now advance into the centre of this district, from whence a network of navigable canals already communicate with the middle Godavery; beyond this, works of magnitude are in progress to render the upper stream available for steamers, which will run to the great cotton-fields upwards of 600 miles from the sea.

Proceeding down the coast to Nellore, we find the Madras Irrigation Company bringing to rapid completion a grand system of similar channels from the Kistna River at Bellary, to pierce the great cotton and indigo fields of that and the adjoining districts of Kurnul, &c., in order to communicate with the sea at the mouth of the Penar River, adjoining the populous town of Nellore; while at the Presidency City of Madras, the terminus of a railway completed for 400 miles to the west, with ramifying branches to the north and east, a pier now spans the furious surf, alongside of which ships' boats land and embark passengers and goods.

Some 200 miles further south, at Negapatam and Tutecoreen, the Trichinopoly Railway brings down the produce from the rich Delta of Tanjore.

The removal of the obstructions which impede the navigation of the Paunbaum channel still engages the efforts of Government.

At Cochin, which possesses natural inland water communications for many miles, ships of 1000 tons have been built; and the operations of an ordinary dredge on the bar at the mouth of the river would enable ships of that burden to proceed at all seasons to discharge their cargoes on the banks.

The western terminus of the Madras Railway at Beypur—a spot at all times of insignificant value, without population or trade, and unapproachable from sea by even coast craft, on account of the surf—has attained some importance as the entrepôt for the produce conveyed by it from the rich district of Coimbatur. But the position, as an outlet for the rapidly accumulating produce of that coast, can never be of commercial value, owing to the insurmountable obstacles of the sea. The line must be prolonged to the north, some 300 miles to the noble harbour of Sedashagur, receiving in its progress the extensive trade and passenger traffic from several populous native towns, and from the numerous estates which are parallel with the coast into the interior, extending to and embracing the entire Neilgherry range, the Upper and Lower Wynaad, the Principality of Coorg, the Munserabad districts, North and South Canara; also scores of others on the Mysore Plateau, all in the possession of European colonists, engaged in the cultivation of cocoanut, coffee, tea, spices, cinchona, &c.

It will be observed by the chart, that when the projected improvements in the harbour are completed, there will be a space of upwards of 21,000 acres available for anchorage, in a varying depth, reaching close in shore from 18 to 30 feet. The rocks and headlands on the coast are of lateritic formation—an excellent material for buildings; for it can be cut out soft from the mass into any shape, but speedily hardens on being exposed to the atmosphere. Granite exists in quantities as one approaches the mountains, and iron ore in masses on the left bank of the stream.

Carwar Head rises 700 feet above marine level. It is visible 25 miles from shore, and projects about a mile into the sea—the solitary headland on the coast from Bombay to Calcutta. It is to Carwar Head that this great bay is due. Even without the aid of the proposed pier, it secures a good anchorage during the south-west monsoon, while the islands give protection when the north-east winds prevail.

As a climate, Sedashagur is one of the few localities in India where cholera has been hitherto unknown. The projecting headland, with the sea on each side, makes the spot a perfect sea-coast sanitarium; and the neighbouring mountains, which rise some 3000 feet above the sea-level, offer a convenient place of resort for those who desire a residence in a more bracing climate than the sea-coast affords.

The PRESIDENT observed, Dr. Macpherson was a distinguished medical officer attached to the Indian service, who had travelled very largely over Eastern countries, and who was well known for his services in the Crimea and his description of the antiquities of Kertch; and they must thank him for his brief but very clear and valuable notice. He should be happy to hear the observations of any gentlemen present on the subject.

MR. MARKHAM said, the paper had brought to the notice of the Society the only port on the west coast of India that afforded safe anchorage during the south-west monsoon. Along the whole of that coast, from Bombay harbour to Cape Comorin, there was a tremendous surf, and trade was entirely at a standstill during the rainy season, from May to September. To those circumstances the importance of Sedashagur harbour was due. The Bombay Government was now fully alive to its advantages. A wall 300 feet long was already completed on the east side of the Beitkool cove. Within a radius of 200 miles from Sedashagur there were rich cotton-producing districts, having 980,000 acres of cotton under cultivation, for which it was the only port. Its importance, as being the only port on that coast, with the exception of Bombay, that was open during every month of the year, could scarcely be over-estimated; the only matter for surprise was that it had not before been made available. He regretted that Lieutenant Taylor was not present, as to him the chief credit was due of having brought to notice the importance of the harbour of Sedashagur.

MR. FENWICK said there was a large and very valuable tract of country immediately in the rear of Sedashagur—the southern Mahratta country—the only country in India where New Orleans cotton had yet been produced in marketable quantities. That cotton, owing to want of communication,

took generally eight, ten, or twelve months to reach England, the country being closed during the four rainy months. The attention of Government had been directed to the coast to discover a port from which the produce might be shipped during those months, and Sedashagur was the port chosen. Another drawback was the want of good roads between the port and the southern Mahratta country. Government was now constructing roads, but the works had been suspended owing to the prevalence of fever in that district. It was a very curious fact that fever had been more prevalent during the last two years—since a stop had been put by the Government to forest-burning and the destruction of the jungle. He believed the true value of Sedashagur as a port would not be fully brought out until a railway was opened between it and these southern districts, because the most important produce of that country (the cotton) was not ready to be sent down to the coast till very late in April, by which time the rainy season had set in, and the cotton was liable to serious damage.

The PRESIDENT said he had only one observation to make as a geologist, which was, that the rock formation alluded to afforded great facilities for the construction of the necessary works in the harbour. It was one of the younger formations—the youngest certainly in that part of India—and the facility with which it could be extracted, and the manner in which it hardened under the atmosphere, were much in favour of all the works to be carried out in the harbour. The observations that had been made with regard to the railway were very important. He hoped Government would consider the circumstances, and forward such an undertaking with the same liberality with which they had established railways in other parts of India.

Tenth Meeting, Monday, April 13th, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATION.—*The Rev. R. W. Greaves was presented upon his Election.*

ELECTIONS.—*Colonel the Hon. St. George Foley*, C.B.; *George Elder; John Fisher; J. H. Gladstone; Charles Mouhot; and Thomas Ogilvy, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since the former Meeting were—Transactions of the Linnean Society, Vol. xxiii., Part 3, and Vol. xxiv., Part 1; the 13th Part of Philip's Atlas; Admiralty Charts, Ordnance Maps, &c.

The PRESIDENT said he was sure that all who had been in the habit of attending the meetings must be well acquainted with the name of Henry Grinnell, of New York. He was a most remarkable man. An American merchant imbued with a strong spirit of philanthropy, and with a love and admiration for those of our countrymen who had explored the Arctic regions, he had spared no expense in fitting out expeditions to search for the relics of the lamented Franklin. He was assured by Captain Sherard Osborn that Mr. Grinnell had spent between 20,000*l.* and 30,000*l.* on this object alone. These were deeds which could never be forgotten, and it was mainly through his instru-

mentality that Mr. Hall, from Ohio, had been assisted in his adventurous enterprise in search of traces of the lost expedition. Mr. Hall went out in a whaler that touched only at parts of the coast very remote from where poor Franklin was lost. He then endeavoured in a little boat to reach that distant region; he, however, lost his boat, and was obliged to confine his explorations to the district in which he was embayed for two winters. During this long interval Mr. Hall made himself acquainted with the language of the Esquimaux; and obtained from the curious traditions which they had long preserved among them—handed down from mother to daughter—information respecting the Frobisher expedition, undertaken in the reign of Queen Elizabeth. Mr. Hall had brought home some relics of that expedition; and he had, moreover, discovered that what was marked on all maps as Frobisher Strait, is in reality a bay.

The first Paper read was—

1. *Frobisher Strait proved to be a Bay, and on the Fate of Five Men of the Arctic Expedition in the reign of Elizabeth.* By Mr. C. F. HALL, of Ohio; communicated by HENRY GRINNELL, Esq., F.R.G.S., of New York.

THE object of the Expedition undertaken by Mr. Hall was to make further search for traces of the Franklin party. In this he was supported and assisted by Mr. Henry Grinnell and other friends, and he besides received a free passage in a ship belonging to Messrs. Williams and Haven, of New London. He sailed on the 29th May, 1860, and on the 17th August reached a harbour on the west side of Davis Strait, a little north of "Frobisher Strait." Here he wintered among the Esquimaux, adopting their dress and habits, and learning their language. In the following spring, although he found it impracticable to reach King William Land for the original purpose of his voyage, he made an expedition of 43 days to the north with some natives, living at night in snow huts erected by the party. Obtaining the loan of a whale-boat, he then explored "Frobisher Strait," and after an excursion of 50 days satisfied himself that the so-called Strait was really a bay. He was detained in these regions another winter by the sudden setting in of ice, which imprisoned the ship in which he intended to return. In April and May, 1862, he made a sledge journey over a great portion of his previous year's route; and visiting the Countess of Warwick's Isle, he collected a number of relics, which he supposes to be those of the lost members of Frobisher's Expedition in 1576.

His supposition is founded partly on an identity of locality, and partly on a tradition among the Esquimaux, that very long ago some ships landed a party of white people; two ships are said to have come in one year, two or three in the next, and very many in the following. The natives spoke also of pieces of very heavy stone of a black colour, which he supposes to be iron, and other

relics, to be found on the island in question. The relics consisted of pieces of iron, of coal, fragments of pottery, ruins of a house containing mortar; and many of them were exhibited at the meeting.

The PRESIDENT, having said that the adventurous gentleman who had communicated this memoir was entitled to their warmest thanks, alluded to several naval officers present who had distinguished themselves in Arctic explorations, and first called upon Sir George Back, who, as an associate of Franklin in one of his earlier expeditions, was very nearly wrecked off the southern point of the tract under consideration, which separates Baffin Bay from Hudson Strait.

ADMIRAL SIR GEORGE BACK said he could give very little information respecting the subject of the Paper, for he had not been nearer to the spot in question than Resolution Island, south of Frobisher Bay. On that occasion—so long ago as 1819—in company with his old and dear friend the late Sir John Franklin, the ship, belonging to the Hudson Bay Company, coming in with a fair wind was suddenly becalmed close in under the almost perpendicular walls of Resolution Island. There appeared very little hope of the ship being saved, but a most extraordinary circumstance occurred. The ship, hove up by the swell, struck upon a rock, which unhung the rudder to a certain extent, so as to make it useless. In that way the ship remained some six or eight minutes, when another upheaving of the sea again ran the ship on the rock, and re-hung the rudder. At the same moment a breath of wind off shore filled the sails, glanced her head off, and so she escaped. The ship crossed Hudson Bay, and arrived safely at York Factory, a possession of the Hudson Bay Company. When she was unladen and placed on shore, to the surprise of everybody they found a huge rock of many tons weight fixed in the bottom of the ship. Had that by any chance slipped out in the midst of the bay, the vessel would have sunk instantly.

To return to the Paper, which was a very interesting one indeed, geographers were particularly indebted to Mr. Hall for having corrected a geographical misnomer. Yet, so far as he remembered, at the time when it was called Frobisher Strait a discussion was raised as to the term; and at a subsequent period the celebrated geographer Dalrymple endeavoured to prove that it could not be a strait, but a bay, though probably from a feeling of respect towards the gallant Frobisher, his name remained affixed to it as a strait. There is nothing more perplexing to explorers on entering a piece of water than to know whether they are in a strait or in a bay, from the land-locked appearance presented by islands. An instance of the kind occurred in 1818, when a distinguished naval officer went to Baffin Bay, and described what was then known as Lancaster Sound to be a bay, and certain mountains which appeared to stand at the end of the bay he named after the well-known Secretary of the Admiralty—John Wilson Croker. The following year the error was discovered by Sir Edward Parry, who sailed past these supposed mountains, and arrived at Melville Island, where he was stopped by the ice. To adopt the words of Sir John Barrow, the fountain-head of modern Arctic discovery, the mountains which were named after one Secretary of the Admiralty were sailed past and were proved to be the straits named after another Secretary of the Admiralty.

We were therefore greatly indebted to the gallant American for having determined the character of the so-called Frobisher Strait. He had achieved most of the journey of fifty-one days in a sledge, and the rest he had performed in a canoe or boat; therefore he had in reality gone round the whole of that bay, and had satisfactorily settled the point that it was a bay, and not a strait.

CAPTAIN SHERARD OSBORN, R.N., said he cordially agreed with the President that we, as Englishmen, were greatly indebted to that distinguished American,

Henry Grinnell, for his cordial and kind support in the endeavours that had been made to discover traces of Franklin and his party. Not only was his heart in the object, but he had employed his means in sending forth expedition after expedition into the Arctic regions; and with an enthusiasm which was honourable alike to the cause and to his country, he was ever ready to back up any effort made either by Englishmen or by his own countrymen. That had been the case with Mr. Hall. Assisted by Mr. Grinnell he went forth to find Franklin, and he said he had found Frobisher instead.

While giving every credit to this gentleman for what he had done, his geographical discoveries were to a certain extent qualified. Looking at the question in a geographical point of view, he might state that eleven years ago, while in the Arctic regions, he was assured by whalers that every one of these sounds were bays. One of the best of them was William Penny, an Englishman, who had fished up to the head of most of them. He was asked why he did not make this truth known. His answer was a good, practical, commercial one; he said, "My knowledge is money." Therefore to Mr. Hall was due the credit, as a geographer, of having made the fact known with respect to the so-called Frobisher Strait, provided he produced latitudes and longitudes. With respect to the discovery of coal on Warwick Island, it struck him that the whole question pivoted on that one fact. Now, it might not be known that on the west side of Davis Strait, from Cape Walsingham downwards, and at many other points, coal is to be found; it abounds near Disco. Mr. Hall would find this circumstance mentioned in the account of Sir John Ross's first expedition, when Parry was one of his lieutenants, and when he was returning down the west side of the strait from that very expedition to which Sir George Back had alluded. It should also be remembered that these early navigators merely found the entrances of these pieces of water, and, as would be seen by reference to a volume published by the Hakluyt Society, they merely marked the headlands in their charts; and it was not until two hundred years afterwards that geographers were pleased of their own accord to call one piece of water a bay, another a strait, and another a sound. Therefore while giving full credit to Mr. Hall for his discoveries, it should not be forgotten that these early navigators are not responsible for the names given to their discoveries.

The PRESIDENT said, as much of the value of the Paper depended upon the evidence of the Esquimaux, he should next call upon the Rev. Peter Latrobe, whose family from the time of his grandfather had been distinguished in missionary exertions, and who was himself connected with the missions to the coast of Labrador, and intimately acquainted with the habits and customs of the natives and the value to be attached to their testimony. He had laid on the table various curious rock specimens from Labrador, including one very peculiar mineral which had been named after himself, Latrobite.

The REV. P. LATROBE then gave a brief sketch of the progress and results of the Moravian mission on the coasts of Labrador and Greenland. He pointed out some of the physical features of the two countries, and the great difference in their respective climates. Greenland was far to the north of Labrador, yet the climate was milder. In Labrador the thermometer often falls during winter to 30° and 40° below zero of Fahrenheit, whereas in Greenland such extreme cold was never known. The inhabitants closely resembled each other, and spoke dialects of the same language, as was shown by Captain Washington, in his interesting vocabulary of the Esquimaux language. To those who wished well to the race, it was painful to observe that they were degenerating. They were becoming better informed, they were becoming more Christianised, their habits were improving in many respects, but they were not equal to their forefathers in point of endurance. This was partly because they had a great tendency to adopt the habits, and especially the food, of Europeans. It is found that train-

oil and blubber suit the Esquimaux constitution far better than coffee and tea, and that as long as they can get that congenial nourishment they are able to endure any amount of cold and hunger or hardship; but as soon as they endeavour to live as Europeans their constitutions begin to get enfeebled. They and their dogs are subject to severe epidemics. As illustrations of the progress of civilization among the Esquimaux, the Rev. gentleman produced copies of Testaments, Prayer-books, and hymns, printed in the Esquimaux language, and stated that the people were very fond of music, possessed good voices, and had excellent memories. They were also very good draughtsmen, in proof of which he had in his possession a chart of 100 miles of the coast, the work of a native; and they also wrote very well. He had with him a very curious book, mainly the production of a Greenlander, illustrated with woodcuts, containing an account of a tradition handed down from generation to generation, in reference to an invasion of Greenland by the Scandinavians six or seven centuries ago. It was known that the Scandinavians formed settlements, built churches and houses, and that after some centuries they disappeared. This book professed to give an account of this incursion of the Scandinavians, of the disputes and wars that took place in consequence, and of the final extermination of the invaders. In conclusion, he stated that Labrador produced a beautiful kind of spar, also hornblende, anthracite, granite, porphyry, jade, serpentine, and other minerals.

The PRESIDENT reminded the Meeting that before Mr. Hall went to examine the so-called Frobisher Strait, he was told by the Esquimaux that it was a bay. It was quite clear, therefore, that the natives were not bad geographers, and were acquainted with the coast-line of their country. He had now to call upon Dr. Rae, who was the first to bring to this country certain very important relics of the Franklin expedition, to read a Paper upon the countries of the Red River and the Saskatchewan.

DR. RAE said he wished to make a remark upon the Paper of Mr. Hall. He fully concurred in all he had said as to the truthfulness of the Esquimaux. When he first brought home information he had gained from them, they were called liars and story-tellers. He knew better. He never in his life found an Esquimaux tell a falsehood unless it was to gain some particular object; and when they did tell a falsehood, it could easily be detected by a little cross-questioning. Where they had nothing to gain by suppressing the truth, you could fully rely upon their statements.

The second Paper read was—

2. *A Visit to Red River and the Saskatchewan.* By Dr. JOHN RAE, M.D., F.R.G.S.

DR. RAE's Paper briefly described a hunting excursion to the prairies of the Saskatchewan River, undertaken by two young English gentlemen, whom he accompanied, and during which he established the latitudes of several points on the route, and rectified the positions of other places. He described two lakes of considerable size (both salt), situated among the elevations of the "Coteau du Prairie," which had not previously been placed on the maps. He named them the "Chaplin" and "Johnstone" lakes. He explained what he believed would be the chief difficulties to be met with in colonising the Valley of the Saskatchewan, and in the formation of an

overland route through it, from the Atlantic to the Pacific. He also gave an estimate of the probable time that would be occupied and the expenses incurred in travelling by this route, as compared with the voyage from England to Vancouver Island *viâ* Panama—viz., 43*l.* and 51 days against 33*l.* and 37 days, or 10*l.* and 4 days in favour of the Panama route.

The PRESIDENT congratulated the Society upon the fact that Dr. Rae, while accompanying two or three gentlemen on a buffalo shooting excursion, had fixed, by astronomical observations, the latitude and longitude of places which were before very imperfectly laid down on the maps. They were therefore much indebted to Dr. Rae for his communication.

The Meeting was then adjourned to April 27th.

Eleventh Meeting, Monday Evening, April 27th, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

ELECTIONS.—*Lieut.-Colonel John Charles Downie Morrison; William Hatfield; Henry Pevenil Le Mesurier; George Loch; Henry Salt; and Cromwell Fleetwood Varley, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the donations to the Library and Map-Rooms since the former Meeting were—Holmes's 'Magneto-electric Light applicable to Lighthouses;' Pugh's 'Queensland Almanack' for 1862; Map of the Mekran Coast, from Kurráchi to the Persian Gulf; and continuations of Admiralty Charts and Ordnance Maps.

EXHIBITION.—M'Leod's 'Geological Map of England and Wales.'

THE PRESIDENT said he had received a letter from Mr. Tinné, in reference to the explorations of the Dutch and English ladies, his relatives, up the White Nile, which he would read.

"Being unable to attend your next Meeting, I have much pleasure in giving you, as requested, some further information regarding my lady relatives, of whose return from Gondókoro to Khartûm on the 20th of November last you have already been apprised.

"Their last letter is to the 5th of February, at which date they had started on a fresh expedition up the White Nile, but were stopped, about three hours' sail from Khartûm, by an accident which happened to one of their boats and threatened to swamp her. This was caused by the captain and the pilot, who, on being examined, were made to own that they had bored a hole in the bottom, being unwilling to go up the White Nile.

"The damage having been repaired, and a new crew engaged, they were on the point of proceeding on their voyage again.

"One of the ladies remained at Khartûm, and Madame Tinné and her daughter were accompanied by Mr. D'Ablaing, a Dutch gentleman, who had come across from Abyssinia; by Mr. Heuglin, whose communications from Africa are known to the Royal Geographical Society; and by another German gentleman (whose name I am not yet acquainted with), a medical

man and naturalist, who also draws beautifully; so that, as Madame Tinné remarks, 'they hope to make a more scientific, if not a more agreeable, journey than the last.'

"The health of the party that had been at Gondókoro, some of whom had suffered from fever, was entirely restored during their prolonged stay of two months and a half at Khartûm, and all were in excellent spirits. The weather had been cool, rather stormy at times, but agreeable and bracing, and the sky bright and blue.

"Their present expedition is on a larger scale than the former one. They have the steamer and five boats, with 168 people to provide for (50 of whom are additional soldiers), besides 4 camels, 30 mules and donkeys, and 3 horses. The boats had been repaired and refitted with new sails, and they had laid in guns, ammunition, new tents, and ample stores of all kinds. Further on, nothing of that description could be got, and everything therefore had to be procured beforehand.

"The Dutch gentleman intended to proceed up the Nile, and Madame Tinné and her daughter were to turn off at Bahr-el-Gazal. At some point of this river they would find the rest of their party, who had gone on in advance. Disembarking there, they proposed leaving their boats and commencing a land journey into the interior,—to use Madame Tinné's own words, 'into unknown parts.'

"She mentions Mr. Baker having started, and also speaks of the rumour about Mr. Petherick's disappearance, but nothing more decided than we have heard previously as to his fate."

For this communication from Mr. Tinné the President begged the Fellows to return their best thanks, for he was sure there were few persons more entitled to be honorary members of the Royal Geographical Society than those adventurous ladies.

The Papers read were—

1. *Exploration of the Elephant Mountain in the Batonga Country, West Africa.* By Capt. R. F. BURTON, H.M. Consul for the Bight of Biafra and Fernando Po.

CAPT. BURTON visited Batonga Bay in September, 1862, about the commencement of the second rainy season of the year. The bay is a mere roadstead, and the ship (H.M.S. *Bloodhound*) lay 1½ mile from the land. A heavy surf breaks on the whole coast from the Cameroons River to Corisco Island; and landing is almost exclusively effected in light native canoes. The shore shows a long line of densely-wooded lowland, based upon yellow sand. Inland are seen groups of low hills, conjectured to be the spurs of the Sierra del Crystal. This range, never yet crossed by any European, seems to form a line of Ghauts similar to those in Eastern Africa, at about 100 or 150 miles from the coast. The most remarkable among the intermediate hills is the "Elephant Mountain," so called from its resemblance to an elephant couchant. There are two or three factories belonging to European merchants in the bay, but none of the residents appear to have ever penetrated a mile of the interior. Although the country is rich, there is no trade but ivory;

and this comes from a distance, as no elephants are found within four days' march of the coast. The Elobe River pours itself into the bay by a low cataract, above which the party obtained a view of the stream, without however succeeding in obtaining any information about its upper course or its source.

On the 14th September Capt. Burton landed with Lieut. Stokes to explore the Elephant Mountain. After considerable difficulty with the chiefs on the coast, who, as usual, were unwilling that any traveller should pass beyond their own territories, the party started the following day. The path, a narrow line, led them first past some villages of bushmen, and then through an undulating country, densely wooded with a profuse variety of vegetation. Water was abundant in clear running streams, but game nowhere to be seen. The first day's march, which was much delayed by palavers at the villages, and at the ferry across the Elobe, was about 7 miles.

Leaving Labele, their night's halting-place, the next morning the party crossed a deep hollow, and began the ascent of the mountain from the south-east. The path, at first easy, soon became steep and slippery, and the wood grew thinner; and after three hours' march the summit was reached. The elevation was found by B.P. thermometer to be 1707 feet, agreeing with the trigonometrical measurement given in the chart. The party descended by a still more difficult path on the western side, and returned to the coast on the 17th.

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2. *Narrative of a Journey to Odé, the Capital of the Ijebu Country, in January*, 1862. By Capt. BEDINGFELD, R.N.

THE object of the Expedition which visited Abeokuta, Porto Nuovo, and Odé, after the cession of Lagos, was to conciliate and explain to the chiefs our views in forming the colony, and to induce them to put a stop to the petty wars, and to open their roads to legitimate commerce.

The Ijebus had never before been visited by any white man, except Mr. Champneys, a Wesleyan missionary. The present party was received in a most friendly manner, and the visit was in every way satisfactory. They were much struck with the beauty of the country, the amount of cultivation, and the industry of various kinds shown by the natives. One large village contained a great number of blacksmiths, occupied in manufacturing hoes.

Captain Bedingfeld, accompanied by Lieut. Dolbin, of the *Prometheus*, and an interpreter, left Lagos on the 12th January in a

canoe, and reached Eginé, at a distance of about 35 miles, the next day. Starting again on horseback in a north-easterly direction, through forest-land extensively cleared, they reached the village of Omu, where a quarrel between one of the porters and a native nearly caused a serious affray. This was, however, prevented by the presence of mind and judgment of the officers in charge of the Expedition. The party arrived at Odé in the afternoon of the same day.

Odé is about 26 miles N.N.E. of Eginé, and is surrounded by a wall about 12 miles in circumference. The houses are substantially built of red clay. The natives are a remarkably fine tall race. Their religion is gross fetichism; and both human beings and animals are occasionally sacrificed. Their principal food is maize, which is produced in great abundance, and is sold for about 2*d.* per bushel.

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3. *Travels in Western Africa.* By W. WINWOOD READE, Esq.

MR. READE left England in December, 1861, and arrived at the Gaboon on the 13th February. He first made a six days' excursion into the Shekanī country on the right bank of the river. In March he went to Corisco, and thence to Bapuka, where he remained about a month. Passing on to the Muni, he followed the main stream for about 30 miles, and then branched off by a tributary which led him to the spurs of the Sierra del Crystal. In May he ascended the Gaboon, and discovered the rapids in the heart of the Crystal Mountains. He then went to the Fernando Vaz, as far as Ngambi. After a visit to Prince's and St. Thomas's Islands, he sailed in a Portuguese schooner to Loanda. Here he was hospitably received by Mr. Gabriel, a Fellow of this Society, who has, however, since fallen a victim to the climate. After a trip to the interior as far as Ambaka, he sailed to the Cape de Verde Islands, whence he crossed to Goree early in December; and after visiting the Senegal, the Casamanza, and the Gambia, he finally returned to Europe in February last.

Mr. Reade made inquiries at Loanda, respecting Dr. Livingstone's supposition that the Quango joins the Zaire, and he found that it received unanimous confirmation. But there seems to be some doubt about the position of Matiamvo; the Secretary of Benguela informed him that the kingdom known by that name is situated to the south-east of that colony, and that a more powerful prince named Domba reigns to the east of Matiamvo. This was confirmed by the Commandant of Quellengues, a Portuguese fort in the interior. Mr. Reade saw at Ambaka a runaway slave of Matiamvo's,

who told him that the name of that tribe was the Boloni. The country itself, he said, was without hills or high trees like those at Ambaka; that the animals found there were lions, elephants, leopards, jackals, giraffes, wild cattle, and small monkeys.

Kikassa, a great river, is said to run from the rising sun to the north; another river called the Matiamvo joins it, coming from the west and running east; another large river, called Rû, passes close to Matiamvo's palace, and runs east and west; and in this river are hippopotami, while in the others are only crocodiles.

Mr. Reade in the main confirmed M. du Chaillu's account of the country and people.

The PRESIDENT said, the Paper showed that Mr. Winwood Reade was an enterprising traveller, who had visited many parts of Africa, but not, as he modestly said, as a scientific man. He had certainly brought before us some remarkable facts and statements respecting the natives. With regard to the concluding observations, he was happy to hear what Mr. Reade had said of M. du Chaillu. M. du Chaillu was about to embark on a new voyage to that country which he had explored on a former occasion under considerable difficulties; and he hoped to go out now more as a man of science than he did before, taking instruments with him, so as to determine some latitudes and longitudes. M. du Chaillu would be very happy if Mr. Reade or some other Englishman would accompany him.

CAPTAIN BEDINGFELD, R.N., said, the only interest attached to his Paper would be its connection with our new colony of Lagos. He went to Porto Nuovo first of all, then to Abeokuta and Odé, in order to explain our reasons for the cession and to conciliate the different chiefs in the neighbourhood. He was particularly struck with the immense amount of industry of the natives. The whole distance they travelled, as far as they could see, the corn-fields on both sides were beautifully cultivated. They passed through one village entirely of blacksmiths; the whole village was taken up with forges, and the men were manufacturing the country hoes from native iron. They were received very kindly at all these places, and they succeeded in getting the objects they had in view carried out, one of which was to establish a market at Eginé for the trade from the Ijebu country. On their return they had a palaver at this market, and it was opened for trade. All these places had since been destroyed, and he was afraid that the feelings of the king in our favour had been very much modified. With regard to the bar at Lagos, when they first went in they had some difficulty, but afterwards ships came in frequently and with very little trouble. He had since heard by the last mail that another passage of 3½ fathoms had been opened out, so that he believed there would be very little difficulty in merchant-ships getting in. Trade was, however, at present entirely stopped on account of the wars; and those wars would, in his opinion, go on until the slave-trade was abolished.

MR. CRAWFURD asked if the King of Abeokuta or his prime minister could read or write, or whether Captain Bedingfeld knew any negro who could read or write.

CAPTAIN BEDINGFELD, R.N., replied, the king certainly could not, but he knew several negroes who could read and write.

MR. CRAWFURD thought that they must be remarkable, then; for, though the natives had been in communication with Europe three hundred years, it was a very rare thing for a negro to learn to read and write.

M. DU CHAILLU said he was about to undertake another journey in the part of the country which he visited last, up the Fernando Vaz river. He had at

length succeeded in getting a vessel, and it would require two months to prepare his outfit, which would be composed of baggage amounting to from fifty to one hundred tons. He intended to make a settlement at the mouth of one of the rivers, leave one or two white men there, and then go into the interior and explore. He would not promise too much to the Royal Geographical Society, for he might meet with impediments; but he sincerely hoped he should be able to reach a thousand miles, to stay there a time, and study the country, and then return. If life and health should be spared, he hoped to be able to write another account of his explorations. This time he should have more wisdom and more knowledge to apply to the task; still he was sure the book would be full of shortcomings, for which he knew the English people would forgive him. Although they did not agree on the gorilla question, he thanked Mr. Reade for the kind words he had spoken in his favour; and he also thanked the members of the Royal Geographical Society for the feelings they had always expressed towards him. He should work hard, and try to deserve their continued approbation.

The PRESIDENT stated that the next sitting would be on the 11th of May.

Twelfth Meeting, Monday Evening, May 11th, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*J. A. Oldling, John Ritchie, and H. Bayley, Esqrs., were presented upon their Election.*

ELECTIONS.—*Rear-Admiral Horatio Thomas Austin, C.B.; Lieutenant I. Sale; Alexander Baring; James N. Dick; William James Farrer; Patrick Douglas Hadow; John Henry Mackenzie; William Simpson, and J. A. Wright, Esqrs., were elected Fellows.*

ACCESSIONS.—'Notes on Ceylon and its Affairs during a period of thirty-eight years, ending in 1855,' by James Steuart of Colpetty; 'A Vacation Tour at the Antipodes, through Victoria, Tasmania, New South Wales, Queensland, and New Zealand, in 1861-62,' by B. A. Heywood, Esq., M.A.; the 'Anthropological Review' for May, 1863; Map of British Columbia; Admiralty Charts and Ordnance Maps.

EXHIBITIONS.—Various curiosities from Australia were exhibited by Mr. Middleton, consisting of fishing-nets, necklaces, girdles, &c., of native manufacture, geological specimens, and sundry relics of Burke and Wills; also a lithographed view of a design for a National Memorial Obelisk to His late Royal Highness the Prince Consort, by George Peacock, F.R.G.S.

The PRESIDENT, in opening the business of the evening, said that there were no special papers to be read respecting one of the most adventurous and successful journeys that had ever been accomplished in Africa. He alluded to the expedition which the Society, aided by the Government, had sent out under Captains Speke and Grant, to proceed from Zanzibar into the interior of Africa, with the view to discover, if possible, the sources of the Nile. After very con-

siderable difficulties, that expedition had, when last heard of, arrived nearly at the position which Captain Speke reached in the previous expedition, under the command of Captain Burton. Instead of finding the country in a state of entire tranquillity, the people ploughing the land and occupied with agricultural pursuits, they found it in a state of great commotion, the different tribes quarrelling with each other, and invading each other's territories. The gallant officers were involved in considerable difficulties, and even the most sanguine of their friends at home began to despair of their success, for they had not then arrived at the great Lake Nyanza, which Captain Speke himself had discovered on his former expedition, and which he had named Victoria Nyanza. We now learned from a telegram, which had been promptly communicated to himself by Mr. Layard of the Foreign Office, that Captains Speke and Grant had arrived safely at Khartûm, on the Nile. He had every reason to believe, and the best African geographers he had consulted were of opinion, that these adventurous explorers had reached the White Nile, and had descended it from Lake Nyanza, and so have traced the sources of the Nile. We could not positively say that *the* source of the Nile had been discovered until we had fuller details; but he was inclined to believe that it had, because Captain Speke, in another telegram to the Foreign Office, sent word, "Inform Sir Roderick Murchison that all is well, that we are in latitude 14° 30′ upon the Nile, and that the Nile is settled." From these pregnant words he inferred that this great problem had at length been solved. The expedition was sent out by the Royal Geographical Society purposely to determine the sources of the Nile; and as this great Lake Nyanza (said by the Arabs to be 300 miles long) was a fresh-water lake, as its altitude had been proved to be nearly 4000 feet above the level of the sea, and as it trended from south to north, and waters flowed into it from the east and west, its exit must be towards the north; and hence the belief that the explorers had come down in a right line from south to north, and had really discovered the sources of the Nile. Another telegram had arrived, in which, as it appeared by the papers of the day, the discovery was announced in so many words. He sincerely hoped that they had set at rest this great question. In the time of the old Egyptian priests, in the time of the Pharaohs, in the time of the Greeks under Ptolemy, in the time of the Romans during all the imperial reigns of the Cæsars, it was always a great object to discover the sources of the Nile. And, previously to the present expedition, no one had ever succeeded, no one had ever traversed the interior of that country to which he was now directing attention. It was, therefore, one of the greatest geographical feats that had been accomplished in ancient or modern times. Cæsar himself is reported by Lucan to have said he would have given up that which was very dear to him, the civil war in which he was a great and successful conqueror, to have been the discoverer of the sources of the Nile. He thought we had reason to be proud that it was an Englishman and a Scotchman who had solved this great problem. He had another communication to make respecting the last telegram that had come, which contained a very important passage, "Mr. Baker has gone to the south-west." It would be remembered that Mr. Baker was the gentleman who had gone from Khartûm to Gondókoro, to meet and assist this very expedition of Speke and Grant. By putting dates together, he had come to the conclusion that Baker had been of considerable assistance to them; and that, with the true spirit of enterprise which animated him, he had afterwards turned off to the west, possibly following the same line which had been taken by the party of Dutch ladies whom he had mentioned on former occasions as having already been as far as Gondókoro, and who were now exploring that great *terra incognita* to the west. People might naturally inquire if no news had been received of Petherick. He hoped, with such a skilful explorer as Mr. Baker, aided by these Dutch ladies, that we should soon have satisfactory intelligence on the subject, for he had not himself yet given up hope that Petherick might still be alive. The accounts of his

death were not clear and definite: and as it was known that Mr. Petherick was a man of great endurance, he might have gone through great difficulties; at all events, whatever might be the result, we should soon have our anxieties set at rest.

Mr. GALTON doubted whether the source of the Nile would have been found in the Lake Nyanza. The reported size of that river above Gondókoro appeared to him too small to be commensurate with so great a source.

The PRESIDENT stated that in the year 1848, before the Lake Nyanza was discovered, and before the altitude of the great range of the Snowy Mountains was ascertained, Dr. Beke called attention to the possibility of discovering the sources of the Nile by another route, to come out at Sennaar, on the Blue Nile, and also to the possibility of there being a ridge at the northern end of the lake Victoria Nyanza, which would throw off the waters in the direction to which Mr. Galton had alluded.

Dr. BEKE said his idea was first conceived in 1846, that the sources of the Nile should be sought by entering from the coast in the neighbourhood of Zanzibar, and penetrating into the interior—in short, by taking very nearly the route which Captains Speke and Grant had followed. He himself had set on foot an expedition in 1848, which reached Zanzibar, but went no further. He believed that Claudius Ptolemy, the geographer of the second century, knew nearly as much of the sources of the Nile as we were likely to know in a few days. That writer described the snowy Mountains of the Moon as being to the west of the "Barbarian Gulf," near Zanzibar, round which dwelt the Cannibal Negroes, and said that beyond that were the two lakes of the Nile, which received the melted snows from the Mountains of the Moon. Dr. Beke further stated that he had founded his views upon this text of Ptolemy, and substantially they were now confirmed. His opinion was that the mountain-range of Eastern Africa continued to the south of Nyanza; that Captain Speke crossed the ridge in about 35° E. longitude; that the water-parting is to the south of the lake, and not to the north; and that consequently Nyanza drains into the Nile, whether by the river which passes by Gondókoro, or by any other stream, it is impossible to say, till we receive fuller particulars from the travellers. We did not know the longitude of the river at Gondókoro, but we knew that its altitude there is not more than 1700 feet, and that the lake, which is at a very short distance from it, is nearly 4,000 feet. A few days would determine whether his views were right or wrong.

The PRESIDENT, before calling upon Dr. Shaw to read the following communications respecting the most recent journeys in Australia, stated that two of the distinguished explorers of that great continent were then in the room—Mr. Landsborough and Mr. Middleton. Mr. Landsborough, who, as Sir Henry Barkly said, had done more to utilise the colony than any explorer who ever went out, having traversed Australia from north to south, after a previous exploration to the south-west from the Gulf of Carpentaria, had brought before us absolutely the real condition of the "Plains of Promise," and the capability of the land for settlement by Europeans, and for the production of sheep and wool. Mr. Middleton was second in command of the M'Kinlay expedition from South Australia.

The Papers read were—

1. *Extracts of a Despatch from His Excellency Sir George Bowen to His Grace the Duke of Newcastle, in reference to the Colony of Queensland, dated Brisbane, 8th January*, 1863.

"I HAVE the honour herewith to transmit three copies of the Queensland Book Almanack for 1863. The historical and topogra-

phical sketch of the progress and present condition of this colony, including the cotton plantations, therein contained, will be found clear and accurate.

"I would particularly call your Grace's attention to the map accompanying the volumes. It appears that this colony now comprises an area of about 678,000 square miles; that is, a surface nearly six times greater than that of the United Kingdom, and above three times greater than that of France. It is estimated that the pastoral occupation within our limits already covers a surface about twice larger than that of the British Isles; and it is rapidly spreading, for the recent explorations of Messrs. Burke, Landsborough, Walker, and M'Kinlay, prove that almost the whole of our vast territory is available for settlement. In other words, Queensland is by far the most extensive in territory, while it is undoubtedly the most favoured in soil and climate, of all the provinces of the British empire.

"They beg to suggest that one of the accompanying volumes should be presented to the Royal Geographical Society; and that the attention of that body be particularly directed to the prefixed map, as exhibiting the only authentic description of the boundaries and divisions of Queensland which has hitherto, so far as I know, been published."

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2. *Extracts of a Despatch from His Excellency Sir H. Barkly to the Duke of Newcastle, in reference to Mr. Landsborough's Expedition, dated Melbourne, 24th August*, 1862.

"AGREEABLY to the instructions in your Grace's despatch of 26th May, No. 31, I placed the watch therewith forwarded, on behalf of the Royal Geographical Society, in the hands of King, the explorer, and have now the honour to transmit a paper containing a copy of the proceedings on the occasion, which were of a very gratifying nature.

"It will be perceived that I availed myself of one of the meetings of the Royal Society of Victoria, under whose auspices the Burke and Wills Expedition was despatched; and that Mr. Landsborough, the leader of one of the parties sent to its relief, who had just reached Melbourne after a most successful journey from the Gulf of Carpentaria, happened fortunately to be present, and added additional interest to the same.

"I stated when I last wrote that Mr. Walker had started on 20th December from the depôt on the Albert River, with the view of following up the tracks of Burke and his companions, which he had

found on the Flinders River, on his outward journey; and that Mr. Landsborough, who subsequently returned to the Albert from a fruitless journey to the south-west, intended to leave it about the middle of February on a similar errand, in case the first party should miss the trail.

"This extra precaution was not unnecessary, for after tracing Burke to his second or third Return Camp with difficulty, owing to the rains which had fallen, Mr. Walker was obliged to abandon the attempt in consequence of not finding any signs of his farther progress southwards; and striking off towards the north-east, managed, not without many hardships and dangers from the exhaustion of his stores, and loss of his horses, to reach Port Denison safely, by the end of April. Mr. Landsborough likewise, as will be seen from the narrative, failed to discover the route pursued by Burke, though he travelled up the banks of the Flinders for about 400 miles, the heavy floods which prevailed having even obliterated the recent traces of Walker and the large number of horses which he took with him. Notwithstanding this failure, however, Landsborough continued his course in a southerly direction, merely crossing the hills for about 20 miles, till he reached the source of the Thomson, a river known to flow towards the south-west, and found by him to be one of the main tributaries of the Cooper. When within about 150 miles, however, from the depôt formed by Mr. Burke prior to starting for Carpentaria, fearing for the sufficiency of his provisions, which from the first had been short, he turned off, and striking the River "Warrego," followed it down until he struck the Darling itself, above Fort Burke.

"By this journey, in which he was the second to cross the Australian Continent, through a country so favourable, and with such facility that a foal dropped on the Flinders accompanied its dam all the way, Mr. Landsborough has not only made a most important addition to our geographical knowledge, but has practically accelerated in a remarkable degree the formation of a northern settlement.

"With regard to the first, he has taught us that Sturt's Desert extends but a short distance eastwards, and that between it and the foot of the eastern chains of mountains, spreads a fine pastoral country, watered by rivers which find an outlet in lakes to the south-west; whilst, more unexpected still, the water-parting between those streams trending southward, and those which flow north to the Gulf of Carpentaria, proves to be scarcely more than 20 miles in width, and may be crossed at an elevation of about a thousand feet.

"As to the second point, already stock are being driven from New South Wales to these fresh pastures, and the best informed newspapers here predict that, before another year shall have elapsed, the whole continent east of the 140th degree will be mapped out and occupied for grazing purposes.

"It may appear strange that with large tracts within the limits of existing settlements yet but nominally stocked, the exodus to tropical Australia should be so rapid, but the rainfall of the new country is believed to be heavier and more regular than on the Darling; and at the same time the Australian air is so comparatively dry, even in the tropics, and the all-pervading forests of "gum-trees," so open and free from jungle, that the climate is far healthier, and more endurable by European constitutions, than in similar low latitudes in other portions of the globe.

"Moreover, the prospect of easy access to the sea on the north coast is a great attraction to squatters, and it will be seen from the accompanying pamphlet, that plans for a city at the mouth of the Albert River have assumed something like a definite shape, and are encouraged, I believe, by the Queensland authorities.

"The task of Australian exploration, as undertaken by this colony two years since, having been thus effectually performed; the veil lifted from the fate of the intrepid pioneers, whom it sent forth; and the chief objects which the promoters of the scheme had in view, being in process of successful accomplishment, it remained but to recall the party under Mr. Howitt, who had been instructed not to abandon the depôt on Cooper Creek until the safety of Walker and of Landsborough's parties had been ascertained.

"Some hesitation was felt by the Exploration Committee here in so doing, in the absence of all information regarding M'Kinlay, who was despatched about a year since from South Australia to look for Mr. Burke, and who, after discovering what he conceived to be the remains of the missing explorers (though in reality but those of Gray), again proceeded northwards in December last, and has not since been heard of. Learning, however, from the South Australian Government that no apprehensions are entertained as to his safety, and that he had orders to explore the country towards Central Mount Stewart, and to return to the settlements *vid* Finniss Springs, where ample supplies await him, it was at length determined to despatch the requisite instructions to Mr. Howitt, directing him to bury what provisions he can spare, for the benefit of whoever may visit the depôt, and to return with all hands to Mount Serle, *en route* to Adelaide."

In reply to questions put by Sir Charles Nicholson and the President, Mr. LANDSBOROUGH said the country on the Gulf of Carpentaria was extremely fine,

and, from his experience as a squatter, eminently adapted for growing wool. He had had sheep within the tropics, on a station situated a little to the north of Rockhampton, on the shores of Broad Sound; and although the sheep did remarkably well there, and grew a very fine description of fleece, and of a sufficient weight to make wool-growing there very profitable, and much more so than in some parts more to the southward that had a very cold climate, where he had had sheep-runs, yet he considered much of the country that he had seen at Carpentaria far superior. Before M'Arthur introduced fine-woolled sheep into Australia, nothing but hair was produced there; and now, as far north as latitude 19° from the southern shores of Australia, the colonists have demonstrated the fact that, by judicious breeding, they can everywhere produce fine wool. And it is quite notorious that, on the whole, the wool grown in the north is at least as fine as that which is grown in the south. With regard to the climate of Australia, he ought to know something about it; for he had travelled all over the settled parts, and also from the northern to the most southern shores. On the shores of Carpentaria they had about 100 people during the hottest period of the year, and he never heard of illness among them. Again, at Rockhampton, there was at one time a rush of population from the southern parts of Australia to the gold diggings which had been discovered there. Some ten thousand people were collected; and though they were disappointed at not finding gold so abundantly as they expected, and though they were there during the warmest season, he never heard any complaint of want of health among them. Before starting for Carpentaria he was told that it would be impossible to land the horses; but the only trouble they had when they ascended the Albert River was to throw a few planks from the vessel to the land, and the horses walked ashore. The natives in the north were like those in the south, and he considered them on the whole neither inferior nor superior. He found the "Plains of Promise" quite equal to what Captain Stokes described them to be,—a fine pastoral country, and very open forest. With regard to the rivers that fall into the Gulf of Carpentaria,—the Albert, the Flinders, and the Nicholson,—the best account we had of them was still that by Captain Stokes. However, when he was at Carpentaria, Lieutenant Woods, of the man-of-war sloop *Victoria*, was sent to explore the Albert, and he returned with a report that it was navigable for the sloop. The Flinders was explored by Captain Norman, and he thought it superior to the Albert. The Nicholson was not as good as the others.

Mr. MIDDLETON, at the request of the President, related the particulars of the great peril in which his party found themselves upon one occasion, owing to a sudden flood caused by heavy rains. They had reached rather a large creek with only water-holes in it. They were compelled to camp there owing to some of the bullocks being knocked up from the great heat, the thermometer standing at 166° on the side of the tents. During the night it came on to rain a little: it increased all the next day. The creek began to rise, and it was thought desirable to be moving; but as the camels and bullocks were all out grazing, and it would be difficult to collect them together, it was resolved to wait till the morning. In the morning they found they were surrounded by water; nothing but a sea in every direction, as far as the eye could reach, except to the south-east, where there were some patches of sandhills about three-quarters of a mile off. There was no time to be lost, not even to get breakfast: the men had to swim out to get the bullocks, camels, and sheep. The flour, provisions, and ammunition had to be placed on the camels' backs, and they made their way to the sandhills, where they were compelled to remain about eleven days before they could move. The region which they were then traversing consisted of nothing but sand as red as Cayenne pepper; not a stone nor even a pebble was to be seen. They were months and months on the sand, but fortunately always got water, though sometimes they travelled twenty or twenty-five miles, and on one occasion twenty-nine, before coming to a creek

with water-holes. The camels were very serviceable, and seemed to be the very kind of animal wanted in Australia; but they suffered more from the want of water than the horses. Mr. M'Kinlay was an excellent leader, and acted with great judgment on the journey: a more noble and generous-hearted man he never met. Mr. Middleton then called attention to the various specimens of fossil organic remains, and articles of native manufacture, which he had brought home with him and had placed upon the table.

Mr. LANDSBOROUGH was then questioned at some length by Mr. Crawfurd, respecting the "Plains of Promise" as an eligible country for the growth of wool; and in reply he stated that he was there during the wet season, from October to February, and that during the first three weeks on the Albert River the mean temperature was within a fraction of 80°. In the southern parts of Australia he had no doubt the thermometer stood quite as high as Mr. Middleton had stated. He quite agreed that in certain portions in the south there were extremes of heat and cold; but he did not consider that an advantage. So far from thinking the northern portions of the country unsuited for pastoral purposes, he was sorry that he had not gone to Queensland sooner. Old Australians would confirm his statement that the hottest parts of Australia were on the Lower Murray and the Lower Darling. This was owing in some measure to hot winds, of which they had none in the tropics.

Mr. CRAWFURD said this might be true in summer, but it would not apply to the average of the whole year. Did Mr. Landsborough perceive any difference between the vegetation of the "Plains of Promise," which appeared to be in the latitude of Bombay—rather a warm climate for a large fleece and fine wool—and the vegetation of Queensland?

Mr. LANDSBOROUGH said there was a difference, and the advantage was on the side of the "Plains of Promise." It was just the kind of vegetation that a sheep-farmer liked best.

Mr. CRAWFURD said it might be. He had seen good sheep, so far as the flesh was concerned, in Java and Sumatra; but the wool was the question. The experiment had never yet been tried of producing fine wool in such a temperature.

Mr. LANDSBOROUGH replied that he had tried sheep-farming for several years in Queensland, within the tropic of Capricorn, and he found that sheep were profitable there for their wool.

Mr. CRAWFURD said the sheep was intended for a temperate climate. Was not the fleece given to the sheep by nature to protect it from the cold? And when it came within eighteen degrees of the equator it could not possibly require the fleece there that it required in a cold or temperate climate.

Mr. LANDSBOROUGH.—You are theorising. Who of all the human race have got the most wool on their heads? Is it not the negro who lives within the tropics? (Laughter.)

Sir C. NICHOLSON said it gave him great delight to see Mr. Landsborough and Mr. Middleton in England. It was but recently that he had had the opportunity of expressing his high appreciation of the courage, enterprise, endurance, and ability of Mr. Landsborough, and of his merits as a scientific explorer. With reference to the country which he had passed through, it was now established that the whole of the region to the east of the 138th meridian was of the best possible description, abounding in the finest pastures, and capable of occupation and settlement. That magnificent district of the valley of the Fitzroy, an area as large as the British Isles, presented enormous tracts ready for occupation, requiring no clearing, simply enclosing, applicable for the purposes of pasture, and also for the growth of all kinds of tropical produce. He might mention that one of the first instalments of cotton from Queensland was received in London from Brisbane a few days ago. It consisted of seventeen bales: two of the bales fetched 3*s.* 6*d.* a pound, at public auction; and the remainder averaged about 2*s.* 6*d.* a pound. This seems a very encouraging

circumstance, as showing the capability of the colony for the production of this great staple, and the superior character of the article itself. Sir Charles Nicholson again urged the importance of the Imperial Government taking some steps with reference to the establishment of a new and independent colony in North Australia; and concluded his observations by stating as a fact, in answer to Mr. Crawfurd's objections, that there were at the present time above a million of sheep within the tropics, many of them in a line as far north as 18°; the clip every year giving an average yield of 2 lbs. per sheep.

The PRESIDENT congratulated the Meeting upon the light which had been thrown upon this Australian subject by practical men, who had brought out facts against theories. He rejoiced particularly in the result of these communications; because he had for many years advocated the establishment of a colony in North Australia, and he had always held to the opinion that it would turn out a good country for settlement. He believed the isothermal lines were not similar in North Australia and in the southern parts of India and the Malayan Archipelago. The extent of the Indian Ocean on both sides of the peninsula of Hindostan communicated great heat to that portion of land; whereas in Australia, with great breadths of land and high plateaus on either side, there were geographical reasons for a different arrangement of isothermal lines which even in theory explained the facts that had been brought before them by Mr. Landsborough and others. He agreed with Sir Charles Nicholson that North Australia ought to be formed into a new colony. In the maps of the Society of Useful Knowledge in 1848 they would find North Australia mapped out under that name. It was then a country without inhabitants, without prospects, without the least notion on our part of anything being realised there, except that Captain Stokes had disembarked in the southern part of the Gulf of Carpentaria, and had very appropriately given to that land the name of the "Plains of Promise." These were very gratifying facts to old geographers; and he was much delighted with the result of the discussion. He begged, on the part of the Society, to return their most hearty thanks to Mr. Landsborough and Mr. Middleton.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Extract of a Letter from* DR. BEKE *to* SIR RODERICK I. MURCHISON.

MY object is to direct attention to what may be called the Delta of the Ethiopian Nile—formed when the Delta of Lower Egypt was not—which has a material effect on the latter; for, whatever may be the source of *the waters* of the inundation of Lower Egypt, it is the Atbára which brings down from the Upper Delta *the slime* which fertilizes the land.

The extensive *alluvial* plains of Ethiopia, which have thus been abraded and carried down by the Nile to form and fertilize Lower Egypt, are those to which Mr. Samuel W. Baker has recently drawn attention as "a possible source of an abundant supply of cotton," and which (as you will perceive from the enclosed document) I brought to the notice of Her Majesty's Government *thirteen years ago;* this being, in fact, the source whence the Egyptian cotton was derived, which forty years ago did not exist, and now in this present year is calculated to produce 150 millions of pounds in weight!

2. *Extract of a Letter, dated Gwadur, 5th April, 1863, from* Mr. WALTON, in charge of the Line of Telegraph from Kurráchi to that Port, to Major F. Goldsmid.

THE double line to Ormara was only completed in the middle of January. You can imagine the work it has been, getting tons of iron posts and wire up the Malan, over 2000 measured feet in height. From Kurráchi to Sonmeani I kept near the regular track. From Sonmeani onwards I kept well to the northward of your route,* striking a straight line over the hard sand-hills near the inland lake Seerundo, then meeting your track again at Buddo. I went to Churr and Poor-i-Soont, near the pilgrims' path in *bad weather*—not by the path you adopted, which is the fine weather pass, and likely to be sometimes flooded. From Poor-i-Soont I kept well to the northward of your route, hugging the Háro Mountains to Aghor, and spanning the cleft in the mountains caused by the Hingole flowing through. Then, instead of turning to the north, *viâ* Hinglaj, I found a valley called the Shum Valley, which leads out to the sea, although it was full of "shor" and other abominations peculiar to Mekran.† I considered this my best route, bearing in mind my settled determination to span the eastern face of the Malan. Over a mile and a-half of most difficult "shor" hills between the Shum Valley and Malan Bay the line runs along to the foot of the eastern precipice. The exact height of the drop here is 1620 feet, and it is taken over the level plain at the top to the back of the Khor Butt Valley. Up the rock at this point I cut a road, up which material was brought by manual labour—no easy job, considering each post weighs over 2 cwt., and each mile of double wire 12 cwt., at least. Then down the Khor Butt Valley and along the sea-side to the Manheji, which is spanned by masts close to its mouth. Thence in a north-west direction, in order to cross the Gorhud at a narrow place five miles inland, and keeping the line about that distance from the sea, and to the north of your route, we strike down the isthmus into Ormara on the western side, in order to avoid the drift sand-hills. . . . . From the top of the Ormara isthmus I struck off direct for Bussole, keeping well under the hills to clear the Kulmut swamp,‡ and following your route to Shor Kundi; then, instead of going by the sea-side, we go through the "Shor" ranges, and come out at the back of Pusint. From Pusint I struck a line direct to the *mouth* of the Shinzánee, and, spanning this, made direct for Mehmed-i-Bul; then, cutting through the Kurwal "shors" to Barambah, the line will come in at the back of the Mêdee to Gwadur.§ . . . . I need not tell you of the physical difficulties of the country we have come through. The want of water in many places has driven us to endure great hardships. A body of 25 Europeans and 600 natives passing through this utterly barren country must expect to meet with very great difficulties. Often I have been obliged to prohibit ablutions of any kind, and to place guards with drawn swords over dirty puddles; but, thank God! we have nearly completed our undertaking now with a trifling loss of men, and not very serious loss of camels. From Kurráchi the double line is completed and working to Shor Kundi, and from Pusint to the Karwat Pass; and the line will be entirely finished ‖ by the end of this month. Both Europeans and natives have throughout behaved excellently, and, by enforcing the strictest discipline, I have now nearly got through the enterprise without a grumble. Of course, all had to be fed from Kurráchi; and the posts being

* Par. 10 of Major Goldsmid's printed Report, and more particularly par. 12.
† Par. 13 of ditto.
‡ Par. 15 of ditto.
§ Par. 18 of ditto, and Mr. Ryland's Report in Appendix.
‖ Reported complete by last mail.

all of iron, brought from England, were distributed eighteen to the mile, and required many camels, which were likewise almost entirely supplied with provender from Kurrachi. We are all exhausted, and glad our labours are near an end, as the hot weather has again set in, and many deaths are occurring among the natives. . . . . I have given Mr. Mansfield some curious fossils from the top of the Malan. Government should send a qualified geologist there. It is covered with wonderful fossil remains.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

SESSION 1862–63.

Thirteenth Meeting (ANNIVERSARY), 1 P.M., *May 25th*, 1863.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

THE Chair having been taken at 1 P.M. by the President, Sir Roderick Impey Murchison, K.C.B., the Minutes of the former Meeting were read and confirmed.

The regulations respecting the Anniversary were next read, and the Chairman appointed Commander Chas. Bullock and the Rev. James Worthington, D.D., Scrutineers for the Ballot.

The Earl of Belmore; Frederick Bullock, Esq.; H. H. Browne, Esq.; Edward Clowes, Esq.; the Rev. H. G. Clements; M. P. Edgeworth, Esq.; Thomas F. Hall, Esq.; Charles John Leaf, Esq.; Viscount Milton; Francis Snowden, Esq.; Dr. George E. Spickernell; the Hon. Henry P. Vereker, LL.D.; Henry Waite, Esq.; Sir John P. Boileau, Bart.; Dr. W. Buchanan; John Brunton, Esq.; Thomas F. Callaghan, Esq.; S. W. Courtenay, Esq.; G. F. Heneage, Esq.; Sir Thomas D. Lloyd, Bart.; Captain Lovell; W. Winwoode Reade, Esq.; R. H. St. Andrew St. John, Esq.; John Taylor, Esq.; William O. Whyte, Esq.; Chas. N. Welman, Esq.; and Lieutenant-Colonel the Chevalier Sonklar von Instätten, as Honorary Member, were proposed as Candidates for admission into this Society, and their Certificates were accordingly directed to be suspended in the Office until the next ensuing Meeting.

The Report of the Council, with the Balance Sheet for 1862, was then read and adopted.

In the absence of Mr. F. T. Gregory, the President delivered the FOUNDER'S GOLD MEDAL to Mr. Spottiswoode on behalf of Mr. Frank T. Gregory for his successful explorations in Western Australia, during which he determined, astronomically, 58 positions for latitude, and 19 for longitude.

The PATRON'S GOLD MEDAL was awarded to Mr. John Arrowsmith

for the very important services he has rendered to geographical science in general, and especially to the Royal Geographical Society, from its foundation to the present time.

A GOLD WATCH was presented to Mr. W. Landsborough; a similar watch to Mr. Thomas Middleton for transmission to Mr. John M'Kinlay, and a third to Mr. F. Walker, for their successful explorations in North Eastern Australia.

The Anniversary Address was then read by the President, to whom a unanimous vote of thanks was passed, coupled with a request that he would allow the Address to be printed.

The Ballot having been concluded, the Chairman declared that the changes advised by the Council had been adopted, viz.:—The vacancy among the Vice-Presidents caused by the retirement of Major-General Portlock, to be filled by Viscount Strangford; that in the list of Secretaries by the resignation of Francis Galton, Esq., to be filled by Clements R. Markham, Esq.; and those among the Ordinary Councillors by the retirement of John Arrowsmith, Esq.; Sir George Back; Thomas H. Brooking, Esq.; Earl Ducie; Colonel Lefroy; Clements R. Markham, Esq.; Dr. Rae; Viscount Strangford; and Count Strzelecki, to be filled by Colonel G. Balfour; James Fergusson, Esq., F.R.S.; Sir Thomas Fremantle; Francis Galton, Esq., F.R.S.; William Hamilton, Esq.; Sir Charles Nicholson; Commodore Alfred Ryder; the Earl of Sheffield; and Colonel Henry Yule.

The thanks of the Society having been voted to the retiring Vice-President and Members of Council, and after some remarks on the recent changes by Drs. Worthington and Webster, the Chairman in conclusion announced that the customary Annual Dinner of the Society would be held the same evening at Willis's Rooms, and the Meeting thereupon adjourned.

PRESENTATION

OF THE

ROYAL AWARDS

To Mr. F. T. GREGORY for his successful Explorations in Western Australia; and to Mr. JOHN ARROWSMITH for the very important Services he has rendered to Geographical Science in general, and especially to the Royal Geographical Society from its foundation to the present time.

GOLD WATCHES, bearing honorary Inscriptions, were also awarded to Mr. WILLIAM LANDSBOROUGH, to Mr. JOHN M'KINLAY, and to Mr. FREDERICK WALKER, for their successful Explorations in Australia.

The President, after recapitulating the reasons assigned in the Report of the Council for the adjudication of the Founder's Medal to Mr. Frank T. Gregory, enlarged upon the importance to geographers as well as to colonists of the last researches of that gentleman, in which he had so successfully and with such precision explored a large well-watered and fertile region to the north-east of the colony of West Australia, and had thus won for himself a renown which placed him side by side with his distinguished brother, Mr. Augustus Gregory, the intrepid explorer of the northern and north-eastern shores of that great continent. He further remarked, that among Australian surveyors and astronomical observers, Mr. Frank Gregory had rendered himself conspicuous by collecting geological specimens; in doing which, on the occasion of one of his former journies to the west and south-west of the settled country, he was the first to assign the true age of certain secondary formations, the existence of which in Australia had been previously unknown. Having particularly adverted to the foresight and sagacity displayed by Mr. Gregory in organising his last great expedition during his previous visit to England, the President spoke of the gratification he had himself experienced when, supported by the Council, he obtained from his Grace the Duke of Newcastle, Her Majesty's Secretary of State for the Colonies, a grant of one-half of the ways and means, without which this great addition to our acquaintance with the shores and interior of North-Western Australia could not have been brought about.

Sir Roderick then expressed his regret that in consequence of the anniversary having occurred during the Whitsuntide recess, his Grace the Duke of Newcastle, and both the Under-Secretaries of State for the Colonies, were out of town, and therefore unable to attend that day to receive the Founder's Medal, which, however, he would transmit to Mr. Chichester Fortescue, M.P., who had taken

a very active and friendly part in supporting the project of Mr. Frank Gregory, as recommended by the Royal Geographical Society, and who therefore, together with his chief the Duke of Newcastle, deserved the best thanks and acknowledgments of the Society.

Having handed the Founder's Medal to the Secretary, Mr. W. Spottiswoode,

The President then said that he never had been more gratified than when the Council adjudicated the Patron's Medal to his old and valued friend, Mr. John Arrowsmith, who would unquestionably have received the honour long ere this had he not himself, by his continual advocacy of the claims of distant travellers and surveyors of our colonies, rendered unavailing our endeavours to confer upon him a distinction so well merited. The perspicuity and fidelity with which Mr. John Arrowsmith had laboured for many years in analysing and comparing the often crude and hastily-constructed sketch maps which travellers brought home from distant lands, and the pains he took, irrespective of any pecuniary profit, to delineate such fresh knowledge on his maps, have justly rendered his name famous among practical geographers. "Let us say," added the President, "that there is a peculiar fitness in seizing the present opportunity of presenting the Patron's Medal to Mr. Arrowsmith, inasmuch as in consequence of the number of years he has served on the Council, he retires, for a year only I hope, from his seat at our board, and as his modesty has prevented him from attending to-day, I feel fully justified in saying that every one in this assembly rejoices with the Council and myself in seeing this recompense bestowed on so eminent and practical a geographer as John Arrowsmith."

Reverting to the consideration of the explorers of Australia, the President then said that in his Address he would dwell so emphatically on the value of the explorations of McDouall Stuart, Landsborough, M'Kinlay, and Walker, that it was unnecessary he should now advert to their great merits.

The first-named gentleman had already received the highest honour the Royal Geographical Society had it in its power to bestow, not merely on account of his adventurous expeditions across the interior of Australia, but also because he had made accurate and therefore most valuable geographical determinations of latitude and longitude.

To Messrs. Landsborough, M'Kinlay, and Walker, the Council presented gold watches, with suitable inscriptions.

The President then addressed Mr. Landsborough in highly complimentary language, the purport of which is to be found in the Address, and that gentleman made an appropriate reply.

The watch of Mr. M'Kinlay was delivered to his companion, Mr. Thomas Middleton, who, as well as Mr. Landsborough, gave a graphic account of some of the peculiar characteristics of the countries traversed, and the difficulties they had to surmount.

The watch voted to Mr. Walker was confided to the care of the Secretary, for transmission to that gentleman.

ADDRESS

TO THE

ROYAL GEOGRAPHICAL SOCIETY.

Delivered at the Anniversary Meeting on the 25th May, 1863,

BY SIR RODERICK IMPEY MURCHISON, K.C.B.,

PRESIDENT.

GENTLEMEN,

IN this, the Ninth Anniversary Address which I have had the privilege of delivering to the Fellows of the Royal Geographical Society, I have to claim your indulgence yet more than on previous occasions, inasmuch as, besides the enlargement of our subjects of inquiry, my numerous other public avocations have prevented my devoting sufficient time to the preparation of the matter to which I have now to call your attention.

Like the noble Lord, my immediate predecessor, however, I am happily able to begin with hearty congratulations on the continuous rise in the prosperity of the Society, and the great increase of our members; albeit that the hand of death has stricken too many of our associates, and among them men of distinguished eminence.

In the Obituary, with which I commence, I will dwell only on the character of those of our Members who were either known as geographers, or distinguished in public life, science, letters, and the arts: yet, even when so restricted, the list, I regret to say, is sad and long.

OBITUARY.

WHILST no practical or scientific British geographer of note has been taken from among ourselves since the last anniversary, we have to

condole with our allies the French on the loss of a man who, during a long life, has greatly and steadily advanced our science, and who was justly elected in our earliest days a Foreign Member of our Society. M. JOMARD, a native of Paris, was born in 1777, and at the period of his death had therefore reached the great age of eighty-five years. By pursuing in his youth those studies in physical science in which our sister country is so distinguished, he laid the foundation of that eminence which he subsequently attained. When but twenty-one years of age, he was chosen one of the corps of *savans* who accompanied General Bonaparte to Egypt; and hence it was that, in the last year of his life, he and my lamented friend the late eminent geologist Baron Cordier, who died in the same year, were the only two remaining members of that very remarkable group of men of science. Just as Jomard was vigorously occupied up to the last days of his life in promoting geography, so Baron Cordier, when aged eighty-four years, explored a large portion of the Alps on foot, and returned to Paris to resume his last lectures at the Jardin des Plantes, which he delivered with his accustomed vigour. Honour to the great soldier, who, at a moment when his countrymen had hardly emerged from the shock of a mighty Revolution, insisted on being accompanied to the classic soil of Egypt by such a scientific body-guard! For, although that expedition ended in a military disaster for France, yet, by her illustrations of the famous days of the history of Egypt, she acquired a reputation which will survive many of the glories of her warlike deeds in arms.*

To proceed, however, with the sketch of the life of the young savant who returned from the campaign in Egypt. Having by great perseverance succeeded, after years of labour, in preparing for publication the great work of his associates and himself, entitled 'Description de l'Egypte,' M. Jomard visited England after the peace in the year 1814; and, through the influence of Sir Joseph Banks and others, he obtained permission to take casts of those

* I may here say, that, notwithstanding this great example set us by the French, England totally neglected the opportunity recently offered to her in the war of the Crimea, in not attaching any men of science to the British army. In fact, when the army was leaving our shores in 1854, an earnest appeal which was made on the part of the scientific Societies of London, in which I took an active part, was rejected. It thus came to pass, that, after all its marches in Bulgaria, and long campaign in the Crimea, few or no real additions were made to our acquaintance with the physical geography, geology, or natural history of those countries. The want of a consulting geologist was indeed sorely felt at the siege of Sebastopol, when the necessity of sinking artesian wells for potable water became imminent; and then I was uselessly consulted on the subject.

great Egyptian works of art which he had admired when he thought they were destined for his own Louvre, but which the fortune of war had brought to our British Museum. Acquiring an insight whilst among us into the new system of education, that of mutual instruction, we next find him giving his first lecture at Paris on elementary education, on the very day of the battle of Waterloo! In 1818, in recompense for his antiquarian researches, he was elected a member of the Academy of Inscriptions and Belles Lettres. Successively, indeed, he became a member of nearly all the scientific Academies and Societies of Europe; but in this place and on this occasion our chief ground for honouring the memory of M. Jomard is, that, having earnestly contributed to found the Geographical Society of Paris, he was during forty-one years one of its most active and zealous members, and often acted as President or Vice-President of that body. His memory has truly another special claim upon our acknowledgments, inasmuch as he was the organizer and administrator of a new department in the National Library of France for the collection and arrangement of the maps of all nations,—a situation for which his acquaintance with many languages, and his active correspondence with geographers of other countries, singularly well fitted him.

In addition to his numerous writings on Egypt, M. Jomard has largely augmented our acquaintance with the geography of Africa by his liberal encouragement of travellers. One of the most striking proofs of this leading feature in his character was the warm manner in which he took up the cause of the poor traveller René Caillaud, and his efficient superintendence of the publication of a work which established the truthfulness of the journey to Timbuctoo of that poor, half-educated, yet enterprising Frenchman, who had been unjustly stigmatized as an impostor.

Rivalling the eminent Portuguese geographer, the Vicomte de Santarem, in the collection of maps and records from the earliest periods, M. Jomard brought out, entirely at his own cost, amidst various other important documents, the Map of the World by Juan de las Casas, the pilot of Columbus. During the last twelve years of his indefatigable labours, we learn from his gifted biographer M. de la Roquette, that he prepared a memoir, adopting the theory that Arabia had been the source whence the population of Egypt had been derived. Besides taking a lively interest in the construction of the canal of Suez, in the formation of the Acclimatisa-

tion Society of Paris, and in archæological researches, it is well known that, when arrested by death, he was, even at his great age, preparing a new edition of his collection of Maps, with a general Introduction.

When we look to M. Jomard's contributions to the great work, 'Description de l'Egypte,' which were thirty in number, to his notices in the 'Comptes Rendus' of the Institute, and in the 'Journal des Savans,' with his numerous writings in the Journal of the French Geographical Society, as well as to his communications to our own, we cannot fail to admire the untiring energy of our honoured Foreign Member. Of this venerable man I can truly say with his associate, biographer, and eminent colleague, M. de la Roquette, that his hospitable house was equally open to foreigners as to Frenchmen, and that he gave to all such a kind reception, that, whether we view him as the enlightened commentator on, and analyst of, all geographical labour, the energetic promoter of our science, or the warm and kind friend of all his associates, M. Jomard will ever be remembered as one of the true benefactors of this age.*

The late Viceroy of Egypt, SAID PASHA, had been so kind a friend to all English travellers, that when His Highness recently visited our metropolis we did honour to ourselves in electing him a Fellow of the Society. In thanking His Highness for his good will towards my countrymen, I expressed a hope that he might be able to aid Captains Speke and Grant in their efforts to discover the sources of the Nile, adding that I feared the difficulties they would have to encounter were in regions beyond his territories. "Still (replied the Pasha), I shall have it in my power to help them; for be assured that my frontiers are very elastic."

We have lost another of our Foreign Members in Dr. HAMEL, a member of the Imperial Academy of Sciences of St. Petersburg. Dr. Hamel was a man, of knowledge, ability, and great perseverance, who had travelled much, observed keenly, and was well known to men of science in most parts of Europe and America.

The Marquis of LANSDOWNE.—Of our own countrymen and Fellows of the Society who have died in the past year, I will first speak of that venerable and illustrious nobleman, the Marquis

* For a full account of M. Jomard's writings and proceedings, see the excellent sketch of him by his friend, M. de la Roquette. (Bulletin de la Société de Géographie, tome v., Février, 1863, p. 81. With a portrait.)

of Lansdowne. The demise of this venerable statesman, in the eighty-third year of his age, has justly called forth from men of all classes and of all pursuits the expression of their admiration of his enlightened, patriotic, and noble character. It is not for the President of this Society to attempt to pronounce an eulogy worthy of such a man; for that has been well done by the leading statesmen in both Houses of Parliament, whilst every section of the daily press* has vied with its fellows in bearing testimony to the truly honourable and distinguished career of the Marquis of Lansdowne.

Men of letters and the cultivators of the Fine Arts have had, indeed, to deplore the loss of one who was not only their kind and considerate patron, but who was also the accomplished judge of the merits of their works. Let us, then, as followers of a branch of science which is closely allied to historical research and literature, put in our claims to say a few words in praise of a scholar who was a lover of comparative geography, and who took as lively an interest in the well-being of our Society as if he had been one of our labouring associates.

In truth, Lord Lansdowne was endowed with so capacious a mind and such broad sympathies, that he always showed the strongest desire to extend every branch of human knowledge; and seeing before me, on this occasion, various explorers of distant lands, let me say that no mansion in our metropolis was ever more freely thrown open to any distant traveller than Lansdowne House. Nor can any such traveller ever forget the urbanity with which he was received, and the tact and happy discrimination which the noble host displayed in eliciting the knowledge of his guest.

On my own part I can testify, that when (in 1840) I first went out to explore Russia and the Ural Mountains, and compare their distant rocks with those ancient formations of my own country, the order and relations of which I had elaborated, it was Lord Lansdowne who procured for me, through the Russian Ambassador, Baron de Brunnow, those credentials, without which my labours would have been in vain. This was indeed but one of the many proofs he gave me of his kindness and regard. Consistent as a Liberal in every sense of the word, and a warm supporter of his political friends, Lord Lansdowne never neglected an opportunity of doing a service to persons of merit who were of opposite politics;

* See particularly 'The Times.'

and it was in thus giving proofs of a general spirit of benevolence that he became universally beloved and respected.

As a Trustee of the British Museum, Lord Lansdowne was for many years eminently useful in the Department of Antiquities; and his advice was always sought when a union of learning with a true feeling for ancient art was required. Nor can I forget that, when all his friends in the present Government had, as his co-Trustees, come to the conclusion that it was expedient to break up the British Museum by severing from it its Natural History contents, Lord Lansdowne then, in the last year of his valuable life, qualified his unwilling assent in a letter, expressing his regret that an adequate expenditure could not have been obtained to keep united those memorials of Art, Letters, and Science in the one great and unrivalled national repository which he had so long admired.

Lastly, as a Scotsman, I have some right to be proud when I remind you that the deceased Marquis, as well as the living Premier and the Secretary for Foreign Affairs, received an essential part of his education in the University of Edinburgh; and it must, indeed, be pleasing to all my countrymen of the north to reflect that the names of Dugald Stewart and John Playfair will go down to posterity as the instructors of a Lansdowne, a Palmerston, and a Russell.

The Right Honourable Sir George Cornewall LEWIS, Bart., M.P.—I have next to record the premature decease of my eminent friend, Sir George C. Lewis, in the fifty-eighth year of his age. Receiving his elementary education at Eton, George Cornewall Lewis took the highest classical honours at Oxford. Afterwards, and under the guidance of his accomplished father,* with whom I was long on terms of intimacy, he laid in those stores of ancient lore which in subsequent years, and when the public only knew him as a statesman, enabled him to compose abstruse works, the production of which, with ordinary men, would have been incompatible with onerous official duties. The great amount of knowledge which he had accumulated was, in truth, the result of those years of hard and patient research which preceded his being called into public life. It was this solid training which enabled him to write so many learned works, that it has been justly said of him that "he did as much in his life as twenty ordinary men, and did it well." †

* The Right Hon. Sir T. Frankland Lewis, Bart.

† 'The Times.'

Sir George's associates in the House of Commons and in the Cabinet in which he sat, having all testified their deep sense of the loss the country has sustained in his death, it would be superfluous in the President of this Society to enlarge on the topics by which he characterised his public career, and for which he will ever be remembered by the nation; but, as one who was proud of his friendship, I must be allowed to record my personal obligations to him.

In the year 1833, or two years only after he had been called to the bar, and before he had himself published any work, young George Lewis, then residing with his excellent father at Harpton, was so much struck with the geological observations I had made in his own county of Radnor, and in the adjacent Welsh and English counties, that he urged me to gather together and condense my materials in one large work. In a subsequent year, and after I had classified and shown the order of those ancient rocks in the old British kingdom of the Silures, under the name of "Silurian," he again urged me to write a distinct work by putting together all my detached memoirs; and thus it was that, in 1835, I announced the "Silurian System" of rocks, the large work which I completed, after seven years' labour, in 1838. I need not say that this sound advice of the thoughtful young George Lewis was of inestimable value to his older friend, and has ever since been gratefully remembered.

Whoever has had the privilege of being an inmate of the house at Harpton, whether in the lifetime of that most agreeable and enlightened man, Sir Thomas Frankland Lewis, or afterwards during the happy union of our deceased Fellow with the charming and gifted lady who mourns his loss, must have been struck with the perfect cordiality and harmony in which father and son, husband and wife, lived together; leaving in the minds of all their visitors in the vale of Radnor a souvenir never to be forgotten.

In whatever aspect we view the late Sir George Cornewall Lewis, whether as the statesman around whom as a nucleus men of all parties might have rallied in a future day; as a scholar "who might have done honour as a Professor of Greek to the most learned University in Europe;"* as a son, a husband, or a friend;—all those who knew him must agree with me when I affirm, that he was as faultless a type of humanity as any man of this generation—one of

* See Dean Milman's Preface to his 3rd edition of the 'History of the Jews.'

whom it has been justly said by a great orator of the House of Commons *—

"Justissimus unus,
Qui fuit in Teucris, et servantissimus æqui."

Sir Benjamin BRODIE, Bart.—This remarkable man, for whom, in common with every one who knew him, I had the sincerest regard, was not taken from us until he had attained the highest distinction to which any man of science can aspire. Rising steadily in his profession by the exercise of a judgment at once quick, acute, and sagacious, combined with a happy operative dexterity, he became and long continued the leading surgeon of this metropolis. But, in pursuing his profession, Brodie never for a moment neglected the cultivation of other and higher branches of knowledge; and even at an early age he was admitted into the Royal Society, and contributed in that capacity several excellent memoirs on physiological subjects. He thus attracted the attention of Sir Joseph Banks, then the President of that body, obtained a high reputation as a physiologist, and with it the Copley medal.

Though for many years absorbed in active anatomical and surgical pursuits, he ever strove to advance the collateral sciences of Natural History and Chemistry; and, while he acted as President of the College of Surgeons, he was ever anxiously at work in promoting the completion of that grand and noble Museum, founded by his illustrious predecessor, John Hunter.

As he gradually withdrew from his active professional career, Sir Benjamin naturally went back to his early scientific love, and thereon his numerous friends and admirers fixed upon him as one who, by his attainments as well as by his honourable character, was eminently entitled to occupy the chair of the Royal Society. In that capacity he gave universal satisfaction by his courteous demeanour, while he had a pleasure in restoring to the Society a portion of the character it had when he entered it. In the days of Banks and Davy, men of any importance in public life, or of any considerable stake in the country, who though not scientifically qualified were yet lovers and supporters of science, were frequently admitted as Fellows. This system having been somewhat abused, and persons with no claims to distinction having been admitted by ordinary ballot, a great reform was called for; and it was decided that fifteen only of

* See Mr. Gladstone's Speech, May 4th, 1863.

the most distinguished men among the numerous candidates were thereafter to be annually selected by the Council. Although the working of this rule has been on the whole excellent, the good sense and right feeling of Brodie led him to the conviction that the plan was rather too exclusive; and hence he suggested the introduction from time to time of men of public distinction or utility, in addition to the exclusive selection of scientific workmen and authors.

As a Trustee of the British Museum, his sound advice was valuable on all occasions; and I had good reason for admiring the heartiness and independence of spirit with which he signed and afterwards personally supported an appeal to the Government, which I had drawn up, praying that the old British Museum might not be dislocated, and its Natural History contents translated to Kensington.

It is not to be forgotten that this eminent and good man served as a Vice-President and as one of the Council of our Society; for, amidst all his busy occupations, Sir Benjamin Brodie found time to cultivate and take much interest in geographical researches, and particularly in that branch of it which connects us with Ethnology. In every relation of life he was a model to be admired and imitated; and he so happily educated his son, that the present Baronet is now one of the leading scientific men of the day, and Professor of Chemistry in the University of Oxford.

The Marquis of BREADALBANE, K.T.—By the demise of the Marquis of Breadalbane I have lost a kind and valued friend, who, though he made no pretensions to science, delighted in associating himself with its cultivators. He was well read in mineralogy, and earned the praise of naturalists by acclimatising the animals of other countries in his beautiful grounds at Taymouth, including the Llama of South America and the Bison of the American Prairies. To him also we owe the re-introduction into the Highlands of the Caper-cailzie, or Great Cock of the Woods.

In every sense of the word, Lord Breadalbane was a great nobleman; and whatever he resolved to do he did it thoroughly, and, if occasion required, magnificently. Having for many years served the Queen as Lord Chamberlain, he was as highly esteemed by Her Majesty and her illustrious Consort, as he was beloved by his friends for his fine social qualities; whilst his munificent Highland hospitality, whether at Taymouth, at the Black Mount, or on the Queen's birthday in London, will be long remembered by foreigners, as well as by our countrymen.

In 1840 he presided over the Meeting of the British Association at Glasgow; and, as I then acted under him as a General Secretary, I am enabled to testify, that, under his leadership, the men of science were most effectually supported by the nobility, gentry, and all classes of the inhabitants of Scotland.

Honest, patriotic, straightforward, and highminded in his public career, he was very sincere in his private attachments. He was, indeed, so deeply affected by the loss of his accomplished wife in 1861, that from that moment he lost, and never recovered, his wonted elasticity of spirit. He died at Lausanne, in the 67th year of his age.

The Earl of GIFFORD, though not professing to be a geographer, was greatly distinguished by distant travel. Wandering far into the higher recesses of the Himalaya Mountains, and through tracts seldom if ever before explored by Englishmen, he underwent great suffering from intense cold. Among his contributions to Natural History, it is to be remembered, that, being an ardent sportsman and a good shot, he killed in these mountains the Kiang, one of the very rare wild asses (*Equus Kiang*, or *Asinus Hemionus*, Gray), an animal not previously seen by our naturalists, and the skull and skin of which are now in the British Museum,* while a living specimen is to be seen in the Gardens of the Zoological Society.

As a member of the House of Commons, Lord Gifford was of great use in the Dockyard Commission, the masterly Report of which was written by him, and has often been referred to in Parliament, as displaying equal ability and integrity. One of his special studies, indeed, was that of Finance; and I learn from his accomplished and devoted widow, that he left behind him an unfinished financial work, to the completion and publication of

* It is also to be noted that Lord Gifford's brother, Lord William Hay, after a residence of fourteen years in the region of the Himalaya, is the person who conveyed to us the first correct intelligence concerning the fate of the traveller Adolph Schlagintweit. He also made (with the assistance of Capt. Clarke, Bengal Cavalry) the most striking photographs of many lovely scenes around Simla, including Lord Dalhousie's famous mountain-road to Thibet, as well as views of the snowy peaks of Ladak, the gorges of the Sutlej, the Valley of Kashmere, &c. The characteristic foliage of the forests of Deodora and each group of native trees, the striking and bold features of the rocks, and even the climatal conditions of warm rains and snow-clad peaks, the form of buildings, and habits of the people, are all so well brought out, that geologists, botanists, architects and engineers must unite with geographers in admiring these scenes of nature and art. It is a remarkable circumstance that four sons of the Marquis of Tweedale should have traversed the Himalaya to the plains of Thibet, viz., the late Lord Gifford; Lord Arthur (now Lord Walden), who brought home many new species of birds; Lord William, as above; and Lord Frederick, who killed many of the wild horses mentioned in the text.

which she had looked forward with sanguine hope and pride, as calculated to make his talents known to the world in the most useful and worthy form.

Lord Gifford was not only a good mechanic, he was also a sound mathematician and a scientific musician, having written a treatise on Counterpoint at the age of twenty. His appreciation of the Fine Arts was intense; and he had such a facility for modelling, that, if born in a humble walk of life, and not as heir to a marquisate, he unquestionably would have been eminent as a sculptor.

Dexterous in every manly exercise, he lost his life through his energy in sustaining a heavy mass of wood, from which some workmen whom he was directing had loosened their grasp, thus suddenly throwing a vast weight upon him. The inflammation occasioned by this accident led to an illness of sixteen months' duration, of which he died on the 22nd of December last, in the fortieth year of his age.

All the friends of Lord Gifford (and I am proud to have been of that number) know well, that an ingenuous simplicity was combined in him with the clearest intellect and the kindliest disposition; whilst, in addressing geographers, I can assert, that the explorers of difficult and inaccessible regions have, by his death, lost a truly distinguished rival.

The Earl of ELLESMERE.—Six years, alas! only have elapsed since it was my painful duty to recount to this Society * the merits of my gifted friend, one of our former Presidents, the first Earl of Ellesmere. His successor, the young Earl, who has since passed away, was so infirm in health when he succeeded to his title, that a long life could scarcely be hoped for him. Though little known in public life, I am bound, however, to say of him, that he was a good scholar, a sound mathematician, and that he felt real pleasure in taking his place in the Royal Society, as well as in our own body. He also proved himself to be a son worthy of his accomplished parent as the patron of the Fine Arts, and as a great landed proprietor he sought to promote the good of all around him.

Lucas BARRETT.—Geography is too intimately linked on to Geology to allow me to pass over the name of young Lucas Barrett, who, though cut off at a very early age, had already risen to distinction, and was Director of the Geological Survey of the West Indies. A pupil of Professor Sedgwick, he earned the full approba-

* See Obituary, Vol. xxviii.

tion of that eminent man by his skill as a palæontologist, and the able manner in which he classified and arranged the Woodwardian Museum at Cambridge. Having published several papers showing great acumen, he was, on the retirement of Mr. Wall, appointed Director of the West Indian Geological Survey. In that situation he displayed both vigour and ability, and, by his acquaintance with fossil remains, was enabled to show that the copper ores of Jamaica occurred in rocks no older than the chalk of Europe—a fact previously unknown. The Geological Map and Sections of Jamaica, which he exhibited at the late International Exhibition, and which his associate, Mr. Sawkins, and himself had prepared, were honoured with a medal. On returning to his post in Jamaica, he took with him a new diving apparatus to dredge for marine animals, and, through some maladjustment of the safety cord, he unfortunately perished when making his first trial; leaving a widow to lament the untimely end of this highly-gifted and promising young man of science.

Mr. James Robert GOWEN, who died since our last anniversary, was an intelligent Fellow of our Society. In addition to his fine temper and amiable social qualities, he had the merit of being the first of our body who recommended the employment of camels in the exploration of Australia; and, as was shown in the article on Australia in the President's Address of last year, it was by such means that the northern sea was first reached from South Australia and Victoria.

Mr. WILLIAM JOHN BURCHELL.—By the death of Mr. Burchell we have lost a venerated representative of the early race of South African travellers, as it is forty years since he undertook extended journeys into the Hottentot districts north of the Cape. He was an assiduous collector and a careful observer; and his narrative may be ranked among the classics of English travels, from its simple, vigorous, and truthful style, and its numerous illustrations, made with scrupulous fidelity on wood and stone, by his own hands.

By the decease of Mr. CHAMBERS, of Adelaide, the promotion of Australian surveys has suffered a great loss. Though not a man of science himself, he was the patron and employer of M'Douall Stuart. And if it be suggested that such an employment of our Medallist was chiefly caused by a desire to acquire new lands, may I not reply that it is by such bold and riskful methods of spending their capital—a boldness which is peculiarly characteristic of the Anglo-Saxon race—that Geography owes many a bright discovery and Commerce many

a useful end? In his employment and fitting out of Stuart, and from the manner in which he transmitted all information to this our Geographical Society, Mr. Chambers has shown much liberality, as well as his surviving partner, Mr. Finke.

Mr. EDMUND GABRIEL.—All those who take an interest in the suppression of the slave-trade will hear with regret of the death of Mr. Gabriel, Her Majesty's Judge in the Mixed Commission Court at St. Paul de Loanda, West Coast of Africa. Mr. Gabriel had been connected with that coast for many years, and was perhaps as instrumental as any man of his time in putting down the nefarious traffic. The son of a naval officer, Mr. Gabriel entered his father's profession at an early age, and served for seven years in the African squadron, twice filling the position of Secretary to the Commander-in-Chief on the station. In this capacity he acquired a perfect knowledge of the slave-trade in all its bearings. Early in 1845, his distinguished talents and zeal brought him under the notice of the late Earl of Aberdeen, then Foreign Minister, who selected him to fill, at the early age of twenty-one, the important post of Arbitrator and Acting Judge at Loanda. His energetic administration of this office was appreciated by the Liverpool merchants, who tendered for his acceptance a costly piece of plate, as an acknowledgment of his efforts for the protection of British shipping; but Mr. Gabriel, with his characteristic high-mindedness and delicacy, declined the valuable gift, remarking that he had only done his duty, and that it was not consistent with the office of a Judge to accept a present. Another very characteristic circumstance is recorded of him in Dr. Livingstone's well-known volume. When that great explorer, having crossed the African continent, reached Loanda in May, 1854, worn out by fatigue and sickness, he presented himself without introduction at the hospitable door of Mr. Gabriel, who immediately gave up his own bed to the sick and unknown stranger. Dr. Livingstone bears grateful testimony to the generous kindness of this "genuine, whole-hearted Englishman," in whose house he and his twenty Makololos found a home for many months.

In urging on the House of Lords (1861) the desirableness of reappointing a Consul at Mozambique, with a view to the suppression of the slave-trade on the east coast of Africa, Lord Campbell passed a well-merited eulogy on the character of our deceased associate, Mr. Gabriel, pointing him out as the man of all others most capable of checking the slave-trade in that foreign colony. It was on that occasion said of him, with justice, in reference to his career at Loando, that, "during a period of fifteen years, the volumes on

the slave-trade abound with proofs of his tact, judgment, public spirit, and intelligence."

We have only to add that Mr. Gabriel eventually fell a victim to the deadly influences of the climate, operating on a constitution impaired by the hard work of seventeen years. He died on board H.M.S. *Torch*, having gone afloat in the hope of recovering his health. After his death the vessel returned to Loanda, where his remains received the honours of a public funeral; the Viceroy, and other foreign authorities, with the inhabitants of the place, joining with his own countrymen in this mark of regard, the universal sentiment being one of deep sorrow for his early death.

Among the other Fellows of the Society who have passed away, I must mention, as personal friends whose loss I lament, Mr. James Walker, F.R.S., the eminent and well known Civil Engineer, whose valuable labours will be recorded in the proceedings of other societies; Mr. Antony St. Leger, an accomplished and most agreeable gentleman; and the amiable Mr. Walter Ewer, a skilful Orientalist and an accomplished civil functionary of our Indian Administration.

The remainder of the mournful list is made up of the names of Mr. David Barclay; Mr. George Smith Brent; Mr. John Costerton; Major-General John Fraser; Lieutenant-Colonel C. Fagan; Mr. George March Harrison; Mr. W. Jackson; Mr. Charles Hammersley; Mr. E. B. Lawrence; Captain Liardet, R.N.; Mr. H. Tanner, of Philadelphia; Mr. Francis Nares; Vice-Admiral A. Vidal (a distinguished officer); and the coloured Missionary, Mr. Hanson. The last-mentioned of these addressed us on African subjects in relation to the slave-trade and the new settlement at Liberia, with much feeling, and in good and racy English.

Mr. WHEELER, our first clerk, who died recently, was a great loss to the Society, and many of our Members have very properly subscribed to assist his widow and young children.

The different subjects of the Address which follow will be given in much the same order as in previous years. Beginning with the Admiralty Surveys, as furnished by our esteemed associate Admiral Washington, the Hydrographer, and succeeded by the national Topographical and Geological Surveys, the account of the progress of exploration in Africa and Australia will form the main features of this discourse. Brief sketches of the progress of Geography in Germany, more particularly as gathered from the publications in

the 'Mittheilungen' of Petermann, will be associated with communications on Asia, Japan, and Greenland, and some general observations on the present and former conditions of the northern regions of Europe, to show the intimate connexion between geological and geographical science.

Commenting very briefly on a few publications of books and maps in our own country, I will defer till the ensuing Anniversary any further observations on them and on the advance of our science in Russia and America. Nor will I till then attempt to take a general retrospective view of the progress of our own labours. On this occasion I will conclude with a few observations on the changes which have just taken place in the administration of our affairs.

ADMIRALTY SURVEYS.

The Coast Surveys in course of execution under the orders of the Admiralty, both at home and abroad, have made the usual progress during the past year. They are conducted by twenty different parties, one-half of which are employed in the United Kingdom; the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, Newfoundland, and Vancouver, and also on the foreign coasts of Syria, Saloniki, China, and Japan.

The British Isles. England.—The Coast Survey of the British Isles is nearly complete; but from the nature of the shores, particularly on the east coast of England, in the estuaries of the Humber and Thames, in Yarmouth Roads, the Downs, and other places subject to the accumulation of sands, changes will ever be taking place that will require watching and re-examination.

The South Devon Survey has been brought to a close, under Capt. Stokes, R.N.; and the re-examination of the Scilly Isles, by Capt. Williams, R.N., and of the Channel Islands, by Mr. Richards, R.N., is proceeding steadily. In the latter group, so beset with rocks and hidden dangers, a very critical search is required; and the careful system carried out by Mr. Richards has been rewarded by the detection of several shoals that had escaped the cursory method of previous surveys.

In South Wales, Commander Aldridge and staff have surveyed 40 miles of coast-line, besides 20 miles of sward or marsh outline, together with about 100 miles of low-water feature, and 108 square miles of soundings.

Mr. Calver, R.N., and party have finished the upper Humber, and re-surveyed a considerable portion (120 square miles) of the southern

entrance of the Thames. They were also engaged in making a series of observations on the tidal streams off Dover, with a view to assist the solution of the much-contested problem of the locality of Julius Cæsar's landing on our shores.

Mr. Scott Taylor, R.N., has continued his delineation of the several changes in progress in the vicinity of Portsmouth and the Isle of Wight.

Scotland.—Captain Otter and his assistants have been engaged in the survey of the islands of South Uist, Canna, and Rum, and have sounded over an area of 1182 square miles. Commander Thomas has continued his survey of the intricate shores of Benbecula and Harris, of which he has delineated 113 miles of the labyrinthine shores occupying a comparatively small area, and has sounded 246 linear miles in boats; while Commander A. G. Edye has surveyed 62 miles of the exposed islands of Barra, Muldoanich, Flodday, Pabbay, &c., as also the dangerous submerged rocks adjacent.

Commander (now Captain) E. J. Bedford and staff have surveyed 97 miles of the coast line of Lochs Linnhe, Leven, Etive, and Iel, and 107 square miles of adjacent topography, together with 194 linear miles of soundings.

Ireland.—Messrs. Hoskyn and Davis, R.N., were employed during a portion of the season in obtaining deep-sea soundings off the Western coast in H.M.S. *Porcupine*, for the purpose of determining the best route for the electric cable to America, should that gigantic and much-to-be-desired enterprise be again attempted; and which the indomitable energy and perseverance of English and American capitalists and engineers will doubtless undertake and accomplish; either by the direct route from Ireland to America, or by the more circuitous connexion of Færöe, Iceland, Greenland, and Labrador. This examination of the bed of the Atlantic to a distance of about 200 miles from the coast, has revealed some remarkable irregularities of contour; and among them is that of the Porcupine Bank, having a depth of only 82 fathoms at a distance of 130 miles west of Slyne Head. A line of soundings was also carried to the extensive and prolific, but, as appears from recent accounts, very uncertain fishing-bank, from which rises the remarkable and almost inaccessible lump of granite, "Rockall," to a height of 70 feet above the level of the sea, where its base is only about 250 feet in circumference. (Lat.: 57° 35′ 53″ N., 13° 42′ 21″ W.) Mr. Hoskyn's survey has added some interesting facts in microscopic life, and also some species of shells and other animals new to British Fauna.

Mediterranean.—Captain Spratt, R.N., with his staff, in the *Medina*, have during the past year completed an admirable survey of the Maltese Islands, with their surrounding depths. This has been charted on a scale of 1½ inch to a nautic mile, and is already in the engraver's hands. They have also delineated the shores of the Gulf of Saloniki, and obtained lines of deep-sea soundings through the Archipelago. Elaborate surveys have also been made of French Creek, and portions of Grand Harbour, Malta, on a scale of 60 inches to the mile, for engineering and other special purposes.

Commander Mansell and his staff, in the *Firefly*, have completed the coast of Syria, forming a junction at El Arish with his previous survey of the coast of Egypt. An extensive triangulation has been carried across the mountain ranges, by which the connexion of Damascus, and the chief points of interest along the valley of the Jordan, with the shores of the Mediterranean have now been accurately established. Commander Mansell has now commenced the re-examination of the channels of Corfu, which is much required.

Africa.—In the Cape Colony Mr. Francis Skead, R.N., has made a survey of Mossel Bay and adjacent coast, on a scale of 4 inches to a nautical mile, and has extended his triangulation for future observations.

Asia.—Along the Mekran coast of Persia, Lieut. A. W. Chitty, I.N., has closely sounded between Ras Jáshk and Ras Gwadel to distances varying from 10 to 20 miles from the shore, where the depths are from 200 to 400 fathoms.

Lieut. Stiffe, I.N., also obtained some additional soundings in the Persian Gulf, and examined various portions of the coast to determine the best stations for the telegraph-line which is to connect this country with our Indian empire, by route of Constantinople, Bagdad, and the Persian Gulf.

A plan of Bushire, by Commander C. G. Constable and Lieut. A. W. Stiffe, I.N., has recently been published by the Admiralty, on a scale of 3 inches to the mile.

China and Japan.—In the course of the preceding year H.M. ships *Rifleman* and *Swallow* left England for the survey of the China and Japan Seas. Mr. John W. Reed, Master, R.N. (commanding the *Rifleman*), and his staff, have already transmitted a good instalment of work, in the surveys of the Tambelan and St. Esprit groups, and the surrounding islets and rocks lying between Singapore Straits and Borneo. Meridian distances have been run between these islands, Singapore, Saigon River, and Pulo Condore; Charlotte

Bank examined and its position accurately determined; while the reported shoal Capiolani, lying (as well as Charlotte Bank) directly in the route between Singapore and Hong-kong, was sought for in vain. From evidence obtained relative to this supposed danger, it seems more than probable that the captain of the *Capiolani* was deceived in what he saw. The next work of the *Rifleman* will be the survey of Pulo Sapato, Catwick, and the several dangers lying to the south-east of Cochin China, in the high road of commerce, and from thence proceed to explore and define the numerous reefs that stud the China Sea between those and the coasts of Borneo and Palawan, one-half of which, as they now appear on the chart, are probably fabulous, so that the importance of establishing what really do exist in this much-frequented route cannot be overestimated.

Mr. Edward Wilds, Master, commanding the *Swallow*, with his staff, have carried meridian distances to Singapore, to Pulo Condore, Sapato, Hong-kong, and Shang-hai, and resurveyed the shallows of Wu-sung River, leading to the last-named place. The *Swallow* is now engaged in the Japan Sea.

During the season of 1861 H.M. ships *Actæon* and *Dove*, Commander Ward and Lieut. (now Commander) Bullock, R.N., were given the assistance of the *Leven* and *Algerine* gun-vessels, in their surveying operations in Japan, by order of Sir James Hope, K.C.B., the Naval Commander-in-Chief on that station.

The approaches to Yedo, extending from Cape Idzee to Cape King, an extent of 150 miles, and embracing the Bay of Wodewara and the Gulf of Yedo, have been surveyed on a scale of 1 inch to the mile, and a chart of the latter, including the joint work of American, Prussian and Dutch surveyors, has been published on the same scale. The chain of islands, extending about 3° south of the Gulf, has also been partially explored as far as Tatsizio, a large island which is said to be a penal settlement, and inaccessible except at one spot. Additional observations were made on the Kuro-Siwo, or Gulf-stream of Japan, which has been here found to recurve to the southward in the summer months, contrary to the generally received opinion.

At Yedo a manuscript survey of the empire, on a scale of 10 inches to a degree, was obtained from the Government through the instrumentality of Mr. (now Sir) Rutherford Alcock, K.C.B., our minister there. This acquisition is valuable not only as a correct map (for wherever tested it has been found to be both trigonometrically and astronomically accurate to a remarkable degree, although graduated

in a peculiar and original manner), but also as a work of art, illustrating the advanced stage attained by this extraordinary people in surveying, which will compare favourably with specimens of our own, published in the beginning of the present century. From this manuscript a new general chart of Japan has been published, on a scale of 2 inches to a degree of longitude, also a chart of the inland sea of Japan, on the scale of the manuscript, with soundings obtained by several of H.M. ships, by which, at the cost of a few days, this intricate labyrinth of rocks and islands is made plain to navigators, which otherwise would have occupied the surveying party a year. The approaches to this sea, embracing about 220 miles of coast-line, have been surveyed by Captain Ward and his staff, on a scale of 1 inch to the mile, and plans of several harbours on the shores of the Eastern or Kü Channel, on the 3-inch scale.

A new survey has also been made of the important harbour of Nagasaki, with that of the adjacent coast as far as Cape Nomo. All of which are in course of publication. The eastern sound of Tsusima and the southern part of the island have also been surveyed; whilst the northern portion of the hitherto unexplored arms of Tsusima Sound have been executed by the Russians, who have also roughly charted the island of Iki.

The depth of the Korea Strait has been ascertained, and the southern part of Goto Islands surveyed, where a fine harbour, called Tama-no-ura, has been discovered. Also a portion of the Korean Archipelago and coast opposite Tsu-sima, has been explored, by which it is thrown 20 miles to the westward of its assigned place on the chart.

A track survey, by Lieutenant Bullock in the *Dove*, was made of 100 miles of the south coast of the province of Shan-tung in China, from the parallel of 36° 40′ N. to within 60 miles of the old entrance of the Yellow River, which is now reported, with scarcely any doubt, to discharge itself into the Gulf of Pechili by the Ta-tsing-ho, a river known to have been gradually increasing its volume for three or four years; and by the destruction of the vast embankments that had confined it to its southern channel, it has resumed the old course in which it had previously flowed (though with frequent fluctuations) for centuries; thus realizing the prediction of Mons. Biot, made but twenty years since. Off the now dry southern mouth of the Hwang-Ho, its sands were found to stretch seaward 100 miles, rendering it dangerous for large ships to approach the coast even at this great distance.

The question of the geographical distribution of species has been advanced by the valuable collections and observations made by the eminent naturalist Arthur Adams, F.L.S., who was Surgeon of the *Actæon*. Mr. James H. Kerr, Master, R.N., with Messrs. Adlam and Dowdale, R.N., were detached from H.M.S. *Actæon* to survey the western branches of Canton River, of which they delineated upwards of 200 miles.

Australia.—The Australian Surveys, at the joint expense of the Admiralty and the Colonies, are progressing steadily; Commander Cox, R.N., and staff have nearly completed that of the noble inlet of Port Phillip, on a scale of 6 inches to a mile, a portion of which is now being engraved on the 1-inch scale.

Commander Hutchinson, R.N., and party have transmitted their survey of the upper inlet of Spencer's Gulf leading to Port Augusta (embracing about 100 miles of coast line), on a scale of 3 inches, with a plan of the port on 9 inches to a mile; a reduction of which will shortly be published; while their chart of the mining district of Wallaroo and Tipara Bays has already been issued.

Commander Sidney, in New South Wales, has transmitted home 50 miles of coast between Crowdy Head and Sugar Loaf Point, and also corrected the chart of Newcastle Harbour to its present condition.

Mr. Jeffery, R.N., who went out at a later period to the survey of the coast of Queensland, is engaged in the survey of the channel within Great Sandy Island.

In Tasmania Lieutenant Brooker, R.N. has made a survey of the Port of Hobart Town, which has been published on a scale of 10 inches to a mile; and also of George's Bay, on the east coast; but we regret to state that his further progress has been cut short in consequence of the finances of the colony being for the time incapable of bearing the moiety of the expense which it had agreed to share with the Admiralty.

Vancouver Island.—Through the indefatigable exertions of Captain G. H. Richards, R.N., and his staff in H.M.S. *Hecate*, the entire survey of this extensive island has now been completed, together with the strait separating it from British Columbia, with most of the inlets that deeply indent the latter. Captain Richards is now returning home, but has organized a party who remain behind to continue the exploration of the coast of British Columbia. A series of eight charts, on the scale of $\frac{1}{2}$ an inch to a mile, will embrace the entire coast of Vancouver; half of which, together with several

enlarged plans of harbours, have already been published. Much credit is due to those who have effected the able and rapid execution of this highly useful survey.

Newfoundland.—The survey of this island, on a scale and system corresponding with the requirements of the present age, is proceeding steadily under Captain John Orlebar, R.N. and staff. The portions of the coast of Trinity Bay lying between Catalina Head and Horse Chops on the west side, and between Baccalieu Island and New Perlican on the east side; also in Conception Bay from Baccalieu to Carbonière, and from Portugal Cove to Cape St. Francis, and thence to Cape Spear, together with Bell and Kelly Islands, have been surveyed on the scale of ½ an inch to the mile, while plans of Catalina, New Perlican, Harbour Grace, and St. John Harbours have been plotted on 3 inches to the mile. On the south coast the Bay of St. Mary, and the harbours within it, have been completed, altogether embracing 370 miles of coast line, added to which upwards of 2000 square miles have been sounded, extending eastward from the coast to the meridian of 50° West. The explorations in Trinity and Conception Bays, and the examination of the sea-bed in their approaches, were made more especially to determine the best point for landing the American end of the Great Atlantic Telegraph, which, it is to be hoped, will soon connect that country with Great Britain and Europe; and Captain Orlebar has reported that New Perlican, on the eastern side of Trinity Bay, seems to be best adapted for this purpose. For the laying of the first cable you may remember that Bull Bay, in the south-west angle of Trinity Bay, was the place selected for its western terminus.

Nova Scotia and Bay of Fundy.—Captain P. Shortland, R.N., with his staff, have mapped 162 miles of the south-east coast of Nova Scotia, on a scale of 4 inches to a mile, and sounded over an area of 282 square miles. Charts of the upper portion of the Bay of Fundy, embracing the Basin of Mines, and the Petitcondiac River and Cumberland Basin, as also of the south-east coast of Nova Scotia from Baccaro Point to Rugged Island, are about to be issued to the public.

West Indies.—The surveying party under Mr. John Parsons, Master, R.N., have completed about 70 miles of coast line of the Grenadines, St. Lucia and St. Vincent, and elaborately and closely sounded over 180 square miles. Plans of Admiralty Bay, in Bequia Island, and Kingston Bay, in St. Vincent, have been made on a scale of 20 inches to a mile, and of Castries Port in Santa Lucia on

15 inches, and very thickly sounded. Mr. Parsons is now engaged in an elaborate survey of Falmouth Harbour, Antigua, on a scale of 30 inches; this port having been selected as a packet station for the West India line.

Besides the works here described as in progress in the different parts of the world, the labours of the Hydrographic Office during the past year have consisted of the publication of 65 new charts, with material additions and corrections to many others, under the immediate superintendence of Captain George A. Bedford, R.N. It will give some idea of the activity of the business of this office when I state that 138,503 Admiralty Charts have been printed during the year ending 30th April. There have also been published the usual Tide Tables for 2500 places, by J. Burdwood, Esq., R.N., the Light Lists for every coast by Commander E. Dunsterville, R.N., together with Hydrographic notices of new lights, rocks, and shoals discovered, and other information essential to navigation in general.

ORDNANCE SURVEY.—I learn from my friend Colonel Sir Henry James, under whom this important branch of material scientific labour is so efficiently conducted, that the survey of Northumberland and Cumberland has been finished within the last year, and the plans of those counties are now in course of publication. By this operation the survey of England and Wales is completed so far as relates to the one-inch map of the whole country. It also completes the survey of the six northern counties, viz. Northumberland, Cumberland, Westmorland, Durham, Yorkshire, and Lancashire, on the twenty-five and six-inch scales also. The plans of these counties have been made as *cadastral surveys*,* the universally received name for plans on a large scale strictly accurate in all respects.

The survey of these counties having been on the eve of completion, a Select Committee of the House of Commons, of which Viscount Bury was Chairman, was appointed last session to report upon "the expediency of extending the Cadastral Survey over those portions of the United Kingdom that have been surveyed upon the scale of one inch to the mile only;" † and this Committee having reported "That it is desirable that the Cadastral Survey, on

* From the French "cadastre," survey.

† Whilst such are the facts, I must repeat the expression of my hope that these surveys on the large scale will not be applied to the wild and mountainous regions of the Highlands; a one-inch map of which is all that can be desired, whether for proprietors, engineers, or geographers.

the scales directed by the Treasury Minute of the 18th May, 1855, and recommended by the Royal Commission of 1858, and again directed by the Treasury Minute of the 11th September, 1858, be extended to those portions of the United Kingdom which have been surveyed on the scale of one-inch to the mile only;" and in consequence of this recommendation, a Treasury Minute of the 18th March, 1863, has been issued, directing that arrangements should now be made for carrying this recommendation into effect, and the measure has since received the sanction of Parliament. We shall therefore have a complete cadastral survey of the United Kingdom; that of the whole of Ireland having been already published on the six-inch scale, that of Scotland having been finished from the southern border so far north as to include the whole of Perthshire, parts of Kincardineshire and Argyleshire, and the survey is now proceeding in the two latter counties and in Aberdeenshire. The six northern counties of England have also, as before stated, been surveyed for the twenty-five and six-inch scales; and by the foresight of the late Lord Herbert the military surveys along the valley of the Thames from Kingston to below Sheerness, of large districts round Portsmouth, Devonport, Pembroke, Dover, and other places, were made as parts of a complete cadastral survey of the counties in which those places are situated. This was a most fortunate arrangement; a great number of the plans are already finished, and the publication of them is now in progress.

A complete catalogue, in three parts, of all the maps, plans, and works published by the Ordnance Survey Department relating to England, Ireland, and Scotland, will be found in the library of the Society; and this catalogue will be reprinted and issued quarterly.

The account of the extension of the triangulation of the United Kingdom through France into Belgium has been published within the last year; the Belgian geometricians are connecting their triangulation with that of Prussia, and the Prussian geometricians are connecting theirs with that of Russia, whilst the Russians are extending theirs as far as Ursk on the river Ural; and M. Otto Struve states that he hopes to have this portion of the work finished next year. We shall then have the data for computing the length of an arc of parallel in latitude 52° N. from Valentia in the west of Ireland to Ursk, extending over nearly 75 degrees of longitude.

In order that the lengths of the computed sides of the triangles in each country and the whole length of the arc should be accurately given in terms of a common unit of measure, a rigorous

comparison must be made between the standard of length used in each country for the measurement of their respective bases, and this comparison is now being made at the Ordnance Survey Office, Southampton. The difference in the computed lengths of the sides in our extended triangulation and the lengths as computed by the Belgian engineers is less than one foot in 10 miles, or less than the $\frac{1}{57600}$ part, but this result may be modified when the standards of length are compared.

The whole of the volume called 'Great Domesday Book' has been copied at the Ordnance Survey Office by the photo-zincographic process applied by Sir Henry James, and the second volume called 'Little Domesday Book,' containing most minute entries respecting the counties of Essex, Norfolk and Suffolk, is now being published; and it is in contemplation to add to these volumes maps of each separate county, showing the position of the several manors mentioned in Domesday Book, with the names by which they were known in the time of the Conqueror and their modern names.

The art of photo-zincography has been greatly advanced within the last few months; for whilst it was previously confined to the production of copies of existing documents, such as MSS., printed works, and line engravings, it is now employed at the Ordnance Survey Office for the production of copies of photographs in permanent ink, and at a very trifling expense. This art is therefore likely to prove of the greatest advantage to travellers, as photographs can now be sent or brought home, and prints to illustrate the account of their travels struck off from zinc plates or stone in any number that may be required.

GEOLOGICAL SURVEY OF THE UNITED KINGDOM.—The report of the last year's progress, which it has been my duty to make as Director-General of this establishment, contrasts favourably with that of the preceding year. Thus, the survey of Great Britain, under the management of Professor Ramsay, has extended over the Wealden country of Kent and Sussex and various midland counties, and has been extended northwards into Staffordshire, Derbyshire, Cheshire, and Lancashire. Again, sheets on the six-inch scale have been published of the last-mentioned county to show in detail the "faults" and complications of the coal-fields. Maps and sections on the same large scale have been finished in illustration of the carboniferous rocks of Scotland. The sale of all these maps has greatly increased.

The survey of Ireland under Mr. J. B. Jukes has also made good progress in the following counties—Queen's, King's, Clare, Galway, Longford, and Westmeath. The published sheets of the map now amount to 93 out of the 205 sheets into which Ireland is divided.

On the affiliated branches of this establishment, which it is my province to direct, it is unnecessary that I should dilate in a geographical discourse. I may, however, say with some pride, that the eminent professors of the Royal School of Mines have educated many promising youths in chemistry, metallurgy, physics, mechanics, and natural history, as well as in geology, mining, and mineralogy. The Mining Record Office, also an integral part of our system, and which is zealously conducted by Mr. Robert Hunt, has proved most serviceable to the Houses of Parliament and the nation in registering the mineral produce of the kingdom. These documents are not only important to the mining, commercial, and manufacturing interests of the country, but are highly appreciated by all foreign statists. Restricting my observations to the Geological Survey only, and the publication of our maps, it has naturally been a subject of great satisfaction to myself, that our labours should have been highly esteemed by geographers and geologists of all nations who attended the late International Exhibition. I may, indeed, particularly cite the opinion of M. Sella, a sound mathematician, and recently Minister of Finance of the kingdom of Italy, who having been officially employed to visit the mining schools and geological surveys of various countries, with a view to the application of the best system to Italy, thus reports upon the operations of our British survey:—"England is, without doubt, the country where geological maps are prepared with much greater accuracy than in any other land. The singular importance of her mining industries, the spread of the elementary principles of geology, the zeal of the geologists charged with these labours, and the precision of their works have been so carried out, that few undertakings of the British Government have so much contributed to the benefit of the public as the Geological Survey of the United Kingdom."

Recent British Publications.—I must defer till next Anniversary, notice of the recently published works. I may, however, notice 'The Introductory Text Book of Physical Geography' of Mr. David Page, as being most useful to young geographers, and scarcely of less value to many of my older associates, in bringing before them

in a clear and condensed form all the leading elements of geographical science.

For the small price of two shillings, any Fellow of our Society can provide himself with a copy of this work, which, illustrated by many diagrams, conveys to the student and brings back to the mind of the proficient all the chief data, whether astronomical, geological, or meteorological, by which the outlines of the crust of the earth are determined. The author has, indeed, particularly pleased me by showing that the changes of land and water can only be well understood by the explanations which geological researches have revealed. In addition to a clear sketch of the effects of climatological influences, he points out the nature of the distribution of plants and the lower animals, and also describes the races and varieties of man, and his advancement through the means of civilisation and culture.

In short, by the manner in which he connects Geography with Ethnology, Mr. Page affords the best possible reason for the union of these sciences; and, as it fell to my lot to bring about that union in one of the Sections of the great national meeting of the British Association,* so I am the more gratified in perceiving that Mr. Page has based these, the last arrangements of matter and life on the surface of our planet, on their true foundations, and has thus connected them with the numerous previous changes which the earth has undergone.

I also refer my associates with much satisfaction to a still smaller, but not less important work in awakening the mind to the harmonious adjustments of Nature. In his Essay on 'The Correlation of the Natural History Sciences'† Professor Ansted has eloquently and clearly shown, in 50 small pages, that Physical Geography, General Physics, Chemistry, Astronomy, Zoology, Botany, and Geology are all correlative—all demonstrative of the marvellous unity of design of the Creator.

In reference to the maps recently published in the British Isles, I must also defer any comment on them to the ensuing Anniversary.

Geographical Publications in Germany.—The zeal with which geographical works, not merely relating to their own country but to the world at large, are issued by Germans is truly remarkable. I

* The Geographical and Ethnological Section.
† MacMillan and Co. 1863. Price 1s.

cannot now pretend to notice the very numerous publications and maps which have issued from Vienna, Berlin, and the smaller cities of Germany. Of the latter, however, Gotha has been rendered so celebrated by the 'Mittheilungen' of Justus Perthes, so ably edited by Augustus Petermann, and so extensively circulated through Europe, that I deem it to be highly useful for geographers to have thus placed before them (as below)* a list of the

* The following are some of the original papers contained in the 'Mittheilungen' for 1862-63:—

EUROPE.—*E. v. Sydow*, Report on the Progress of the great National Surveys of the European States in 1861 and 1862 in particular, and of recently published maps in general. *A. Petermann*, on the English Admiralty Survey of the Western Coast and Islands of Scotland (with map). *A. Petermann*, on the Cartography of Denmark and the Duchies, and her Colonies in Iceland, Greenland, Færöe, and the West Indies (with map). *General Blaramberg*, Director of the Imperial Russian Ordnance Office, Cartography of Russia in 1862. *General Chodzko*, the Russian Surveys in the Caucasus. *Captain Iwashintsoff*, Russian Survey of the Caspian Sea (with map, showing the soundings by blue tints, from 100 to 100 sashen, and representing two great depressions of the sea-bottom of upwards of 400 sagenes); Measurement of the Arc of the Meridian between Palermo and Christiania. *L. v. Babo*, on the Wine-Growing Districts of Germany, and the characteristic features of the different kinds produced. *Professor Rogg*, physico-geographical essay on the Basin of the Boden-See. *Lieut.-Colonel Sonklar*, the Alpine Group of the Hohen Tauern. *Coaz*, the Alpine Passes of Graubünden, and the Railway between Switzerland and Italy. *Dr. A. Ficker*, the New Administrative Division of Austria (with map). *J. Schmidt*, Director of the Observatory at Athens, Travels in Greece, and Hypsometric Measurements. *V. Baer*, the project of the Manytsh Canal. *Magister v. Seidlitz*, Journeys in the Caucasus, 1862.

ASIA.—*Berghaus*, the Present and Future Lines of Communication between Europe and India. *Dr. Th. Kotschy*, Journey to Cyprus and Asia Minor, 1859. *Dr. O. Blau*, Journey in Asia Minor and Kurdistan, 1857; and on the Orthography and Meaning of Turkish Names of Places in Asia Minor. *Dr. A. Schläfti*, Ethnography of Kurdistan and Mesopotamia; and the Political Condition of the countries round the Persian Gulf. *Julius*, Survey of *Captain Selby* and *Lieut. Collingwood* of Lower Mesopotamia, by order of the Bombay Government (with map). *Maximovilsth*, Journey on the River Sungari, in Mantchooria, 1859. *Chalmers* and *Hawk*, Journey on the Tong-kiang or East Canton River, 1861. *F. v. Richthofen*, Journey in Siam and Pegu, 1862.

AFRICA.—*A. Petermann*, Map of the Interior of Africa, in 10 sheets. (This map extends from Cairo in the north to Kazeh and Lake Tanganyika in the south, and from Karthum on the east to Lake Tsad on the west; it has been constructed with great care and labour from published as well as manuscript materials: hundreds of works and papers having, I understand, been consulted. Of this extensive work, 8 sheets are now published, accompanied by seven memoirs, which have been selected from among the unpublished materials consulted in constructing the map. These are *M. v. Beurmann's* Journey through the Nubian Desert, 1860; *Dr. Th. Kotschy's* Journey in Kordofan, 1839; *Brun Rollet's* Journey in the Marshy Regions of the Bahr el Abiad and Bahr el Gazal, 1856; *Dr. E. Behm*, the Eastern Portion of the Desert of Sahara, including the Country of the Tebu; *M. v. Beurmann's* Journey from Bengazi to Murzuk, 1862; *Marquis O. Antinori's* Journey from the Bahr el Gazal to the Country of Djur, 1860-61; and *M. v. Beurmann's* Journey from Murzuk to the East into the country of the Tebu, 1862. The two last sheets, 8 and 9, are in the press, with an original paper by *Heuglin*, on the Upper Blue Nile and its Tributaries; as well as a memoir by the Missionary *Mortang* on his journeys to the East and West of Gondokoro, 1859.)

I further learn from Mr. Petermann that reports have been made on the journeys and observations of Messrs. Heuglin, Heudner, Kinzelbach, and Munzinger, in the regions of Eastern and Inner Africa, extending from Juakin in the North, southwards through Abyssinia to near the 10° of N. lat., and from Massuah in the East to Kartum and El Obeid in the West. (Eight valuable maps of this region, with astronomical positions and observations

various papers and maps issued by that establishment in the past year. In addition to this copious list, I must call attention to a new edition of 'Stieler's Atlas,' in 80 sheets, which Petermann is engraving on copper, in order to render them more clear and distinct than any lithographic map can be made. The specimens of these sheets which I have received, illustrative of Great Britain and Ireland, Denmark and her Colonies, Upper Italy, Australia, West Australia, Tasmania, and New Zealand, are much to be commended. Supplementary to Stieler's Atlas, our indefatigable German associate is preparing a still larger series of 300 sheets. His idea is to supply in full and careful delineation all those details which are inadequately represented, and on too small a scale, in most existing Atlases. Thus Australia will be represented in 25 sheets. Another and well-executed map of Petermann's is the Geological Map of the Province of Auckland, in New Zealand, as prepared on the spot by our distinguished friend, Dr. Hochstetter, of the Austrian *Novara* expedition. This author has just published a beautifully illustrated work entitled 'Neu Seeland,' which I commend to the attention of geologists and naturalists as well as to geographers.

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of altitude, have been received from these travellers, and are being prepared for publication in the 'Mittheilungen.') The other communications relating to Africa, are *M. v. Beurmann's* Journeys in Nubia and Soudan, 1860 and 1861. *Dr. A. Roscher's* Notes of his Journey from Zanzibar to the River Lufiji, 1859. *Baron von der Decken's* and *Dr. Kerschen's* Second Journey to Kilimanjaro, 1862, in which they ascended that peak to the height of 13,000 feet, and encamped in the snow. A memoir on the Exploration of the Gaboon Country, by *P. Du Chaillu* and others (with map); the River Systems of the Niger, Benue, Calabar and Cameroon (with very detailed map, showing the routes of all European travellers and native itineraries); on the Present State of Geographical Knowledge of Congo and Angola, a careful digest of the oldest as well as most recent authorities, including MSS. documents (with detailed map).

AUSTRALIA AND POLYNESIA.—Besides the illustration of the Expeditions of Stuart, Burke, F. Gregory, McKinlay, &c., as illustrated by four maps which have recently been brought out in one clear compendious map, the principal original papers have been those by *F. v. Hochstetter* of his Journeys and Observations in New Zealand. Of this traveller four papers have been given, illustrated by four maps, viz., one general map of New Zealand, a topographical map of the Isthmus of Auckland, and two geological maps of the province of Nelson and of the region of Roto Mahana, with its hot springs. Also, papers on the Guano Islands of the Pacific and the Islands to the East of New Guinea, by the Italian missionary, D. Carlo Salerio.

AMERICA.—Reichel's Observations on Labrador and the Missionary Stations there (with two maps of the country round Okak and Nain, from his observations). *Dr. H. Berendt's* Observations on Mexico. *Dr. Moritz Wagner* (three papers): Volcanoes of Central America; Exploration of the Interior of the Isthmus of San Blas, east of Panama (with map); and Province of Chiriqui (with detailed map). *Dr. A. v. Frantzius*, Costarica. *A. Keppler*, Expedition of the Dutch and French into the Interior of Guiana, 1861. *J. J. v. Tschudi*, Brazilian Province of Minas Geraes (with large map by Halfeld, from the official surveys in 1836-1855). *Burmeister*, Artesian Wells at Buenos Ayres.

POLAR REGIONS.—The Swedish Expedition to Spitzbergen, 1861, in which *M. Forell* has added many new and important geological data, has likewise been well illustrated.

Having mentioned that expedition, I have much pleasure in requesting my hearers to peruse the third volume of the work of Dr. Scherzer, which gives in very clear and attractive style the historical narrative of that survey. When all the scientific details which were collected by the physicists and naturalists of that memorable expedition shall be published, Austria will doubtless receive the praise which is due to her for having sent a frigate round the world solely to augment our acquaintance with the natural productions physical structure, climatic conditions, and inhabitants of various remote regions.

Greenland—Former Conditions of Northern Europe.—Our knowledge respecting the snow and ice clad region of Greenland has been from time to time largely increased by the communications of our foreign member Dr. Rink. It is in part through his memoirs, as published in our volumes, that geologists have been enabled to reason upon what they believe to have been the former glacial condition of Scotland, and other tracts in Northern Europe, during a period antecedent to the creation of man. Independently, however, of any acquaintance with the condition of Greenland, as explanatory of ancient phenomena, my illustrious friend Agassiz, in the year 1840, boldly applied to the larger part of the northern hemisphere, and specially to Scotland, the doctrine which he had derived from a study of the effects produced by glaciers in the Alps. Wherever he found that the hardest rocks of North Britain had been ground down, polished, and striated by lines and furrows in the same manner as that by which the rocks beneath or on the side of existing glaciers are affected, there he contended solid ice had once advanced from the mountains to the sea-shore. This view, though supported vigorously by my dear friend and eminent master, the late Dr. Buckland, met at first with much opposition, though of late years it has been well upheld by much good evidence, patiently worked out by Professor Ramsay and various authors; and in the last years particularly by Mr. Jamieson of Ellon in Aberdeenshire, and by Mr. Archibald Geikie, of the Geological Survey. Now that the direct analogy of Greenland has been prominently brought forward, the bold theory of the great Swiss naturalist, who founded it on his knowledge of the Alps, has, to his great honour, been well sustained. Though once a sceptic as to a former spread of snow and ice over a large portion of Scotland, I have for some time been a firm believer in the application to that country of this portion of the theory of Agassiz.

The manner in which the snow of the mountains descends and in the first instance forms "névé," the solid glaciers which advance to the shores of Greenland, and the mode in which huge masses of these glaciers are broken off and launched into the sea, have been described by other authors, but by none more clearly than by Dr. Rink, whose long residence in Greenland has naturally given him favourable opportunities for observation. In his last memoir Dr. Rink has shown us, that though little water is apparent on the surface of the ice, yet that every glacier is a frozen mountain-river, which is greatly aided in its descent to the sea by a volume of water (about a sixth part of the whole icy mass), which flows either in interstices of the ice, or between the warmer subsoil and the thick cover of ice which prevents congelation. The proofs of the issue of large quantities of water from beneath the lofty ice-cliffs is seen by the issue of springs of fresh water, which rise like whirlpools at the external edge of the ice; and that some terrestrial living things are brought out in these agitated masses is proved by myriads of sea-birds being seen to hover over them, to obtain food in the brackish and muddy water.

The occurrence of an unfrozen lake at a certain distance inland in one of the great glaciers, and the occasional sinking of its water, is accompanied by a corresponding rise of the springs in the sea, and the rise of its water by their diminution. At first sight I thought it possible that this existing phenomenon might in some degree serve, though by no means entirely, to explain the manner in which Mr. Jamieson, adopting the theory of Agassiz, has recently accounted for the so-called Parallel Roads of Glen Roy; * the lake on whose edges these terraces are supposed to have been formed having been held up by a glacier, the successive shrinkings of which at intervals let the water off from higher to lower levels. But looking to the Greenland case as the result of occasional and frequent openings of channels for the water, I see nothing in it which will account for the gravel terraces of Glen Roy at separate and distinct heights. In our Highland example, I now believe with Agassiz and Jamieson, that the lacustrine waters were held up by a glacier; yet, knowing that each gravel terrace on their shores could only have been formed in tranquil periods, the distinct separation of the one from the other is to me a clear proof that sudden movements of the subsoil and rapid change of climate occasioned paroxysmal dislodgments of these icy barriers. In this

* See Quarterly Journal Geological Society, vol. xix. (1863.)

way the successive subsidences due to the sudden collapse and removal of large portions of glaciers will as well account for the distinct separation of terraces which were accumulated during periods of quiescence, as the successive upheavals of the sea-shore (as I shall presently show) explain to us clearly how the heaps and terraces of gravel with sea-shells, which occur at different altitudes around the British Isles, were produced.

In this way the geologist, reasoning upon true existing causes to which he can still appeal, calls up before the mind's eye the ancient physical geography of the surface at a period in all probability antecedent to the creation of man. Pursuing the same mode of reasoning into periods much more remote, he performs the part of the comparative geographer, and can, like Godwin Austen,* map out as pristine oceans the larger portions of our present continent and islands. For, as many of these masses of land are replete with the remains of marine animals, the inference is inevitable, that these materials must have been accumulated under the sea, and subsequently raised into the atmosphere to form dry land. On the other hand, as these desiccated sea-bottoms and sea-shores, which are now habitable lands, are filled with the detritus and fragments derived from ancient rocks; so in those tracts where there are no similar rocks at hand to account for such *spolia*, we infer that, just as the bottom of the sea has been raised up in one tract into dry land, so many of the ancient continents and islands from which such rocky fragments were derived, have disappeared and been submerged, though others remain above the waters. In this point of view the science of geology is true ancient physical geography.

But to return to the consideration of that glacial condition of the surface which geologists are pretty generally agreed upon as having been that which immediately preceded the creation of the human race. Believing, as I now do, that snow and ice formerly covered, during the whole year, my native Highlands, as well as the mountainous parts of England, Wales,† and Ireland, and, further, that glaciers descended from the higher grounds into the adjacent valleys and to the sea-board, transporting into the sea-bottom great blocks as well as enormous accumulations of clay and sand with striated fragments of rocks, constituting the "till" of Scottish

* See Quarterly Journal Geol. Soc., vol. xii., p. 1856, and other memoirs by Mr. Austen.

† On this subject Professor Ramsay's excellent and original Papers should be consulted; particularly the general reader should peruse his Essay on the 'Old Glaciers of Switzerland and North Wales,' in the 1st volume of 'Peaks, Passes, and Glaciers,' and also published as a separate volume.

geologists,* I must impress upon you that, in adopting this view, you do not embrace the largest portion of the operations of transport which took place in the glacial period. For, when the ancient glaciers advanced to the seas of that glacial epoch, they must (as is now taking place on the shores of Greenland) have launched from their cliffs huge icebergs, which were floated away by the prevailing currents, often to vast distances before they were melted. So in the present day numerous icebergs are wafted for hundreds of miles to warmer and southern seas, in which they disappear, and strew the surface of the sea-bottom with the blocks and pebbles with which they were loaded, to be mixed up with marine shells, sand, and mud.

Similar accumulations of a former period are called by geologists "marine glacial drift;" and, as they are found to be spread over wide terrestrial areas, both in low tracts and on hills of some altitude, it is clear that such low lands and hills were submerged during the mixture of these water-worn materials with sea-shells, and have since been elevated from beneath the sea to their present position. The coasts, and some of the bays, of Scotland, and of parts of the north of England, North Wales, and Ireland, afford, indeed, proofs of the glacial drift with shells lying at various heights above the sea up to altitudes of about 1300 feet.

In no part of Europe, however, are the evidences of glacial drift and huge erratic blocks so remarkable as in that enormous region over which such wide-spread detritus has been shed from the ancient glaciers of northern Scandinavia and Lapland, and been carried, eccentrically, to the shores of the North Sea—to the heart of Russia in Europe—over the plains of Poland—up to the foot of the Carpathian Mountains, and finally over all Northern Germany, including the kingdom of Prussia. On this point I may refer you to the detailed description of this grand phenomenon, given by my colleagues de Verneuil, von Keyserling, and myself, in our large volumes on Russia and the Ural Mountains—a work little referred to, I apprehend, by my countrymen. In the map attached to that work we laid down for the first time the south-eastern, southern, and south-western lines to which this, the grandest of all the European glacial drifts, extended, when all the kingdoms now covered by it must have been beneath the sea. In short, we showed clearly that

* See the very clear and able illustration of this subject, with a map shewing the various directions followed by the old glaciers, in the book entitled, 'On the Phenomena of the Glacial Drift of Scotland,' by Archibald Geikie. Glasgow, 1863.

the south of Sweden, as well as Finland, Russia, and all Northern Germany, must have been submarine when the erratic blocks derived from the glaciers of Lapland and the north of Scandinavia were floated far away, some of them to distances of 700 or 800 miles from their original sites.*

When we reflect upon the differences which the map of Europe at the period of this translation of glacial detritus must have exhibited, if constructed when whole kingdoms were under the sea, and that this grand operation was coincident with the existence of species of shells which are still living, and this, too, in the period antecedent to the creation of man, the physical geographer naturally appeals to the geologist, and craves from him some information as to the manner in which these enormous transformations of vast sea-bottoms into plateaux, continents, and islands, may have been brought about.

Now, although all geologists agree that such mutations did take place, we are not of one mind as to the manner in which these mighty changes were effected. One school maintains, that, if we extend existing causes backwards into countless ages, their action has been adequate to account for all these changes of sea and land. On the other hand, there are many practical geologists, including myself, who see in most lands, and particularly in all mountain-chains, numerous great breaks and frequent inversions of rock formations, which are the clearest proofs of violent fracture, and which no amount of small and imperceptible risings could ever have effected. We therefore infer that some of the changes between sea and land, which accompanied and followed the glacial period, were, like many that preceded them, suddenly produced. Fully admitting that there were long periods of quiescence, during which the crust of the earth was subject, as at present, to small imperceptible movements only of elevation and depression, we believe that there were also at intervals powerful and sudden upheavals and downthrows, accompanied, doubtless, by great translations of water.

As regards the more recent elevations and depressions, we sustain this belief by showing that marine remains of the most recent tertiary date (the post-pliocene of Lyell) are found at different altitudes, separated from each other by great intermedial spaces, wherein such remains are not traceable or visible. These marine

* See 'Russia in Europe,' &c., chapters 20 and 21, with diagrams, and particularly the map.

remains *generally occupy separate terraces or plateaux and elevated plains*, and are rarely if ever seen lying continuously in slopes upon a hill or mountain side, as if indicating a gradual uprising from the sea-shore to their present positions (often upwards of 1000 feet above the sea). Had slowly gradual causes been in action only, we should surely have seen proofs of the phenomenon by finding the marine remains arrayed in *sloping* accumulations, and not in terraces or heaps at separate altitudes, which necessarily imply sudden jerks or lifts. We further argue, that, if the very slight and almost imperceptible movement (and, in some instances, perfect stability, of the present surface of certain tracts during the last 2000 years) were alone to be appealed to, no conceivable amount of time would explain many of the broken features which Nature presents to us.* Thus we know, from finding remains and bones of the same species of extinct mammalia in the gravel of Britain and the Continent, that at a, geologically speaking, recent period our islands were united with France. We also know, from the skeletons of the great Irish elk, which are found in the bottom of the bogs of Ireland, and also in the Isle of Man and in Cheshire, that when that creature lived these three islands must have been united. Yet it cannot surely be maintained, that by the ordinary action of the sea, and a gradual depression of the lands now sunk beneath the Irish Channel, England and Ireland were separated since the big elk inhabited our lands. Nor by such gradual agency only can we ever account for the formation of the great channel which now separates England from France.

My firm belief, indeed, is, that these separations were effected in the first instance by powerful breaks of continuity, caused by much grander earthquakes than any of which history affords a record, due to expansive internal forces, which gave rise to great upheavals and subsidences in the crust of the earth. In more remote periods, or those of older geological date, these forces have, we well know, produced still more intense disruptions, and have even abruptly thrown enormous masses of hard pebbly sediment under the rocks out of whose detritus they have been derived.

But even looking at the changes which were produced in the comparatively modern glacial period, and in that which immediately followed it, I view each of these sea-shell terraces to which I have

* There is every reason to believe that the eastern shores of Britain, where Cæsar landed, have not changed their relation to the sea-level since that event.

alluded, and which present themselves at separate levels around the coasts of continents and islands, as clear proofs that they were not placed in their present positions by continuous gentle gradual movements, but have been, I repeat, heaved up suddenly; such movements having been accompanied by powerful translations of water, which completed by denudation the work which great earthquakes and dislocations began.

I must not, however, wander further into such geological considerations, though I may take leave to say, in reference to the former changes of the surface of the globe, that whether we adopt, as I do, the theory of former, occasional, great paroxysmal disturbances, followed by long periods of quiescence, or that of an uniformity of causation during all ages, I have already said enough to show that the sciences of Geology and Geography are inseparably connected. This subject has, indeed, been well treated lately by Professor Ramsay in his published lectures on the Physical Geology and Geography of Great Britain.* Such of my hearers as wish to follow out this subject, and who have not time to study the great works of Lyell on the Principles of Geology, will do well to read a lecture of Professor Ansted, entitled, 'The Correlation of the Natural History of Sciences,'† in which the author happily demonstrates that Geology includes Physical Geography, General Physics, Chemistry, Astronomy, Zoology, and Botany, and is therefore a history of Nature during all time.

ASIA.

Central Asia.—The southern portion of Central Asia—a region which is peculiarly interesting to British geographers—has recently received a valuable illustration through the explorations of M. Nicholas Khanikoff and his scientific Russian associates, to which some allusion was made in the Address of last year. As an experienced traveller in Persia and Bokhara in previous years, M. Khanikoff devotes the first sixty-eight pages of the work he has published to a fair and well condensed retrospect of the labours of his predecessors in the provinces of Khorassan, Yezd, Kirman, Seistan, and a part of Affghanistan.

Among the earliest geographers to whom M. Khanikoff renders just tribute, I am glad to see that the names of our countrymen,

* Stanford, 1863.
† London and Cambridge. MacMillan. 1863.

Rennel and Forster, stand out conspicuously; the one as the joint founder with the celebrated D'Anville of the science of Comparative Geography, the other as the first traveller, in modern times, who crossed the Continent of Asia from India to Europe, and who did so successfully in the disguise of an Oriental pilgrim.

In the early part of the present century (1807-9) the French *savans* Dupré, Jaubert, Trézel, and Truilhiet, who were attached to General Gardanne's Mission to Persia, zealously exerted themselves in extending our acquaintance with that country: and shortly afterwards further accessions to our knowledge were made by the travels of our countrymen, Pottinger and Christie, who were sent to explore Southern and Central Persia by my lamented and gifted friend the late Sir John Malcolm, when that distinguished man proceeded with a brilliant staff of officers from India to counteract French influence at the Court of the Shah. Of their travels and observations, as well as of the great general work of Malcolm himself, the 'History of Persia,' M. Khanikoff gives a succinct account. Enlivening his recital by allusions to the 'Lalla Rookh' of Moore and the 'Hadji Baba' of Morier, he assures us, and competent English Orientalists agrees with him, that the last is the best work ever written, as giving a faithful and vigorous picture of the habits of the higher classes in Persia. Returning to pure geography and travels, he criticises somewhat severely the memoir and map of Macdonald Kinneir, as superficial and devoid of novelty; but praises highly the solid information contained in the rich materials given to us by Sir William Ouseley. He also mentions with much commendation the numerous geographical data and positive observations of Baillie Fraser and the acumen of Arrowsmith in preparing his map. He then shows how the lamented and gifted Arthur Conolly, from his more perfect acquaintance with the language of the natives, surpassed in many respects all his predecessors—especially in his faithful sketch of the social condition of the people. In one of his earlier expeditions, M. Khanikoff knew Conolly well; and quitted Bokhara only forty days before that unfortunate officer, and his companion, Colonel Stoddart, were assassinated by order of the crazy Emir.

M. Khanikoff next speaks of another of our English enterprising heroes, my dear friend Alexander Burnes, who formerly so captivated us by his lively and intelligent communications, and from whose flying notes Arrowsmith was enabled to construct the map of those

countries which for a long time was our only authority. This retrospect of the labours of British explorers and geographers will be read with pleasure.

Turning to other labourers, M. Khanikoff considers the maps of Zimmermann to be complicated and confused. The Russian mathematician Lemm is then brought out, and the vast number of his astronomical observations, his lines of march through Persia, as well as his determination of the heights of the mountains, are noticed. He informs us, that, in a journey of thirteen months, Lemm determined 129 geographical points, over 10 degrees of latitude and over 15 degrees of longitude, and of these eighty-three stations were in Persia.

The admirable grouping of the labours of these travellers by the lamented Carl Ritter, particularly in regard to the southern parts of the interior of Asia as given in his eighth volume, is deservedly praised as the best type of descriptive geography; and I specially recommend those pages of M. Khanikoff (44 to 55) to the perusal of such of my associates as desire to seize the salient points of the writings of that great Prussian geographer and excellent man, Carl Ritter.

As to the 'Asie Centrale,' that striking work of my illustrious friend Alexander von Humboldt, and which was duly analysed in former volumes of our Journals, M. Khanikoff alludes but little to it, since it scarcely touches upon Persia and Khorassan. On the other hand, he expatiates on the more recent military operations in Central Asia, such as the Shah of Persia's advance upon Herat, the Russian efforts to reach Khiva, and the English expedition to Cabul, showing how much geographical science has benefitted by such movements, though in a military point of view they were real disasters. We thus have references to the labours of Major D'Arcy Todd, who travelled from Teheran by Herat, Candahar and Cabul to Simla, and was subsequently for some years stationed at Herat as our Envoy; and we have notices also of Major Todd's assistants, James Abbott and Richmond Shakespeare, both of whom passed from Herat by Khiva and Orenburg to the Russian capital; the journey of the latter officer having been recorded at the time in our Journal.

Not omitting to notice the value of the astronomical and hypsometrical observations of Major Gough, published in 1841, M. Khanikoff further attaches much importance to data accumulated by Edward Conolly (brother of the traveller) in Western Afghan-

istan, and particularly in regard to the form of the great lake Hámoun in Seistan.

After an analysis and criticism of the labours of Ferrier and Keith Abbott, and due reference to the 25th volume of our Society's Journal, in which the tours of the last of these travellers are published, he speaks of the extraordinary journey said to have been performed by a French officer by the head-waters of the Heri-rud to Herat, which, if it be an authentic narrative, is deserving of the highest admiration.

Having thus given a succinct analysis, in chronological order, of recent travels in Central Asia, showing what French and English travellers had respectively accomplished, and how his countryman Lemm was the first to furnish solid materials for the construction of a map of Eastern Persia, M. Khanikoff points out how much remained to be done before a correct idea could be formed of the physical features of this region. In order, therefore, to obtain a somewhat better acquaintance with the great terraces at the foot of the mountains, with the hydrography of the country, the structure and direction of the mountain-chains, the fauna, flora, and ethnography of the region, as well as to make observations on terrestrial magnetism and heat, he proposed that a scientific expedition should be formed in Russia. His proposal was willingly embraced by the Imperial Geographical Society of St. Petersburg; and, aided by men distinguished in astronomy, botany, geology, and topography, M. Khanikoff was himself named chief of the Commission. For this station his previous journeys and experience in the East had thoroughly qualified him; for, besides having resided during many years in the North of Persia, he had been in one expedition the companion of that great botanist the late M. Lehmann, and at another period he had been, as before said, the friend and colleague of our unfortunate countrymen Conolly and Stoddart, at Bokhara.

In the volume already published, and which can only be considered as a prelude to the rich materials which are to follow, M. Khanikoff gives us a sketch of the whole line of march of the Russian scientific Commission eastward into northern Khorassan, then across part of Affghanistan to Herat, and thence into Seistan on the borders of Beloochistan, and further by Nilo, across the great saline desert of Lout, to Kerman. Having sent observers to Tebes and other places, he returned by Ardekán to Teheran. In perusing the sketch of the difficulties which he had to overcome in transporting his small party across certain tracts, particularly the

great saline and waterless desert called Lout, the reader cannot but be forcibly impressed with the enormous difficulty, if not, indeed, the impossibility, of moving any regular modern army, with its baggage, artillery, and commissariat, across such regions; and this may afford some comfort to those persons who have been needlessly alarmed at the bugbear of a Russian overland invasion of British India with a vast host!

As the small map which accompanies his memoir is very clear and satisfactory, and is essentially a great improvement upon the previous maps of these tracts, we have to thank M. Khanikoff for this instalment of a work, the first sketches of which were laid before British geographers by himself, at the Oxford Meeting of the British Association (1860).

The western portions of Persia, and much of the region to the south of the Caucasus, had been well examined by our early Medallist Sir H. Rawlinson and others, including General Monteith; but the geography of Southern and Eastern Persia, and the adjacent countries, has been infinitely better defined by the researches of M. Khanikoff and his party than by his precursors.

In a short time it is to be hoped that very valuable additions to our acquaintance with the geography of Western Persia will also be made by the publication of the labours of Lieutenant Glascott, R.N., who was employed as surveyor from 1849 to 1853 with the Anglo-Russian Commission, appointed to fix the delimitation of the Turco-Persian frontier from the mouth of the Euphrates to Mount Ararat; and who has been occupied ever since, in conjunction with his Russian colleague, in laying down the result of the survey on a map of enormous dimensions, and containing the correction of the geographical positions of many places to the east and west of that hitherto ill-determined frontier. The frontier of Persia in the opposite or south-eastern direction seems to have been of an equally uncertain nature, and at various periods to have encroached considerably upon Beloochistan. Of that region, and particularly as regards the northern coast of the Indian Ocean, we have acquired information, which is quite fresh, from the journey of Major Goldsmid, of which I have elsewhere spoken. In his examination of the particular track along which the electric telegraph which is to connect British India with London, will pass, that officer has ascertained that several of the rivers and other geographical points have been very inaccurately placed on all former maps. In fact, although Pottinger, Masson and others have travelled extensively

in Beloochistan Proper, and although we have marched an army through the province and still retain a Resident at its capital, we were very ignorant of the sterile region which forms its southern shores, and which is governed by petty chiefs under the suzerainty of the Khan of Kelat.

Proposed New Route to British India.—In the preceding notice of the character of Lord Gifford, I have specially alluded in a note to the striking photographs of the Himalayan and Cashmirian regions by his Lordship's brother, Lord William Hay. After a long residence in the mountainous parts of India, and a frequent intercourse with travellers from the north-west, or the countries of Bokhara, Kashgar, Ladak, &c., Lord William contemplates a return to his post by an overland route which no one individual, and certainly no European, has yet followed. If he can meet with the protection of the Russian Government, he would take the line across Siberia, followed by the lamented Atkinson —*i. e.* by Nijni Novgorod, Ekaterinburg, Omsk, Semipalatinsk, Azof, Kopal to Issyk-kul. He calculates that he might reach that distant place in fifty-two days' travelling from Nijni Novgorod, or say in two months. From Issyk-kul to Kashgar is only 250 miles, and allowing for every difficulty he assigns to this march fifteen days; from Kashgar to Le by Yarkand, he gives thirty-six days, and from Le to Kungur in Cashmere fifteen days, or in the whole about four months.

Now, Lord William Hay is not a wild schemer, but a practised traveller—one of the four brothers of that family * who have traversed the Himalaya to the plains of Thibet. After fourteen years' residence in those mountains and in Cashmere, and after obtaining for us all the real intelligence we possess respecting the fate of poor Adolf Schlagintweit at Kashgar, he has well weighed the possible obstacles to such an enterprise. He knows that the present political state of affairs in the region of Kashgar and Yarkand is very different from what it was when Adolf Schlagintweit was assassinated; and he also infers that in the journey from Issyk-kul or those wild hordes of Kirghiz over whom the Russian power extends he would have great advantages if furnished with Imperial passports and support. I need not say that, as I warmly approve the bold project, I will do all in my power to induce the Imperial Government to enable this enlightened British nobleman to execute a journey which has never been performed by any European, and

* See Gifford in the Obituary.

which, if he passed over the Karakorum into Cashmere, would unite in one long chain the old route of Marco Polo with the journeys of modern travellers who have hitherto vainly endeavoured to pass from the east to west or from west to east in those latitudes.

Indian Navy.—On the 30th of April of the present year the Indian Navy ceased to exist; the Commodore's broad pendant having been hauled down at Bombay on that day. I cannot, therefore, allow this occasion to pass without making some allusion to the debt which geography owes to the officers of that distinguished service. The war services of the Indian Navy in Burmah, China, and Persia, as well as the beneficial and enduring results of its repression of piracy and the slave-trade are well known. These services have been varied, honourable, and useful; but, in the eyes of geographers, the wide-spread and lasting utility of the excellent surveys made by officers of the Indian Navy on the coasts of India and Arabia, in the Persian Gulf, and in the Red Sea, on the coasts of China and Cochin China, hold an equally prominent place; nor as a geologist can I omit to call to your recollection the admirable memoirs of Dr. Carter on the structure and fossils of the coasts of the Persian Gulf. In the abolition of the Indian Navy, the Bombay Geographical Society will, I fear, sustain a loss which it will not be easy to replace; while the numerous able papers scattered through our own volumes, by Kempthorne, Selby, and other officers of that service, remind us that we are sharers in the loss. I trust, however, although their honourable career in the Indian Navy has come to a close, that many of the gallant officers who composed it will still be enabled to render their great ability as surveyors and explorers available for the advancement of geographical science.

Telegraphic Communication by Land and by Sea.—Two years have elapsed since Sir Henry Rawlinson brought under the consideration of this Society the importance of constructing an overland telegraphic communication with India, and pointed out how far the work had already proceeded, and the track which ought to be followed in completing the remainder of the line. He justly observed, that the Royal Geographical Society would do itself honour by encouraging this great work. At that time, however, no one had accurately examined the nature of the country of Mekran at the head of the Indian Sea, which lies between the British Indian frontier, near Kurrachee, and the mouth of the Persian Gulf. That task has been now accomplished by Major Goldsmid, who has shown

that there are no real physical or political obstacles throughout the tract in question; the greater part of which is tributary to the Khan of Beloochistan, the western portion only being subject to the influence of Persia. I have elsewhere alluded to the sketch of Major Goldsmid as making us acquainted with a tract, which, though it was, in days of yore, the scene of great events, had so passed into oblivion that, save for the unpublished notice of it by one Englishman, a Mr. Macleod, who traversed a portion of it only, the nature of the country was quite unknown to us; the position even of the rivers which flow into the sea having been most incorrectly laid down on all our maps. The search for the best line for the construction of the most comprehensive civilizer of modern days, the Electric Telegraph, has thus called once more into prominent notice a region, the shores of which, in all probability, were coasted by the ships of Solomon when trading to Ophir, and the interior of which was undoubtedly traversed by the armies of Alexander the Great.

The direction of the whole of this telegraphic communication, which is to be in part submarine, has fortunately been placed under the management of Colonel Patrick Stewart, an officer of the Indian Army, signally distinguished by the great ability and intrepidity with which he rapidly constructed those lines of telegraph in India, during the late rebellion of the native army, which were of such essential service to Lord Clyde.

Colonel Patrick Stewart, who has personally examined a great portion of the line, including the coast of Mekran, informs me that the first link of the chain between India and Europe is that to which I have just alluded as having been explored by Major Goldsmid. This section, from Kurrachee to Gwadel, measures about 400 miles, and along a considerable portion of it, 250 miles from Kurrachee, telegraphic stations have already been erected. From Gwadel the line becomes submarine for about 400 miles as far as the Arabian headland called Ras-al-Jebel, at the entrance of the Persian Gulf, from which station another submarine stretch of 430 miles will bring the telegraph to the port of Bushire, whence the land-line will branch off, passing through Shiraz and Ispahan to Teheran and eventually to Constantinople. A branch-line is also to be extended from Teheran to Baghdad, which will provide a secondary or alternative means of communicating between Baghdad and Bushire. The principal and more direct line, however, between these points, is that which it is proposed to carry out

by means of a submarine stretch of 170 miles, from Bushire to Fao, at the mouth of the Shat-el-Arab river, and thence, by land, through Bassorah and along the western bank of the Euphrates, to ancient Babylon and Baghdad. The line from Baghdad to Constantinople, which was constructed some years back by British officers and workmen at the expense of the Turkish Government, continues in good working order, and telegraphic messages are thus constantly passing between London and Baghdad along a track which is more than two-thirds of the entire distance to India.

I further learn from Colonel Stewart that the ships from which the submarine cable will be laid are to leave England in July, and that the operation of submerging it will commence about the middle of November, and be terminated in December. It is also confidently expected that the land-line from Fao to Baghdad will be speedily finished, and that a direct and through communication from London to Calcutta will thus be for the first time established before our next Anniversary Meeting. Further, it is calculated that the alternative line through Persia will also be finished in the spring of next year, and that a double means will be thus afforded of communicating with our great Indian Empire.

While enterprise and capital are thus employed in connecting England with India, one of our associates, Mr. C. M. Grant, who recently contributed an instructive sketch of his travels from China to Siberia, across the Desert of Gobi, is now actively employed in the endeavour to induce the Government of Russia to establish a telegraphic communication between Kiachta and Pekin, and even, if possible, so to extend the Siberian line eastwards as to reach the shores of the Sea of Ochotsk, whence to the continent of Russian North America the transit requires a short submarine stretch only. There can be little doubt that, independent of other considerations, this would be the line of all others by which Europe and America can best interchange messages. Should such and other enterprises like these succeed, men, even of my own age, may live to find the electric spark carrying knowledge in a few minutes round the globe, and enabling us even to converse with our countrymen at the antipodes. Already an attempt is being made to put us in direct communication with Australia; Mr. F. Gisborne, brother of the late Sir Lionel Gisborne, being engaged in an attempt to organize a telegraphic service from Calcutta, through Burmah and the Malay peninsula to Singapore, and thence to Batavia, Soerabaya, Timor, and North Australia, *vid* Melville Island.

Whilst the physical geographer is sure to acquire fresh knowledge by the examination of distant lands over which telegraphic wires have been, or are about to be laid down, and that submarine cables are in action in seas of such limited dimensions as the Mediterranean, the Red Sea, and the Persian Gulf, let us not despair of obtaining such a better acquaintance with the bottom of the great ocean which separates Europe from America, as will greatly obviate the difficulties which have hitherto impeded the successful accomplishment of the grandest of all the submarine telegraphs which have been proposed. To this point I next direct your attention.

North Atlantic Sea-Bed.—In contributing to our better acquaintance with the natural history of the sea, as ascertained during the voyage of H.M.S. *Bulldog*, under the command of Sir Leopold McClintock, Dr. Wallich* produced, by soundings at great depths, excellent materials to enable men of science to appreciate more correctly than before, the feasibility of laying down a submarine telegraph between Ireland and North America. Extending the Bathymetrical limits of animal life in the ocean to the great depth of 7500 feet, or 1½ miles, beneath its surface, and working out accurate data as to the varied condition of the sea-bottom at different depths, he was well qualified to propose to our Council a scheme for such a systematic survey of the sea and sea-bed between Ireland and Newfoundland, as might lead to the laying on a sound basis a submarine telegraphic cable between the two countries.

Attributing the fears and doubts as to a successful issue of the schemes put forth chiefly to the inadequate methods hitherto employed in examining the sea-bed by the rapid transit of our surveying ships, and by soundings taken on one line only at great distances apart, Dr. Wallich proposed that a much closer search should be made before telegraphic cables were lowered into unknown depths, and laid across submarine hills, gorges, and valleys, the irregularity of whose forms, as existing between the points hitherto sounded, might prove to be enormous. He argued that a full and proper submarine search was as essential a preliminary to a rational scheme of laying down a telegraphic cable, as a survey of the outlines of land was requisite for the engineer before he could accurately define the best and safest line to be followed by a railroad.

* See Dr. Wallich's work, published with the sanction of the Lords of the Admiralty, entitled "The North Atlantic Sea-Bed." London, 1862. Van Voorst.

Being of opinion that such an effort was well worthy of their encouragement, the Council of our Society supported the project of Dr. Wallich, not only in the belief that its execution must throw much light on this interesting branch of physical geography, but would also develope various phenomena of great interest in natural history, geology, meteorology, and physics. On my own part, being very desirous of seeing so noble an exercise of the searching powers of this great maritime nation set on foot under the management of so energetic a naturalist as Dr. Wallich, I earnestly recommended its adoption to the First Lord of the Admiralty. But, as the project matured, it speedily appeared that Dr. Wallich required two steamers for the effectual survey in question, which demand was considered to be too heavy at a moment when few vessels could be spared from our naval reserves; and hence the consideration of the subject has, for the present, been dropped. I hope, however, that in more quiet times a complete submarine survey of the Atlantic will be carried out, by the joint operations of nations on *both* sides of that ocean; and when that day arrives, I trust that the project of Dr. Wallich, with all his ingenious appliances, will obtain the countenance of the public, just as in an earlier stage it has met with the approbation of the Council of the Royal Geographical Society.

Japan.—The privilege accorded by treaty to the British Minister in Japan to travel through the empire has been taken advantage of by Sir Rutherford Alcock, who during a journey of thirty-two days traversed the island of Kiusiu and a great part of Niphon. In the interesting paper which was read to the Society, much light was thrown upon parts of the country heretofore but little known. Although Dutch Missions had occasionally gone overland from Nagasaki in Kiusiu to Yeddo in Niphon, their opportunities for observation were necessarily limited, owing to the rigour of the surveillance to which they were subjected by the Japanese Government. In the case of our Minister these rules were relaxed; and, although a good deal of jealousy was frequently manifested by the officials, we have acquired a great deal of most valuable and useful knowledge. The part of the road leading from Osaca to Yeddo, and which avoids Miako, traversed by Sir Rutherford, has, so far as we are aware, not been travelled over by any European: the Dutch Missions always following the route through Miako since the expulsion of the Portuguese and Spaniards more than two centuries ago. We have also had a short paper from Mr. Oliphant,

giving some account of the island of Tsusima, a spot which was visited by Europeans for the first time in the spring of 1861; and which derives its importance no less from its geographical position than from the magnificent harbour which it has been discovered to possess.

In spite of these additions to our information of the geography of Japan, there is still much to be done. The whole northern and eastern portion of the central island of Niphon is still unexplored, the large island of Sikok has not yet been visited; while of the northern island of Yesso, which contains a larger superficies than Ireland, we know nothing beyond the observations made by Mr. Pemberton Hodgson during a very limited tour from Hakodadi. The interior, which is supposed to be uninhabited, is still a sealed book. It is to be hoped that no political difficulties will arise, to put a stop to the interesting work of exploration in a country which affords such a wide field for the labours, not only of geographers, but of men of science generally.

Mexico.—A good addition to the valuable descriptions of Humboldt respecting the meteorology of this country as dependent on its physical structure and outline has been recently published by M. Henri de Saussure of Geneva. Visiting Mexico before the French invasion the author has, notwithstanding the continual interruptions to the prosecution of travel caused by the civil wars which desolated that interesting region, succeeded in sketching in a very clear manner the great features, and also in explaining the causes, of its very remarkable hydrology.

South America. Peru.—Don Antonio Raimondy, who has been occupied for two years in exploring that part of the valley of the Amazons, and of its tributaries the Huallaga and Ucayali, which is comprised within the Republic of Peru, has recently published a valuable geographical work, with maps, which has increased our knowledge of that vast but little known region. Another Peruvian geographer, Don Mariano Paz Soldan, whose brother's work, 'Geografia del Peru,' has recently been presented to the library of this Society, is now preparing in Paris a large map of Peru, together with a volume of plans and views.

Mr. R. Clements Markham, while employed by the Indian Government in superintending the collection of seeds and plants of the quinine-yielding Cinchonæ in 1860, explored the courses of two of the principal sources of the great River Purus, one of the most important but least known of the tributaries of the River Amazons,

for a considerable distance, and thus added to the geographical information which he had previously collected during his travels in 1853 respecting this almost unknown part of South America.*

Brazil.—Mr. H. W. Bates, the former companion of Mr. Wallace, who, as a most enterprising naturalist and ethnologist, has recently become known to the public through his excellent new work, 'The Naturalist on the Amazons,' has also increased our geographical knowledge of the main stream of that great river from Ega to its mouth, and of some portions of its tributary the Tapajos.

Australia.—Much as had been accomplished in preceding years by the bold explorers of the interior of Australia, the past year is, if possible, still more remarkable in the amount of satisfactory results, as obtained by the journeys of McDouall Stuart, Landsborough, McKinlay, and Walker. To the progress of these adventurous men I last year adverted in the Address of Lord Ashburton; and now it is my pleasing duty to record their successes. On former occasions, after admiring the first intrepid researches of Leichhardt, we had subsequently to mourn over the loss of that great traveller; and, in honouring Burke and Wills as being the first to reach the Gulf of Carpentaria by a direct route from Victoria, we, alas! could only revere the memories of those and other men, including Leichhardt and Kennedy, who had sacrificed their lives in the cause of geographical discovery. On the present occasion, however, the enterprises of the travellers have happily not been attended with any loss of life, whilst the objects in view have all been satisfactorily accomplished.

To begin with the last exploits of our former medallist, McDouall Stuart—and for which the late Governor of the colony of South Australia, Sir Richard MacDonnell, claims the blue riband of Australian exploration. No one can peruse the diary of Stuart's last journey from Adelaide on the southern to Van Diemen Gulf on the northern shore, without admiring the steady perseverance with which, in his last as in his first expedition, he overcame all the natural obstacles opposed to his progress. Thus, we mark with approbation his repeated and toilsome efforts to penetrate through a thick, waterless, central forest to the north-west. For, if those efforts had succeeded, he would probably have reached the sea at the mouth of the northern Victoria,†

* The volume which Mr. Markham has published descriptive of his last travels has been received with favour by the public, as embracing much interesting history of the native Peruvians with which we were unacquainted; whilst his successful translation of various species of the Cinchona plants to India, and the plantation of them in localities best suited to their growth, has met with the unqualified approbation of the Government of India.

† The Victoria was discovered and named by Capt. Wickham, R.N.

or that position to which I have twice adverted in previous Anniversary Addresses as the situation of all others *on the northern coast* best suited in my opinion for the establishment of a new colony. There are, indeed, physico-geographical causes which account for the salubrity of that intertropical station, and to these I shall allude in the sequel. This was the tract to which doubtless Stuart intended to proceed. He was, however, driven from his endeavour to reach the sea-shore nearest to him at the head of Queen's Channel, and was compelled to take a due northerly route, which necessarily brought him to the sea on a meridian much farther to the east. There the land runs out towards the equator in a broad promontory (the Arnheim Land of maps), which, though indented by fine bays, can scarcely be expected to offer the same advantages of climate and productiveness as the tract at the mouth of the northern Victoria. Still, as the route to it from South Australia has been shown to be practicable, even this district, in nearly 12° s. lat., will, it appears, be soon occupied. By a recent letter from Mr. Finke, of Adelaide, I learn that already a private company had been formed there for the purpose of transporting, in April of this year, sheep, cattle, and horses to the newly-discovered lands in Van Diemen Gulf, whilst a vessel with ample supplies will be sent round to meet the new settlers. This commencement will, I trust, induce Her Majesty's Government to take decisive steps as to the method by which this independent body of settlers and others who may join them are to be governed.

The knowledge we previously possessed, that the colonists of Queensland were rapidly pushing on their settlements towards the head of the Gulf of Carpentaria has been recorded in the despatches of Sir George Bowen, and enlarged upon by the Secretary of the Colony, Mr. Herbert, during his recent visit to the mother country. Before these facts transpired Sir Charles Nicholson, on his last return from Australia, pointed out, in a well-argued document addressed to Her Majesty's Secretary for the Colonies, of which I have seen a copy, that large portions of Northern Australia would assuredly be soon occupied by migratory bands of colonists. He therefore called the attention of Her Majesty's Secretary of State to the confusion and disasters which would follow, if neither law nor system were established by Imperial authority for the government of such broad lands. Sir Charles Nicholson has, I think, successfully shown that any colony on the North coast, or even at the head of the Gulf of Carpentaria, would be much too distant from Queensland or South Australia

to be governed with effect from either Brisbane or Adelaide. And now that the colonists from Adelaide are really about to establish themselves in the distant Van Diemen Bay, the very case suggested by him has occurred and some action will, I trust, be taken by the Imperial authority. The establishment of a separate colony on the North coast of Australia has so long been advocated by myself, whether for commercial purposes or for political and maritime considerations, that I rejoice in having lived to see the dawn of the realisation of this great object. The subject is now about to be brought in a striking manner under the notice of our rulers, who, at no cost to the mother country, have simply to give titles to the possession of rich lands, the sale of which, as Sir Charles Nicholson shows, will speedily far more than remunerate the small outlay which is called for in the outset of such an organisation.

But, whilst the success of any settlement on the north coast is a problem about to be solved, I must again express my regret that the Queen's Channel, at the south-east end of Cambridge Gulf, and at the mouth of the northern Victoria, should not have been the spot whereon the first experiment was to be tried by the settlers. The deeply-embayed position of that site, and the simple fact of its being 4 degrees further removed from the Equator, as well as being bounded by large masses of plateau-land, fairly entitle us to believe that such a situation would be much more likely to secure the health and well-being of the settlers than the Van Diemen Gulf of old navigators, which is about two hundred miles more northward, and on the verge of the heated Indian Ocean. It is true that Van Diemen Gulf is protected from the storms and tornadoes by Melville Island and the Coburg peninsula, on which our former ill-selected and exposed station of Port Essington was placed; but still this first experiment would have been more likely to succeed, especially if the mouth of the Victoria had been the site chosen.

In comparing new maps of Australia with those of older date, I find, on referring to the publications of the Society for the Diffusion of Useful Knowledge, that, in their Atlas issued in 1844, Australia is defined as consisting of the colonies of New South Wales, Van Diemen's Land, Port Phillip, South Australia, West Australia, and *North* Australia. The first, or our oldest settlement, has now had taken from it the region known to former geographers as the Moreton Bay Settlement, which has expanded into the vast and flourishing colony of Queensland (of which hereafter); Van Diemen's Land

has become Tasmania; Port Phillip, then holding a population of 3000 only, has swollen into the rich auriferous land of Victoria, with its grand commercial city of Melbourne; and, whilst West and South Australia have both largely increased in size and importance, the so-called colony of "North Australia" has disappeared from all our maps as an unknown quantity! Yet, on the very map to which I have alluded, the great headland to which McDouall Stuart has found his way from the south, has on it, besides the name of Arnheim Land, the following words engraved in large letters, "Colony of North Australia, established 1838." In the legend of the map no population is indeed affixed to it; but now, after the lapse of a quarter of a century, a few spirited Australian colonists are about to revive the forgotten name of the "Colony of North Australia." *

This result will, indeed, be accelerated if the wise suggestion of the Governor of Queensland be adopted (which, I have every reason to think, has met with the approbation of Her Majesty's Secretary for the Colonies) that a commercial and careening maritime station be established at Port Albany, near Cape York, at the north-eastern extremity of this vast country. In a letter to myself, dated November 19, 1862, Sir G. Bowen, after describing his voyage of exploration of all the north-eastern coast, and showing from the experience of the naval authority, how a safe passage for steamers may always be made within the great Barrier reef, says of Port Albany, "that it is perhaps destined one day to be the Singapore of Australia." Well may we anticipate such a result when we mark the extraordinarily rapid progress of that flourishing new colony of Queensland. In a recent despatch to the Duke of Newcastle which has been communicated to us, Sir G. Bowen calls the attention of his Grace to the progress and present condition of the colony, which, as now defined, has a surface nearly six times greater than that of the United Kingdom, and the very grazing grounds of which are about twice as large as the British Isles; to say nothing of the tracts peculiarly adapted for the growth of cotton. The map which is attached to the Colonial Almanac of Queensland is worthy of commendation as being a correct delineation of the boundaries and divisions of a country which its accomplished Governor considers to be "undoubtedly the most favoured in soil and climate of all the provinces of the British empire" (Letter to the Duke of Newcastle, 8th Jan., 1863).

* Whilst I write, a North Australian Association is in the course of formation in London.

From the results of these considerations we naturally turn to the recent exploits of Landsborough, McKinlay, and Walker. Last year we had, alas! to mourn over the deaths of those noble fellows, Burke and Wills, who were the first to go from Victoria to the sea at the head of the Gulf of Carpentaria, and lost their lives on their return. Well may the motto "Præmiando incitat" be applied to the legislature and inhabitants of Victoria, who have done infinite credit to themselves in removing the remains of those geographical martyrs from the sands where they lay, and in erecting monuments to their memory at the metropolis from which they proceeded.

It is indeed cheering to the heart of every geographer and traveller to read the accounts given by the press of Melbourne of the depth of feeling exhibited by the Governor, Sir H. Barkly, the Legislature, as well as by the crowds of the inhabitants who came together to do honour to the deceased explorers, when monuments were raised to their memory.

To determine with precision the tracts followed by the deceased travellers, and to define the amount of good country for settlement in the region so properly named by Sir H. Barkly "Burke's Land," three of the Colonial Governments have been rivalling each other. In the first place, it was as just as it was honourable to the rich colony of Victoria, that she should take the lead in the endeavour to afford succour to the expedition of Burke and Wills. Accordingly, the ship *Victoria*, under the command of Captain Norman, was despatched with supplies to the head of the Gulf of Carpentaria; whilst arrangements were made with the Government of Queensland for the transmission by the same vessel of a party to explore inland under an able and experienced explorer, Mr. Landsborough. It was also further arranged that Mr. Walker should, with his native mounted police (all bushmen), traverse the country between Brisbane and the head of the Gulf of Carpentaria. The shipwreck which befell the *Firefly*, conveying Landsborough and his party through Torres Straits, and the riskful but successful operation by which the water-logged tender was tugged round the headland and brought up to the mouth of the Albert River, at the head of the Gulf of Carpentaria, have been already recorded. It was then that the researches of Landsborough commenced; and, though the primary object of the Victorian expedition for the relief of Burke and Wills was, alas! frustrated by the deaths of those gallant men, the subsequent results were in the end most satisfactory. For, by these researches we now clearly know that the

territory at the head of the Gulf of Carpentaria was most correctly named the "Plains of Promise,"—a land not too hot, according to Landsborough, for British colonization. Realising the truthfulness of the records of Burke and Wills as to the vast tracts of good land, we may be assured that that region will be soon occupied by our settlers; for Landsborough has told us, and McKinlay has confirmed it, that the country south of the Gulf of Carpentaria is a land rich in herbage, and well fitted for the pasturing of horses, horned cattle, and sheep—the plains being as fattening as any he had ever seen in Australia, and the climate as cool as in many parts where wool is profitably grown (see 'Sydney Herald,' Jan. 21, 1863).

We may also rejoice in the fact recorded by the Exploration Committee of the Royal Survey of Victoria, "that the explorers of the Victorian Expedition were the means of opening out a path from the southern settlements to the northern shores, which they hope will at no distant day be made available for telegraphic communication, by way of Batavia and India, with the mother country." The realisation and complete establishment of such facts are in great measure due to the sagacious and trustworthy explorer, Mr. Landsborough. The son of an accomplished Scottish naturalist, who was an ornament of the Presbyterian Church, Mr. Landsborough was so educated that he possessed all the groundwork for success. After first exploring for 200 miles to the south-west, he took up the return line of Burke and Wills, and first following up the Flinders River south-eastward, he crossed the dividing ground and descended along the banks of the Thomson, and was on his march for Burke's depôt, when, fearing for the sufficiency of his provisions, he turned to the east and south, until he struck the River Warrego, which he followed to its junction with the Darling above Fort Burke. I must refer you to the cheering despatch of the Governor of Victoria, Sir H. Barkly, recently read before the Society, for convincing proof that Mr. Landsborough has practically accelerated in a remarkable degree the formation of a northern settlement. Geographically he has taught us that Sturt's desert extends but little to the east, and that between it and the foot of the Eastern Cordilleras there is a vast, rich, and well-watered pastoral country.

Already stock had been driven from New South Wales to these new grounds, and the public press of Victoria predicts that in a year all the region to the east of the 140° E. long. will be mapped

out and occupied for grazing purposes. The prospect of easy access to the sea is also a great attraction to squatters; and it is even said that plans have been already drawn for the construction of a city at the mouth of the Albert on the Gulf of Carpentaria. In short, Mr. Landsborough declared, at a public dinner given to him at Sydney, and at which the Governor, Sir John Young, presided, that if he were going to Carpentaria with stock, he should consider the worst of the journey over when he came to the head of the Gulf.

The journey of Mr. Frederick Walker, with his native bushmen, or mounted police, to the head of the Gulf of Carpentaria, thence up the Flinders, and eventually to the north-east, at Port Denison in the colony of Queensland, has been productive of some very satisfactory results. Thus, he made out that it was near the mouth of the Flinders River that Burke and Wills had their last camps. He also informs us, in laying down the course of the Flinders and Norman Rivers, that, although there are fertile plains at some distance from them, the valleys in which they flow are subject to extensive inundations.

It is due to Mr. Walker to say, that, in parts of his course, he made such astronomical observations as enable us to determine the true course of the Flinders River. Nor must his observations upon the heat of the climate be lost sight of, when we desire to estimate the probability of the success of British settlements.* We have yet, however, to learn the duration of the heat in these regions, and to what extent it is tempered by night breezes and by rains.

On these subjects we have a third good authority in that of McKinlay, who, after great exertions, reached the Gulf of Carpentaria from Adelaide in South Australia, and eventually emerged in the northern parts of the colony of Queensland. To the earlier efforts of this bold explorer, as organised under the government of Sir Richard McDonnell, allusion was made in the Anniversary Address of last year, when, in aiding my predecessor, I spoke of Mr. McKinlay's discovery of the relics of an Englishman, which have since been ascertained to be those of Gray. From that scene of misfortune, near Cooper Creek, McKinlay's course was first to the N.N.W.; then making a deflection to the east, on account of great floods, he took a course nearly north until he reached the mouth

* Since this Address was read, I have seen Mr. Bourne, the companion of Landsborough; who informs me that, owing to the coolness of the nights, the climate at the head of the Gulf of Carpentaria in S. latitude 18° is much less oppressive than on the Darling River in S. latitude 31°. So little does mere latitude govern the distribution of heat.

of the Flinders River in the Gulf of Carpentaria, whence, deviating to the E.S.E., he ended his trying journey of nearly a year's duration at Port Denison, in the northern part of Queensland. The narrative of this arduous journey of the "Burke Relief Expedition," bound up with three maps, is, as well as the Journals of Stuart and Landsborough, to be purchased in this country.* In perusing these Journals, I have equally admired the sagacity, self-reliance, and endurance of each of those bold explorers; and it would have been a source of real gratification to me to have recommended to our Council that, at this Anniversary, we might assign Gold Medals both to Landsborough and McKinlay. But the Council have felt themselves bound to prefer the antecedent labours of Mr. Frank Gregory in the north-western portion of Australia, which very nearly obtained for that geographer one of our medals last year. In fact, Mr. Frank Gregory had determined by astronomical observation (about 33 degrees of latitude and 19 degrees of longitude) a large, well-watered, and productive region; whilst, with every admiration of their prowess and success, Landsborough and McKinlay have only laid down their routes by dead reckoning. Our highest geographical distinction must therefore be assigned to those who work out our problems scientifically. At the same time we have taken another mode of testifying our admiration of the services of those intrepid and successful explorers, who have traversed this vast continent, by handing to them other tokens of our entire approbation of their labours.

Along the route followed by McKinlay and his associate Middleton, who has recently come among us, we find the same alternations of poor and arid sands,† with well-watered and rich tracts, and the same proofs of occasional inundations, as in the regions visited by McDouall Stuart. In all these three successful expeditions, as well as in that of Burke and Wills, we have now the proofs before us that, whatever may be the obstacles, Australia can be traversed from south to north by different routes.

Nothing is more striking in the narrative of McKinlay than that, in approaching the Gulf of Carpentaria, after upwards of eight months of travel not only had he still with him camels and horses,

* Besides the detailed Journals, a very interesting volume has appeared whilst these pages are going through the press, entitled 'Tracks of McKinlay and Party across Australia; by John Davis, one of the Expedition. Edited by Mr. W. Westgarth.' (Sampson Low and Son.)

† Mr. Middleton exhibited some of this sand at the Meeting of the 11th May, which is of so red a colour that he compared it to "Cayenne pepper."

but also that the sheep which were left (soon afterwards eaten) had "their kidneys well covered" with fat, in south latitude 19°, notwithstanding their fatiguing journeys and the long grass on which they fed.

The last efforts of McKinlay and his associates, when traversing a tract in great part hard and stony, to reach Port Denison in the north of Queensland, and after their bullocks and camels had all been eaten, is worthy of all commendation.

The appearance at our last Meeting of Landsborough himself, and of Middleton the companion of McKinlay, enabled us to satisfy ourselves that British colonisation can be successfully extended into Tropical Australia. If mere geographers had made this assertion, their dictum would not have made the same impression on Englishmen and Colonial residents as the positive declarations of two practical men like Landsborough and McKinlay, both of whom began as settlers, and having by their sagacity and conduct made independent fortunes, are surely the best possible judges on this debated subject. These gentlemen have assured us that many thousands of sheep are now thriving within the tropics in North Australia, though we have yet to learn whether these animals will permanently flourish if carried to the northernmost shores of the continent.*

In addition to the discoveries recently brought under our notice, let me refer my associates to the 28th Volume of our Journal for evidences showing the feasibility of establishing British colonies on some parts of the north coast. There they will find, not only the full accounts of the memorable researches of our medallist, Augustus Gregory, after he left the mouth of the Victoria, but also the notes of Mr. Wilson, the geologist of the expedition, who, being left in charge of the camp and having resided there for ten

* Mr. Brodribb, late a Member of the Legislative Assembly of Victoria, has written to me expressing his belief that North Australia will become a great wool-producing country. He shews that there are tracts in the southern parts of Australia less propitious for the breeding of sheep than certain parts which approach to the tropics, and where he has reared many fine ones. At previous Meetings of our Society, Mr. M. H. Marsh, M.P., who is also a large proprietor, has assured us that sheep thrive well in parts of Australia to the north of any tract which was previously pastured, and the rapid extension of flourishing flocks in the northern part of Queensland, which is within the tropics, is an undeniable fact—though the farthest successful limits where sheep can flourish has not yet been ascertained. Mr. Brodribb adds, "The settlers in North Australia will, however, have to procure fresh rams every two years from the colder regions, in order to keep up the weight of the fleece; for the animal, while growing older there, will suit itself to the climate. The wool will retain its fineness but not its weight; it will be light and open, but will not become *hair* as was asserted."

months, gives us as perfect a conception as can be obtained of the nature of the climate, productions, and natives of that intertropical tract. In one part of these notes he says, and Mr. H. Gregory confirms him, that in no part of the world had he seen grass grow so luxuriantly. As to climate, he affirms, after giving tables of the mean temperature for ten months of the year, that, although the maximum temperature in the shade was 106°, and the minimum 47°, the health of the travellers and the animals of the expedition was by no means impaired. Surely, with such statements as these before us, theoretical objections to the selection of chosen parts of North Australia as the sites of British communities ought to cease.

In opposition, however, to these data and the inference to be derived from them, it has been argued that, inasmuch as tracts at about 15 degrees north of the equator, in the peninsula of India and other places in the Indian Ocean, are from their great heat unsuited to European settlement, such must also be the case in like southern latitudes in Australia. But this reasoning seems to me to fail when we consider the distribution of heat over the surface of the globe, according to the law which regulates isothermal lines. Thus, whilst the Indian Ocean is necessarily the source of warmth to the Indian peninsula, the enormous breadth of table-lands with their gum-trees in North Australia must to a great extent cool the temperature, and thus bring about a more moderate climate than on a similar parallel to the north of the equator, where water so vastly predominates over land.

Viewed in this way, theory accords with the facts ascertained by our explorers, who, surmounting all difficulties, have laid open practicable routes across the continent, and have shown us that Tropical Australia can be colonised successfully. Moreover, as Sir H. Barkly well observes, "the Australian air is so comparatively dry even within the tropics, and the forests of gum-trees so free from jungle, that the climate is far healthier and more endurable by European constitutions than in similar low latitudes in other portions of the globe." *

These recent discoveries have further dispelled those theoretical speculations in which, in common with many geologists and physical geographers, I confess I at one time indulged, as to the vast and continuous extent of internal deserts in Australia. From such desponding views I am now relieved; and I congratulate Governor

* Despatch to the Duke of Newcastle, 21st August, 1862.

Gawler and others, who sagaciously contended, that vast interior districts of rich and fertile lands would be found, to compensate for barren intervening tracts. But, whilst in my Address of 1858, I suggested reasons for scepticism as to the extent of rich interior lands, I said that it would ill become the President of this Society to damp the ardour of those researches by which alone the question could be settled; and I expressed a hearty wish that the Colonists might be gratified, as they have been, by the discovery of such large *oases* in the interior.

Nothing, in short, in our age, can be more cheering to the geographer than by taking in hand the Map of Australia published by Arrowsmith in 1842, and contrasting it with one on which our excellent cartographer can now insert all the mighty additions which the explorations of the last twenty years have enabled him to make. In concluding these remarks on the wonderful extension of geographical researches in this continent, let me say that the progress which our enterprising Colonists have made, not only in wealth and material prosperity, but in all that can dignify a people, was strikingly manifested at the last great International Exhibition. In it we saw collocated, not merely the rich natural products of gold and copper, with admirable pictorial views which even enabled us to imagine that we had visited the mines of our antipodes, but we also had before us solid proofs in the publication of excellent Maps and the Catalogues of the valuable Libraries of Sydney and Melbourne, that there is scarcely any branch of knowledge or of industry which is not cultivated in Australia with a zeal rivalling that of the mother country.

Relying on the conversations which it was my privilege to hold with the distinguished men who represented the several Australian colonies on that occasion, as well as with my personal friends who have long resided there, I feel assured that there is no part of the British dominions where the people are more attached to the Sovereign and the British Constitution than Australia. It has always, therefore, been a source of pain to me, when some persons have spoken or written of the coming of the day when these great Colonies are to be separated from us. Seeing no cause for such separation, and believing that our Government and Legislature are much too enlightened to commit the error into which our ancestors fell when Britain lost her North American settlements, we are, I rest satisfied, never likely to estrange our Australian colonists by similar treatment. It has been well said by a late Governor of

South Australia that the loyalty of Australia is an homage to the enlightened rule of England, of which her statesmen may be proud.* On my own part, I am indeed persuaded that, if judiciously and considerately treated, Australia, which affords by far the finest possible field for the emigration of our superabundant population, will long continue to be a source of wealth and strength to the mother-country; and will, I trust, for ages hold out a proof that the people who live under a constitutional monarchy enjoy much truer freedom than those who have formed part of any democracy, ancient or modern.

In concluding the preceding imperfect analysis of the labours of recent explorations in Australia, I have to express my regret on one point only. I cannot learn that any of the recent travellers have made observations on the relative altitudes of the tracts they traversed, such as those which the indefatigable Mitchell was wont to make in all his surveys. For, whilst I know that Stuart, Landsborough, and McKinlay could not possibly devote sufficient time to any one district they traversed, to delineate, with the accuracy of an admirable surveyor like Mitchell, all its physical contours, still with a thermometer only and the boiling water which they had at every camp, approximate heights could easily have been ascertained. If such comparative levels of the country had been registered, our knowledge would have been greatly increased; and our practical geographers would have had the means of laying down on their works the river systems and drainage of the vast interior.

New Zealand and its Gold.—It is not my province to enter on this occasion into a general review of the progress made in these fine islands in agriculture, mining, trade, and new settlements. I will simply advert to the great stimulus which has recently been imparted to this southern colony by the discovery of gold. As I have no precise information respecting the amount of gold which is yielded in other parts of these colonies, I confine the following few sentences to the auriferous product of Otago. Whilst my friend Dr. Hector has been occupied in tracing out the boundaries of the rock formations of this province, or the Scotch colony, and has been analysing the specimens of earths and ores of the newly-settled parts of it, we learn from the elaborate report of Mr. Vincent Pyke, the Commissioner of the gold-fields, some highly interesting particulars.

* See the Lecture, "Australia: what it is, and what it may be," by Sir Richard G. MacDonnell, C.B., Dublin, 1863.

Although no systematic search for gold was made until 1861, the discovery of the Tuapeka gold-fields attracted workmen and speculators from other parts of the islands, as well as from Australia; so that the revenue of Otago, *mirabile dictu!* was quintupled in one year, having been raised in that short time from 33,500*l.* to 161,744*l.* At the date of this report, 1st October, 1862, we find it stated that, independently of undeveloped tracts, "a continuous gold-field may be said to extend in a general northerly direction from Tokomairivo to the valley of the Upper Clutta, a distance exceeding 100 miles."*

As far as examination of the auriferous region has extended, it would appear that the gold is chiefly found in the younger tertiary deposits, which are made up of the detritus of the subjacent old slaty and quartzose rocks. The latter rarely protrude to the surface in Otago, and do not form, as in Victoria, the visible and striking gold-bearing backbones of the region, into which the miner may penetrate in search of the ore when the gravel, sand, and detrital accumulations shall have been dug out or exhausted. It would appear that, in Otago, these older or original matrices of the gold (my Old Silurian rocks) are much covered up by the tertiary or alluvial accumulations in which the gold is disseminated, and in many parts the hills are covered even to their summits with rich black earth. Hence it follows that, although there may be auriferous detrital matter sufficient to enrich the colony by diggings for many a year, and that the colonists may now only see the beginning of their rich golden harvest, still it would appear that they have not before them the same hopeful prospect of a stout (but in my opinion not permanent) staple like that of Victoria in the outcrop of the original matrices of the gold-bearing slates, into which they may drive shafts and mines.

Whilst the recent discovery of coal in the western part of Otago is also of much importance to the colony, this region of New Zealand has also become most interesting to the naturalist by the report that the gigantic bird, the Moa,† whose bones excited much interest when so admirably described by Owen, is still living there. In

* See Otago Provincial Gazette, November 26, 1862, No. 217.

† My eminent friend, Mr. John Craufurd, informs me that Moa is the name given in the great Polynesian language to the common fowl in the tropical islands of the Pacific which possess it, and seems to have been bestowed on the gigantic bird by the Maoris when they emigrated to New Zealand. In the Polynesian, the generic term for "bird" manuk is taken from the Malay, and is found in the dialect of New Zealand.

early days these gigantic birds were masters of the lower, richer, and more accessible regions of these islands. Then came human beings, Maori, from other regions, who killing and eating this noble game, whose bones have been found mixed up with stone knives and other implements, a few survivors found a refuge in the higher, colder, and more sterile tracts of the south. There the persecuted birds might perchance have long remained in solitude, had not the discovery of the precious metal led to a great exodus of miners and speculators, who, having once invaded the wild region, will doubtless soon exterminate the last of the Moas.

Polynesia.—From New Zealand, which was anciently peopled from a part of tropical Polynesia, we may turn for a moment to the clear and animated description of the Fiji Islands, given by Dr. Seemann in his recently published volume, entitled, 'Viti: an Account of a Government Mission to the Vitian or Fijian Islands in the years 1860-61. Acting as botanist and naturalist to the Government expedition under Colonel Smith, which was sent out to inquire into the desirableness or otherwise of colonising these beautiful and fertile islands, Dr. Seemann gives us not only a scientific sketch of their gorgeous vegetation, but also a very lively account of the habits and manners of the natives, a race of the Polynesian negroes, who have only very lately been reclaimed from the cannibalism so strikingly described by Admiral Erskine.*

Africa.—A few weeks only have elapsed since our hearts were oppressed with apprehensions respecting the fate of the Eastern African expedition under Speke and Grant, and by the rumoured death of Consul Petherick, who was *en route* to meet and aid those travellers. I could then scarcely venture to think of touching upon African exploration in my approaching Anniversary Address, so great were my fears respecting the enterprise to which, as geographers, we attached so much importance. Our latest accounts from Speke and Grant had made known to us their position at Kazé, 2° to the south of the Lake Victoria Nyanza on the 30th of September 1861. They had then, after great delays, owing to the infidelity of their porters, who ran off with one-third of their property, just emerged from the wilderness of Mgŭnda M'khalé; while, to complete our depression, a telegram from Alexandria announced that Petherick, after the loss of his stores, had perished in passing to the west of the White Nile. What then was our joy when, after a long and

* 'Cruise among the Islands of the Pacific.'

painful interval of suspense, a first telegram from Alexandria gave us the grateful news that Speke and party had reached Khartūm; while a second, quickly following, bore from Spéke to myself the pithy words, "The Nile is settled!" Then came the cheering intelligence that Petherick was not only alive, but had actually joined Speke and Grant at Gondokoro on the 20th of February last; and, finally, we have been furnished with the journal of the travellers, with a map of the region they explored, illustrated by the determination of many points of latitude and longitude in regions hitherto wholly unknown.

Whatever might have been our recent forebodings respecting the success of the explorers from the east and south, who had met with obstacles unknown to Burton and Speke in their former traverse of that central region, I never, on my own part, gave up the hope that, like many a previous African traveller supposed to be dead, Consul Petherick would still be found in life. Owing, however, to his disasters on the White Nile, and the loss of his stores, our agent—who had been liberally supplied with money by us, with a view to succour Speke and Grant when they were struggling to get through a tract where we apprehended that their greatest difficulties would occur—could afford them no important assistance when he joined them at Gondokoro. This is the place, as you will recollect, beyond which the Dutch ladies had reached in their steamer; and had our travellers arrived there some weeks earlier they would, doubtless, have not only been well cared for by these adventurous ladies, but would have been so rapidly carried down by steam to Khartūm that before now we might have had them among us. Real and substantial succour had, however, before Petherick's arrival, been brought to the expedition by that gallant, devoted, and enterprising explorer Mr. Samuel Baker, who, having heard of Petherick's disasters, had fitted out at his own cost a separate expedition, in which he was determined, if he could not relieve our explorers, at all events to try to follow the White Nile to its real sources. Mr. Baker—distinguished formerly by his exploits in Ceylon, and in the preceding season by his researches in the districts north of Abyssinia, also by defining the position and peculiar hydrographical conditions of several affluents of the river Atbara, previously quite misapprehended by geographers—had made up his mind to pass the equator in his southward search after the missing travellers. Pursuing his route to Gondokoro, he was the first to meet the long

absent parties, and to supply them with money, provisions, and boats. The cordial thanks of our Council have necessarily been voted to Mr. Samuel Baker for his noble conduct; and, as he has now gone off to the south-west in the hope of tracing the extent of a lake on the west, laid down by Speke in his map as the Luta Nzigé, and intending to devote a year to this enterprise, we may confidently hope for a satisfactory solution of this collateral question of the source of a great feeder of the White Nile in a higher latitude. Let it also be recollected that Mr. Baker is not merely a daring explorer, a good naturalist, and a first-rate sportsman, but is also a good geographer, having already made, as I learn from a letter addressed to his friend Admiral H. Murray, numerous astronomical observations fixing the positions of rivers and places.

But, whatever may be in store as to future discoveries, let us, in the mean time, dwell with delight on the grand achievement of Speke and Grant, who, by traversing a region never previously explored by civilised man, have solved the problem of ages; and have determined that the great fresh-water lake Victoria Nyanza, whose southern watershed extends to three degrees south of the equator, is the reservoir from which the sacred Bahr-el-Abiad, or White Nile, mainly descends to Gondokoro, and thence by Khartŭm into Egypt.

In tracing the outline of Speke's recent discoveries, I may shortly recapitulate the nature of the problem that was presented to him when he started on the expedition. His previous journey (1858) (at right angles to the route jointly travelled by Burton and himself to the Tanganyika Lake, and undertaken while Burton lay sick at Kazé) led him into a land where small rivulets began to flow northward into a great fresh-water sea, called the Nyanza, of which he fixed the longitude and altitude, as well as the latitude of its southern end. The lake was bounded to the east by the warlike Masai nation, and to the west by the kingdoms of Uzinza and Karagwé, whilst along the northern shore lay Uganda, Usoga, Amara, &c. Speke's furthest point at the southern end of the lake therefore lay, by astronomical observations, about 480 geographical miles south of Gondokoro, the uppermost well-known point on the White Nile, though the exploration of occasional travellers or ivory dealers—as Peney, the brothers Poncet, and mainly De Bono and Miani—had reduced the distance between the nearest points then known to white men to 400 geographical miles. The assertions of travelled Arabs convinced Speke that the outlet of the lake which

gave birth to the White Nile lay far away in the north, between Uganda and Usoga. Speke's present journey was made to ascertain the truth of such information. His main difficulty was presumed to lie in obtaining the goodwill of the powerful chief of Uganda, who was known to be constantly at war with the king of Unyoro, and of such other native potentates as might otherwise block his way; but no great trouble was anticipated in reaching the lake-district a second time.

Our travellers started from the East African coast on the 1st of October, 1860, but the commencement of their journey was most inauspicious. Eastern Africa was parched with drought, and its tribes were at war with the Arabs trading there in ivory. The result was that they did not reach even Kazé without great delays and anxiety, terminating with illness. The next intelligence was dated September 30, 1861, near Kazé, and told a more cheering tale. The travellers were again on the advance, with a sufficient attendance of porters and interpreters, and were hopeful of success. More than a year then ensued without a particle of news, owing to the wars alluded to, when the joyful information, already alluded to, reached England by telegram. There is a short break in our knowledge of their proceedings in the mean time; for Speke sent a despatch by way of Zanzibar, which has never reached the Society. His present reports contain a consecutive narrative of the last and principal part of his journey between Karagwé and Gondokoro. Grant having been left behind sick, Speke commenced on January 1, 1862, his departure from the capital of a kingdom called Karagwé, that abuts by one of its corners against the west shore of Nyanza, at its southern end. Here he seems to have made a most favourable impression on the intelligent King Rŭmanika, who gave him friendly recommendations to the powerful King of Uganda. Karagwé is a portion of a peculiarly interesting district. It occupies a shoulder of the eastern watershed of a territory 200 miles broad, and some 6000 feet above the sea-level, studded with detached conical hills, one of which attains the height of 10,000 feet at least.

Two sources of the Nile rise in this territory—namely, the Kitangŭlé River, which is the chief feeder of the Nyanza Lake, and probably that of another Lake, the Luta Nzigé. So, probably, also does the source of the Shirè of Livingstone, if we may believe the reports now brought to us by Speke; for it seems that the Tanganyika Lake is emptied, and not supplied, by a river at its southern end, and that this affluent feeds the Nyassa Lake, and through it,

of course, the Shirè. The northern feeder of the Tanganyika takes its rise in the land of which we have been speaking.

It is evident, from a part of the present reports, that the missing papers would have enlarged on the fact that in Karagwé, Speke found himself in contact with a superior caste, strongly and favourably contrasting with the negro tribes he had previously seen, and that Uganda, whither Speke now went, was ruled over by a similar race. Their country lies along the Nyanza, and occupies a full half of both its western and its northern shores. The parent stream of the Nile bounds Uganda on the east, as it issues from the middle of the northern boundary of the lake with a stream 150 yards in width, leaping over a fall of 12 feet in height. The Nyanza is said to have other outlets from the same shore, which all converge upon the Nile, and feed it at various points of its course extending to a distance of 150 miles from the lake. The north shore of the Nyanza is parallel to the equator, and about 20 miles north of it.

Our traveller conceives the lake to have formerly extended over a greater area than at present. Its banks are intersected at frequent intervals by what he calls "rush-drains," apparently small half-stagnant watercourses, which drain that portion of the adjacent land which he believes to have been formerly flooded by the lake. The present size of the Nyanza is considerable; it is about 150 miles in length and breadth, but it appears to have no great depth.

Speke further learnt that other lakes have a share in feeding the Nile. One of them, Baringa, lies immediately to the east, connected by a strait with the Nyanza. It supplies the Asŭa River, which runs into the Nile just above Gondokoro. The other is the Luta Nzigé, to which we have already alluded, and which Mr. Baker has proceeded to examine. Captain Speke never saw it, but pictures it on his map as being annexed to the Nile. The river enters it, after making a great bend, at the easternmost part of its northern shoulder, and re-issuing at the westernmost part of the same locality. This lake lies 120 miles north-west of the northernmost part of of Nyanza.

Speke describes the people of Uganda as "the French" of these parts, from their sprightliness and good taste in behaviour, dress, and houses. Their ruler is absolute in his power; fortunately he showed great kindness and even affection for Speke. He knew confusedly of the navigation of the White Nile by white men, and had occasionally received their goods in form of presents brought by the northern negroes. He was exceedingly anxious for the establish-

ment of a trading route to Gondokoro, but northern tribes blocked the way.

Speke was detained five months at Uganda whilst waiting for Grant's arrival, owing to the attachment this youthful king formed for his white visitor, who taught his majesty the art of shooting and various other accomplishments, and thus gained much influence at the sable court: his movements were narrowly constrained, to satisfy the king; but he finally gained the ever-doubtful passage to the north, and thence he was passed on to the next kingdom, that of Unyoro, still inhabited and ruled over by the same peculiar Wahuma race, but by a far less advanced portion of them. North of Unyoro the South African family of languages, which had been universal thus far, suddenly ceased to be used, and the northern dialects took its place.

Hitherto Speke had had no trouble about interpreters; for one tongue was understood more or less by persons in every kingdom he passed through. Henceforth he could not advance without Unyoro interpreters. The people, too, were far more barbarous. He saw strangers among them who lived, when at home, in absolute nudity. At Unyoro they adopted a scanty dress, out of deference to the customs of the Wahuma. Speke's troubles and the procrastination of the King Kamrasi, when he was getting to the end of his journey, were most annoying; the barbarian succeeding in taking from him his only remaining chronometer. He contrived, however, to escape and to follow the Nile for 120 miles north of the great lake, or to lat. 2° N. There the river falls rapidly and makes its great bend to the west, to pass through the Luta Nzigé Lake, and Speke was obliged to travel along the chord of the bend, a distance of 70 miles. He again struck the river at De Bono's ivory station, in lat. 3° 10′ 37″, and found he had descended 1000 feet.

A large body of Turks (ivory traders) were the only occupants of the station when Speke arrived, and they welcomed him cordially. After some days, the camp broke up, and marched to Gondokoro, Speke accompanying it. They passed, in north latitude 3° 35′, the tree on which the Venetian Miani had cut his name to mark the extreme point to which that traveller had penetrated. The Turks compelled the Bari natives to contribute porters; and I am sorry to add that the narrative fully confirms the universal accounts of the inhuman treatment of the natives by these Turkish traders. Our traveller reached Gondokoro on the 15th of February, and there met Mr. Baker.

In his retrospect of the more civilised countries he had visited, namely, the three kingdoms of Karagwé, Uganda, and Unyoro, Speke unhesitatingly gives the preference to the first-named, inasmuch as the King Rumanika is described as a person of character and intelligence. M'tese, the sovereign of Uganda, is an amiable youth, surrounded by his wives, and delighting in field sports; while one of the rules of his court would seem to require the execution on an average of one man per diem for the good of the State. The northernmost of these three kings, to the north of whose dominions language wholly changes, is described as a morose, suspicious, churlish creature, yclept Kamrasi, whose chief occupation was the fattening of his wives and children till they could not stand, and in the practising of witchcraft. Our travellers spent a whole year in getting through these three kingdoms, in no one of which had a white man ever been seen before; nor would our friends, in all probability, ever have escaped from the royal clutches had they not supplied their majesties with numerous presents, and had not the kings eagerly desired to open a traffic with the whites.

The question of the sources of the Nile has occupied geographers and travellers from the remotest periods of history; and when we come down to the period of the Romans, we learn from Seneca that Nero sent up two centurions to settle it, but the Roman captains returned without accomplishing what our two countrymen have effected. Lucan, indeed, in his 'Pharsalia' makes Julius Cæsar speak thus at the feast of Cleopatra:—

> "Sed cum tanta meo vivat sub pectore virtus,
> Tantus amor veri, nihil est quod noscere malim
> Quam Fluvii causas per secula tanta latentes,
> Ignotumque caput: spes fit mihi certa videndi
> Niliacos fontes; bellum civile relinquam."

It is not, therefore, for us only as geographers to rejoice on this occasion; but our country should be proud of such a feat as has been achieved by the two gallant officers of the Indian army; and I have no doubt that when the recitals of their toils and journeys are made known, as well as their graphic description of interior native kingdoms of whose names we never heard, they will be greeted with the same approbation of the public as that which was so justly bestowed on my valued friend Livingstone after he had traversed Southern Africa. Let us hope that Speke and Grant may reach these shores before the last day of meeting, on the 8th of June; but should this not occur, the Council of the Society

have already authorised me to call a special meeting, in order that we may gratify the public, and do honour to ourselves, by having their precious discoveries communicated to the Society by the authors in person.

In the mean time it is highly gratifying to know that our Authorities at home have been prompt in offering to these distinguished men every requisite succour. Earl Russell, with the same alacrity as when he assisted Lieutenant (now Captain) Pim to traverse Siberia in search of Franklin, has transmitted a sum of money in aid to Alexandria. The Oriental and Peninsular Company have liberally granted a free passage to Aden or Bombay to the twenty-three black attendants of the explorers; for without such assistance the poor creatures could never have reached their homes near Zanzibar. Again, the Secretary and Council of India have, at our request, at once extended the leaves, with Indian pay, of Captains Speke and Grant to the 1st of July, 1864, in order to free them from embarrassment, and enable them to publish full accounts of their researches. In communicating this circumstance, and in authorising me to send the news by telegram to Alexandria, our Associate, Mr. Under-Secretary Merivale, thus writes: "I wish the telegraph could also conveniently carry the expression of our Indian satisfaction at the great achievement which these officers have performed, and our pride that we, the Indian Service, have beaten Julius Cæsar." I may here state, that the telegram I sent to Alexandria on Thursday was answered on Saturday by Mr. Saunders, Her Majesty's Consul at Alexandria, in these pithy words:—"Speke and Grant reached Thebes and Kineh.—Telegram of Leaves just received here." As, therefore, our travellers are now far below the Cataracts, and in steamers of the Viceroy, we may very soon welcome them at home.

When the full narrative of this expedition is laid before the public, you will then have the perusal of a most graphic, and in many parts an amusing account of the customs and habits of various peoples of whom we never heard before, and of the character and power of kings, to traverse whose dominions required such a continual exertion of tact, vigilance, and resolution, as have proved the leader of the expedition to be as good a diplomatist as he is a gallant soldier. Looking at Speke only as a practical geographer, we of this Society owe deep obligations to him. For he has determined by astronomical observations the latitude and longitude of all the important sites which he visited; and, in transmitting these to us, accom-

panied by a variety of meteorological data, has expressed a wish that these should, if possible, be calculated and compared by competent authorities before he reaches England, and before his map is published. On this point, I am happy to say, that Mr. Airy, the Astronomer Royal, has, with his well-known love of our science, undertaken the important task.

When delayed in the interior, Captain Speke occupied his leisure hours by writing a history of the Wahuma, otherwise (as he believes) Gallas, particularly in reference to the portion of that nation that crossed the Nile and founded the large kingdom Kittara, which is bounded on the south by the Lake Victoria Nyanza, and its affluent the Kitangŭlé Kagera; on the east by the Nile; and on the north by the river-lake Luta Nzigé; and on the west by the kingdoms of Utumbi and Nkole. These names, as well as those of the kingdoms of Karagwé, Uganda, and Unyoro, were only made known to geographers by hearsay from Arab merchants in Speke's first journey; while no historian has heretofore heard of the dynasties which Speke enumerates, among whose kings we read of Ware the 7th and Rohinda the 6th, while one of the descendants of these sovereigns is at present found possessed of from 300 to 400 wives.

Not wishing, however, to do more on the present occasion than to stimulate your desire to listen to a fuller narrative at a future meeting, I must be permitted to read the very words of Speke, when, at the end of the long pilgrimage of himself and his companion, he fell in at Gondokoro, on the 15th February last, with Mr. Samuel Baker, who was travelling onwards to assist him. "The meeting," says he, "of two old friends suddenly approaching one another from opposite hemispheres, without the slightest warning, can be better understood than described: we were intoxicated with joy, though my good friend had inwardly hoped till now to find us in some fix from which he might have relieved us. Baker had one *dyabia* and two smaller vessels, stored with corn, which he at once placed at our disposal. He also lent me money to pay the way to Cairo, and finally supplied our *dyabia* with many little delicacies for our comfort. He was our saviour, if not in the interior, at any rate on the Nile." Nor can I here omit to notice the paragraph in Speke's first letter to myself, in which he says, "I may safely say I never felt so rejoiced as when Petherick delivered your letter announcing that the Royal Geographical Society had awarded to me the Founder's Medal."

The determination of the reservoir from which the Nile flows will enable us to speculate with more certainty than before on the regular periodicity of the rise of this stream in Egypt; and which is now generally attributed, not to the melting of the snows of the higher chain to the east, but, in far the greater part, to the fall of the equatorial rains on the interior spongy upper basins, which, when supersaturated, must fill to overflowing the lakes into which the waters pass, the periodicity being determined by the passage of the sun over the equator. And here I cannot but observe that if there be any persons who adhere to the old-fashioned erroneous belief that the interior of Africa is a mountainous sandy desert, from which the sources of the Nile are derived, the discoveries of Burton and Speke, and of Speke and Grant have as completely dispelled the illusion respecting the equatorial latitudes, as the journey of Livingstone put an end to a similar false hypothesis in the southern part of this great continent.

Modern discovery has indeed proved the truth of the hypothesis, which I ventured to throw out to you eleven years ago, that the true centre of Southern Africa is a great elevated watery basin, often abounding in rich lands; its large lakes being fed by numerous streams from adjacent ridges, and its waters escaping to the sea by fissures and depressions in the higher surrounding lands. It was at our anniversary of 1852,* when many *data* that have since been accumulated were unknown to us, that, in my comparative view of Africa in primeval and modern times, I was led to suggest that the interior of that continent would be found to be such an unequally elevated basin, occupied now, as it was in ancient geological periods, by fresh-water lakes, the outflow of which would be to the east and to the west, through fissures in subtending ranges of higher mountains near the coast. While this theory was clearly verified in Southern Africa by Livingstone in the escape of the Zambesi, and is well known to be true in the passage of the Niger, through deep rocky gorges, so does it apply to the Nile, in as far as the great central lake, Victoria Nyanza, is ascertained to occupy a lofty plateau 3,500 feet above the sea. Again, as the southern end of this lake extends to the water-parting between North and South Africa, and in its range northwards is only fed by small lateral affluents flowing from the flanking higher grounds, so the waters issuing from the northern end of the Lake Victoria Nyanza, and, forming the White

* President's Anniversary Address 1852, vol. xxii., p. cxxi.

Nile, take advantage of a series of depressions, through which they descend in a succession of cascades. The uppermost of these cascades, close to the lake, has been named, after my predecessor (now Earl de Grey and Ripon), "The Ripon Falls." Thenceforward, the White Nile, fed by other affluents as it flows to the North, has a descent of 2,400 feet, when it reaches Khartŭm, which is itself 1,100 feet above the sea. The general course of the Nile, from south to north, and its peculiarity as a stream, in having no affluent between the Atbara River and the sea, a distance of 1,700 miles, has been in the first instance dwelt upon by the great Abyssinian traveller, Bruce, and has since been ably illustrated by Sir Henry Holland.* The phenomenon of its being confined to this northward course is due to the fact, that the flanking higher grounds, ranging from south to north, do not afford, as in Southern Africa, lateral valleys which lead to the sea. The other generalizations which have been established by Speke and Grant, independently of the true source of the White Nile, are—

1. That the hypothetical mountain-chain, which has been called the "Mountains of the Moon," and which on old maps has been represented as traversing the equatorial regions of Africa from east to west, exhibits no such range. According to Speke, the only high land seen was simply a separate interior cluster of hills, from which descend some small western feeders of the Lake Victoria Nyanza. In fact, these mountains occupy the higher part of the central watershed between North and South Africa. Now, as they supply the Victoria Nyanza, and, consequently, the Nile, with some of its western waters, they may also send eastern contributions to the river Congo. To the south there seems little doubt indeed but that their waters flowed into the Lake Tanganyika of Burton and Speke, and thence into the Nyassa of Livingstone, as had been, indeed, inferred, on what seems to me very sound reasons, by Mr. Francis Galton.†

2. That the inhabitants of the kingdoms of Karagwé and Uganda, in the central and equatorial parts of Africa, are much more civilized and advanced than the people who live to the north, on the banks of the Nile, between the Lake Victoria Nyanza and Gondokoro, the latter being for the most part those naked barbarians, probably the

* Edinburgh Review, Oct., 1854. Alluding to the mysterious unsolved problem as to the true origin of the Nile, Sir H. Holland then justly said, that "the man who makes the discovery will perpetuate his name to all future time."

† See Earl de Grey and Ripon's Anniversary Address, 1860, p. clx. "Africa."

anthropophagi of Herodotus, who have doubtless been the real impediments during all ages to explorations up the stream, or from north to south.

3. We learn that some acquaintance with the language of the natives on the east coast enabled the travellers to hold converse with many individuals in all the tribes and nations they passed through until they reached the above-mentioned northern barbarians, whose language is quite distinct from any dialect of Southern Africa.

4. From the notes of Speke on the geological structure of the countries he passed through, I infer there is little or no hope of any portion of those regions proving to be auriferous. I direct attention to this fact; since an erroneous notion has crept into the public mind, derived probably from the possibly gold-bearing character of some mountains extending southwards from Abyssinia, that a gold region existed near the sources of the Nile.

In this Address I cannot pretend to do justice to the writers from the early days of Herodotus to the later period of Ptolemy, as well as to many modern authors who, referring to those ancient works, or obtaining information from natives, have assigned the origin of the Nile to lakes in the interior of Africa.* We are told by Cooley, in his 'Geography of the Great Lake of Southern Africa,'† "that above three centuries have elapsed since accounts of a great sea in the interior of Africa reached the Portuguese settlements on both sides of that continent." It is probable that from this information was constructed the old map of the sixteenth century, which exists in the library of the "Propaganda Fede," in Rome, and in which the Nile is represented as issuing from an equatorial lake.‡ Already in 1518, adds Cooley, we find it stated as a fact, learned from the natives of Congo, that the River Zaire rises in a lake in the interior, from which issues in another direction another great

* Colonel Sir Henry James informs me that in Lelewel's 'Géographie du Moyen Age' (Brussels, 1830), there is a map taken from the Arabian work called 'Rasm,' which map was copied by Abu Diafar Mohammed Ben Musa, A.D. 833, by order of the Calif Almamoun. This map is therefore upwards of 1000 years old; and on it the source of the Nile is represented as being in a lake called "Kura Kavar," situated on the Equator, an island in it being represented as in longitude 32° 40′ E. This agreement to so great an extent with modern discovery is truly remarkable.

† Journal of the Royal Geographical Society, vol. xv., p. 185.

‡ A small copy of this large map taken by Lieut.-Gen. Jochmus von Catignola is in our Apartments. In a letter from Rome, dated July 3rd, Monsignor F. Nardi, Prelate of the Pope's Household, informs me that this fine and large old map was constructed by one Jerome Verrazano, probably a brother of the celebrated Florentine geographer John Verrazano, who was sent out by Francis I., King of France, to explore a part of North America.

river, presumed at that time to be the Nile.* Again we learn from the same learned, critical geographer, that De Barros tells us of the great lake in the centre of Africa, "whence issue the Nile, the Zaire, and the great river, the branches of which encompass Benomotopa, besides many others that are nameless." † Such information, gleaned from native sources, it has been reserved to our times to verify or disprove by actual observation. The one or more great lakes of the old authors have now been separated by explorers into several great water-systems; and it is to that of the White Nile, as fed by the great reservoir of the Lake Victoria Nyanza, that our present attention is called.

And here we must give due credit to our Abyssinian medallist, Dr. Beke, who, in the year 1848, threw out an original hypothesis ‡ respecting the sources of the Nile, which the journey of Speke and Grant has proved to be substantially correct; § and on which he has dilated at the meetings of our Society, and in letters to myself.

It is not my province to enter now into a general discussion on the relative merits of the writings and maps of critical geographers upon Africa, nor to endeavour to show how in the south-east the recent observations of Livingstone may have substantiated or modified the ingenious views of Cooley, the practical sagacity of Arrowsmith, or the laborious analyses of Macqueen. The source of the White Nile is the question before us, and on that point we know that, when (1858) he was associated with Burton, Speke discovered and named the great Lake Victoria Nyanza. Nay, more, he assured

* Fernando de Enciso, Suma de Geografia.

† Asia, Decad., l. xi.

‡ Transactions of the Sections of the Brit. Association, 1848, p. 63.

§ In this Address, delivered on the 25th May, which, hastily written, was printed in the *Times* of the following day, there are *errata*, particularly in reference to the writings of Mr. Cooley and Dr. Beke, which I have endeavoured to correct in the text. As respects Africa, my main object was to convey a clear and popular view of the journey of Speke and Grant. I am aware that various opinions prevail among sound critics on the geography of the interior of Africa; and I profess to be wholly incompetent to side with Cooley, Lacerda, and Pigafetta, or Burton, on the one hand, or with Macqueen or the other African authorities, such as Beke, Erhardt, Speke, &c., on the other. On the following points of comparative geography, however, I must do Mr. Cooley the justice to say, that he has satisfied scholars that the Blue Nile was *the* Nile of the ancients (though we now know that it is merely an affluent of the much greater White Nile)—that Greek geography can be traced with certainty to Palta on the east coast of Africa, and, as stated in the text, that the Mountains of the Moon do not belong to the genuine text of Ptolemy. (See Dr. Smith's Ancient Geography). Though unprepared myself to go into the relative merits of our African critical geographers (not forgetting the Inner Africa of Cooley and his original Map, the Memoirs and Maps of Macqueen, Beke, and others), I should wish to see clear abstracts of their writings placed before us in a future Number of our Proceedings; for such a repertory would be highly interesting, and also useful to practical geographers and explorers.

us, in 1859, when he determined its position, that it would prove to be the true source of the Nile; and that problem of ages he has himself now settled by actual survey. For all the speculations of geographers as to the main source of the Nile remained to be confirmed or set aside by actual observation.

As to the "Mountains of the Moon," they are, according to Cooley, an Arab interpolation, and do not belong to the genuine text of Ptolemy, Amedi, &c. Amid the mountains of tropical Africa, we may hesitate to apply that designation with Burton to the group which Speke views as such, *i. e.*, W.S.W. of the Lake Victoria Nyanza; or, on the other hand, to agree with Dr. Beke in considering as such a north and south chain on the east, which, as he supposes, may unite the lofty peaks of Kilimandjaro and Kenia with mountains in Abyssinia. Even those two views need not exhaust this prolific subject of theory; while they and other speculations may serve geographers a good turn as useful stimuli to future explorers.

In dwelling on the fact that all efforts to ascend the Nile to its source have failed, I must do justice to those geographers who have shown the way as to the desirableness of exploring the interior of Africa from the coast near Zanzibar and Mombas. First, I have to record that in the Session of 1838-9, Captain W. Turner, R.N., suggested to our associate Mr. W. Bollaert and the late Captain Ormsby of the Indian Navy, that the three should go to Zanzibar, thence to explore the country to the great lakes then called *Maravi*. Their plans were submitted to Mr. Cooley, who even wrote out a list of instructions, whilst the Royal Geographical Society as well as the Government offered assistance. This expedition was put an end to by the employment of both the naval officers; and Mr. Bollaert most unwillingly relinquished the project, and went to Texas to explore portions of a country, the regions to the south of which he has since so well described. Next we have to bear in mind the efforts of those enterprising German missionaries, Krapf and Rebmann, who, advancing from Mombas to the foot of the great mountain Kilimandjaro, announced the startling phenomenon that these very lofty mountains, though under the equator, were capped by snow. The truth of this observation has since been completely realised by the very remarkable actual survey of Baron C. von Decken when accompanied by the geologist Mr. R. Thornton, as well as by subsequent ascents by the former to the height of 13,000 feet. Then Erhardt read a memoir before our Society, illustrated by a map compiled by himself and Rebmann, of a vast tract of Eastern Africa. It was

based on numerous caravan routes and included an enormous lake stretching from the Equator down to the lake Maravi. Next, our associate Colonel Sykes earnestly advocated the operating from Zanzibar,* as an excellent base for all geographical researches in the adjacent continent. I must further state that, as early as 1848, Dr. Beke projected an expedition to the Zanzibar coast, of which Dr. Bialoblotsky was to be the leader. As great prejudices then existed against these suggestions, on account of the supposed inevitable loss of life to any European who should sojourn there, the more have we to thank those of our associates who advocated a line of research, which has led first to the expedition of Burton and Speke, and eventually to the actual discovery of the source of the true White Nile.

I may also say, with no small pride, that from first to last the Council of this Society has vigorously sustained African expeditions, whether in southern or northern latitudes; and I am well entitled to state that in the absence of our persistent representations to Her Majesty's Government, for whose support and countenance we are indeed deeply grateful, the discoveries of Livingstone, and of Burton and Speke, and the great recent discovery of Speke and Grant, which now occupies our thoughts, would not have been brought about in our day.

The introduction of a small steam-vessel on the waters of the White Nile has enabled a party of lady-tourists to effect its navigation, with an ease that astonishes those who had experienced the grievances of the usual means of transport. Not only was the time of passage reduced to a small fraction of its former amount, but the rapid and independent movements of the steamer withdrew her passengers from the risk of those native hostilities which had become a serious danger to the navigators of the White Nile. At the same time that Mr. Baker, warned by the universal experience of the ivory-traders and previous travellers, had pointed out the necessity of a powerful escort to secure ordinary safety, the three ladies, Madame Tinné and her daughter, and her sister Madame van Capellen, steamed in their little vessel to Gondokoro, and beyond it, with a scarcely more numerous attendance than would have assured their personal comfort in the most civilized parts of Egypt.

The energy of these ladies, the daughters of the celebrated Dutch Admiral van Capellen, the coadjutor of Lord Exmouth at Algiers,

* See Journal of the Royal Geographical Society, vol. xxiii. p. 101.

induced them to extend their voyage up the Sobàt, which they describe as a river of importance only during the period of high waters. We had previously been gratified with their lively accounts of the country even to the south of Gondokoro; and we have recently heard of their making a new expedition from Khartûm to the Bahr el Ghazel, in the hopes of penetrating some of the affluents of that great mere. They were at the same time doing an additional service to geographers by conveying the exploring party of Dr. Heuglin to their point of departure from the shores of the same lake. I have twice called the attention of the Society to the exploits of these ladies, the youngest of whom, Miss Alexine, is a naturalized Englishwoman: I will only repeat what I have said at one of our Evening Meetings, that they well deserve to be honoured in an especial manner by the Royal Geographical Society. Dr. Heuglin has already thrown great light on the geography, in its widest sense, of the northern parts of Abyssinia; and the linguistic studies of his original colleague Dr. Munziger have resulted in the collection of eight new vocabularies.

Little is known with certainty of the result of Von Beurmann's endeavour to penetrate Wadai. He appears to have reached Lake Tsád, and there to have awaited permission to proceed. Further rumours have reached Bengazi; but intelligence of a definite character is anxiously waited for.

M. Jules Gérard has sailed to the West Coast of Africa with the object of penetrating Dahomey and Ashanti, and of making such further explorations as opportunity may admit, by passing through the interior to Sierra Leone. The Council of this Society have encouraged his strongly-expressed desire to collect geographical information by the loan of a small but serviceable outfit of instruments. They have also furnished him with instructions in respect to the routes by which, in their opinion, he might most profitably travel, but have in no wise become responsible for the expenses of his expedition.

M. Paul du Chaillu has announced his immediate intention of again starting for the Gaboon, now adequately prepared to map his future journeys; and I confidently hope that by the study he has recently gone through, he will be enabled to make accurate astronomical observations, and add materially to the value of his published work which has so much interested the public of England, France, and America. I must add that M. du Chaillu having freighted a ship at his own cost, and having provided himself

with all the requisite instruments and stores, has expended in this generous effort nearly all the money he obtained from the sale of his work, and has therefore our warmest good wishes.

The Baron C. von Decken had again started, and again been foiled in penetrating the interior of Africa by the way of Mombas. The territory of the Masai appears to be absolutely closed to strangers, at least in that direction. The Baron, as before stated, ascended Kilimandjaro to a height of 13,000 feet, where he experienced a fall of snow, the first that has been endured by any white man, rarely even by a black one, in tropical Africa.*

In general African geography, maps of the whole of the continent, introducing recent discoveries, have been published by Mr. Arrowsmith, and also by M. Ravenstein. The large sheets of Dr. Petermann are all issued, with the exception of those that unite the Lake Nyanza and Gondokoro, which have awaited the results of Speke's expedition. The scale of these charts of Dr. Petermann is sufficient to admit of the insertion of numerous geographical notes and references, whereby it becomes a valuable index to the authorities whence it has been compiled, in addition to its merits as an ordinary map.

Dr. Barth's valuable vocabularies, to which attention was drawn in the last Anniversary Address, are on the point of completion. That able and energetic geographer, who now worthily fills the chair of the Berlin Geographical Society, has published a great

* After the Anniversary Meeting I received a letter from Baron C. von Decken written in the Seychelles Islands, and dated May 12, 1863. This most enterprising Hanoverian traveller was then on his way to Madagascar with the intention of returning to Zanzibar and Mombas, to continue his explorations in Eastern Africa. The object of his letter was to obtain from the British Government some efficient countenance, and a little assistance from our ships of war; inasmuch as the Sultan has been inimical to all his efforts. It appears that Baron von Decken is procuring a steamer of his own, in which he proposes to ascend the river Juba if he can once get his vessel over its dangerous bar. In his last journey Baron C. von Decken was prevented from traversing the Massai country and reaching the northern snowy mountains (Kenia) by that route, and he now intends to ascend one of the rivers which fall into Formosa Bay, *i. e.* the Dana, Osi, or Sabalki, and the Juba. If he is enabled to proceed 100 or 150 miles up any one of these rivers, he hopes to succeed not only in reaching the Kenia Mountain but also the Lake Baringo and other interesting points. Our German cotemporaries may well be proud of this noble and devoted explorer, who, they may be quite sure, will have the heartiest support of the Royal Geographical Society and its President, and, as I can now add, of Her Majesty's Government. This enterprise of Baron von Decken will, if successful, throw a clear light on the relations of all the eastern affluents of the Victoria Nyanza and White Nile, of which Speke has brought us home knowledge as derived from the natives. In the mean time, Captain Speke is decidedly of opinion that the Kilimandjaro snowy peak is separated from the Victoria Nyanza by salt lakes and plains, and throws off its chief waters to the east by the Pangani River. The Kenia snowy northern peak may, however, he thinks, contribute water to the Lake Baringa, and thence by a channel may swell the Nile at the north end of the Lake Victoria Nyanza.—*July 1st*, 1863.

mass of information, in a compendious tabular form, which bears on the periods of rise and fall of the rivers of North Africa, and the corresponding state of the rains and winds. The subject is of interest, partly because the means of intercommunication among the natives and their daily pursuits are largely dependent on the condition of their rivers, but mainly owing to the fact of its offering some acceptable glimpses into the hydrology of little known regions.

LIVINGSTONE.—The proofs obtained by Livingstone that the Rovuma was too shallow a stream to be used in commerce were communicated by my predecessor; and a second expedition to that river enabled the indefatigable traveller to ascend that stream in a boat, and ascertain that it has its source in high lands, and not, as was at one time imagined, in the northern end of the great Lake Nyassa.

After his visit to the Shirè River, and his return to the Zambesi, Livingstone had the happiness of being joined by his devoted wife, after an absence of four years; but in three months, alas! she followed the fate of the good Bishop Mackenzie and his Archdeacon. The touching letter of my friend to myself on this bereavement, and which was read before the British Association at Cambridge, in September last, must have deeply affected all those who knew, as I did, how devotedly the great traveller was attached to that excellent woman.

The extraordinary efforts made by Livingstone to get his boat up the tract watered by those falls of the Shirè which he named after myself, followed by his extraordinary labours and courage in ascending that river and the Lake Nyassa, and his subsequent unwearied labours to transport his small steamer in pieces up the banks of the Shirè, where that river descends in cataracts to the Zambesi, as well as the devoted energy of the pious Bishop Mackenzie and his reverend associates, are all to be recorded as proofs of the heroic resolution of our countrymen.

I had, however, been for some time aware that both the Zambesi and its affluent the Shirè were localities little fitted for the stations of Christian pastors, from whence religion might be successfully extended. Whilst the malaria on the banks of the Zambesi renders any residence on them most dangerous, the evidences obtained by Livingstone and his brother Charles, were, that although the higher country up the Shirè was healthier, yet that the various tribes of the inhabitants were continually at war with each other,

a fact of which sacked villages and the frequent bones of the victims of war were the too palpable evidence. Alas! we also know too well that, in the very first efforts to select missionary stations, that excellent man Bishop Mackenzie found himself compelled to side with one tribe against another, and to be thus engaged in actual warfare! Again, I learned with sorrow, that, in Livingstone's efforts to suppress the slave-trade, in the interior, he had been grievously thwarted by the underhand conduct of certain slave-traders, who followed him into tracts which he had opened out, transporting as slaves many unfortunate natives.

Seeing that all these operations, whether missionary or philanthropic, must be carried on by acting from a base where no British colony exists whence real support could be derived, and also referring to the untoward circumstances to which I have adverted, I was quite prepared to learn that Her Majesty's Secretary for Foreign Affairs should have put an end to a Consulate the main object of which was to suppress the slave-trade. However, therefore, we may regret the withdrawal of our energetic Medallist from the scene of his successes, and before the complete exploration of the Nyassa has been accomplished, we who are sincerely attached to him may rejoice in the prospect of welcoming him on his return to Britain, after making such vast additions to our acquaintance with the geography of Central and Eastern Africa—additions which, without his sagacity and indomitable energy and endurance, might not have been obtained in our day.*

CONCLUSION.

In concluding this Address, I must advert to the changes which take place among our Officers at this Anniversary.

The bad state of health of my distinguished friend General Portlock has, I regret to say, necessitated his retirement from the office

* In reference to what is said above on the subject of Livingstone's explorations, I learn by a letter recently received from him that, instead of returning home, my indefatigable and truth-loving friend has determined to re-ascend the Shirè, and work out the problem of the true source of that stream and his great Nyassa Lake. The British public ought, however, to be informed that in his anxiety to extend his researches—and by so doing check the slave-trade as carried on across the Shirè—Livingstone had expended 6000*l.* of the earnings derived from the sale of his work, in the purchase of a small steamer, intended to navigate that stream. Now, as that sum was of great importance to his motherless children, I earnestly hope that he may be reimbursed, at all events to some extent; the more so as the Consulate, from which he derived only 500*l.* per annum, is at an end. My forebodings as to the helpless state of the University Mission on the Shirè have, alas! been but too fully realized.—July 22, 1863.

of Vice-President. Through the resignation of the post of Honorary Secretary by Mr. Francis Galton, we lose the official duties of a sound geographer, who obtained one of our Gold Medals for his travels in the south of Africa, and who of late has been the able unsalaried Editor of our Proceedings. Though out of office, I venture to hope that he will continue to give us his aid and advice in the Council, particularly as he is the only person in the list proposed who is personally acquainted with the geography of Africa.

In the retirement of the Acting Secretary, Dr. Norton Shaw, the Society is deprived of the services of a zealous and efficient administrator; and the Council have therefore taken the opportunity of marking their sense of the value of his long services in the manner recorded in the Report which has been read to you. I must further do justice to Dr. Shaw by reminding you that, when he was first placed in office, our Members were under 700, and that at present they are about 1800. As I have also had some share in endeavouring to swell these numbers, and in spreading the reputation of the Society, so am I bound to add that, on every occasion when the sympathies of the public were to be united with our own in any good cause which the Fellows of the Geographical Society had espoused, the energy of Dr. Shaw was conspicuous. Thus, I may particularly cite two Meetings over which I presided. The first of these was the gathering which was called to raise a fund to honour the memory of the gallant French officer Bellot, who was lost in the search after Franklin; the other, the organisation of the great festival given to my dear friend Livingstone on his last departure for Africa. The marked success of both these Meetings was unquestionably due in great measure to the heartiness with which Dr. Shaw urged each project. Again, as the Editor of the Volumes of our Journal and of our Proceedings during many years, he has for a long time been identified with the reputation which our publications have obtained. On these various grounds, therefore, I only do justice to the retiring Acting Secretary, in saying that for such essential services he has obtained our cordial thanks.

In reorganising the Administrative Officers of the Society on a new basis, the Council has deemed it desirable for the permanent advancement of our scientific reputation, that we should follow the system which has been found to work best in the Royal, Linnæan, Geological, and other scientific Societies. The essential change made is, that the two so-called Honorary Secretaries are henceforward to resume the titles of Secretaries (as was the case for many

years after our foundation), and are to act as the efficient Executive Officers, who, under the President and Council, shall transact all the scientific and other business of the Society. On this head I feel quite confident, if Mr. W. Spottiswoode and Mr. R. Clements Markham be, as the Council have suggested, elected to fill these posts, that our best anticipations will be effectively carried out. Under them, the Assistant Secretary will have to perform parts only (and quite enough for any one man) of the numerous avocations of Dr. Norton Shaw; his principal duties will be those of Editor of all the publications, and superintendent of the Assistants and subordinate officers of the establishment.

Finally, let me say that, if I am enabled to conduct your affairs during the ensuing year, I trust that I shall, at its close, be able to announce to you, that there has been no diminution of the prosperity to which we have attained. I must, however, add that the term of my two years of Presidency will then have been completed. And, when I remind you that, if I live till the next Anniversary, I shall have acted as your President for nine years—and that on many other occasions I have also been seated in this chair to do the duty of your absent Presidents—I know that, however great my shortcomings may have been, you will admit that I have zealously served you; whilst I can truly assure you that this service has been a source of the deepest gratification to myself, since I have invariably met with your hearty support.

The capabilities, however, of doing effective service have their limits in the life of any man; and you must not think of changing your rule of biennial Presidencies in my favour, as some of my kind friends have suggested; for I feel that I cannot in a future year undertake, in addition to official and other occupations, this most honourable duty.

Pray, therefore, look to the coming year when I must take leave of you in the capacity of a President, and select some one as my successor, who shall be worthy of the high distinction of presiding over you,—one who will value this privilege as I do,—and who will strive, as I have striven, to promote the best interests and true advancement of the Royal Geographical Society.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

SESSION 1862–63.

Fourteenth Meeting, Monday, June 8th, 1863.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Mr. Geo. Cockle and Mr. Gillet.*

ELECTIONS.—*His Royal Highness the Count de Paris; the Earl of Belmore; Sir John P. Boileau; Hutchinson Browne, Esq.; John Brunton, Esq.; Walter Buchanan, Esq.*, M.P.; *Frederick Burdock, Esq.; Thos. F. Callaghan, Esq.; the Rev. G. H. Clements; Edward Cloves, Esq.; S. W. Courtenay, Esq.; M. P. Edgworth, Esq.; Thos. F. Hall, Esq.; G. F. Heneage, Esq.; Charles J. Leaf, Esq.; Sir Thomas Davies Lloyd; Captain Lovell; Viscount Milton; W. Winwoode Reade, Esq.; R. H. St. Andrew St. John, Esq.; Francis Snowden, Esq.; Dr. George E. Spikernell; John Taylor, Esq.; the Hon. Henry P. Vereker; Henry Waite, Esq.; Charles Noel Welman, Esq.; Wm. Octavius White, Esq.; also Lieut.-Colonel the Chevalier Sonklar von Instätten as Honorary and Corresponding Member.*

ACCESSIONS.—Among the donations to the Library and Map-rooms since the former meeting were—'Vancouver Island and British Columbia: Where they are, what they are, and what they may become;' by Alexander Rattray, M.D. 'A Short Explanation of the Sketch of the Analytic Universal Nautical Code of Signals;' by Count d'Escayrac de Lauture. 'Considerations on the Phenomena attending the Fall of Meteorites on the Earth;' by Professor W. Haidinger. 'The British Shipmaster's Handbook to Rio Grande do Sol;' by the Hon. H. P. Vereker, LL.D.; and 'Transactions of the Zoological Society,' Vol. iv. Part 7, and Vol. v. Parts 1 and 2. Maps of British India; Africa (South), sheet; Philip's Atlas, Part 15.

EXHIBITIONS. — Numerous specimens of birds from the Malay Archipelago, and diagrams illustrative of the Papuan and the Malay races.

In opening the business of the evening, the PRESIDENT said he had the pleasure of announcing that he had received a telegram, stating that Captains Speke and Grant left Alexandria on the 4th current, in the steamer *Pera*. They were due at Southampton on the 17th, and the Council of the Society had decided upon having an extra Meeting to receive them, on the evening of the 22nd.

While upon the subject of Africa, he might state that he had further intelligence of Madame Tinné and her daughters, the adventurous ladies, who, after having gone up the Nile as far as Gondokoro, whence they returned to Khartûm, had started afresh in their steamer for the Bahr-el-Ghazal, the great western affluent of the White Nile. The following letter had been received from Madame Tinné, and was read by the President:—

"21*st March*, 1863.

"Here we are, come to a stop again; that is, as far as we can go in the steamer on the Bahr-el-Ghazal. We are near to an island which Petherick calls Kyt, but the natives call it Misr of Reg. Its longitude is 26° 45′ E. of Greenwich." [This may probably be depended upon, as Mr. Von Heuglin and his companion, both scientific men, are of the party.] "The Bahr-el-Ghazal is more like a very narrow canal. There is little to say of it. It winds through high grass and bulrushes; large plains, with huts and flocks at a distance, and nothing else. This is a very difficult place to come to, as the river, though deep, is choked with rushes and a soft-wooded sort of tree, which breaks as our ships pass, but is very formidable to look at. The leaf is the same eternal mimosa-shaped leaf, and it bears a large yellow flower, like broom, and very sweet-scented. We came through it with the steamer, having the paddles taken off. Our learned friends have found 60 curious new birds, and an unknown fish, as well as several new flowers and plants. Mr. Von Heuglin and the Doctor have made some valuable observations. No one the least scientific seems ever to have been here before us.

"We have no porters yet, but we are going on shore to see what can be done. It will now be long, very long, before I can write again; but we have a very good medical man with us, so we feel as safe as in Europe. As to our return to Khartûm, it may be soon, but it may be long. This depends on the time the rainy seasons set in in the parts we are going to visit; but as no one has been there yet, of course we cannot know. Mr. Baker went into a part of Abyssinia previously little known, to hunt elephants for six weeks, and they were detained nearly a year before they could travel, on account of the rain and mud! We are decidedly late in the season, and we may be overtaken in the same manner: but do not be alarmed; we have two scientific men to guide us, and about seventy or eighty soldiers, well armed, to guard us, besides our good reputation, and the idea of your sister being the Sultan's daughter, travelling on a ship of fire!"

The PRESIDENT said he had also to call attention to the circumstance that M. du Chaillu, who was about to make another exploration into the interior of Africa from the west coast, had taken great pains

to instruct himself in making correct astronomical and geographical observations, and had provided himself with instruments. He had also at his own expense freighted a ship to take him out to the river of Fernand Vaz, 1° 10′ S., and 9° E. He had resolved on going alone, with plenty of instruments and an ample supply of presents for the natives; and he was determined to prove to the English public, that, though many of his observations might not be geographically correct, yet his published work was as a whole essentially truthful. He (the President) rejoiced at this determination, and he need not say that he wished M. du Chaillu complete success in his exploration.*

He might further announce that there was a communication from Earl Russell, consisting of two despatches from Mr. Consul Callander, of Rhodes, to the Foreign Secretary, relating to the great earthquakes which visited that island in the spring. The first despatch, dated April 27th, gave an account of the earthquake on the night of the 22nd of April, the shock of which was felt at about half-past ten, and lasted about three-quarters of a minute. The movement was apparently from west to east, and the shock was so severe that there was not a building in the island which was not more or less damaged. The fine tower of St. Michael, called the Arab's Tower, at the entrance of the harbour, was partly destroyed, as well as the tower of St. Nicholas, on which the lighthouse stood. About thirty houses in the town, and as many in the suburbs, were destroyed, and thirteen individuals killed. Out of twenty-six villages, from which information had been received, thirteen were entirely destroyed and the remainder partly ruined; and about 100 individuals killed and as many wounded. The little village of Massary (36° 10′ N., 28° 6′ 30″ E) 20 miles S.W. by S. of Rhodes, and one mile from the coast, was reduced to a heap of ruins; 126 bodies had at the date of the first despatch been dug out of the ruins, and the condition of the survivors, who had been driven into the fields without shelter, was aggravated by an abundant rain which fell for two days after the earthquake.

The second despatch, dated May 2nd, gave additional particulars. From official information 224 people had been killed throughout the island, and 124 wounded. The number of houses destroyed in twenty-one villages, out of the forty-four in the island, amounted to 1377. An *aide-de-camp* of the Sultan had arrived on board an Imperial corvette, entrusted, it was said, on the part of His Majesty the Sultan, with 500,000 piastres (5000*l.*) for the relief of the sufferers, and another steamer with tents was shortly expected.

The paper of the evening, the President ventured to say, was as remarkable a contribution as had been laid before the Society for a long time. It was the production of one of our most eminent naturalists, Mr. Wallace, who had spent seven years in the Indian

* M. Du Chaillu took his departure from Gravesend on the 5th of August, 1863.

Archipelago. He had previously communicated valuable papers upon Borneo and other subjects, which were printed in the Transactions of the Society. The paper had, geographically speaking, quite a unique character, for the author, judging from the nature of the animals and plants that are found in these different islands, showed how and when former continents must have been separated from each other, and how the respective *floræ* and *faunæ* of ancient continents are now to be found almost within a few miles of each other.

The Paper, which was entitled,—

On the Physical Geography of the Malay Archipelago,

was then read by Mr. MARKHAM, Secretary.

MR. WALLACE, after briefly glancing at the importance of his subject, which, he said, furnished the most extensive and varied materials for speculation in almost every department of scientific inquiry, proceeded to classify the topics treated of in his paper, the first section of which consisted of a tolerably precise determination of the limits of the Archipelago, with data as to the position, extent, and magnitude of the principal islands; the great object being to define the eastern boundary of the region in question, where, unless due care be taken to verify its limits, geographers are apt to conceive that it blends insensibly with the various Pacific groups usually classed as Polynesia. This archipelago—for which he proposed the name Indo-Australian in lieu of Malay—he held to extend from the Nicobars on the north-west (Mr. Wallace did not mention the Andamans), to San Cristoval, one of the Solomon Islands, on the south-east; and from Luzon on the north, to Rotti, at the south-west angle of Timor, on the south; being an irregularly triangular area of 29½° latitude, by 69° of longitude. For ethnological and other purposes stated in the paper, the Malay peninsula, though a portion of the mainland, is included in this insular belt; and analogous reasons induced the determination of the eastern limit. After strongly advocating the insertion in all future atlasses of a special map of these islands, comprising so many varieties of man, so many different tribes, and such variety of physical phenomena as to entitle it almost to be regarded as the sixth great division of the globe (Australia being the fifth), Mr. Wallace alluded to the immense number of active and extinct volcanoes (the islands in which the former occur being unusually liable to earthquakes), as also to the immense forests which, throughout a great portion of the Archipelago, clothe even the loftiest hills to their summits; while in other portions these give place to arid hills and plains scantily covered with scrub. The meteorological phenomena display similar

contrasts, some of the islands experiencing the monsoons with the utmost regularity, while others show an inconstancy of climate resembling our own. But the most marked feature of the physical geography of the region is to be found in the fact that one large section is connected by a very shallow sea with the continent of Asia, while a similar submarine plateau unites another portion to Australia; the intervening belt of ocean being almost unfathomable.

Mr. Wallace then subdivided the islands into—I. Volcanic, and Non-Volcanic; II. Forest Country and Open Country; III. Well-marked Seasons and Undefined Seasons; and IV. Western, or Indo-Malayan Region; and Eastern, or Austro-Malayan Region.

As to the first, Borneo and Celebes formed two central masses, round which the volcanic islands are distributed in a band about 5000 miles in length, roughly conforming to their outline, and comprising about 50 active volcanoes. Throughout this entire length are to be found, at innumerable points, most convincing evidences of frequent upheavals and depressions of land, especially of upraised coral reef. In strong contrast is the island of Celebes, throughout its singularly-complicated form, the great mass of Borneo and the whole Malay peninsula, which, like Celebes in this respect, have absolutely no volcano, active or extinct; and there is a similar quiescent area, 1000 miles wide, in the great island of New Guinea, where no volcano is known to exist nor earthquake to occur, in an island which Mr. Wallace estimates to contain 290,000 square miles, or 53,000 more than Borneo, hitherto regarded as, after Australia, the largest island in the world. Still further to the east occur a few small active volcanoes.

The author then noticed the variations of soil, and endeavoured to account for the extraordinary configuration of Celebes and Gilolo, which have been variously accounted for, but which he did not feel disposed to attribute to volcanic action (there being but a few volcanoes at the extreme northern end of Celebes), but rather to the alternation of forces acting in opposite directions, which nearer home have been known to raise and depress large tracts of land several hundreds of feet within comparatively short geological periods. He then briefly stated his reasons for believing Borneo to have been long stationary, before proceeding to touch upon the contrasts of vegetation and climate, which he proposed to consider together, and of which he gave numerous most interesting particulars, tracing their varying features to climatic and other influences.

He next adverted to the change of the seasons, which in many

parts seems, at first sight, to follow no known law, though an accurate and prolonged series of observations would doubtless enable us to determine them.

"Speaking generally," said Mr. Wallace, "the whole south-western part of the Archipelago, including the whole range of islands from Sumatra to Timor, with the larger half of Borneo and the southern peninsula of Celebes, have a dry season from April to November, with the south-east monsoon. This same wind, however, bends round Borneo, becoming the south-west monsoon in the China Sea, and bringing the rainy season to Northern Borneo and the Philippines. In the Moluccas and New Guinea the seasons are most uncertain. In the south-east monsoon, from April to November, it is often stormy at sea, while on the islands it is very fine weather. There is generally not more than two or three months of dry hot weather about August and September. This is the case in the northern extremity of Celebes and in Borneo, whereas in Amboyna July and August are the worst months in the year. In Ternate, where I resided at intervals for three years, I never could find out which was the wet and which the dry season. The same is the case at Banda, and a similar uncertainty prevails in Menado in Celebes, showing, probably, that the proximity of active volcanoes has a great disturbing meteorological influence. In New Guinea a great amount of rain falls, more or less, all the year round. On the whole, the only general statement we can make seems to be, that the countries within about 3° on each side of the equator have much rain and not very strongly-contrasted seasons; while those with more south or north latitude have daily rains during about four months in the year, while for five or six months there is almost always a cloudless sky and a continuous drought."

The Paper now passed to the consideration of the geological formations and zoological products, and broadly stated it as a recognized fact that one portion of the Archipelago is entirely Asiatic, while the remaining portion is quite as distinctly Australian. With the additional information since obtained, Mr. Wallace combated a theory advanced by Mr. Windsor Earl in a Paper read before the Royal Geographical Society in 1845, in which that gentleman argued from the existence of shallow seas between the mainland of Asia and the immediately adjacent islands at one end, and of a similar shallow sea uniting Australia with New Guinea at the other, that Australia was once part of Asia. Mr. Wallace remarked, that had Mr. Windsor Earl been better acquainted with the natural history of the various regions, he would not have advanced a proposition "to which the whole bearing of the facts in physical geography and

natural history is opposed." In support of this view, he briefly discussed the relations of the geographical distribution of animals and plants with geology; and claimed that the same changes in geological distribution of land and water, of which we have so many evidences in our present acquaintance with the constituents of the earth's crust, are still going on. Hence we shall find that wherever upon islands contiguous to each other or to a continent animals or plants of the same or closely analogous descriptions are observed, it will be found, upon investigation, that the sea between them is decidedly shallow; and by parity of reasoning, that where a deep sea divides islands from each other, there entirely different types will be found. While enlarging upon this branch of his subject, he pointed out that an upheaval of only 50 fathoms would, to judge by soundings, make dry land of the whole sea intervening between Borneo, Java, and Sumatra, and the mainland of Malacca and Siam, while the 100-fathom line of similar soundings includes the Philippines and other groups; from which fact he argues the comparatively recent submergence of this part of Asia, which he ascribes to violent volcanic action. He then adduced a variety of arguments from the zoological world, instancing examples both of *carnivora* and *ruminantia*, which are common to the islands named and to Southern Asia, while they are totally unknown to Australia, yet which could never have reached the islands of the Western section from the mainland of Asia, so long as the ocean retained its present configuration.

After noticing a few anomalies observable in the Philippines, which could sufficiently be accounted for by the more remote period at which they were cut off from Asia as indicated by the greater depth of the intervening ocean, Mr. Wallace proceeded to apply a similar chain of reasoning to the islands from Celebes and Lombok eastward, which he showed to present all the characteristic features of having been united to Australia, as indicated by the shallow sea between, and the similarity of fauna and flora between the Eastern section of the Indo-Australian Archipelago and Australia, as evidenced by two Tables (which will appear in the Society's 'Transactions').

Starting from this point, the writer then proceeded to demonstrate that the dividing line between these may become so narrow that a few miles only may carry the traveller from one great division of the earth (as measured by dissimilarity of productions) to another; and, in proof of this, instanced the Strait, barely 15 miles wide, between Bali and Lombok, which marks the dividing line between the Asian and Australian kingdoms of Natural History. From

these various *data* he drew the general conclusion that all the islands eastward of Borneo and Java formed part of an Australian or Pacific continent, from which they were separated at a period, not merely long antecedent to the submergence of the adjacent portion of the Asiatic continent, but probably long before any portion of South-Eastern Asia emerged from the waves; basing the conclusion upon the comparatively recent geological formation of Java and Borneo, and on the great depth of the sea between Borneo and the Eastern section of the Archipelago, which, upon his theory, pointed to a very remote period at which the two continents of Asia and Australia were separated.

He invited particular attention to the fact that the division of the Archipelago which he had pointed out did *not* correspond to any physical or climatal divisions; that the volcanic band runs through both sections; and that the climates of Borneo and New Guinea are very similar; yet that, in spite of these, which are usually deemed the necessary conditions for ensuring similarity of animal life, the most striking contrast between them respectively at once forces itself even upon the most unobservant traveller. He then illustrated the difference between these two sections of the Archipelago by speculating as to what would be the consequence of the two continents of Africa and South America becoming joined in the course of ages by the slow upheaval of the Atlantic bed, the erosive agency of rivers on either continent, and other similar causes, followed by a sudden violent divulsion along the axis of what had been the ocean. If, then, a renewed period of upheavals occurred, islands would have been formed similar to those of the Indo-Australian Archipelago, yet equally dissimilar as to Natural History. The Paper concluded by urging upon naturalists increased devotion to that science, as tending to throw light upon many of the most recondite questions of the earth's previous history.

The PRESIDENT remarked that as a geologist, he must say, in all the years he had had the honour of being connected with the Society, he had never heard a paper read of a more luminous character, and which so bound together in the most perfect forms all the branches of the science of natural history, more particularly as it developed the truths of geography upon what he considered to be its soundest basis, that of geological observation and analogy. He was perfectly certain there was no person present, who could not say that they had never sent a traveller into a foreign country, who had more completely studied all the grand features of its natural history, or who had combined them together in a more profoundly philosophical spirit.

Mr. CRAWFURD said the subject of the Malay Archipelago had been the study of his life; but he felt himself much enlightened by the paper of Mr. Wallace. He did not know that he could add any information. He might not entirely agree with all his theories, and, perhaps, not even with his divisions of the Archipelago; but for all that, his paper was a most enlightened

and a most able one. He wished Mr. Wallace had said something about the human inhabitants of these regions. Mr. Wallace knew more about them than any Englishman, for he had lived among them; and he should be glad to hear his opinion of them. He divided the Archipelago into two parts, the Indian portion and the Australian portion. Now he wished to ask Mr. Wallace, seeing that he conjoined Australia and New Guinea as part of the same region, how it happened that the human inhabitants were totally different? Again, if the Indo-Malay portion of the Islands were grouped with India, how came it that no two human beings could be more unlike than the Hindoo and the Malay? How did the Malays come there? How were the dwarfish inhabitants of the Andaman Islands to be accounted for? for there were no such people in India—that was certain. How were the pigmy negroes of the Malay Peninsula to be accounted for? There were differences here which he (Mr. Wallace) might perhaps be able to reconcile. Mr. Wallace had mentioned the eruption of the mountain Tomboro. He was himself old enough to have been an eye-witness of the commencement of that eruption, probably the most remarkable one on record. In the year 1814 he proceeded with an expedition to the island of Celebes; and as they approached the island of Sumbawa, which contained this famous mountain, they thought they saw a very heavy squall coming on. They were beating up against the south-east monsoon, and as they approached they saw that it was a volcano. As they beat up nearer the shore of the island, the ashes fell on the deck. That was one whole year before the great eruption took place. He was then at Soerabaya, at the eastern extremity of Java, about 300 miles distant from the mountain of Tomboro. For three days it was pitch dark. Mr. Wallace had greatly underrated the extent of ashes that were ejected, which were certainly not confined to an area of 300 miles, as they fell at Bencoolen, 1200 miles distant, transported thither by the south-east monsoon; and they were carried by a second current of air a thousand miles in an opposite direction, as far, in fact, as the island of Banda. For ten days he had to write by candlelight; and the country-people were compelled to travel into the country with flambeaux. For six weeks together they could not see the plain disc of the sun. There was one difference between the volcanic and non-volcanic portions of these islands. Generally speaking, the volcanic part was highly fertile. Mr. Wallace had given a just eulogy of the island of Java. He himself resided on that island six years, and he was tolerably well acquainted with it. Java was about half the size of Great Britain; it was a fertile island, beautifully watered, and at present contained a population of full 12,000,000; indeed, the last accounts make it about 13,200,000. On the other hand, he did not believe the population of Borneo exceeded four or five inhabitants to the square mile, and probably on the whole did not exceed one million and a quarter. If Borneo were as fertile as Java, as well watered, and as suitable to maintain a population, it ought, according to its immense size, to contain a population of 80,000,000. The people of Java were civilised, having fine monuments and a literature. The whole of the inhabitants of Borneo, who were not strangers, were savages. There was a still more remarkable example. Mr. Wallace had mentioned the islands of Bali and Lombok. Now, those two very small islands were highly fertile, and although they were not above one-eightieth part of the size of Borneo, they contained a population equal to that of Borneo, and a civilised population too, well-clothed and well-fed, and possessing a literature. These were striking differences between the volcanic and non-volcanic islands.

Mr. WALLACE said with regard to the question that Mr. Crawfurd had asked, why he did not refer to the races of men inhabiting these islands, it was simply because his paper was already too long, and it would require another paper equally long to do justice to the subject.

Mr. CRAWFURD.—Will you promise one?

Mr. WALLACE.—Certainly. He should just like to say a word with regard

to the number of very difficult problems that Mr. Crawfurd had proposed to him—problems which, as Mr. Crawfurd, who had devoted his whole life to the subject, was unable to answer, it was not likely he should be able to answer upon such short notice, if indeed at all. However, he would say, generally, that the races of man do not correspond at all accurately to those two great divisions of the Archipelago, which differed so remarkably in their natural productions. The reason why they did not correspond appeared to him to be simply this; that man is a migratory animal and continually moving about. We had a great deal of historical evidence of the number of changes of the races of man in the Archipelago itself. Some races have been driven out; others have come in; others have made conquests; others have gone to more fertile regions. Therefore, the races of man would not correspond to those of animals and plants. Still there was a slight general correspondence. There was the Malay race, the whole of which, generally speaking, corresponded to the western half of the Archipelago; they did stretch into the eastern half, but not a great part of it. The Papuan race occupied the eastern half, and extended into New Guinea. It was probable they had extended still further west, but they had been driven back by the Malayan race.

The PRESIDENT, in adjourning the Meeting, congratulated them upon having had from Mr. Wallace a proof that Geography as a science embraced all the sciences relating to Natural History. He had proved himself not alone a first-rate naturalist, but also a good geologist.

The Meeting then adjourned, after a cordial vote of thanks had been unanimously passed to Mr. Wallace for his most interesting and instructive paper.

Fifteenth (Special General) Meeting, Monday, 22nd June, 1863.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

As already mentioned in the record of the Proceedings of the Meeting of the 8th June, it was on that occasion announced by the President (*v. ante* p. 204), that Captains Speke and Grant were at latest accounts on their way home from the scene of their splendid discoveries; and those gentlemen having in the interim landed at Southampton on the 17th June, notices were immediately sent out from the Offices of the Society, calling a Special General Meeting for the above evening.

ELECTIONS.—*Sir Alexander Gordon Cumming, Bart.; R. H. Davies; Edward Francis Dayrell; Gardner D. Engleheart; Alexander Fergusson, Esqrs.; Major-General Alexander Peto Le Mesurier; S. P. Low; Alexander McArthur; John Remington Mills*, M.P., *Esqrs.; Sir Robert Phillimore; Russell Brooke Robertson; Thomas F. W. Walker*, M.A.; *Swinburne Ward; and John Westlake, Esqrs., were elected Fellows.*

DONATIONS.—Admiralty Charts and Ordnance Maps; Maps of Belgium, presented by Mr. Ph. Vander Maelon, of Brussels.

EXHIBITIONS.—Views of Napoleon Falls, Lake Nyassa, and nu-

merous photographs of natives and scenery along the line of Captain Speke's route, from Zanzibar to Gondokoro; spears and shields, &c.

The President having entered the Hall, with great difficulty forced his way to the chair. He would not, he said, commence the proceedings until Captain Speke had been placed on his right hand, and Captain Grant on his left, which arrangement was effected with no little difficulty.

In introducing Captains Speke and Grant, the President said:—

GENTLEMEN, we are now specially assembled (for our regular Session has terminated) to do honour to the two men who have accomplished the most remarkable geographical feat which has been performed in our time, and one which it has been the ambition of other nations to accomplish during all ages. The Council of this Society has the greater reason to be proud of this achievement, because it was by their exertions that the means were obtained to carry it out; and Her Majesty's Government and the Indian Government must also have a real gratification, in reflecting that they complied with the wishes of the geographers who organised the East African expedition, in furnishing the essential means of accomplishing it. But, Gentlemen, whilst we may dwell with satisfaction on the encouragement we warmly offered, let us at once turn to the man without whose earlier as well as recent labours, this great feat could never have been brought about—I mean, of course, Captain Speke. In the year 1858, when serving with our former medallist, Burton, and when that eminent explorer lay sick at Kazeh, Captain Speke, having heard of this lake from Arab merchants, hastened to reach it, and finding that its southern extremity was on the high plateau-land, between 3000 and 4000 feet above the sea—(the land which forms, indeed, the watershed between North and South Africa in that meridian)—and finding also that the waters of this vast lake were fresh, he, then and there, after accurately determining the longitude of its southern end, was convinced that this body of water must be the great southernmost reservoir, out of which the White or Main Nile flowed at its northern end. It was for this great discovery that the Royal Geographical Society awarded our founder's gold medal to Captain Speke. Though obliged to return to England with his leader, Captain Burton, Captain Speke held pertinaciously to his project; and engaging his Indian brother officer, Captain Grant, to accompany him (an officer, let me say, who distinguished himself, and was severely wounded in the great Indian mutinies), and encouraged by this Society and the Government, he has gone and accomplished the great deed, and has fol-

lowed the Nile from its sources to its mouth. Gentlemen, it is not for me to recapitulate any portion of that abstract of vast labours gone through by Captains Speke and Grant, which I read to you at our anniversary. But I think it necessary to say that I now know that, in my anxiety to satisfy the desire of the public, there were omissions and errors in that Address. I know, for example, that I did not on that occasion do sufficient justice—and I am sorry for it—to able critical geographers, who had framed hypotheses, or had collated data from natives and other authorities, as to the probable source of the Nile; but I beg you to consider that I was then solely bent on developing, as well as I could, from the records sent home by Speke, the main features of the great actual and practical survey which had been made by himself. As to the statements which are arising and will arise as to the dates of the old maps on which lakes were marked in the interior of Africa, and out of which the Nile is made to flow, they are not confined to the old (probably Portuguese) maps of the 16th century, of which I spoke, and which exist in the library of the Propaganda Fede in Rome. One Arabian map is now indeed cited, which is upwards of 1000 years old, in which one or more pieces of water occupy very nearly the position of the Victoria Nyanza of Speke. Not pretending to be able to decide upon who may have been the people who first were acquainted with such great interior waters, Captain Speke informs me that he believes the traders from Hindostan were probably anterior even to the Greeks in visiting this region. When, however, we come to the latter, Captain Speke is of opinion that that great geographer, Ptolemy, is the authority who first placed upon historical record the existence of African lakes under the Equator, out of which the Nile flowed. But age after age rolled on: traveller after traveller, from the days of the Roman emperors to our time, endeavoured to ascend the Nile to its source, and all have failed. In our days, one Miani, a Venetian, who had lived many years in Egypt, is the person who got farthest southward in ascending from Egypt; and he, not being an astronomical observer, thought, and has asserted, that he had reached to the second degree of north latitude, where he cut his name upon a tree. He has even written to me from Vienna what he calls a "protest" against the river of Speke being the true Nile. Speke, however, in passing southwards, determined the latitude of that very tree, with Miani's name on it, to be $3\frac{1}{2}°$ N. latitude; and as Speke has traced the waters of the Nile from 3° S. of the Equator, it follows that the Venetian was never within about 400 miles of the head waters of the Nile. As it would be impossible, on this occasion, for Captain Speke to carry you along with

him on this long pilgrimage which he and his companion made from Zanzibar, on the east coast, to the central and equatorial kingdoms in which they were so long detained, he will now first read to you a brief sketch of the whole course of the great White Nile; and will show you how vastly superior it is, not only in length, but also in volume and importance, to all the affluents which it receives from the east or from the west, including the great Blue Nile. Cavillers about the source of the Nile there are, I know, in abundance; and such persons will probably not even be satisfied by assuring them that Captain Speke himself does not talk of the source; but he tells you that, whilst the southernmost end of the Lake Victoria Nyanza does not receive waters from the south, that great body is fed by numerous small streams which flow into it from the west and the east, as it extends northwards; the great fact remaining, that the southernmost end of this lake is on the watershed between North and South Africa, and in 3½° s. latitude. Before I call on Captain Speke to read his communication on the Nile, I must acquaint my associates with the deep interest which our Patron the Queen and our Vice-Patron the Prince of Wales take in this discovery. When, along with other Royal Commissioners, I recently waited upon the Queen in the deserted building of the International Exhibition, Her Majesty was pleased to congratulate me most graciously upon this great geographical feat, and I feel certain from the kind and emphatic manner in which the Queen expressed herself on this, the first time on which Her Majesty had appeared after her sad bereavement, that she is truly proud in the reflection that two of her own gallant Indian officers should have succeeded in doing what the people of every European nation have failed to accomplish. Then as to our Vice-Patron, the Prince of Wales, I know that His Royal Highness, who is himself a great traveller, and who loves our science, would have been here this evening had not a very special engagement prevented him; but arrangements have, I am happy to say, been made by which His Royal Highness will hear, to-morrow night, a lecture from Captain Speke, at the Royal Institution. Whilst our own Royal family recognises the importance of this great discovery, the King of Italy has taken the lead amongst foreign sovereigns in the expression of his desire to commemorate this great discovery, and has directed two gold medals to be struck in honour of our heroes of the Nile. One of them, or that which is destined for the leader, has arrived, and has on it the inscription, "Honor a Nilo." I must here add that the letter of the Italian Minister, the Marquis d'Azeglio, which accompanies this appropriate reward, is such an elegant and apposite composition, that it is worthy of the country which reared a Columbus. Its tenour is as follows:—

MONSIEUR LE PRÉSIDENT, 49 Grosvenor Street, 22 Juin, 1863.

Le Roi Victor Emmanuel, à qui les grandes choses qu'il fait pour son pays ne font pas oublier le progrès des sciences partout où ils se manifestent, en apprenant les découvertes relatives aux sources du Nil, vient de décerner deux médailles en or : l'une au Capitaine Speke, et l'autre au Capitaine Grant.

Ces voyageurs, dont on ne saurait assez admirer la résolution et la persévérance, viennent de résoudre l'un des problèmes géographiques que depuis des siècles les savans avaient vainement cherché à pénétrer.

Le Gouvernement du Roi, en me chargeant de vous informer de ce qui précède, Monsieur le Président, vient s'adresser à vos bons offices pour la transmission à destination de ces médailles qui vont m'être expédiées de Turin.

L'empressement qu'on a montré à donner cette distinction à Messieurs Speke et Grant est la meilleure preuve du grand intérêt que l'on porte en Italie aux succès de ces hommes dévoués, qui au milieu de mille périls prolongés pendant des années, suivant sans faiblir une idée et un but, n'ont songé qu'à porter en avant la civilisation et à élargir le domaine de la science.

Il est naturel que ces chaleureuses sympathies existent dans la patrie de Christophe Colomb, qui fît preuve de toutes ces grandes qualités des hommes exceptionnels pour démontrer la vérité de ses calculs, quant à la découverte de l'Amérique.

Nous savons donc apprécier ces qualités, si éminentes dans ce pays-ci ; une volonté déterminée, une patiente persévérance, et le désir du progrès.

Je suis charmé qu'une occasion aussi agréable se présente pour me mettre en rapport une fois de plus avec vous, Monsieur le Président, à qui tant de travaux scientifiques ont fait dans le monde savant une position si élevée ; et je vous prie d'agréer l'assurance de ma haute considération.*

M. D'AZEGLIO.

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* *Translation of the above Letter.*

MR. PRESIDENT, 49, Grosvenor Street, 22nd June, 1863.

King Victor Emmanuel, who amid his great achievements for his native land is not unmindful of the march of the sciences wherever cultivated, has, immediately on learning the nature of the discoveries relative to the sources of the Nile, decreed two gold medals : one for Captain Speke, the other for Captain Grant.

These travellers, whose resolution and perseverance it is impossible sufficiently to admire, have succeeded in practically elucidating a geographical problem, which the learned men of all ages have vainly endeavoured to solve.

His Majesty's Government, while instructing me to inform you, Mr. President, of the preceding fact, take the same opportunity of requesting your good offices in transmitting to their destination the medals in question, which are about to be forwarded to me from Turin.

The readiness which has been displayed in conferring this distinction on Messrs. Speke and Grant is the most convincing proof of the deep interest felt by Italy in the success of these devoted men, who, amid a thousand dangers extending over years of hard travel, have without faultering followed one idea, and had but one aim, and have thought of nothing but advancing civilisation and enlarging the domain of science.

It only remains for me to add that the French Geographical Society (like our own Society) having awarded a gold medal to Captain Speke for his original discovery of the great lake, he, in grateful remembrance of that act, named a large channel at the head of the Victoria Nyanza after the Emperor Napoleon, who will, I doubt not, duly appreciate the honour of having had his name affixed to such an important feature in the heart of Africa, and by such a distinguished British geographer. I now call on Captain Speke to read his communication.

Captain SPEKE, who on rising was greeted with enthusiastic applause, then read the following Paper:—

"In attempting to describe the extent and character of this great river, compared with its tributaries within the limits of actual inspection by myself, I will first treat of its head, the Victoria Nyanza, from its southern extremity, which I found by astronomical observation, in 1858, to be close on 3° S. of the Equator, and gradually bring it down to its point of *débouchure* in the Mediranean Sea, 31° N. of the Equator; by which, it will be seen, the Nile represents, considering it lies almost in a direct line from south to north, a total in round numbers of 2000 geographical miles in length, and is therefore nearly one-tenth the circumference of the globe. It must be borne in mind, however, that my observations respecting this great river are not the result of one expedition, but of two; that I have not actually followed its banks from head to foot, but have tracked it down, occasionally touching on it, and even navigating it as occasion offered, for the barbarous nature of the African lakes forbids the traveller doing as he likes; therefore, to give full weight to any inferences I may draw, deduced from what I have only seen in part, I shall blend native information with my own experiences, and in doing so shall hope to teach others what I know, and, beyond that, what I believe myself. In the year 1858, when I discovered the Victoria Lake, which is the great reservoir of the Nile, I found it a large sheet of sweet water lying on the main level, or from 3000 to 4000 feet above the sea-level of the

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It is natural that such ardent sympathy should make itself felt in the native land of Christopher Columbus; himself an example of those great qualities peculiar to exceptional men, of which he availed himself to demonstrate the soundness of those calculations which led to the discovery of America.

We therefore know how to rate at their true value the eminent qualities of this country; the determined will, the patient perseverance, and the zeal for true progress.

I rejoice that so agreeable an occasion should have occurred to place myself once more in communication with yourself, Mr. President, whose scientific labours have secured for you in the learned world so distinguished a position, and I beg you to accept this assurance of my marked consideration.

M. D'AZEGLIO.

great interior of Equatorial Africa, looking for all the world like the source of some great river; so much so, indeed, that I at once felt certain in my own mind it was the source of the Nile, and noted it accordingly. To add to this impression the natives, who there only know it by the name of the Nyanza, which equally means lake, pond, and river, described its extension in this confused manner to the northward as being boundless, whilst its breadth really—in fact its circumference—was enormous: greater, if anything, on the east than on its western side, for the negro informants knew the names of all the countries surrounding the lake, and must, had they understood the value of geographical definitions, have been able to separate the river Nile from the Nyanza, and to reduce their explorations to some common understanding. Other informants, Arab merchants and their slaves, residents of Zanzibar, who penetrate Africa in quest of ivory, who had completed the whole circuit of the Nyanza, not individually but separately, some on one side and some on the other, assured me the Nyanza was the source of some great river, they knew not what, though they had heard confused accounts from the natives living on the Equator, of the European ivory-merchants who frequented the Nile in vessels at 5° N. latitude, and had further heard through the same channel that with the rising of the Nile, and consequently the increased violence of its waters, islands were floated down its surface, which really is the case, not composed of earth and stone, but tangled roots of trees, rushes, and grass, with even sometimes huts upon them, which, otherwise undisturbed, are torn away by the violence of the stream and carried down, perfect floating islands. Then, again, these men described the territory between the Nile and Asua rivers as an island on the one side and the land composing the ancient kingdom of Kittara, according to their acceptation of the word as an island, also being nearly circumscribed by the Kitangulé and Luta Nzigé rivers, in conjunction with the Lake Nyanza and the Nile. No merchants, however, had crossed the first parallel of north latitude; none understood geography. They heard what the natives said, but could not fully comprehend them, and thus it was that a doubt still existed in everybody's mind but my own as to the origin of the Nile, which no one would believe until I went again and traced the river down from head to mouth. Had I been all alone in the first expedition, I should have settled the Nile in 1859 by travelling from Unyanyembi to Uganda with an Indian merchant Musor Mzuri, who was prepared to go there; but my proposal having been negatived by the chief of the expedition, who was sick at the time, and tired with the journey, I returned to England, and, to my inexpressible delight, the very first day after

my arrival here, found in Sir Roderick Impey Murchison a warm advocate, who proposed to the Royal Geographical Society to complete what I had before begun; and, as may be imagined, I could not rest satisfied until the world accepted my own views, happily now verified by the indisputable evidence of actual inspection and astronomical observation, that the Victoria Nyanza is the great reservoir of the Nile. Suffice it now to say, after returning to Unyanyembi (the old point), 3° s. of the lake, in 1861, I struck upon a new route, which I imagined, from the unsophisticated depositions of the ivory merchants, would lead me to a creek on the westerly flank of the Nyanza, situated on the southern boundary of Karagwé. Geographical definitions were here again found wanting, for, instead of the creek to the great lake appearing, a new lake was found, called Luero-lo-Urigi, or White Lake of Urigi, which formerly appeared to have contained a considerable amount of water, but is now fast drying up. Its head lies in Urundi, and, circling round the south and east flanks of Karagwé, in form a mountain valley, is subsequently drained by the Kitangulé River into the Nyanza, but not in sufficient quantity to make any sensible impression on the perennial contents of the Nyanza basin. It is to the west and south of Karagwé that the lake receives its greatest terrestrial supply of water, through the medium of the Kitangulé River, which, in draining the aforesaid Luero-lo-Urigi, drains off the superfluous waters of many minor lakes, as the Akenyara in Urundi; the Luchuru, which is the second of a chain including the Akenyara; the Ingezi and Karagimé; and the little Winandermere, which in Karagwé lies below the capital on its south-eastern corner. None of these lakes are large—mere puddles in comparison to the great Victoria Nyanza; but still the Kitangulé, after receiving all their contributions, is a noble river, low sunk like a huge canal, about 80 yards across, with a velocity of about 4 miles an hour, which appears equal to the Nile itself as soon as it issues from the lake by the Ripon Falls. The question naturally suggests itself, What forms these lakes?—whence originate their waters? It is simply this: the Mountains of the Moon, in which they lie, encircling the northern end and the Tanganyika Lake, are exposed to the influences of the rainy zone, where I observed, in 1862, no less than 238 days out of the year were more or less wet ones. Mashondé, in the upper portion of Uganda, is the first place where, in this second expedition, I obtained a view of the Victoria Lake, called in these more northern countries Luero-White (lo-of) Luta (dead) Nzigé (locust), in consequence of the reputed fact that flights of locusts, in endeavouring to cross these waters, have dropped down

from fatigue, unable to accomplish such an extended journey on wing, and, perishing in the lake, have been found dead in dense masses by the boatmen. But, like the word Nyanza, it is also applied to the Nile and its tributaries, thus confounding all inquiry. This is the explorer's greatest difficulty in endeavouring to put together the information which he hears, though it may be overcome by close questioning, even better with the natives than with the Arabs; for whilst the former regard all rivers flowing, as we do, from head to mouth, the Arab invariably says it runs from mouth to head. In a southerly direction the Uaganda boatmen go as far as the island of Ukerewé, which I saw on my first journey to Muanzae, the southern extremity of the lake; and to the eastward beyond the escape of the Nile, to the north-eastern corner of Victoria Lake, where by a strait they gain access to another lake in quest of salt, possibly the Baringa of Dr. Krapf, which he, from information gained through the natives, called Salt Lake, most likely because there are salt-islands on it, which reasoning I deduce from the fact that on my former expedition, when the Arabs first spoke to me of the Little Luta Nzigé, they described it as a salt-lake belonging to the Great Nyanza; yet not belonging to it, when further pressed upon the subject. The Great Nyanza waters were purely fresh and sweet. They (the Arabs), like Dr. Krapf, merely narrated what they heard. As salt-islands were visited by the natives in search of that mineral, the surrounding waters naturally were considered salt by them, deprived as they were of its connecting links, which included the whole area of ground under consideration within the limits of the drainage system of the Nile. The Arabs, who it is now very clear, had heard of everything in connexion with the science of physical geography, were enabled to connect what they had gleaned in detached fragments from it. Dr. Krapf further tells us of a river trending from the river Newey, by Mount Kenia, towards the Nile. If such is the case, it must be a feeder to the Baringa, whose waters pass off by the Asua River into the Nile, for the whole country immediately on the eastern side of the Victoria Nyanza is said by the Arabs, who have traversed it for ivory, to be covered with low rolling hills, intersected only by simple streaks and nullahs from this point in Muanza to the side streak, which is situated on the Equator, on the northern boundary of the Victoria Nyanza. Turning now again to Mashondé, and proceeding north along the boundary coast of Nyanza to the valley of Katonga, which, as situated on the quarter of the lake, is constantly in view, the land above the lake is beautiful, composed of low sandstone-hills, streaked down by small streams—

the effect of constant rains — grown all over by gigantic grass, except where the numerous villagers have supplanted it by cultivation; or on the deltas, where mighty trees, tall and straight as the blue gums of Australia, usurp the right of vegetation. The bed of the Nyanza has shrunk from its original dimensions, as we saw in the case of the Ujiji Lake; and the moorlands immediately surrounding are covered with a network of large rush-drains, with boggy bottoms, as many as one to every mile, even counting at one period a much fuller stream than at the present day, when the old bed was on the present surface of the water, and its breadth was double that which it now presents. The Mountains of the Moon are wearing down, and so is Africa. Crossing over the Equator altogether, the conformation of the land appeared much the same, but increased in beauty; the drainage system was found the opposite, clearly showing where in the north slope of Africa one stream, the Mweranga, of moderate dimensions, said to arise in the lake, flowed north, and joined the Nile in the kingdom of Unyroro, where its name is changed to Thafa. Far on another stream, the Luajerri, followed its example; and then still further on from the centre of the Lake Nyanza's coast, issued the parent stream of the Nile, flowing over rocks of igneous character 12 feet high, which the natives, and also some Arabs, designate by the simple name of "stones." I have done myself the honour to christen it the Ripon Falls, after his Lordship, who was the President of the Royal Geographical Society when the expedition was set on foot. Now, proceeding down the Nile from the Ripon Falls, the river first bisects the sandstone hills which extend continuously into Usoga above the coast-line of the lake, and rushes along northwards with mountain-torrent beauty; and then, having passed these hills—of no great extent—it turned through long flats more like a lake than a river, where, in Unyroro, it was increased by the contribution of the Kaffu and the Luajerri, and continued in this navigable form to the Karuma Falls in Chopi, where again, the land dropping suddenly to the westward, we saw the river rushing along with boisterous violence; but could not follow it, owing to the war which lay upon the track. It was, indeed, a pity, for by common report, not 60 miles from where we stood, the Little Luta Nzigé, which I had taken so much trouble in tracing down its course from the Lunæ Montes, with its salt islands in it, joined the Nile.

The main river was next met with in the Madi country, due north of the Karuma Falls, where it still bore the unmistakeable character of the Nile,—long flats, long rapids. The southern half of the Madi was a flat, extending, we believe, to the junction of the Little Luta

Nzigé, the northern, a rapid extending down to the navigable Nile; that is to say, the Nile which is navigable its entire length during the period of its flooding; and here it is that the Asua River, of which we have heard, draining from the north-east corner of the Victoria Lake, joins; in a rainy season an important feeder, but when low, fordable. The first great affluent, which, indeed, is the only one worthy of remark on the left of the Nile, is the Bahr el Ghazal. The point of confluence presents the appearance of a diminutive lake at a sharp elbow of the Nile, and has hardly any visible stream of its own, whilst the great river winds round with a considerable velocity, carrying, as I have said, the palms with it. The second affluent in order of position, which, with all the others, is on the right of the Nile, is the Giraffe River, swirling with a considerable stream and graceful round into the parent Nile. Its magnitude and general appearance is like that of a first-class canal, inferior to the Kitangulé River, although not so much so as to equal in volume one-third of the Nile at its point of junction. It is navigable to a great distance south; but where it comes from, nobody knows. It cannot be called a mountain river, as we found it full of rosets floating on its surface as in the Nile, evidently showing that both the trunk and the branch are subjected to the same alternations of sluggish flats and rapids. The third is the Southern Sobat River, which was full and navigable. In breadth it is greater than the Giraffe River, but less in velocity; so that we may infer their perennial contents are much the same. Unfortunately, the Northern Sobat was passed without our knowledge, which also being navigable, would make the Upper Sobat, that is to say, the Sobat above the Delta, of far greater magnitude than the Giraffe, unless, indeed, the three streams may be one river still further south, when in its combination the comparison would have to be drawn with the Nile above it, which it would very nearly equal; for the Nile, with these additions, has scarcely doubled its importance, considered as it was seen from above entering the Bahr el Ghazal. The Blue River was long assumed to be the Nile only because its perennial powers were never tested. It appears to be a mountain-stream emanating in the country without the rainy zone, but subject to the influence of tropical rains and droughts, at one time full, and empty at another, or so shallow as to be fordable. The suspicion, therefore, that it was the Nile must of itself appear absurd; for its waters, during the dry seasons, would be absorbed long before they reached the sea. But apart from this feature of the volume of the Blue River, the Nile runs like a sluice in its wonted course; whilst the Blue River, conjoining with the

Giraffe and Sobat, describes a graceful sweep. The Atbara, which is the last, is in all respects like the Blue Nile, only smaller. With one more remark I will conclude. In the height of the dry season in the White River, the Blue is freely navigated, owing to the great accessions of the Giraffe and Sobat Rivers, but below the Blue and Atbara Rivers to the sea, the sandbanks obstruct further passage. There is one thing that I have left unstated, and that is the fact that, on my return, the first Englishman I met was Mr. Baker, with whose name you are already acquainted, who came up for the purpose of helping us out of a scrape, if we had got into one. Mr. Baker hearing that there was one branch of the river that I had not explored, went on for the purpose of searching for it; and I trust that before another year is out we shall see him back to tell us all about it. Another remarkable fact was that three ladies came up to meet me; but one having been taken ill, Mdlle. Tinné and her mother went up the river to satisfy their desire for geographical knowledge. I endeavoured to persuade them to return, and subsequently wrote them a letter, entreating them to give up their journey, with what result remains to be seen. If the remaining branch is not explored by these parties, why, I shall have to do the work myself.

Captain GRANT, who was also received with loud applause, said Captain Speke had been his companion throughout the journey. They had been brother officers in India; and when he knew that Captain Speke was about to go to Egypt, he expressed a wish to go with him. Captain Speke assented, and they went; and he was most happy to say that not a single word of dispute had ever occurred between them, but that the greatest cordiality and good-fellowship to each other had always existed. In fact, he felt great pleasure in being associated with such a brave leader as Captain Speke. He had with him a few sketches as well as some botanical specimens which he had brought from Africa; and he should be very much pleased to show them to any one who might wish to inspect them. Should any gentleman desire any information, he should be happy to reply to any inquiries that might be made.

Captain SPEKE then, at the President's request, favoured the audience with some interesting information on the habits and manners of the natives of the countries through which he had travelled. It was deeply to be regretted that these natives were not brought under the light of the Gospel. He considered that if black men were appointed consuls on the coasts, very beneficial results would accrue in the production of confidence among the natives. They possessed pleasing manners, but unfortunately the want of religious truth led them to commit many errors. One of

the results was, that when a party of them had made an agreement to serve him they did not keep it, but ran away. He had engaged 185 of them, but only eighteen had adhered to him throughout the whole of the journey. He then described the great efforts he had been compelled to make in order that his caravans might be fed. He had only two guns, and with them he shot rhinoceroses, buffaloes, birds, &c. Afterwards his men became blind and stricken with fever, and it was months before they could proceed on their journey, and then only in detachments. In proceeding through one of the kingdoms he found the Sultan most anxious to detain him, in order that he might fleece him. The King of Uganda was their greatest friend. He and his people were not pure negroes. It appeared to him that there had been an immigration of the Abyssinian race, and the result was that the people had not the nose of the negro, but noses like Europeans. They were tall gaunt men, but they had the curly hair of the negro. They had lost their language, and they had also lost religion, for they had no idea of a soul. The King of Karagwé possessed a very inquiring mind. He asked about the stars and moon, and also what became of the old suns. He (Captain Speke) first taught the King to shoot. When he first handled a gun he placed it on his thigh and shot the cows in the courtyard. The King had given him a great deal of geographical information, and he was very much opposed to his leaving. Captain Speke then related several interesting anecdotes, and concluded amid the loud cheers of the Meeting.

The PRESIDENT then presented to Captain Speke the Gold Medal which the King of Italy had sent to him, and intimated that a similar medal was on its way for Captain Grant.* He therefore, in the name of the Society, offered their grateful thanks to the King of Italy for His Majesty's good will, and amid great applause called upon the distinguished Italian geographer, Signor Negri Cristoforo, who was present, to explain to the Meeting how deeply his Sovereign and his countrymen appreciated the arduous enterprise so successfully executed by Captains Speke and Grant.

Signor NEGRI CRISTOFORO returned thanks in an eloquent speech in his native language, which was much applauded.

The PRESIDENT having expressed a hope that some honours of the British Crown would be conferred on the discoverers of the Nile, concluded by moving that a cordial vote of thanks should be given to Captains Speke and Grant, which was carried amid the greatest enthusiasm, and the Meeting terminated.

* The medal for Captain Grant has since arrived, and bears the following inscription :—"*Al Capitano Grant: divise col Capitano Speke gloria e pericoli.*"

The Climate of Lake Nyanza. Deduced from the observations of Capts. SPEKE and GRANT, by FRANCIS GALTON, F.R.S., Foreign Secretary Meteorological Society.

Nature of the Observations.—The temperatures in the accompanying table are deduced from daily observations made by Captain Grant at his principal stations. The minima temperatures were invariably recorded; the maxima were intermitted during 3½ months at Karagwé, when the only thermometer suitable for their registration had been taken by Captain Speke to do service at Uganda. Fortunately a complete series of 9 A.M., 3 P.M., and 9 P.M. observations were made by Captain Grant at Karagwé, before and during this interval, and afford materials for a satisfactory reproduction of the absent data. Observations at 9 A.M. were continued during the whole journey, but the 3 P.M., and still more frequently the 9 P.M., were latterly almost wholly omitted. The thermometers were excellent instruments, made by Casella: they have been examined and freshly guaranteed by their maker since the close of the journey.

The number of days of rain and slight showers is taken from Captain Speke's journal, in which they were invariably recorded. The rainfall was measured by Grant. The rain-gauge was likewise made by Casella, and was used up to Unyoro, where an accident compelled the substitution of a tin can with a measured aperture.

The prevalent direction of the wind was estimated by Captain Speke, without the aid of any special instrument.

Temperature.—The thermometrical registers are very antagonistic to the popular ideas of African and Equatorial temperatures. We find that in only one instance during the 5 months spent at Karagwé, did the maximum temperature attain 85°. We also find the nights to be invariably cool. At 9 P.M. the temperature ranged between 60° and 71°, and the coldest period of the night between 57° and 65°. There seems nothing in such a climate that should be trying to a European constitution. The heats are not too great for ordinary labour in the morning and evening, while the nights are never too hot for refreshing sleep. There is more severity in a hot English summer than in the climate of Karagwé—far more severity in the summer of the south of France. The great elevation of the basin of the Nyanza above the level of the sea will partly, if not wholly, account for the moderation of its temperature.

Uganda, although 1700 feet lower, seems little hotter than Karagwé. Speke's maximum thermometer, which was examined and registered once a fortnight, ranges closely with the simultaneous observations made by Grant at Karagwé, if we omit a single uncorroborated entry of 92°, which may reasonably be ascribed to exceptional circumstances, or to error. So, again, Grant's Uganda observations form a consecutive series with those he had previously made at Karagwé, which they would not have done if the difference of temperature at the two places accorded with the usual approximative rate, viz., 1° of cold for every 300 feet of elevation.

Unyoro is decidedly hotter. The temperatures registered on

the march between Uganda and Unyoro are the highest of the whole year. They are not, however, considered by Captain Grant to have been observed under circumstances favourable to accuracy. The maximum once reached 91°, and twice reached 89°. The Unyoro maximum was 86°; its minimum ranged between 61° and 72°.

Rain.—The annual rainfall is 49 inches,—an unusually small amount for an equatorial region, and inferior to that of many places in the British Isles. This deficiency is reasonably to be accounted for upon physico-geographical data. The outflow of water from every district must be ultimately supplied by clouds charged with vapour originally generated by evaporation of the water of the ocean. Now, the district of Lake Nyanza is peculiarly ill-situated for receiving rain-bearing winds from the African coasts. The vast desert of the Sahara cuts off all moisture from the north; and the easterly winds which were chiefly met with by Speke and Grant, must have deposited the larger portion of their load of water when they first impinged on the rampart-like eastern edge of the East African plateau.

The wind is variable during the rainiest season, at other times easterly winds prevail.

The sky was remarkable as being either very clear, with fleeting clouds, or heavily overcast, with low black clouds.

The wet and dry seasons are imperfectly marked in the Nyanza districts. Their most distinct manifestation was in the April and November rains, and in the comparatively dry weather that immediately preceded the former. It must be remarked that Speke's 21 days of "rain and slight showers," during March, in Uganda, corresponds to only 11 days during which enough rain fell at Karagwé to enable Grant to measure it. The frequency of these showers is, therefore, an imperfect criterion of the wetness of the month.

Taking the average of the whole year, there is rain of some description, whether heavy or slight, on two days out of every three. A sufficient rainfall takes place to be worthy of measurement by the gauge, on one day out of every two. About once a month a heavy burst of rain occurred, to the amount of one or two inches; and fully one-third of the annual rainfall was contributed by these occasional storms. The river-beds were often suddenly filled in consequence of partial deluges; and masses of tangled grass, with soil attached to them, were washed down to the Nile during the rainiest months; but there is no appearance of the level of the Lake Nyanza being affected by the different seasons in any considerable degree. Thus, in the sketch of the outflow of the Nile, trees of some years' growth are seen to clothe the promontories down to the water's edge. On the other hand, it is well known that the rainy and dry periods are sharply defined at Gondokoro, and even so far to the north of that place as Miani had explored, viz. to north latitude 3° 34′. We must, therefore, ascribe the rise and fall of the trunk stream of the Lower Nile to the periodicity of the rains that feed it south of the 3rd degree of north latitude, and, in a *very inconsiderable degree*, to the periodicity of the rains that fall upon the land whose drainage is into the Lake Nyanza.

CLIMATE OF THE COUNTRIES BORDERING LAKE NYANZA, 1861-2.

Explanation. a = from the 1st to the 7th; b = " 8th " 15th; c = " 16th " 23rd; d = " 24th " end.		Temperature. Mean Temperature.	Extreme Heat.	Extreme Cold.	Extreme Range.	Rain and Cloud. Rainfall in Inches.	No. of Rainy Days.	Rainy Days, per Month.	Days of Rain and slight Showers. (Spoke.)	Winds. Prevalent Winds.
Karagwé, 5100 feet above sea-level.	Nov. d	70°	84°	57°	29°	1·00*	3*	(12)	17	N.E.
	Dec. a	76	83	58	27	·77	4			
	b	66	78	53	26	·34	5			N.E.
	c	67	80	57	25	·32	3	14	16	
	d. a.	69	84	57	29	1·35	2			
	Jan. a	69	82	57	27	·21	2			
	b	69	85	64	23	·89	2			N.E.
	c	68	80	57	25	·84	4	14	14	
	d. a.	67	79	57	24	1·47	6			
	Feb. a	67	79	59	22	·96	4			
	b	69	82	58	26	1·90	3			N.E.
	c			59		·13	2	12	12	
	d. a.		82	58		·63	3			
	Mar. a	70	80	62	20	·00	0			
	b	69	81	61	22	·34	3	11	21	E. by N.
	c	68	84	59	27	2·62	4			
	d. a.	69	82	60	22	·98	4			
	April a	69	79	61	20	·84	3			
	b	65	71	60	13	4·00*	6*	18*	27	Variable
	c									
	d. a.		82							
	May a					3 heavy storms (in all 8 in.*).	3*			
	b		82				4			
	c						4			E. by S.
	d. a.		82				5*	21*	26	
Uganda, 3400 ft. elevation.	June a	69	79	62	19		2*			
	b	69	79	59	22	·42	3			S.E.
	c	70	78	60	20	·08	2	8*	20	
	d. a.	69	80	62	20	·05	1			
	July a	68	76	61	17	1·94	3			
Camp, 3400 ft.	b									
	c	76	91	64	29	Rain seldom alluded to in note-book. (6 in.*)		(15)	22	S.E.
	d. a.									
	Aug. a									
Camp, 3400 ft.	b	74	89	60	31					
	c							(14)	20	S.E.
	d.									
	Sept. a									
Uzyoro, 3300 ft. above sea.	b	75	86	65	23					Variable
	c	73	84	62	24	1·61*	3	18*	18	
	d. a.	73	80	61	21	·44	6			
	Oct. a	72	82	64	20	3·00	6			
	b	72	82	63	21	·82	4	21	27	Variable
	c	73	82	63	21	3·48	6			
	d. a.	74	84	65	21	1·30	5			
	Nov. a	72	83	64	21	2·20	1			
Means and Totals .		68	82	51	49	34·93	135		240	E.
Estimated value for complete year		68	82	51	49	49		178	240	E.

These are obtained by adding 3° to the temp. at 3 P.M. No maxima were taken.

Uganda maxima, taken each fortnight by Captain Speke.

These are of doubtful value. The thermometers were hung in crowded huts. No record in note-book of any unusual heat.

The numbers marked by an asterisk * are partly, and those included in brackets ( ) are wholly, deduced by proportion. Rain chiefly falls in sudden showers and thunderstorms. The sky is either very clear, with flocting clouds, or overcast, with low black clouds.

[The following amusing letter from Captain Speke to Rumanika, King of Karagwé, may appropriately be inserted here, as giving a sketch of native manners and customs at the Court of one of these petty sovereigns, and of the curious experiences of the writer during his adventurous journey alone,—Captain Grant having been detained at Karagwé by an accident.]

Copy of a Letter from Captain J. H. Speke to H.M. Rumanika, King of Karagwé, dated "Bandowarogo M'tesás Kibuga," which I have been directed to copy and transmit to the Royal Geographical Society, received by me on the 23rd March, 1862, and its probable date the 3rd of March.

Karagwé, 27th March, 1862. J. A. GRANT, Captain.

"Bandowaroga M'tessás Kibuga.

"MY DEAR RUMANIKA,—By the blessings of God, and with thanks to thee, Great King, for the many favours you have shown me, I have at length reached this place in good health, and have had an interview with the mighty King M'tessa. First, I must tell you that I no sooner arrived at Niama Goma, one stage short of this, than I sent Nyamgündü, my m'koongo, instead of Maulah, forward to announce my arrival, and to say I had come through many dangers and difficulties to see him, for I considered him the King of the Lŭta-Nzigé, and that Uganda was his pasture-ground. Nyamgündü found M'tessa had gone on a pilgrimage to another palace on the border of the lake, so followed him there and delivered the message. M'tessa had no place appropriate to my reception there, so hoped I'd stop one day longer where I was whilst he came here to receive me. He then gave Nyamgündü three cows, and sent me seven, four of which were milch ones. On the 18th he reached this place, and sent a man to fetch me; but the day was far spent, and my men were all fever stricken, so that I could only make Sŭnnás Kibŭga that night. However, next morning (19th) I came here. It rained, so M'tessa said he hoped I would call next day.

"*20th, morning.*—Started for the opening visit. As a guard of honour I had twelve men, all dressed in joho down to their heels, and carrying carbines with bayonets fixed; preceding these was the 'Union Jack,' and in their rear I had all the other men, each carrying a present: one had the tin-box with four rich cloths in it, value 200 brass wire; one gun = 200 wire; one gold chronometer = 400 wire; one revolver = 300 wire; then three muskets with bayonets, one box ammunition, one box bullets, one box caps, one telescope, my big chair, one pair of spurs, one set of spoons and forks, elastic bands, and finally ten bundles of every sort of best beads, all covered with chintz and tied with red tape. It all looked very pretty; and as we marched past, the people along the road said, 'Oh, how very beautiful!' I thought myself all was going on as well as could be; but presently Kiyengo's man with Suwarora's present of wire—which was all my own—joined in the procession, and took precedence of me. However, I subdued my emotion

till I was in the palace court; when I was desired to sit on the bare ground with Kiyengo, junr., and all my servants. I could stand this no longer, so appealed to the servants in waiting; and as they only replied, 'Have patience,' I spun on my heels and walked back home, telling Bombay to deliver the presents. The king, who had shown me such respect, I hear was very distressed, so much so that he tried to follow me; but, as I had gone far and walked fast, changed his mind and sent all his Wakŭngŭ running after me.

On arriving at my abode I tried to tranquillize my pulse by a pipe and a cup of coffee; but all the Wakŭngŭ, Bombay, and Nasib, who had never ceased running, threw themselves before me, and implored me to return at once. M'tessa, they said, had heard I was affronted at Kiyengo's taking precedence of me, and also that I would not sit upon the ground, so he turned Kiyengo away, and desired me to bring my chair that I might sit at ease—he was dying to see me, but could not touch food until he had done so, and begged I would return. This message, I may say, touched my heart more than anything else, he had been so kind; so, to do the best, I sent the Wakŭngŭ back again to tell him all the circumstances. How shocked I felt, but I could not help it. I was my Queen's right hand. My heart and life were at her service. If I had sat on the ground with Kiyengo and my servants, disgrace would have befallen her. I came into the country to make friends with kings, and brought presents for them all,—100 wires for himself, 50 for Rumanika, and also some for Suwarora; but Suwarora, though I entered his country at his own invitation, never once deigned to see me, but on the contrary told his Wakŭngŭ to take property from me, and did the same himself, refusing to let me pass unless I consented. He preferred wires to anything else, because he wanted them for M'tessa, and therefore took 150. I should have pardoned Suwarora, and called his plunder Nongo, and said nothing about it, had I entered his country to trade and without being invited; but now I would never see him, nor would I ever enter his country except by force. After this message had been taken, I followed it up myself, proceeding as before until I reached the court I had returned from. Thereupon messengers, dressed with abrus-turbans and painted cow-skins, went to announce my arrival. Cows, dogs, goats, and men were led about by strings. A band of music then marched past, and finally I was asked to approach. The palace houses are large circular hay-stacks, all built in lines across the brow of a hill, and partitioned off with red screens. It was in one of the palaces in the third line where he was sitting, dressed in an mbŭgi, with a bit of the same stuff for a handkerchief, that I first saw him. He had a brass ring on every finger, a ridge of hair from stem to stern of his head, and other head-ornaments. His throne was a small chibŭtra covered with red joho, and he held a white dog tied by a string. Besides this, there were within the palace many of his elders, and outside, forming three sides of a square, and fronting himself, squatted several lines of men. On entering this yard, as soon as I saw him, I took off my hat, and

bade my guard carry arms. The first ceremony lasted but for a moment, when I was desired to step within the square of squatters; which being done, as everybody else was told to sit, I planted myself on the stool. The king then stared at me and I at him for full half an hour, when he sent to ask me if I had seen him. I thought this such a foolish question, that I only answered 'Yes.' He then rose from his throne, leading his dog, and walked off to another palace, leaving me sitting, whilst, they say, he ate his first dinner after three days' starvation. His gait was so curious, I asked whether he had been injured in any way; but the reply given, was, that he had learnt to move after the fashion of a lion, as his father did before him. About half an hour later, I was asked to see him again, and proceeded as before with my guard, to another court, where I found him standing on a joho, leaning against the portal, with two groups of women squatting on either side of him. I was now desired to sit down and put on my hat, and then he asked Maula and Nyamgundu to give him all their news. Maula said your message was to the effect that Englishmen had come up the Nile to Ugani and Ukede. After this the king proceeded to another palace, followed by his women; sat upon another throne, and asked me to draw near: which I did. Again he asked me if I had seen him,—a question evidently dictated by excessive pride; so, to flatter him, I said, 'Oh yes, indeed, you are very beautiful!—as refulgent as the sun. Your hair is like the wool of a black sheep, and your legs, when you walk, move as gracefully as a lion's: I am very pleased to see you; and as an earnest that I am so, may I beg you to accept this gold ring, which I take off my third finger and place on your own. I shall then consider it a token of our having contracted a lasting bond of friendship. M'tessa then replied, 'If your desire is friendship, then what would you say if I showed you a road by which you could reach your home in one month?' But before he would give me time to answer, though I longed to open the conversation with him, he said he would like to see the gun I shoot with. Much disappointed at the hasty interruption, I told him I had brought with me the best shooting gun in the world, which I hoped he would accept, with a few other trifles; and, if he would consent, I would lay them on a carpet at his feet, as is the custom of my country when visiting Sultans. He graciously assented, sent all his women away, and had an m'bugu spread for the purpose. The ceremony of presentation was then gone through by Bombay first spreading a joho on the m'bugu, and then opening one thing after the other, which Nassib rubbed against his dirty face and then handed to the Sultan. A long talk now ensued till night stopped the proceedings, when the Sultan asked me what I liked most to eat (the most sensible thing he had done), and then said 'Would you like to see me to-morrow?' I said, 'Yes, every day.' 'Well then,' said he, 'you can't see me to-morrow, because I have got business; but the next day come if you like. You can now go away; here are six pots of pombe for you, and my men will search for food to-morrow.' I was very tired and

very glad to go—not to dinner, for I had none, excepting beef, which I could not eat alone, but to bed and to rest my wearied limbs. You will perceive that I presented no brass wires, because, in fact, I had not 100 left to give.

"21*st*.—Rain fell to-day, which is considered a sign of good omen. I send Nyamgŭndŭ to enquire how the kibakka (king) is, and in the evening he sends twenty cows and ten goats; of which five cows are claimed by Wazaro as his right. At first I refuse to give them, as it is contrary to etiquette to give anything away that is given to me; but on his insisting, I tell him he shall have them this time, but for the future I shall not accept anything that I do not eat myself; for I consider the fifteen cows were given to me. Nyamgŭndŭ then begs for a goat to offer as a sacrifice to his temple; but I give him a wire instead, as I cannot give away the kibakka's present.

"I have now told you of my reception at M'tessás Kibŭga, so shall now go back a little to tell what happened before. I greatly enjoyed the journey with my Wakŭngŭ, Maula, and Nyamgŭndŭ; the former did not overtake me till I reached Mashakka, the residence of Pokérŭ, governor-general of Uddŭ, and appeared when the governor was present, giving me a nazir. I then complained of Maula's having treated me like a dog, and expressed a wish that Nyamgŭndŭ should be my guide. Pokérŭ politely assented to my request, and as a reward to Nyamgŭndŭ I then gave him four wire, twenty blue eggs, and ten foondo of all colours of beads.

"The next thing I should like to tell you about is an explanation of what I read in brother Grant's letter. He informs me that the Arabs had been telling you we did not eat meat, and that you were very angry with them. Now let me assure you that the French even call us 'Roast Beef,' because it is our national food. Again he informs me we have bribed the Watuta* to fight against Suwarora. This I assure you is a malignant falsehood: so much so that I stopped my expedition, to return from M'sere to Unyanyembe, on purpose to prevent the Arabs doing this very thing. They had done so; but they promised both Musa and myself that they would retract what they had done, and further, as Suwarora's M'kŭngŭ arrived at the same time in Unyanyembe, Mŭsa told him what I had done, and likewise told him that when I arrived in Usui, I would settle all the differences in person with Suwarora. Suwarora, however, coveted my wires more than my advice, and so we never met; and, please God, we never shall do so, for he has insulted me beyond measure. I tried to terminate the war in Unyanyembe, both at the request of Mauwa M'sera and the Arabs; and should have done so only that the Arabs, contrary to my advice, killed poor good old Maula of Rubuga in such a treacherous manner that Mauwa M'sera was afraid to treat with them. The reason why these Arabs, whom you see trading, dislike and tell such lies about us, is because they are

* Note by J. A. Grant:—"The *Arabs*, and not *we*, had bribed them."

very ignorant, and do not know that we sided with Sayyid (prince) Majid against his brother, who wished to fight him because old Sultan Said Said, their father and our good old friend, asked us to prevent their fighting; which he rightly foresaw would be the case as soon as he died. The Arabs say we want to take Zanzibar; but that we could do and might have done long ago with only one ship, but we love Sayyid Majid, so much that we are going to crown him Sultan as soon as the arrangements can be made. He is not a Sultan yet, but only a Sayyid, or Prince. The Arabs, whom you see are all fugitive renegades of the Harsi caste who tried to spoil Zanzibar, who tried to spoil Unyanyembe, who tried to spoil Ugogo, and now who try to spoil Usui; and they will do so, you may depend upon it, if Suwarora does not govern his country better. No Wakŭngŭ in any country has a right to tax a caravan. One country can only take one honga, and if it tries to take more it will be a just provocation of war. Mauwa M'sere has lost his throne by trying to levy mahonga where none existed before. Ugogo takes six mahonga—this caused the war there, but none take so much as Usui; so your own wisdom will tell you Usui must give up its mahonga, reducing it to one moderate honga, or fight the merchants, who will destroy the country, for the Arabs are many, and all are as hungry for ivory as lions are for meat. With fairness, justice and truth all would go well.

"Last night, when I was in bed, M'tessa sent a message to me, saying, if I wished to be his friend, he hoped I would lend him another gun, to make up six with what I had given him, as he wished to visit his relations, and show them how well God was pleased with him, sending him an M'zŭngŭ and so many pretty things. It was a greater favour than ever he had shown his father, and pointedly proved his right to the throne of his father; I sent him three.

"22*nd*.—We hear M'tessa going the round of his relatives with all his muskets and a band of music. Suwarora's wires were presented yesterday, and all he said was, How did he come by these? they were made by the Wazungu to be given to me, and Suwarora has robbed them of them. The reply was Suwarora would not show the Wazungu any respect, because they are wizards, and do not sleep in houses at night, but fly upon hill-tops, and practice every description of bad sorcery. M'tessa wisely said, 'That is a lie! I can see no harm in this Wazŭngŭ; and, if he had been a bad man, Rumanika would not have sent him to me.' M'tessa now sends a m'koongoo to ask after my health; says he is very sorry he cannot call on me to day, but hopes I will take the will for the deed. Extravagant reports have been spread about my generosity to Nyamgŭndŭ, and the Wahinda are all jealous of him begging for something. My reply is, I gave nothing to Nyamgŭndŭ until he treated me with marked respect; I then gave him a trifle; but as yet I had not been introduced to any of M'tessa's courtiers, and therefore did not know them. My kirangŏzi claims the head and mtŭsi the teats of every cow killed. At midnight the Kibakka returns the muskets lent,

and I am so pleased with his promptitude and honesty that I beg him to accept them.

"23*rd*.—M'tessa would like to know if I desire to see him; on replying, 'Yes,' he tells me to come at twelve, which I do with the guard of honour and my stool; but I am kept waiting in an ante-palace three hours before he is ready. During this time he sends me a royal bundle of grass, and hopes I won't be affronted if I am required to sit upon it, as nobody but himself can sit upon such grass. It is all his throne is made of. Nobody ever yet sat upon a chair in Uganda, and therefore he cannot allow me to do so. He only assented to it the first day to appease my wrath. At the third hour I was called in, and the bundle of grass placed in the open court before his throne. There were few spectators present, but the dog as usual was by his side. It then began to rain, and we were desired to adjourn till the fall was over. When the rain ceased we were again called, and found four cows in the court, whilst the head of another, with one horn cut off, was lying before the throne. M'tessa had taken off his ten brass rings, and had put my gold one on his third finger. He then wanted me to shoot cows quickly; and as I had no bullets, I asked him to let me fire his pistol, which I did, and shot in all four cows; but one of them, being only wounded, turned at me, so I knocked it over with the third bullet. The cows were then given to the Wungwanas; and he loaded a gun with his own hand, and ordered a servant to go out and shoot a man with it, which was done without the slightest concern. I was now asked to draw near, and for the first time sat in company with him. He then sent all his retinue away, and showed me a book which I had given to Rumanika. I then asked for leave to send a dâk to Karagwé, to find out how my brother was, and proposed sending boats to fetch him; but he said he would send Nyamgŭndŭ, if I liked, to Karagwé, and boats to Kitengŭle, but he thought Rumanika would not consent to their going to his ukamma (palace). I was then dismissed by torch-light.

"24*th*.—The King again sends for three of my men to shoot cows; but I send seven, with Bombay, to tell him I have three vessels waiting for me at Ugani, and I have instructed one Englishman to look for me at Karagwé, and another to try and come here; so, if he would send a messenger to the vessels, that Englishman would come to see him. I have lots of property there; and if he would tell me what he likes most, I would write for it; for I feel very much ashamed of having been able to give him so little. M'tessa admitted all the men, and told them to shoot cows; but Bombay said he wished to speak one word first. M'tessa said, 'What is it?' And when Bombay told him, he said, 'Very well: I will either send boats *vid* Ukidi, or will send by land, just as the gentleman likes; but it would be well if two Wungwanas went with his men.' Then, in a great hurry, he said, 'Now shoot the cows, for I want to see how Wungwanas shoot.' They killed the seven, and all were given them, when they were dismissed. Whilst

this was going on, Kiyengo, junr., calls on me and begs for meat. I tell him M'tessa is his host, he should ask him; but he said, 'I have never had one sight of him, because he only wants to see the Wazŭngŭ. When I gave the wires, he sat behind the screen.' I then told Kiyengo, in my best Kiswahili, what I had heard at court concerning him, accusing Suwarora of having tried to belie me. He acknowledged all, and said he was obliged to deliver the message; but I must not consider him the author of it. I then forgave him, and put him upon a Kirangōzee's rations; not, however, without telling him of Suwarora's treatment of me. In the evening M'tessa wishes to know whether I'd like to shoot kites in his palace, but I say 'No; if he would show me either elephant, buffalo, or rhinoceros, then I'd be very happy to shoot with him.'

25*th*.—Sultan sends for me to shoot. I complain of my treatment at his palace, and say I am indisposed, so cannot go; but wish to send Bombay to make arrangements for to-morrow. The messenger then departs; but another comes to say the King is very sorry to hear I feel unwell, but hopes I will see him, if only for a minute, for he wants medicine. This was evidently an excuse trumped up for the occasion, but I packed the medicines and went. The old thing occurred again. I was shown to an antechamber and told to sit with swarthy negroes until the King was ready; but I would not, and forthwith prepared to leave the palace. Information flew at once to the King that I was walking off. Wakŭngŭ shut the gate against me, and others implored me to return as the King was on his throne. I stormed at the gate being shut, and made them open it again before my face, when I turned round and went in to the King. I asked him how he was, but he gave his head a silly shake, and told some men to shoot cows; but as I would not countenance his folly, he asked what the box contained I had brought with me. On being told it was the medicine he desired, he asked me to draw near, and sent his courtiers away. When all was clear, he wished to know if I would put the medicine on his stomach; but I said 'No, it must be put upon the part which seems most weak.' He then laughed, and became inquisitive; so I move my finger and ask him whether he knew what gave impulsive action to it, and, as he did not know, I gave him an anatomical lecture, and so satisfied him that I knew everything. When quite content to be operated upon, I gave him a new Rodgers' penknife, and ordered him to shave, which he did while sitting on the throne. I then applied a blister; and this being done, I said I should like to have one word with him before I left. It was relative to a plan I had formed to fetch Petherick and Grant. He approved, and said he should send for me in the morning.

"26*th*.—Call on the King first thing; find the blister had risen nicely. He asks me to eat some fruit with him, like loquats, which I do, and then plan to fetch Petherick and Grant; but as he won't listen to a dâk, some Wakŭngŭ are to be sent in boats to Kitengule. I then go home and prepare letters.

"Now, my dear Rumanika, I must wind up. Petherick's letter will go down the right bank of the Kivira River, and this one will go to Katonga, where all the royal vessels are at anchor, and then on to Kitangule, when they will cross your hills to the Palace. I wish my brother to come as quickly as he can, but my property to remain with you, as everything is uncertain in the distant future.

"I remain, ndŭgo yako,

"J. H. SPEKE."

(True copy) J. W. GRANT, Captain.

Karagwé, 28th March, 1862.

The following was the text of the letter despatched by the same opportunity to Consul Petherick:—

"MY DEAR PETHERICK,—I wrote a letter from Karagwé to send it by my Balyŭz Baraka, through Unyoro, to ask you how you were. Now, I am a great deal nearer you, and send another Balyŭz Mabruk, together with some men from M'tessa. This is to invite you up to Uganda, for the King is very anxious to see you. I daresay this may somewhat interfere with your trade, and so create some pecuniary loss; but depend upon it, whatever that loss may amount to, I will ask the Government to defray it; for it is of the utmost importance that the country should be open to trade, &c., and no opportunity could be better than the present. You will have to drop your dignity for the present, and to look upon me as your superior officer; for on asking M'tessa what presents I should write for, he said, 'Don't say anything about it, lest he should think that I, M'tessa, coveted his property more than himself.' So, to quiet him, I said he did not understand the matter—that I ordered you to come up the Nile to look for me, and to bring me away, and that three vessels were mine, as well as their contents, and you could not disobey my orders. I do not know what things you have; but bring a lot of pretty things, such as cheap jewelry, toys, pretty cloths, glass and china ware; one or two dogs of any sort, for the King's emblem is a dog; and any quantity of powder and lead, for he shoots cows every day. Mabruk can best select these things. Don't bring uniform, for I have none, but bring a lot of common red cloth, and fez-caps for my men to wear as a guard of honour. I have lots of muskets, and have given several guns and rifles to M'tessa; so bring no spare guns here, though your men may be armed up to the teeth. I have lots of beads for the way back to the boats. Grant is at Karagwé with a game leg, and I am sending boats for him. His last letter to me is enclosed, also a map of the country, which you had better send to England, together with this, by the first opportunity. I will go across the Masai country at once to Zanzibar; but, considering your promise to keep two or three boats two or three years for me, I sacrifice everything to fulfil the engagement. A photographic machine would be very useful here, for the court is very splendid.

You need not trouble yourself with a sextant, for I have three, but compass your route carefully. If Baraka reaches you, bring him up this way; we will then all go in boats to Rumanika's, King of Karagwé. Mind Rumanika and Kamarasi, King of Unyoro, are mutual brothers-in-law, but M'tessa is Kamarasi's enemy. However, I am trying to patch up their war by telling M'tessa he is the King of the Lūta-Nzigi, and Uganda is his grazing-grounds; that he should send a present to Kamarasi, and become friends with him. You may tell Kamarasi this; and say I am a very great man anxious to see him, if he will let you come here and fetch me away. I am very hard up for tobacco, and have neither brandy nor tea. All the things I have asked for are for myself; nobody else need give a present. I cannot write any more letters, for I have a whole year's collection in Unyanyembe waiting for an opportunity to reach Zanzibar.

"J. H. SPEKE."

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LONDON: PRINTED BY WILLIAM CLOWES AND SONS, STAMFORD STREET, AND CHARING CROSS.

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY.

VOL. VIII.

SESSION 1863-4.

Nos. I. to VI.

EDITED BY THE ASSISTANT SECRETARY.

Authors are alone responsible for the contents of their respective statements.

LONDON:

15, WHITEHALL PLACE.

1864.

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, STAMFORD STREET,
AND CHARING CROSS.

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Authors are alone responsible for the contents of their respective statements.

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N.B.—Home and Foreign Literary and Scientific Societies whose publications are exchanged with those of the Royal Geographical Society, are requested to note the following abstract of the Regulations of the General Post Office with reference to matter sent by Book Post:—

Every packet must be sent either without a cover, or in a cover open at the ends, so as to admit of the enclosures being removed for examination. For the greater security, however, of the contents, the packet may be tied *across* with string, but must not be sealed, and should have the words "Book Post" marked in legible characters above the address, in all cases in which there is a postal arrangement for the transmission of printed matter between the two countries at reduced rates.

It is also particularly requested that all MSS. intended for publication in the Society's Transactions be written only on one side, for the convenience of printing.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

SESSION 1863–64.

First Meeting, November 9, 1863.

[ISSUED 31ST DECEMBER, 1863.]

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

ELECTIONS.—*William Balfour, Esq.; Lieut. A. J. Clarke* (late I.N.); *Capt. J. G. Goodenough*, R.N.; *Sir Joseph Paxton*, M.P.; *James Walker, Esq.; J. W. Walton, Esq.; Henry Wood, Esq.*

ACCESSIONS and DONATIONS.—Among the numerous Donations to the Library and Map-rooms since the previous Session were—'A Mining Journey across the Andes,' by Major F. I. Rickards. 'The Island of Formosa,' by R. Swinhoe, Esq. 'South American Sketches,' by T. W. Hinchcliffe, Esq. Vol. xvi. and last of the 'Imperial Dictionary of Universal Biography.' 'A Winter in Upper and Lower Egypt,' by G. A. Hoskins, Esq. Continuations of Transactions of various Societies, &c. &c. Maps of Belgium, on various scales, by M. Van der Maelen. Continuation of Coella's Atlas, on 10 sheets. Geological map of Sweden, on 5 sheets. Philip's Atlas, Part 17. Angola, on 2 sheets, by Visconde de Bandeira; presented by the Rev. R. T. Lowe. 'Iceland, its Scenes and Sagas,' by Sabine Baring Gould, M.A., by the Assistant Secretary; Maps of Province of Canterbury, by Dr. Haast; and Island of Java, by W. F. Versteeg, &c. &c.

EXHIBITIONS.—View of the Snow Mountains of Kilima-njaro, Eastern Africa. A Map of Scinde Railway, showing a general plan of the line; presented by J. Brunton, Esq., Engineer to the Company. Two ancient Maps on vellum, lithographed from an atlas to Ptolemy's Geography of 27 maps on vellum by Arnold Buckinck. Rome, 1478; presented by Hudson Gurney, Esq.

In opening the Session, the President, SIR RODERICK MURCHISON, made the following Address:—

Now that we are re-assembled in the metropolis for this our thirty-fourth Session, we commence our operations with a consideration of several subjects of great interest relating to Africa. Whilst we are

all waiting with impatience for the issue of that work which will bring out the interesting details of those great and successful adventures, by which our countrymen Speke and Grant, traversing tropical regions never before visited by any European, determined the main sources of the Nile, we naturally begin by doing honour to the Hanoverian nobleman, the Baron von Decken (now sitting near me), who, fitting out, at his own expense, a scientific expedition, has explored the loftiest mountain known to us in Eastern Africa. The German missionary Rebmann, who had reached the foot of that mountain, had indeed informed us that, both from what he heard and what he saw at a distance, this mountain was capped by snow. His story was, however, met by scepticism on the part of many persons, including myself, inasmuch as we had then no good evidence to sustain the belief that any portion of the mainland to the north-west of Zanzibar, so near to the coast and almost under the Equator, attained a sufficient altitude to account for the existence of snow upon its summit. Now, Baron von Decken, after two ascents, has, by his perseverance and energy, swept away my doubts; for, after he had examined the flanks of that mountain, and laid down its geographical features, he ascended it to very nearly 14,000 feet above the sea, as determined by both barometer and boiling-water, and having by trigonometrical measurements determined that the summit exceeds 20,000 feet in height, and having ascertained that, when he visited the mountain, the snow-line descended to below 16,000 feet, the snow falling during a short interval to below 13,000 feet, he has satisfactorily established and set before us a grand and new phenomenon in the physical geography of Africa.

It is not to be forgotten that, before he began his journeys to Kilima-njaro, Baron von Decken made a gallant endeavour to proceed from Kiloa, and reach the spot in the interior where Roscher was murdered, in the hope of obtaining the papers of that intrepid traveller, but was compelled to relinquish his object owing to the desertion of his porters and the hostility of the Arab traders.

In his chief expedition, Baron von Decken, meeting with my lamented friend the late Mr. Richard Thornton, who went out with Dr. Livingstone, but who was at that time at Zanzibar, engaged that able and zealous young geologist to accompany him; and I was happy to learn that poor Mr. Thornton, to whose merits I recently called the public attention, was of great use to Baron von Decken in aiding in the construction of the map, an outline of which you now see before you, and which will be rendered much more complete when the calculations, which Mr. Thornton worked out before he lost his life on the Zambesi, shall have been received.

In the mean time I may state that Baron von Decken having submitted to me some specimens of rocks which he has brought to Europe, I find that, whilst on the lower flanks of Kilima-njaro there are micaceous gneissic rocks, hard calcareous sandstone, and felspathic rocks, the higher zones of the mountain consist of unquestionable igneous rocks of older date below, with obsidian and trachyte at the highest altitudes reached; thus proving that the lofty summit has been raised by volcanic action, though there are no proofs of any eruption in the modern period.

But, Gentlemen, the Baron von Decken is not a man to do things by halves. Although what he has already achieved is sufficient to establish a high reputation among African travellers, he is not content with having mastered the monster Kilima-njaro, but is resolved to grapple with its rival peak, called Kenia, which, although not yet reached by any geographer, has been placed in Arrowsmith's last map upon the very line of the Equator, and about 200 miles to the north of Kilima-njaro.

Having left behind him one of his companions, Dr. Kärsten, an accomplished chemist and astronomer, and who is to rejoin him at Zanzibar, Baron von Decken has come to our country to *equip* (I speak in a geographical, not an international sense)—to equip himself, at considerable cost, with a long river steamer, which, though it be built of iron, is not to be a *ram*, nor is it to have any warlike contrivances. In this vessel he purposes to ascend one of the rivers in or near to Formosa Bay (possibly the Juba), and so penetrate rapidly into the interior, either towards Mount Kenia, or, if foiled in that object, to Gondokoro viâ Kaffa.

I must here mention a circumstance which is much to the credit of the noble Duke who now worthily presides over the Admiralty. Baron von Decken had expressed to me his hope that, in passing his vessel over the bar of the river he chose to ascend, he might be assisted by one of the British cruisers in those seas; and on my representing this wish to the Duke of Somerset, his Grace at once acceded to the request, and orders were sent to the Admiral at the station of the Cape to lend all necessary aid to this meritorious traveller.

I may also take this opportunity of announcing that Baron von Decken would be glad to receive the services, in his forthcoming expedition, of some competent young artist to sketch the landscape as well as the inhabitants and wild animals of the regions he may traverse.

Such devotion as that which the Baron von Decken has shown, and is showing, in the cause of African discovery, calls indeed for

our warm commendation; and I feel certain that you all wish God speed and a successful issue to the chivalrous endeavours of a Hanoverian nobleman, who, rivalling our foremost travellers, reminds me of those days when his countrymen in our own German Legion won the praise and regard of every British officer, and brings at once to my mind those great recent African discoveries in which Barth, Overweg, and Vogel have been so eminently distinguished as members of British expeditions. I will only add, what you will be happy to learn, that the Council have this day elected Baron Charles von Decken an Honorary Corresponding Member of the Royal Geographical Society.

By the letter of that fine young man the late Mr. Richard Thornton, which will be read, and which was written shortly before his lamented death, you will perceive how hard he worked to develope the mineral structure, as well as the physical geography, not only of the tracts around Kilima-njaro, but also of the countries watered by the Zambesi and Shiré, or what may well be called the great Livingstone region. His loss is deeply to be deplored, as it is to be feared that some of his conclusions were not matured when he was seized with his last and fatal illness.

As Mr. Charles Livingstone and Dr. Kirk, both members of the Livingstone Expedition, are once more happily among us, they will, I hope, in awaiting the arrival of their celebrated chief, convey to us much valuable information respecting the countries of the Zambesi and the Shiré.

Short as is the letter referring to the last operations of Dr. Baikie, it cannot but excite in us an earnest desire to hear more of his last enterprise, and to learn that this accredited envoy of our Government, who has long been doing good service in introducing habits of honest trade among the native chiefs high up the Niger, has, in penetrating far into the interior, obtained important fresh knowledge, and has at the same time widely extended our good name among the natives of Africa.

Let us hope that, under such humanising influences, the barbarous conduct of the chief who murdered the accomplished and amiable Dr. Vogel may never be repeated; whilst I am sure you will listen with deep interest to the lively description of the habits of the natives which poor young Vogel gives us in the familiar letters to his mother and Mr. Hinde, which will be brought before you.

I may now announce that I have received a long letter from Mrs. Petherick, dated Khartûm, July 26, which gives a very touching narrative of the dangers and difficulties which beset her husband

and herself, first on the White Nile far above Khartùm, and afterwards in the endeavour to travel westwards, amid many perils and disasters, by Khol and Ngam Gara to the former ivory station of Mr. Petherick, or Nyam-Bara, whence they passed through a most interesting country to Gondokoro. The letter is written with much feeling, and makes known to us that Mr. Petherick was lying too unwell at Khartùm to be able to write himself.

I am also bound to make known that Mrs. Petherick states that her husband had rendered himself unpopular in that region by his efforts to check the trade in slaves.

This letter, or portions of it, may be read before the Society as soon as we receive advices from Mr. Petherick explanatory of his geographical researches. The state of his health, we must presume, has prevented him from transmitting to us, as we had a right to expect before now, some account of his travels; particularly as I learn from one of his companions, Mr. Murie, an able naturalist, who has arrived in England, and who is present on this occasion, that many astronomical observations were made during the expedition, all of which were registered in books. Although the main object for which we subscribed our money—the succour of Speke and Grant—was, through the disasters of Petherick, to a great extent delayed, I trust that we may yet be furnished with such an amount of geographical data, particularly in reference to the hitherto untravelled country between Nyam-Bara and Gondokoro, as will satisfy geographers that the pecuniary means which they placed at the disposal of Mr. Petherick have not been expended without affording us some good results.

Lastly, I have to announce that our associate, Mr. Tinné, who is present, has received letters of the 1st July from his relatives the Dutch ladies, whose travels have excited so much interest; and, if time permit, he will communicate an outline of this correspondence.

The first Paper read was—

1. *On the Snowy Mountains of Eastern Equatorial Africa.* By the Baron Charles von Decken.

After apologising for the meagreness of the present communication, consequent on all his papers being at Zanzibar, the author mentioned that, on leaving Mombas, he proceeded southward along the coast to Wanga, and thence struck westward up the river Umba. On reaching the Ugono range, 5000 feet high, he found himself among a well-formed race, sufficiently civilized to smelt iron—very rudely, certainly—but with sufficient success to enable them to

make no contemptible weapons. He experienced in several places much opposition from the natives, who had got a notion that the bare presence of a European would prove fatal to their cattle. On leaving the Wa-Ugono, or people of Ugono, he coasted Lake Jipé on the west side (having previously, in company with Mr. Thornton, traversed its western shores), and, on reaching the northern end, discovered that the river Daffeta, after entering it from the elevated tract beyond, left it within a mile or two of its entrance, the course of the river turning abruptly at almost a right angle. The next point was the Aruscha range, about 4000 feet high, to the westward of which, at a considerable distance, was another lofty range. This would probably be found to be the eastern watershed of Lake Victoria Nyanza. From this point there was a fine view of the two peaks of Kilima-njaro, a sketch of whose snowy summits was exhibited. He now fell in with two minor kingdoms, in which, after going through various ceremonies, such as drinking blood with the chiefs, &c., he found himself about to be hampered by the untrustworthiness which is so characteristic of the African tribes, and therefore pushed forward to ascend the mountain. Here, accompanied by Dr. Kärsten, an accomplished astronomical observer, he encamped the first night at 6000 feet, the next at 11,000, in heavy rain, which, on the weather clearing off in the morning, proved to have been snow, at an elevation of about 13,000 feet. This disappeared by about 9 A.M., but left a clearly defined limit of what seemed to be perpetual snow at about 17,000 feet, the triangulations having previously given the main peak an elevation of 20,065 feet, and the other upwards of 17,000. Still advancing upwards, he attained a height of 13,900 feet, when his companions having given out, owing to the increasing rarefaction of the atmosphere, he was compelled to retrace his steps. He then returned through the Djagga country to the coast. The paper concluded by briefly detailing the alternative routes which Baron von Decken had sketched out for his future exploration. One of the most interesting features of Baron von Decken's paper was a detailed account of a fly, called by the natives "Donderobo," whose bite, as deadly as that of the better known Tsetse, was fatal to asses and goats only; involving serious inconvenience and even danger to the expedition, by the destruction of the draught asses of the caravan. The effect of the poison seemed to be to produce tubercular deposit, following immediately upon acute inflammation.

The PRESIDENT having invited remarks—

MR. MACQUEEN said it was satisfactory indeed to find Baron von Decken

confirming in such a clear and decided manner the information conveyed to us fifteen years ago by those indefatigable and intelligent men the Church missionaries, which, though clearly and minutely given, has for many years been distrusted. In reference to the height of these mountains, he might remark that every 5000 feet in height gives a line of vision of 83 geographical miles when not obstructed by intermediate heights. Consequently, the height, as estimated, gave a circumference of vision of 332 geographical miles, and by that of Baron Decken 340 miles, which shows at once the error of those who place these mountains so near to the coast as has been in some instances done.

It was satisfactory to him to have his estimates so nearly confirmed by the actual observations of the Baron. He wished to draw the Baron's particular attention to Dr. Krapf's journey from Mombas to Wa-Mbané. In journeying along the north side of those mountains, he crossed a considerable but clear, cold stream, the river Tzavoi, which rises on the north-east face of Kilima-njaro. Hereabouts the lower mountain hid the higher from his view. Soon after the higher with its snow-covered top came in view, and two days' journey farther to the westward he crossed the river Adi, a fine stream, but then very low. This stream rises in the south corner of a very mountainous range to the north-west. From this river he proceeded through the high land of Yata in Wa-Mbané.

The river Duna, which he next visited, at the point he saw it was from 150 to 200 yards wide and 7 feet deep, with a current of about 4 miles per hour. This was at the very close of the dry season, yet here was a river of very considerable magnitude, running into the Bay of Formosa. It rises on the north side of Mount Kenia. At Rivoi's village Dr. Krapf saw the snow-clad Kenia bearing about N.W. by W., and to the south of it, on the bearing of W.N.W., he saw another mountain, with two dome-like peaks at each end, also covered with snow. From the small angle at which this range of mountains was seen, its distance west must have been somewhat greater than the other. On the west side of Mount Kenia there is a lake, from which issues a river said to run to Massùr (Egypt). At some distance west of Kilima-njaro Dr. Krapf describes another mountain, at least 18,000 feet high. Beyond this is Bahuringe (? Baringa of Speke and Grant. [ED.])

In reply to Captain Maury, BARON VON DECKEN said his first ascent was made in the month of June, and the second (that detailed before the Meeting) about the end of November. The rainy season commenced in the month of June, and extended through July, August, and September; but near the Djagga the rainy season extended over nearly ten months of the year. It was only for two months that there was really no rain; during the other ten months there was rain every day. The rain nearly always fell in the evening, and commenced with a heavy north-east wind.

CAPTAIN MAURY said the rains at Parà, at the mouth of the Amazon, which was still nearer to the Equator, had a similar feature of regularity about them. There, however, they commenced about two in the afternoon, and so regularly, that people regulated their appointments by them, saying, "Come to me half-an-hour before the rain." In these explorations it was a matter of interest to find out not only the prevailing direction of the winds, but the quantity of rain that fell, and the time of day as well as the season of the year in which it fell. Because it must be obvious to every one that there is a close connection between the meteorological phenomena, and the fauna and flora of every latitude—one was the complement of the other; therefore, when a traveller gave us information respecting the one, we could draw general conclusions with regard to the other. He recollected listening, at a previous meeting, to a paper on Madagascar, in which the author stated that one of the principal features that attracted his attention was the remarkable development of vegetation, so different from the vegetation in the corresponding latitudes on

the coast of the mainland of Africa. Knowing this fact, viz. that the flora of Madagascar is very different from the flora of the neighbouring coast, between the same parallels, we know also that the fauna must be very different, because the flora is the foundation, as it were, upon which rests the fauna of any particular region. When we come to account for this remarkable difference in the vegetation of the two regions, we find that Madagascar is for a certain season of the year in the line of the south-east trade-winds, which come charged with moisture; and the moisture being drawn off by the mountains of Madagascar, the atmosphere is left comparatively dry, and in this state it makes its way to the mainland. One most interesting feature in these African explorations was the glimpses which we obtained of the meteorological conditions of that unknown country as bearing upon its flora and fauna. Thus there was no equatorial region in the world, except Peru, where the rains were so scanty as on the eastern coast of Africa, in the region of the head-waters of the Nile. According to the rain-gauges of Grant and Speke, the rainfall throughout the year is not greater on the average than that of England. It was the knowledge of these facts which enabled us to form some sort of estimate as to what the country in question is fit for. Where there is no moisture, there is sterility, as in the deserts of Sahara; on the contrary, where there is moisture, as in the valley of the Amazon and in Madagascar, there is a profusion of vegetation. Applying this rule, then, to the newly-discovered regions of Central Africa, he should say that they were eminently fitted for the cultivation of coffee, tobacco, and perhaps sugar. With regard to the Snowy Mountains, it appeared to him that the snow must be due to the south-east trade-wind, which, not being turned aside to supply the south-west monsoon of India, keeps up the stream of moisture which the Baron spoke of as lasting nearly all the year round, and which would keep the mountains covered with snow. One consequence of this steady fall of moisture and accumulation of snow was to be found a little farther to the north. The reservoirs of the Nile consist of lakes, which feed that river precisely as the reservoirs above Niagara feed the St. Lawrence, keeping them nearly at the same level, and precisely as the reservoirs in Minnesota feed the upper waters of the Mississippi. When we compare the two branches of the Nile, one fed by lakes and the other by snows, with the two great branches of the Mississippi, we find that when the floods on the Ohio are coincident with the melting of the snows on the Missouri, we have tremendous inundations in the lower country, just as we had the other day on the Nile, in consequence, no doubt, of a precisely similar coincidence with regard to its two main branches. But in all these explorations it is frequently as desirable to know what trees, plants, birds, and mammals the traveller does not see as to know what he does see. Negative information is often most important.

In reply to a series of questions by Mr. Crawfurd, Baron von Decken said there were no horses nor donkeys in the region of Kilima-njaro; they only came with caravans from the coast. At Djagga he was the first person who brought a donkey there, and it made more impression upon the natives than the presence of white men. Cattle were plentiful, of the same species nearly as those in the Gallas country. There were goats and two kinds of sheep, one with a long tail and the other with a fat tail. Turkish corn, a species of potato, and bananas were grown. He found bananas at an elevation of 5000 feet. Cocoa-nuts he never found more than two days from the coast. The sugar-cane grew in abundance in the lower country, but not in the Djagga. He saw no wild coffee.

Sir Edward Belcher said he had visited nearly every part of the coast of Equatorial Africa on the west side, and his observations agreed with those of Captain Maury as to the limited rainfall. He would ask at what altitude did the Baron experience these constant rains?

Baron von Decken.—It was nearly 5000 feet.

Sir Edward Belcher said this could form no rule with respect to the condition of things on the sea level, where he was inclined to think that very little rain might fall when this constant moisture was experienced at such an elevation. It was indeed above the cloud level; and those who had visited places on and near to the Equator, as at Borneo and Penang, knew, even at 2000 feet above the sea level, that in the dry season rain-clouds and extreme cold prevailed.

The President remarked that the existence of the Snowy Mountains had been stoutly contested so recently as the preceding Saturday by a well-known geographer. To have physical proofs brought before them for the first time that these mountains were covered with snow, invested the question with considerable importance. The measurement of the altitude would sufficiently account for the fact.

The Earl of Donoughmore said as the fly which had been described was fatal to asses, he presumed that mules would run the same danger; therefore he should like to ask whether the Baron considered the country suitable for camels. In exploring this region it appeared that the great difficulty travellers had to contend with was the impossibility of getting beasts of burden. They were, consequently, obliged to travel with large caravans of porters, and their movements were much impeded, owing to the danger there was of the porters being driven away by hostile tribes.

Baron von Decken replied, that camels would never do; there was such a quantity of mimosa and thorns that camels could never pass through them. There were very few roads, and these roads were alone practicable for camels. For his part he preferred to push his way through the bush. There were no mules in the country, nor were there any on the coast.

Mr. Crawfurd asked Baron von Decken if he had ever known the negroes to acquire the art of taming the elephant? The elephant would be fit for that country if only the negro had ingenuity enough to domesticate the elephant, as was done by people in other parts of the world, in which it was indigenous.

Baron von Decken said he had never known an instance of the kind; Mr. Crawfurd remarking thereupon that he had expected such would prove to be the case.

The Bishop of Natal asked whether the languages of the eight nations, which were said to have no connection, were similar to the languages of South Africa, in having the plural formed by prefixing a particle—a modification of the prefix which marks the singular?

Baron von Decken said there was this connection: the people of the *Ugono* country were called *Wa-Ugono;* the people of the *Djagga* country were called *Wa-Djagga.* But there was no prefix to distinguish the plural from the singular.

The Bishop of Natal asked, Would the plural of the name of the fly (*u-donderobo*) be *o-donderobo* or *aba-donderobo?*

Baron von Decken said in the Mossi language it would be *wa-donderobo;* but in the different native languages it would be just the same as the singular. He was not able to say whether there was any relation between those languages and the languages of South Africa.

Mr. Tinné asked if the Baron observed any rivers going westward or north-westward towards Victoria Nyanza?

Baron von Decken replied he never had an opportunity of looking to the north; the range of the Kilima-njaro was too high for him to see in that direction. About thirty miles to the westward there was another range extending a considerable distance, which precluded the idea of any rivers flowing westward towards Lake Nyanza.

ELECTIONS.—*Edward Arber*, A.K.C.; *John Henry Barkhouse*; *William Best*; *Charles Albert Brophy*; *Lord Calthorpe*; *John Pincher Faunthorpe*; *George Fleming*; *John Townshend Fowler*; *David G. B. Gardyne*; *Lord John Hay*, C.B.; *Henry Hull*; *Captain Alexander Innes*; *Andrew Jardine*; *Robert Jardine*; *John Kirke*; *Edward C. Lowndes*; *Major-General James Matthie*; *Jerome John Mercier*; *Thomas Middleton*; *H. Byron Moore*; *Joseph Pattinson*; *George Herbert Pember*; *Henry W. Reeves*; *John Thornton Rogers*; *William Dukin Spear*; *Miles Staveley*; *William Tegg*; *Griffith Thomas*; *Archibald Travers*; *Hon. Edward Fiennes Twisleton*; *Thomas Francis Wade*, C.B.; *Right Hon. Spencer Walpole*, M.P.; *Joseph Wilks*.

EXHIBITIONS.—Two Models—one of Gibraltar, the other Lines of Torres Vedras—by R. T. Wilde and Sons; presented through Admiral Collinson.

The first Paper read was—

"*A communication from Mr. Tinné relative to the Dutch Ladies' Expedition from Khartùm up the River Bahr-el-Ghazal*," *commencing 26th February, at a point on the White Nile.*

DR. HEUGLIN, who accompanies the expedition, states (*vide* Petermann's 'Geographische Mittheilungen') that it left Khartùm on the 24th January, 1863, with the intention of tracking the western affluents of the Nile, so as, if possible, to penetrate from this side into the country of the Nyam-Nyams.

A very favourable wind brought them on the third day to El-Eis, the most beautiful part of the White Nile. On the 31st January they passed Tefaffan, 300 feet high, and 3 miles from the river, which is not, as hitherto supposed, of volcanic origin. On the 1st February the flotilla reached Hellat-Kaka, the residence of the Viceroy's deputy, a wretched nest of huts; and on the 4th passed the mouth of the Sobat. From this point for more than 200 miles the expedition had to work its way through the swamps of the Bahr-el-Ghazal, and on the 5th February reached Lake No; the goal of the expedition being the Lake Rek, or Mishra Rek. This part of the voyage was exceedingly tedious, the river resembling a narrow canal, full of curves and windings, walled in by impenetrable thickets of reeds or else mud-banks. Huge herds of elephants were passed, with hippopotami, buffalo, and other wild animals; but hunting is impossible, owing to the nature of the soil.

At length on the 10th March the entire flotilla reassembled. Here it became necessary to take the paddles off the steamer and proceed in small boats, one of which towed the steamer. In the last stages of the navigation of the Ghazal its banks were covered with

forests of ambadsh (*anemone mirabilis*), which fringes the banks in narrow strips, and grows in rather deep water. These forests Dr. Heuglin compares to rows of well-used brooms, very fragile, and from 20 to 25 feet high.

We now quote from the correspondence of the ladies.

"Mishra of Rek, 26th March.

"I write at present from one of the most singular spots on the globe, which can only be reached by a route as singular. We pushed along up the Ghazal for three or four days, the river in front always appearing to have come to an end in a sea of herbage, alternating with bulrushes, &c. It proves, however, to be an immense marsh, through which the boats are slowly pushed, the brushwood being beaten down with sticks, or cut with hatchets and scythes. After four days of this exhausting work we arrived at a small pond or lagoon, in which were crowded together, in the utmost confusion, twenty-five vessels of various descriptions. This was the Mishra or port of Rek. Here we had to stay to get porters, and only now can detail our plans. Dr. Heuglin has gone eight or ten days inland, to see whether he can find any, when we shall proceed to the spot selected for our passing the rainy season. The equipment of the expedition is something incredible, as we must carry with us ten months' provisions and stores—amongst other things, a ton and a half of beads, 8 bars of copper, 12,000 cowrie shells, pepper, salt, &c.; and as each porter only carries 40 lbs. load, you can form an idea of the immense number we shall require—above 200 porters at the very least. There is absolutely no traffic along the river, except for the *naggars* or merchandise boats in search of ivory; a pair of tusks fetching at Khartùm perhaps 25*l*. These naggars convey provisions to the various stations or *zeribas*, as they are called, taking back ivory in exchange.

"*May* 13.—All is well now; we have 80 porters; we know whither we are bound; in short, all is right. Dr. Heuglin is quite pleased with the interior—pretty country, good water, and hospitable people, and is enchanted with the birds; quite rare and new, he says.

"We have had a visit from Mr. and Mrs. Petherick, who, hearing we were here at the Mishra, came to see us to offer to be of use to us, which they have been in many respects. They have had dreadful ill luck. They set off too late from Khartùm in March, and the wind being adverse caused them much delay and damage, so they had to abandon their boats and proceed by land from Abukaka. This was the end of August, 1862; and it being the rainy season, that plan proved equally impracticable. They were delayed by

affrays with inhospitable natives and by illness, and only arrived at Gondokoro in February last, five days after Captain Speke, who, not knowing what had become of them, and believing them from the current reports to be drowned, accepted Mr. Baker's provisions, boat, and men, so that the Pethericks had to retain all they had sent forward for Captain Speke's requirements. These we have taken over from them,—beer, wine, tea, soup, pearl barley, Leman's biscuits, a gutta percha boat, and what not. It is strange to find these luxuries here, and we have enjoyed them famously.

"*June* 1.—We left our boats on the 17th May, and landed our baggage, in order that the porters might see what they had to carry. I cannot say that the first part of the country is pretty, but it is very peculiar; the trees beautiful, with a succession of neat villages, and pools of water. We arrived at a village called Afog on the 20th. Here my daughter fell ill with fever; and the next day our soldiers rebelled. They complained that they had nothing to eat, although they had five bullocks a-day; then they said they had not enough *doura* (grain of the country); but after some patient remonstrances, they all came, one by one, to beg pardon. So we arranged that as many as we could spare should go on to Ali-au-Mori's station.

[The illness alluded to, and also that of Dr. Heuglin, delayed the party for some days. We resume our extracts.]

"Once more *en route*, we shall, I trust, arrive safe and sound at the mountain, Casinka, where we are to remain till the weather is fine and the earth dry. It must be a beautiful country, plenty of game, and very good people, though no Europeans have been there. We have already sent off three companies of porters, about 400 men in all. They carry but little, say 40 lbs. each, and all on their heads.

"Afog, where we are staying, is a very pretty village, with rich cultivated patches, full of *doura*, besides a sort of ground-nuts and quantities of pumpkins. The trees are magnificent, and the cows, goats, and sheep abundant. The people live in beehive-looking huts, of which each family has three or four, for themselves and flocks. We have rivers to pass before we come to where we hope to stay, near the mountain Casinka. And we are now going to Ali-au-Mori's *zeriba*, where we have sent on all our provisions. From there we hope to cross to Casinka; and thence we are only two days from the Nyam-Nyam, our goal.

"*July* 1.—I know you will be glad to hear how, after all our trouble and expense, the new country pleases us, and that, though still weak and subject to attacks of fever, our invalids stand the journey very well: my daughter has a *'ngerib*, arranged with a covering to keep

off the sun, and her mattress on it, so that she reposes very agreeably. We have 192 negroes for our immediate luggage; we have 38 donkeys, but they suffer so much from climate and neglect, and are so cruelly overburdened when we allow them to be loaded at all, that now they are kept for the sick or tired human beings. We take very short journeys, and always find a village to sleep in. The two first days, after leaving the Mishra, was not pretty; but there were some beautiful trees and so many rich villages, that it could not be called ugly; thousands of birds made it gay—such beautiful stations, belonging to rich negroes or merchants, such neat houses, surrounded by a high hedge of the poison-plant, and such a number of cows and sheep. After a while the trees became thicker and higher, and we were one whole day's journey in a wood of gardenias in full bloom, with jasmine and sensitive-plants. Afterwards the woods became forests of high majestic trees, and the ground covered with sweetest flowers; we had not time to pick many, as we are hurrying on. We crossed the river Djour on the 16th June, which took only six minutes for each party: but there were only seven boats for all our luggage and people.

"You can form no idea of the frequency and intensity of the storms—wind, hail, rain, thunder, and lightning—which makes us all the more anxious to reach our camping-ground for the rainy season. We had one on our landing from our boats at the Mishra; another just after our arrival at Afog, while we were pitching our tents; that of my daughter was blown down when half up, and herself nearly smothered in its folds. The severe cold and wetting she then experienced brought on a fever, which prostrated her for more than a week, and, as already mentioned, brought her almost to death's door. Our last experience was just after crossing the Djour, when, not having succeeded, owing to the stupidity of the vakeel, in bringing over our tents and baggage, the whole party were exposed throughout the night to the pelting of the storm, there being no village or shelter of any sort near. Fortunately the storm had no evil effect upon the health of any one of the party.

"I am writing this in the village where poor Dr. Steudner died. We did not meet a caravan, as we expected, and came on 21st June to a zeriba or village belonging to Buselli, a foreign merchant of Khartùm, whose reception of us was magnificent, but who proved afterwards most extortionate. We are going to hire a small zeriba he has for 30 thalers, which we succeeded in getting, after he had attempted suddenly to charge 200 thalers. But it is impossible to tell how he teased us. First he turned out all our soldiers, and when we built a shed for them he asked hire for it! Then he has

once offered and refused negroes, and changes his terms every day; one day lets us have as much *doura* as we want, another refuses to let us have anything for our people to eat, and tries to make us pay 9 thalers for what costs at Khartùm only one. The whole country is one field of *doura*, yet he will not permit his negroes to sell us any.

"The origin and system of these merchants are different here from the White Nile. A man comes into a village, sets himself down, and begins by buying ivory and making friends with the negroes, promises to protect them if they will take the ivory to the ships in the Mishra, and he either remains himself or leaves a vakeel. He builds a house or two, surrounds it with palisades, and, by degrees becoming master of the village, then proceeds to attack a neighbouring hostile village, and, having guns, of course they conquer. That village he attaches to the first, and so on till he has a good many villages, when he forces the negroes of the whole to furnish *doura* for his soldiers or fighting men, and they submit.

"We heard to-day from a party coming down from Casinka that it is no longer possible to reach the mountain before the rains: we shall, therefore, be shut up for the next four months, but it is very safe."

Writing before their departure from the Mishra on 6th May, finished 16th May, 1863, they had remarked:—

"There is no chance of our being able to come back here to rejoin our boats till December or January next. The rains do not finish till November, and then the rivers are so swollen, and the mud so deep, no animals can pass, nor are there any boats for us—nothing but a hollowed-out tree or a bundle of sticks joined together, which the blacks go about on: however, we shall make it out as well as we can.

"There is abundance of game everywhere. Of quadrupeds, we have seen giraffes and gazelles, and the recent tracks of elephants and buffaloes, large herds of which Dr. Heuglin fell in with on his previous short visit, when in search of porters, but they are now scared away by the noise of our large caravan. Of birds, there are francolin (rails), black partridges, and guinea fowls. Dr. Heuglin has collected specimens of 60 new and rare sorts of birds, which he has sent to the Museum of the University of Leyden."

The PRESIDENT, in conveying the thanks of the Society to Mr. Tinné for his interesting communication, repeated what he has often expressed—his admiration of these adventurous ladies, who had explored farther to the westward of the White Nile than probably any European. He then called upon

MR. TINNÉ, who added that it was a remarkable and adventurous expedition, organised and conducted entirely by two ladies. No doubt, in the course

of time, we should, through the assistance of Dr. Heuglin, acquire some most interesting scientific information. The country through which and into which they were travelling was one of great interest, and should they succeed in the object which he understood they had in view—which was to penetrate into the river districts of Central Africa, lying between the White Nile and the supposed mountainous districts of that part of Africa—the result would conduce to geographical knowledge. Without doubt, the large accession of water into the Nile was derived not only from the lake discovered by Captain Speke and Captain Grant, but also from other sources; and if these sources should be found in the regions visited by these ladies, the discovery would tend to elucidate the geography of Central Africa. In one of their letters they expressed surprise that no Englishman had spirit enough to go into that country.

At the request of the President, CAPTAIN GRANT next addressed the Meeting. He said that Captain Speke and himself at Khartûm met one of the three ladies who had ascended the White Nile to Gondokoro on their first expedition, but had not joined that up the Bahr-el-Ghazal, where she was detained by illness and unable to accompany her sister and niece up the Bahr-el-Ghazal. They spent many hours daily in her society during the ten days they remained at Khartûm, and Captain Speke wrote out instructions for her fellow-travellers then up the Bahr-el-Ghazal. They both strongly endeavoured to dissuade the ladies from penetrating into the country on account of the malaria which arose from the inundations, and which might prove disastrous to the expedition. He did not wish to prognosticate evil, but if anything could be done to prevent their exposing themselves to risk in that dangerous country, it would be desirable. He really hoped Mr. Tinné would recommend them to return, and so escape the fevers, and get out of the hands of those rascals the Turks, who would rob them of every sou, as the Meeting had just heard. He and Captain Speke came down the same latitude, and they met with nothing but immense wastes of tall reeds. There are no mountains in that latitude at all; only solitary hills covered with scrub, a few trees in the plains, and palms and acacias in the villages. Ascending the Nile up as far as the 5th degree north, there is nothing but eternal rush all the way. It was a most uninteresting and desolate country. The ladies traversed this region in going up to Gondokoro, and, of course, as soon as they saw a hill they were delighted with the country, and imagined that they must regain health and be restored to vigour. To Captain Speke and himself, coming from the rich and beautiful countries of the Equator, the region in question bore a most uninviting aspect. He must also point out the delusive nature of the idea which the ladies entertained, that they could get the Turks to carry loads.

[The PRESIDENT explained that the Turks spoken of were ivory traders, who had large establishments in the country, occupying several villages, and having the control of a great body of negroes. They appear to have received these ladies with a great show of hospitality, but the very next day tried to extort vast sums of money from them.]

CAPTAIN GRANT said the ladies had engaged 192 of these men as porters to carry loads of 40 lbs. each on their heads, and to go eight or ten miles daily. They had made one day's march, and already there had been a mutiny; and the ladies would find that, before they had gone ten marches into the interior, these fellows will have raised half-a-dozen mutinies. The men on that side of Egypt will not carry loads, but they will ride on donkeys and bullocks, and overload them shamefully. In Speke's expedition he engaged men from Zanzibar, a different caste of men altogether, and they carried 60 lbs. each man; but upon reaching the ivory traders' camps they were derided by these Turks, who sneered at them—"You are all women, to carry loads;" the consequence was, that the men were completely spoiled and ruined.

The EARL of DONOUGHMORE said he wished to draw attention to one point

which had been incidentally suggested by the Paper. It appeared that there is a very large drainage running into the White Nile from the Bahr-el-Ghazal. We had got some notion of the quantity of water which came down from the lake discovered by Captain Speke and Captain Grant. During the present season there had been a disastrous inundation of the Nile in Egypt, causing an immense loss of property and a considerable loss of life. Now, this inundation had arisen from natural causes which it was the duty of science to endeavour to discover; he therefore thought it would be very desirable that some steps should be taken by the scientific gentleman who was accompanying the ladies, upon his return, to compare the outflow of water from the Bahr-el-Ghazal with the outflow from the White Nile. That comparison would enable us to judge to a certain extent as to the amount of country drained by these two outfalls. We now knew where the White Nile came from, but we did not know the extent of the country whose waters drained into the Bahr-el-Ghazal. It might turn out that a considerable, possibly the larger, proportion of the water which formed the inundation of the Nile came from that quarter, and not from the White Nile. Therefore, a careful comparison of the quantity of water discharged by these two confluents would be most valuable for the purposes of science.

The PRESIDENT said they were extremely indebted to Lord Donoughmore for this suggestion. He might observe that the ladies were really on the right road to obtain this knowledge; for their great object was to reach the mountainous region whence the Bahr-el-Ghazal flowed. Should they succeed in reaching that region—which he was in hopes they would, notwithstanding the dissuasion of Captains Speke and Grant—and should they discover that its waters are thrown off to the Nile on the one side, and to Lake Tchad and the other great lakes to the westward on the other, it would be a most important geographical result.

MR. TINNÉ stated that Dr. Heuglin corresponded with 'Petermann's Journal,' a recent number of which contains a series of valuable astronomical and scientific observations which Dr. Heuglin had transmitted to Germany. (This number unfortunately has not yet been forwarded to the Society.)

The PRESIDENT then read a letter from M. Du Chaillu, announcing his arrival at Acra, and stating that, having become a proficient in astronomical observation, he hoped soon to send most useful information, and thanked the Society for the assistance they had rendered him by supplying instruments, &c.

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2. The next Paper, detailed in an abridged form, the observations of COLONEL PELLY on the geographical capabilities of the Persian Gulf as an area of trade.

COLONEL PELLY first describes the different suzeraineties of the territories abutting on the Gulf, and briefly notices the various tribes that inhabit its shores—as the Chaab Arabs from the Karoon to the Hindeean; the territory directly held under the Shah, extending from Bushire to Lingah; territory leased by the Shah to the Imaum of Muscat, consisting of Bunder-Abbass and the coast northwards to Lingah, and southwards to a point not definitely specified by treaty, but tacitly recognised, as also the island of Kishm (on which is Hormuz) and its dependencies; territory of the Imaum

of Muscat, including Cape Ras Mussendom (south side of Straits), extending to El Khatif, and subject to independent maritime Arab chiefs, erstwhile pirates of the Gulf; territory of Nejd, from El Khatif to Koweit, professing allegiance to Turkey, but virtually independent; and, lastly, territory governed by Turkish pashas from Koweit to Busreh or Bussŏra. It then describes the appearance of the country, consisting of vast green fields with herbage at all times suitable for sheep, and generally for cattle, till Bunder Dielum is reached in Persia Proper, near which are the remains of ancient cities of immense extent, where the plain merges in low sandstone and earthy hills. After passing another fine plain with ruins and the bed of an ancient stream whose waters are traditionally alleged to have been diverted by an earthquake, Bushire, the principal port of the Gulf, is reached, described as possessing by no means suitable accommodation for the trade that centres there, a large proportion of which is cotton.

From Bushire southward is a ridge of barren mountains, at the base of which nestle villages more or less wretched. Bunder-Abbass Colonel Pelly speaks of as being the best point for deep-sea vessels to stop at, so as to transfer cargo, either to go up the Gulf to Koweit and Bussora, or across by Yezd to a line extending from Herat on the east by Balfrush, Ispahan, and Teheran, to Tabreez, and so communicating direct with Central Asia. The port he describes as superior to that of Bushire, while Mussendom, on the opposite side, where the submarine telegraph from Bushire is to have its first station going eastward, has every facility on its western face for being made a coaling station.

The PRESIDENT observed that Colonel Pelly was brought up under the auspices of Sir Henry Rawlinson, from whom he hoped in the course of the evening to hear some remarks in connexion with the great telegraphic communication between England and India, which it was proposed to carry along this line of country. In the mean time he would ask for a few observations from Mr. Lynch, who was well acquainted with the Persian Gulf.

MR. LYNCH said the Paper gave an interesting and correct description of the northern part of the Persian Gulf. But Colonel Pelly was mistaken in supposing that Bunder-Abbass was the port of Shiraz. It was the port of Kerman, Yezd, and indirectly of Ispahan, but Bushire was the port of Shiraz and Ispahan. Bunder-Abbass was a very fine port, with at least 14 fathom water close in shore, and no doubt with the introduction of railways in Persia it would be of great importance. The physical features of the country were in its favour, for to the eastward there was a vast range of mountains; spurs of the Taurus, called the Elburz and Bukhtarian and Luristan ranges, extend along the eastern coast of the Gulf of Persia; whereas at Bunder-Abbass there was all open plain, which extended right up into the heart of Persia, first to Yezd, and thence to Ispahan. In former times Hormuz was the great emporium for this part of Persia. Its insular situation secured for it protection on the land side during the disturbed state of the country when it was governed

by the Tartars and Turks; and the Portuguese made it a grand depôt for the commodities of Europe, which when opportunity offered they sent into the interior in caravans, which traverse the country from Bussora to Damascus on one side, and to the capital of Timur on the other, and opposite Bunder-Abbass. When Persia becomes more enlightened and more amenable to civilisation, Bussora and Bagdad will, however, command the whole trade of this country. Merchandise will follow the water-line, and at Bussora and Bagdad it would find a much better access into the interior than from Bunder-Abbass, the country round which is remarkably desert and inhospitable, and its climate most prejudicial to European constitutions. From Bagdad to Ispahan was 20 days' journey by caravan, whereas from Bunder-Abbass it was nearer 30 days.

Sir Henry Rawlinson said it was only fair to Colonel Pelly to state that the Paper consisted merely of a few detached geographical facts culled from a very long and able Report on the general state of the Persian Gulf, which embraced political considerations mainly, together with statistics of trade and a variety of other matters.

Of Colonel Pelly himself he also wished to say a few words as a most deserving officer and a really good geographer. He is an infantry officer on the Bombay establishment, the same service which has produced Outram and a number of well-known historical characters. He graduated in Scinde, under Colonel Jacob and Sir Bartle Frere. He afterwards joined Sir Henry Rawlinson as Secretary of Legation at Teheran. After Sir Henry quitted Persia, Colonel Pelly travelled direct through Affghanistan from Teheran to India, being the only European travelling singly who has passed through since the time of the Affghan war. After that he went to Zanzibar, where he assisted Baron von Decken in his journeys into the interior. From Zanzibar he was removed to the Persian Gulf, where he is now political resident. Colonel Pelly had always appeared to him as a real type of the Indian officer of the old school—as hard as iron, plastic, ambitious, full of talent and energy, and ready for any work.

There were two points of interest in the Paper. The first was that the particular line of coast which Colonel Pelly had described was part of the great line of telegraph which is being laid down between England and India. From the mouth of the Euphrates the line will be laid submarine to Bushire; from Bushire it will follow down the coast the whole way to a point opposite Bunder-Abbass, where there will be a great telegraph-station; and from that point it will be continued along the coast of Mekran to Guadeh, and thence by land to Kurrachee. It was formerly proposed to bring the alternative line through Persia, down by land to Bunder-Abbass; but the Persian Government were obliged to give up the idea, because they could not protect it in the interior.* That alone would show what the country must be in the interior, and how hopeless it would be to expect to conduct a line of caravan communication into the interior from Bunder-Abbass. Bushire is the natural port of Shiraz; but if the interior could be pacified, no doubt Bunder-Abbass would be the proper line to Kerman and Yezd, and thence to Khorassan on the right, and Irak on the left.

The other point to which he wished to draw attention—and he was sure it would be interesting to Mr. Crawfurd—was with regard to cotton. He believed there was not a better cotton country in the whole world than all that region which Colonel Pelly had described lying to the north of the Persian Gulf. It had been very little brought before the English public. We had heard of Queensland, of the west coast of Africa, of Egypt, and the outlying regions of Turkey; but the country which he believed of all others was the most acces-

* This "alternative" line will, as at present designed, unite with the direct line at Bushire.—[Ed.]

sible, and the best qualified with regard to soil, climate, irrigation, and water-carriage, was this province at the head of the Persian Gulf, which had been almost overlooked.

Mr. Crawfurd asked what was the quality of the cotton.

Sir Henry Rawlinson replied, Sea-island long staple. He might mention that a sample produced at Bussora had been compared with the best Sea-island by American merchants, and they did not distinguish any difference. The country available belonging to Turkey was 500 miles in length, extending down the valley of the Tigris and the Euphrates, every inch of which was perfectly open and adapted to cotton cultivation. It was a fine alluvial soil, and with the Tigris on one side, and the Euphrates on the other, the whole country could be reticulated with a series of canals from one end to the other. The same advantages would apply, though, perhaps, in a less degree, to the country to the east, which Colonel Pelly had been describing—to the country below the mountains, which constituted the ancient province of Susiana. In ancient times this province of Babylonia was the seat of great capitals, and Herodotus tells us that it paid one-third of the whole grain-revenue of the great empire of Cyrus, which extended from Egypt on the west, to Cashmere on the east. This was sufficient evidence of the natural capabilities of the country, and it was astonishing when we were looking everywhere for cotton fields that the great valley of the Tigris and Euphrates should have been so completely neglected.

Mr. Crawfurd said, notwithstanding we had been paying a bounty of 200 per cent. for cotton during the last two years and a half, Persia—which was so productive and so promising, according to Sir Henry Rawlinson—produced only 1500 bales out of the 2,000,000 that we required. Still, what Sir Henry had said as to the capabilities of the country was quite correct. If the country were well governed, and capital were introduced, the valley of the Tigris and Euphrates might be made, no doubt, one of the most productive plains in the whole world. Neither the valley of the Nile nor the valley of the Ganges excelled it in fertility. It could produce abundance of good cotton, but he doubted the advantage of growing Sea-island cotton. Sea-island cotton was fine in quality, but the quantity per acre was about one-half that of ordinary cotton. It would be far more profitable to produce good common cotton of the description that is chiefly consumed in this country.

With respect to the ports on that coast, he thought Kurrachee would become a great and important emporium. It commanded the trade and navigation of all the countries upon the great river Indus up to Lahore, just as Calcutta commanded the trade of the valley of the Ganges. Kurrachee was cutting off a considerable portion of the trade of Bombay.

This closed the discussion, and the Meeting was then adjourned to 14th December.

Library Regulations.

I. The Library will be open every day in the week (Sundays excepted) from *Eleven* in the morning to *Five* in the afternoon,* except on New-Year's Day, Good Friday to Easter Monday inclusive, and Christmas week; and it will be closed one month in the year, in order to be thoroughly cleaned, viz. from the first to the last day of September.

II. Every Fellow of the Society is entitled (*subject to the Rules*) to borrow as many as four volumes at one time.

Exceptions:—

1. Dictionaries, Encyclopædias, and other works of reference and cost, Minute Books, Manuscripts, Atlases, Books and Illustrations in loose sheets, Drawings, Prints, and unbound Numbers of Periodical Works, *unless with the special written order of the President.*
2. Maps or Charts, *unless by special sanction of the President and Council.*
3. New Works before the expiration of a month after reception.

III. The title of every Book, Pamphlet, Map, or Work of any kind lent, shall first be entered in the Library-register, with the borrower's signature, or accompanied by a separate note in his hand.

IV. No work of any kind can be retained longer than one month; but at the expiration of that period, or sooner, the same must be returned free of expense, and may then, upon *re-entry*, be again borrowed, provided that no application shall have been made in the mean time by any other Fellow.

V. In all cases a list of the Books, &c., or other property of the Society, in the possession of any Fellow, shall be sent in to the Secretary *on or before the 1st of July in each year.*

VI. In every case of loss or damage to any volume, or other property of the Society, the borrower shall make good the same.

VII. No stranger can be admitted to the Library except by the introduction of a Fellow, whose name, together with that of the Visitor, shall be inserted in a book kept for that purpose.

VIII. Fellows transgressing any of the above Regulations will be reported by the Secretary to the Council, who will take such steps as the case may require.

By Order of the Council.

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* On Saturday the Library is closed at 3 P.M.

N.B.—Home and Foreign Literary and Scientific Societies whose publications are exchanged with those of the Royal Geographical Society, are requested to note the following abstract of the Regulations of the General Post Office with reference to matter sent by Book Post:—

Every packet must be sent either without a cover, or in a cover open at the ends, so as to admit of the enclosures being removed for examination. For the greater security, however, of the contents, the packet may be tied *across* with string, but must not be sealed, and should have the words "Book Post" marked in legible characters above the address, in all cases in which there is a postal arrangement for the transmission of printed matter between the two countries at reduced rates.

It is also particularly requested that all MSS. intended for publication in the Society's Transactions be written only on one side, for the convenience of printing.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

[ISSUED 25th FEB., 1864.]

SESSION 1863–64.

Third Meeting, 14*th Dec.*, 1863.

LORD STRANGFORD, in the Chair.

ELECTIONS.—*Rev. John Bamforth; Thomas Bigg, Esq.; Donald Dalrymple*, M.D.; *Percy Matthew Hart, Esq.; Lord Gilbert Kennedy; M. Herman von Rönn; Charles Rowley, Esq.; Le Chevalier Giraldo dos Santos; James Duncan Thomson, Esq.; James F. Wingate, Esq.; John Randon Worcester, Esq.*

ACCESSIONS TO LIBRARY.—Among the Donations to the Library and Map-room since the 23rd November, 1863, were—'Wanderings in West Africa by a F.R.G.S.' 'Captain Speke's Discovery of the Source of the Nile.' 'Abeokuta and the Camaroons Mountain,' by Capt. R. F. Burton, F.R.G.S. 'Explorations in the Interior of the Labrador Peninsula,' by Professor H. Y. Hind, M.A., F.R.G.S. Continuations of Transactions of various Societies, &c. &c.

ACCESSIONS TO MAP-ROOM.—Continuation of Ordnance Maps and Admiralty Charts. Government Map of Bolivia, by Colonel J. Ondarza.

The first Paper read was entitled—

1. *Notes on the Island of Formosa.* By ROBERT SWINHOE, F.G.S. &c., H.M.'s Vice-Consul at Tai-Wan-Foo, on the island itself.

The island of Formosa is a *foo* or district of the Chinese province of Fokien, and is governed by a special Taou-Tai, who may memorialise the throne direct. Mr. Swinhoe doubts whether, owing to its bad anchorage and bad harbourage, Tai-Wan-Foo can ever become a centre of British trade, especially as there are known to be other and far more suitable ports. After marching overland to Tai-Wan-Foo, which is described as girt by a high battlemented wall,

six miles in extent, the Paper mentioned that the town was fast going to decay owing to the silting up of the river. The difficulty of navigating the coast of Formosa is great, and there are numerous wrecks of vessels that are compelled to run for a port, and are ignorant of several excellent harbours unsurveyed near the south end of the island. On the north-west coast is the Tam-suy River, which Mr. Swinhoe seems to think destined to become the British port of trade, there being 16 feet of water at high tide over the bar. The capital, Foo Chow, is not far distant, and there are several natural landmarks for facilitating navigation. The chief danger is from the freshets in the early summer, when the mountain-snows melt. The river in its upper course is formed by two chief branches, near one of which are sulphur mines. Among other improvements effected by native skill is their having, about 40 years since, diverted a large stream of water so as to make amends for the very bad water on the plains. There is a wooden aqueduct, 5 feet deep, 8 feet broad, and about 360 feet in length, which has been rendered water-tight with Chinese cement. Not far distant from this the territory of the aboriginal savages inhabiting the east coast is reached, where the division line is strongly marked by the Chinese side being denuded of trees, for the cultivation of the tea-plant, while the native side is covered with the usual forest vegetation. Great quantities of rain fall from November to May, making the climate comparatively cold, as is evidenced by a table drawn up with considerable care. This excess of moisture the author attributes to an oceanic stream known as the Kurosino, which departs at the south cape of Formosa, and extends along its east side and past the eastern shore of Japan even to the Kurile islands, and is supposed to run for some distance alongside of a much warmer stream coming up from the Philippines. From the bold appearance of the eastern, northern, and north-western coast, the coast-line is assumed to be receding if anything. Excellent lignite coal is procured at Coal Harbour, on the north-east corner. There is fair sound tea on the island, besides rice, sugar, jute, grass-cloth fibre, rice paper, rattans, barley, wheat (superior to that of the mainland), camphor, petroleum, and dyewoods, and a constantly increasing import, chiefly opium.

The CHAIRMAN, in returning the thanks of the Society to the author of the Paper, said it was an exceedingly interesting and important contribution to our knowledge of a very curious and little known island. To nine-tenths of ordinary readers the name of Formosa would convey no more distinct idea than to recall the most successful typical forgery of modern times—George Psalmanazar's forgery of the Formosan language at the end of the last century. In reality it was a most beautiful and interesting island. The Paper touched upon the most important points connected with the island, and seemed to go with fair depth into them. There were three important points. The first was the geo-

graphical position and relations of the island; the imperfect way in which it had been surveyed hitherto, and the very small knowledge which we possessed with reference to the coasts, and the way in which that had acted practically upon our commerce. The second point was the Chinese colonisation (which did not appear to be an official colonisation, but an encroachment of the Chinese upon the aborigines), the relations of that colony with the central government, and its commercial prospects. The third point was the aboriginal race itself. Fortunately, each of these points could be illustrated by gentlemen present; by Sir Harry Parkes on the subject of the Chinese relations, and by Admiral Collinson, to whom we were indebted for the whole of our geographical knowledge of the coast at the present moment. He believed the Society would join him in echoing the opinion of Mr. Swinhoe, that the Hydrographic Office should take into immediate and serious consideration the unsurveyed state of the coast of Formosa, and especially the fact that when an appeal was made to the Admiral in command at Hongkong, he expressed his inability to grant assistance. He thought some suggestion might advantageously be brought to bear upon the Admiralty, for no doubt Mr. Swinhoe was perfectly right in saying that the present state of our knowledge on the subject was detrimental to British commerce.

Admiral COLLINSON said he looked upon Formosa in some measure as a child of his own. In the course of his survey of the Pescadores he occasionally caught glimpses of the far-off island, and availed himself of the opportunity to fix the position of the principal mountains, to the highest of which—above 10,000 feet high—he gave the name of Mount Morrison; a name which he believed all those who were acquainted with our original connection with the Chinese would acknowledge ought to be perpetuated throughout all ages. After his survey of the Pescadores, on his return to Hongkong, Sir Thomas Cochrane desired him to go up the east side of Formosa. It was a *terra incognita*. He went round in a little brig, which he commanded, and coasted along in search of a harbour; but no harbour could be found until he came to Blackrock Bay. Up to a certain point they saw Chinese boats; but above that point they did not see a single boat afloat. They came upon a beautiful and highly-cultivated terrace-ground of high hills, which rose almost immediately from the beach, and which were very confined and narrow. In Blackrock Bay, which was merely a basaltic protuberance from the coast, when he was making his observations, one of his assistant surveyors went on shore to take up a position to make a survey of the place. In the course of his walk along the beach, two of the natives came out and visited him; and those were the only two they got into communication with during the whole of their visit. They appeared to be more of the Malay than of the Chinese race. The Chinese whom they met with afterwards in the upper part of the island reported that they were cannibals, and lived in trees,—in short, gave them the worst possible character. He found that Mr. Swinhoe gave them a very different character; and he must say, so far as he could judge from the nice appearance of the houses and the cultivated lands, that he should have very much liked to have got into communication with them. With reference to the probability of our entering into commercial relations with the people on the east side, he was inclined to think that there was no opening for British commerce there. The coast-line was nearly straight; there were no indentations, and the boulders on the shore were so large, that they gave some idea of the immense force of the ocean-current which carried them there. The only place where they attempted to land afterwards was Chekodai Bay. There was a large river there, and they took boats and tried to get in, but found it impossible. They then went up to Sau-o Bay, and they found the Chinese had come round the end of the island, and were in full possession; but over the remaining portions of the island, the

Chinese had no rule whatever. Generally speaking, Formosa might be said to be half the size of Ireland; and from the papers that were given to him, he judged that the dialect was undoubtedly Malayan. The great equatorial current set in on the island in a more wonderful manner than it did in any part of the Atlantic. Off Steep Island, he was carried away one day 91 miles against the wind by the current, and on the following day 103 miles against the wind. The whole force of the motion of water given by the equatorial movement through the Pacific Ocean reached the island of Manilla; it then flowed up along the island of Formosa, and from thence on to the coast of Japan; but its greatest strength was felt at Formosa and Japan. He had no hesitation in saying that the current would be found to run at the rate of 4½ to 5 miles an hour.

With respect to coal he might state, that finding no anchoring place but the little Sau-o Bay, they went round to Kelung Bay, and in pulling up the river they met with junks laden with coal. It was not known before that coal had been found in this part of the world. He was called to make an examination of it, and he went to the mines, which were about a mile and a quarter from the beach, and found them in a very primitive condition, worked simply by adits. They had no means of lifting, and the only seams which could be worked were those which could be worked from the surface. Whether a seam would be found by sinking was the province of the geologist rather than the nautical surveyor. He added that the island itself, at least the Chinese part of it, produced everything that was required in the shape of fruits and supplies, and that it might be called the granary of the Fokien provinces. The trade from Tai-Wan to Amoy and Loochoo Fu was very great indeed in rice, camphor, wood, and vegetables. The operations in the Gulf of Pecheli, and the opening of Japan to the commerce of the world, have interfered with the survey of Formosa, which was begun by him; but now that attention has been called to the island by the interesting paper by Mr. Swinhoe, it is to be hoped that some steps will be taken to complete the survey of its shores.

Sir Harry Parkes said he was afraid he should scarcely be able to speak upon all the points suggested by the Chairman, for it was rather a complicated and little known subject. Mr. Swinhoe had rendered good service in drawing attention to an island of immense extent, which was probably as much a *terra incognita* as any other unexplored part of the continent of Asia. It was less a *terra incognita* to Europeans some time ago than it was in the present day, for two centuries ago it was claimed as a European possession. The Dutch occupied it from 1622 to 1662. At that time, wishing to share with the Portuguese and the Spaniards in the trade of the East, they took possession of the Pescadores Islands as a check to Macao on one side, then held by the Portuguese, and on the other to the Philippine Islands, which belonged to the Spaniards. At the instance of the Chinese they relinquished the Pescadores Islands and established themselves on the island of Formosa, which up to that time had not been formally claimed by the Chinese, although separated from them by a channel only ninety-five miles in width. They themselves suggested that the Dutch should take possession of the island. At that time another power which had lately come into notice, the Japanese, were also located there; and whenever the Chinese and Japanese came in contact in those days, the Chinese went to the wall.

The Japanese followed a very different policy then from that which they pursued now. They were then the adventurers of the East, and they supplied mercenary troops to many Asiatic nations. They had flourishing colonies in the island of Formosa in the fifteenth and sixteenth centuries; and perhaps it was with the politic intention of setting one race against the other that the Chinese suggested to the Dutch to go there too. However, when the Dutch went there, they found not only the Japanese but also the Spaniards, and they

had to expel both before they became masters of the island. Masters of the island they scarcely continued to be: for, in consequence of the great civil troubles which set in throughout the whole of China in the middle of that century, swarms of Chinese flocked over into Formosa, against whom the Dutch were scarcely able to contend; until at last the famous piratical chief, Koxinga, who had been strong enough at one time to contend with the Tartars for the empire of the South, was driven from the country, and, crossing over to Formosa, he in turn expelled the Dutch from that island. Following the usual course of events, the pirate himself was eventually subjected to the Chinese Government; and, as late as 1682, the Chinese for the first time claimed jurisdiction over Formosa and incorporated it with their territories. It was now called a *Foo*, a territorial division of which there are no less than 260 in the whole of China. From that time Formosa ceased to be of much importance to the European; and even after our first treaty, though the coasts of China became accessible to us, yet notwithstanding the attractive name that it bears, Formosa was dreaded by sailors and navigators in consequence of the difficulties to which Admiral Collinson had alluded, and which rendered it a serious obstacle to the navigation of the coast of China. The South Cape was about the very worst point for a vessel to get on shore; for on that extreme point of the island there was a particular aboriginal tribe, numbering 200 or 300 individuals, who had an unfortunate passion for human heads, and it was a habit with them to murder any foreigner that came in their way. He had occasion to make the acquaintance of these people about twelve years ago, when one of our vessels was lost on that point, and he was sent over by Her Majesty's Government to make some inquiries respecting the missing crew. They succeeded in rescuing two of the men, who were in the hands of another tribe on the western point, the wreck having taken place on the eastern point of the said Cape. These two men had been bought by the Chinese at 6 dollars a head, and had been in captivity with them six months. The north point of the island had also proved as dangerous to us as the South Cape. Two English vessels, the *Nerbuddah* and the *Ann*, were both wrecked there, in consequence of the strong oceanic currents which prevailed on the coast. That was in the year 1842; and although the crews of those two vessels did not fall into the hands of savages, but into the hands of the Chinese proper, they were treated in no better way; for, out of a crew of 240 on board the *Nerbuddah* 2 only remained with their lives, and out of 57 which formed the crew of the *Ann*, 10 only remained; the others having been taken to the capital of Formosa, and, after being kept in captivity there, murdered in cold blood. This was the character which Formosa bore to us: wrecks in the north and south, judicial murders on the part of the Chinese, and bloody murders made by the aboriginal tribes. We had now turned over a new page in the history of our communications with Formosa. The opening of the island to British commerce was one of the last acts which that great British nobleman (Lord Elgin), whose loss we had now to deplore, had accomplished by the treaty which he made with the Chinese.

As to Formosa being a colony, certainly in one sense it was a colony of China, though a very great portion of it still belonged to the aboriginal tribes; and it was worthy of notice that in this land were found impinging upon each other the remnants of very distinct races of men. To take the three little islands of Lambay Botel, Tobago, and Samasima, all situated in the vicinity of South Cape, the first was inhabited by the Chinese, the second by the Malay, and the last by Japanese. In other parts of the island it was difficult to say by what race it was possessed: some of the tribes were believed to be of Malay origin, and some of Polynesian; while still further north Mr. Swinhoe would say that the natives belonged to the aboriginal races of China. The island was very interesting in an ethnological point of view, because we had those distinct traces of different races of people; and, bearing this circumstance in mind, he

was not surprised that Admiral Collinson did not find in the pictures of the aborigines presented to the meeting any very strong resemblance to his friends in Blackrock Bay, certainly, those he saw were not so good-looking or so attractive as those represented in the pictures who probably came from the northern part of the island. At present the island presented two different aspects, the western and the eastern one: the western one prosperous and commercial, the eastern one wild and still occupied by savage races; where, as Admiral Collinson stated, no native craft were to be seen, while the narrow channel which separated the island from China on its western side was always crowded with junks. A further change, however, had taken place in later years; junks were passing out of date, and now most of the local trade was carried on in foreign bottoms. There was a large trade at Tam-Suy, and there was also a trade at Ta-kow. Lord Elgin's treaty in throwing Formosa open for trade did not specify for any particular port. He stipulated that Taiwan, which is the name for the whole island, should be thrown open to commerce, and it was afterwards for our consuls to find out which spot was the best suited for commerce. Mr. Swinhoe was perfectly right in considering Taiwan as unsuitable. He had visited that place himself, and he could confirm what Mr. Swinhoe said, that it is unapproachable to vessels drawing any depth of water; and the event had proved that Ta-kow in the south, and Tam-Suy in the north, were ports at which considerable commerce could be carried on. Although the Chinese might argue we were not entitled to more than one port, they had been so liberal as to allow trade at both these ports since the treaty came into operation. From the large immigration from China, he had no doubt that we should see the aboriginal tribes dwindle down, and perhaps at no distant date become altogether extinct; and it might be expected, that in proportion as they gradually disappeared, so commerce would increase. The foreign trade at present bore a local character, that is, cargoes were not sent direct from England to Formosa, nor from Formosa direct to England, but were exchanged between the island and the coast of China and Hong-Kong. The trade was already of sufficient importance to employ a considerable amount of foreign tonnage for steamers, and would probably speedily realize all the expectations formed of it.

The Chairman said that the only point he would advert to was with reference to the aboriginal tribes. The knowledge they possessed of these people as regarded their languages and dialects was entirely derived from the original Dutch settlers. Their occupation of the land was from 1620 to 1660. They were acquainted with two slightly differing dialects, and a discovery made twenty years ago had put us in possession of a Dutch grammar and a Dutch dictionary of another Formosan speech: this last differing almost entirely from all those that we had known of before. The earlier specimens were the subject of a treatise in Klaproth's works. The whole of the languages had also been made the subject of a very able treatise by a distinguished German philologist, Dr. Gabelentz, who possessed a special knowledge of the Malayan and Polynesian dialects. He had compared those dialects together, and the result was that they possessed a general, but not a special, affinity with the Malayan or the Polynesian, rather than with the extreme type of the Oceanic race, which is usually considered of a different descent altogether. These Formosan dialects differed considerably between themselves, and amounted almost to two separate languages having general affinities. This was the only point to which he wished to call attention. He thought the physiological evidence ought to go hand in hand with the philological evidence, in order properly to determine the question of race.

The second Paper read was—

2. *A Journey from Nazareth to Bozrah of Moab.* By F. A. EATON, Esq., M.A.

The Author commenced by stating that a fortunate rencontre with the Rev. Mr. Zeller, long resident in the country, induced the party of which the writer was a member, to abandon the beaten track from Jerusalem to Nazareth and Damascus, and, starting eastward from Nazareth, to explore the Hauran, a country east of the Jordan, as far as Bozrah of Moab. Such a tour, it was found, occupied but a fortnight, and is entirely safe as well as deeply interesting if accompanied by any one personally acquainted with the Arab Druse Sheiks.

Leaving Nazareth, the party first made for the encampment of Agleeby Agha. The road led along the north-east edge of the Plain of Esdraelon (Scriptural Jezreel), which it reached just beneath Mount Tabor. Leaving the plain and crossing the Wady Bireh, the Wady es Shirar is reached, in whose course were perceived what seemed to be ruins of reservoirs and aqueducts. In four hours after starting began to ascend hills to west of Jordan, on reaching the summit of which there lay extended below a view from Lake Tiberias to the Dead Sea. The old bridge by which the river was crossed is traditionally said to mark the spot at which Jacob and Esau met. At sunset of first day reached the Agha's encampment. Thence passed the Yarmâk (ancient Hieromax), and entered the Tetrarchical provinces of Perœa and Gaulonitis (? Scriptural Bashan and Gilead). Scenery very wild. Visited second day the hot springs of Amatha, 110° Fahr.; country generally of volcanic formation. In vicinity of springs are remains of a Roman bath. Reached Umkeis at 1 P.M., where the escort ceased. A Bedouin of the Beni Sukhr was here adopted as guide, and led the travellers due east along a crest of a range separating the Sherîat-el-Mandhûr from the Wady el Arab. Soil rocky, but thickly covered with stone-oak. Before entering the open plain beyond, passed numerous towers in the gorge. Put up with Sheikh Abdallah, of the Beni Sukhr, who was very hospitable, and occupied a region much resembling an English village-landscape. Made next day for Mezarîb, a pilgrimage-station from Damascus, nearly due east, in order to get letters from the Governor of the Haurân, whose residence is here. The Wady Shelâleh, which was crossed the same day, and is described as flowing through a deep gorge, is the same as the Wady Warran, which forms the boundary north-west of the Djebel Ajlûn, and afterwards joining the Sherîat el Mandhûr. Course changed to due north; thence over a vast, level, treeless plain, covered with barley.

Reached the Haj (or pilgrimage-road) where it crosses the Wady Dâre by an old stone bridge which marks the western boundary of Haurân proper. Country singularly flat. Mezarîb is a large, old, square fortress, with a few huts within its *enceinte*, and is only garrisoned during the Haj to protect the Damascus pilgrims on their road to and from Mekka. The visit taking place just at the period of the Haj, there were no fewer than 1000 infantry—perhaps more than were required; but in reality these concentrations of troops have a political object. Next point was Der'a, whence they hoped to reach Bozrah. Still the same flat plains, and passed a ruined village with stone roofs, indicating they had arrived in the Haurân. Next crossed the Wady Dâu, near which is an old Roman bridge of five arches, the shape of the buttresses evidently showing that the stream now and for ages past has run into the Sherîat el Mandhûr. Der'a is supposed to mark the site of the capital of the Kings of Bashan, though Mr. Porter prefers Edh'ra, as more easily fortifiable. At this point had to get a native Arab to act as guide. Next day passed numerous villages and reached Bozrah, whence there is a Roman road to Darú, which their road struck to the south. At this point they turned northwards by Dâmâ, a fort amid hills, whence they followed the ordinary often-described road to Damascus.

The CHAIRMAN said the part of the Paper which was of special interest related to the visit to El-Lejah. El-Lejah was a country which had been unrecorded, and to the best of his knowledge untravelled. He did not know how far Burckhardt went into the country; but El-Lejah was a mountain fastness said to be of curious geological formation, and he hoped Mr. Eaton would favour them with a word or two upon the subject.

Mr. EATON said the party with which he travelled had very little opportunity of visiting El-Lejah. Their visit was confined to a day, or a day and a half. It was very hurried, and afforded them no opportunity of studying the architecture of the villages and towns, or to mark even the inscriptions. The spot was very remarkable, being a sort of island-rock, in the midst of a level plain; it began as abruptly as the rocks on the sea-shore. They did not go into that part which had been described by Mr. Porter, and also by Mr. Cyril Graham, where there are very deep ravines; that part lay more to the north and west of El-Lejah; whereas the part which they visited was to the east, where the surface consisted of ledges and occasionally rough rock. The point they started from was midway between Ormân and Damascus; and at Dâmâ they were hospitably received by the Arab sheikh. The people supplied them with coffee, and refreshment of every kind; with water for their horses, which, considering they had to fetch every drop of the water from a distance of six miles on mules, was a great proof of the hospitality which they showed. There were about seventy or eighty people in all; and they had taken up their quarters there as a refuge from the Turkish Government. It was an admirable natural fortress; for there was only one entrance to it, which would be easily defended by ten or twelve resolute men. The towns in El-Lejah were certainly very numerous, and the remains very interesting. In the town of Dâmâ they saw a great deal of that peculiar architecture which was common to the country. There were some great stone doors, 10 or 12 feet high, which turned on their sockets with the greatest ease. They were of immense weight, and were hung on the ball-and-socket principle, great solid stones being used as

lintels at the top and bottom. With regard to their extreme antiquity, there was reason to doubt it; but the doors themselves, and the materials out of which they were made, might be of very great antiquity. He had also great reason to doubt the antiquity of many of the houses at present standing. They were all of the same kind, one as like another as possible. As the ruins around the place were of Roman origin, he thought that the doors were not of greater antiquity. The last purpose to which they had been applied was a mosque; and in the mosque you could trace signs of a Roman temple; and in the material itself you could trace signs of a still older building. At one spot there was a specimen of Cyclopean architecture, consisting of large rough stones, put together with mortar: that was the only specimen they saw which seemed to be ante-Roman.

The particular part which the Chairman had referred to as being untravelled before was that which is arrived at immediately after crossing the Jordan. He understood that Lord Lindsay traversed the country near there, and he believed Dr. Beke had come across that route, but he thought that the particular part where he and his party experienced the hospitality of the Arab Sheikh, had never been visited by Europeans before, at least there was no public mention of it. As to the identification of cities with names in the Old Testament, he was not prepared to say how far that could be established. No doubt there were many villages which might be identified rather by resemblance of names than anything else, and at best the identity must be more or less fanciful. The tribes were said to be most unruly and most lawless, and travellers had been deterred from crossing the country in consequence of the character which they possessed. The natives would try to get out of travellers all that they could by legal means, and if they failed in that they would endeavour to rob them; but to those acquainted with the language there was every facility afforded for going into that part of the country if they were so disposed.

MR. CYRIL GRAHAM said there was only one point which he wished to bring before the meeting,—that that portion of Mr. Eaton's track through El-Lejah which coincided with the old Roman road was new to Europeans. Burckhardt, Dr. Wetstein, and himself, had examined the ruins further to the west; the substructures, and in many cases the buildings, of which, although subsequently embellished by Roman chisels, are undoubtedly of more ancient workmanship. The probable fact that the houses and other structures along the line of the Roman road rose up in consequence of its existence, would sufficiently account for the remark made by Mr. Eaton with reference to the comparatively recent origin of the remains, which he saw. Had time permitted, he (Mr. Graham) should have wished to say much more on the subject of the Paper which had just been read to them; but, considering the lateness of the hour, he felt himself bound to conclude by calling the attention of the meeting once more to the chief point in Mr. Eaton's journey—the tracing of the Roman road.

The meeting was then adjourned to 11th Jan., 1864.

Fourth Meeting, Monday Evening, January 11, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

ELECTIONS.—*The Rev. William Byrnes; David Chambers, Esq.; John Conder, Esq.; Angus A. Croll, Esq.; John Ferguson, Esq.; Lieut. Francis Fitzpatrick; Mons. C. T. Fortuné; Capt. William John Foster; Charles Grierson, Esq.; Benjamin Hardwick, Esq.; John Harvey, Esq.; Robert Henderson, Esq.; William Gunston Hovell, Esq.; Capt. George F. Lamert;*

Francis Richardson, Esq.; *E. J. Routh, Esq.*; *Grenville Ryder, Esq.*; *Mutu Coomaroo Swamy*; *Richard B. Wade, Esq.*

ACCESSIONS to LIBRARY.—'Marvels of Friar Jordanus,' by Colonel Henry Yule, C.B., F.R.G.S., presented by the Hakluyt Society. 'Buddhism in Tibet,' by Dr. Schlagintweit. 'Results of a Scientific Mission to India and High Asia, undertaken between the years 1855-58,' by Hermann, Adolphe, and Robert de Schlagintweit; Vol. iii. 'Wanderings in West Africa,' by a F.R.G.S. 'A Treatise on the Chronology of Siriadic Monuments,' by Hekekyan Bey, C.E. 'Journal of the Discovery of the Source of the Nile,' by Capt. J. H. Speke, F.R.G.S. 'Abeokuta and the Camaroons Mountain,' by Capt. R. F. Burton, F.R.G.S. 'Continuations of Transactions of various Societies, &c. &c.

ACCESSIONS to MAP-ROOM from DEC. 14th to DEC. 23rd.—South Polar Chart, by A. Petermann. Railway Map of proposed Metropolitan and Suburban lines (1864), by E. Stanford. Continuation of the Trigonometrical Survey of India, on 13 sheets. Part 3 of Schlagintweit's Atlas.

The first Paper read was—

1. *On the Non-Auriferous Character of the Rocks of West Australia.* By E. C. HARGREAVES. From a Despatch of His Excellency SIR GEORGE BOWEN, Governor of Queensland, to His Grace the DUKE OF NEWCASTLE, and communicated by the Colonial Office.

MR. HARGREAVES, who first practically opened out the gold-mines of Australia, having been sent to examine West Australia, with the view of determining if, as had been loosely asserted, it would prove to be auriferous, has, after various excursions into the interior, reported, that although rich in iron and copper ores, its rocks, so different from those of New South Wales and Victoria, render it essentially a non-auriferous region. Relying upon the absence of those rocks, which Sir Roderick Murchison (to whom he refers) had cited as the only true *matrices* of gold in veinstones, he shows that the statement that that geologist had ever suggested that West Australia would be found to be a gold-producing country, was entirely unfounded. Mr. Hargreaves had sent home numerous specimens of the rocks.

The PRESIDENT, in expressing the customary vote of thanks to the author of the Paper, said Mr. Hargreaves was the first practical explorer of the gold-mines of Australia. He had been sent out by Government to see if Western Australia would prove auriferous. He had stated what was certainly a fact, that he (the President) never had the remotest idea of suggesting that Western Australia would prove auriferous; on the contrary, he knew very well from what had been previously said of the structure of these rocks, and from the fossils and

organic remains which had been brought before them by Mr. Frank Gregory, who had explored the country, that there were none of those ancient slaty rocks in the regions examined, with quartz veins in them, in which gold could be discovered. He had great pleasure in informing them that Mr. Selwyn, the geological surveyor of the rich auriferous colony of Victoria, was present; a gentleman who had contributed more to the real advancement of their knowledge as to what was probably to be contained in a gold colony than any other individual: and he, therefore, hoped that Mr. Selwyn would state what he knew of the probability or improbability of gold being found in Western Australia.

Mr. SELWYN said on his way up to Victoria he was at Albany for a few days, when he took the opportunity of seeing as much of the surrounding country as he could. He quite agreed with Mr. Hargreaves that there were no indications there of auriferous country, unless we took certain granitic rocks as being occasionally indicators of the presence of the ore. Hitherto it had not been generally supposed that granitic rocks alone were indications of auriferous country. The rocks about Albany were entirely granitic, overlaid by some of the middle and upper tertiary rocks, consisting of ferruginous grits, quartz grits, and conglomerates, and a white rock, which Mr. Hargreaves referred to as chalky rock, consisting of silicate of alumina with quartz grains in it. He never found fossils in these rocks, but he had found rocks, similar in position and structure, in Victoria, resting sometimes on granite, sometimes on Silurian, and sometimes on the upper palæozoic. All the specimens brought home by Mr. Hargreaves were entirely granitic and tertiary rocks, with a few specimens of hornblendic rocks, which that gentleman spoke of as intersecting the granite. With regard to the auriferous character of these rocks, there was no doubt that these tertiary rocks, or the representatives of these tertiary rocks in Victoria, were the richest gold-bearing rocks. But then they had been derived from the slaty Silurian rocks, whereas in Western Australia they had been derived almost entirely from the granitic rocks. Therefore he thought Mr. Hargreaves was right in his conclusion that in that district auriferous tracts were not likely to be found. Some of the specimens, in which Mr. Hargreaves found indications of copper, he thought were analogous to rocks of central South Australia, from Mount Serle to Mount Remarkable, in which the great copper-mines of South Australia occur. He thought, however, we ought hardly to take an examination of the coast-line as a proof that the whole of Western Australia was not auriferous, because if we looked at the enormous expanse of Western Australia, it would be seen that Mr. Hargreaves had traversed it but to a very limited extent; and it was not improbable that there might be regions in which the Silurian rocks might re-appear. If the coast-line of the province of Victoria, for example, were selected for examination, districts might be found fifty miles from the coast where there would be no auriferous deposits.

The PRESIDENT observed that other travellers had penetrated a considerable distance into the interior of Western Australia, and they had found little else but granite.

Mr. SELWYN added he had travelled over the whole of the settled districts of South Australia, from Cape Jervis to Mount Serle, and there were one or two districts where he thought it possible that the rocks were Silurian, and that gold might be found. But these rocks were only of limited extent: the great mass of the rocks were of a newer formation—Devonian, or something even newer than that. There was a large quantity of quartz, but the quartz did not appear to be auriferous. The characteristic of the South Australian rocks was copper, which was rarely found in the rocks in Victoria, associated with gold. Respecting the occurrence of gold in granite, he might mention that he had received a letter from one of his colleagues in Australia, stating that a new locality in Victoria had been discovered, at Wood's Point, in which the quartz

reefs were turning out extraordinarily rich, far surpassing anything hitherto known. The Surveyor-General stated that the reefs were in granite and did not continue into the adjacent schistose rocks, and were horizontal. The discovery was made by eight miners, who in eighteen months had realized between forty and fifty thousand pounds each.

Mr. CRAWFURD asked if indications of tin had been found in Western Australia.

Mr. SELWYN replied, he had not seen any. Before he left, the Western Australian Government forwarded him some specimens of granite with mineral in it, which he found to be sulphide of molybdenum.

MAJOR SANFORD took exception to the conclusions of Mr. Hargreaves, and was about to enter into the question at some length, when the President begged him to postpone the discussion to a future occasion, in consideration of the importance attached to the next Paper which had to be read, "On the Glaciers of the Mustakh Range," and stated that an early opportunity would be afforded for considering the points mooted as to the capabilities of West Australia.

The second Paper read was—

2. *The Glaciers of the Mustakh Range (Trans-Indus).* By Captain H. H. GODWIN-AUSTEN, Assistant on the Great Trigonometrical Survey of India.

STARTING from Iskardo 5th August, 1860, the survey of this region may be considered as divided into two grand divisions, separated by a line drawn through Iskardo, Shigar, and a point on the great range of the Kuen-Lun, about 40 miles west of the Mustakh Pass, leading into Little Bucharia. This Mustakh Pass is a newly-discovered pass, described as being capable of being so far improved as to be practicable for ponies, though the height is 18,400 feet. It is separated to the eastward from the renowned Kara-Korum Pass by the magnificent range running eastward from the Kara-Korum Peak, as yet unnamed, the second highest peak in the Himalayahs or the world, which rises about north-west to an elevation of 28,265 feet. Its approximate position is 35° 53′ N., 76° 35′ E.,* that of Mustakh being 35° 49′ N., 76° 14′ E.

The first portion of the survey lay up the Hushi Valley, a tributary of the Nubra, which name the author applies to the whole length of the North fork of the Indus (in lieu of its customary designation of Shah-Yok), instead of confining it as hitherto to the tributary branch of that name which falls in a little above the junction of the Hushi Valley. At the head of the valley he encountered three glaciers, the easternmost of which he traced into the recesses of the immense mass of the Masherbrum (35° 38′ N., 76° 20′ E.), 25,600 feet high. After surveying these in regular order, he

* The positions assigned in this abstract are only approximative as derived from the Map.—ED.

returned to the junction of the Hushi with the Nubra, and thence westward 24 miles down the river to Kapaloo, 35° 10′ N., 76° 24′ E., which is itself about the same distance above Iskardo, whither he returned after twenty three days' arduous labour, and which was the head-quarters of the survey.

Captain Godwin-Austen next proceeded to determine a position for the triangulations to the south of Iskardo, the panorama from which, embracing nearly the whole extent of the peaks from Masherbrum westward, was magnificent.

That season being finished, it was necessary to postpone any further survey till 7th July, 1861, when a survey was made to the south-west of Iskardo as far as the Pass of Borijee. Thence he returned to head-quarters, and at once started for the village of Kuardo, having now completed the examination of the very remarkable basin of Iskardo, which bears evident traces of having been once an immense lake. Here the weather proved unpropitious, as it was throughout the season, but with occasional bursts of clear weather, when the views from the peak over Kuardo from south round to north-east—from the mountains bounding the table-land of Deosia over Kashmere round to the great Kara-Korum Peak—were grand beyond description. Shigar was finally reached 18th July.

On the 28th he proceeded to explore the Valley of the Bialdoh, which, rising in the distant glaciers of Punmah and the ridge bounding the great Baltoro glacier on the west, receives large numbers of glacial tributaries (the ice-cold water of which had frequently to be forded), and flows westward to a point where it receives the Basha, a similar glacier stream from the north, when the united streams flow in a S.S.E. direction, and take the name of the Shigar. Not long after setting foot in the valley, the party, while at camp, were nearly being swept away by the bursting of a glacier-lake, which rolled along huge blocks of rock and torrents of black mud,—a phenomenon which is called by the natives "Shwā," and is of by no means infrequent occurrence, corresponding, in fact, to what is known to Alpine travellers as a *débacle*.

After exploring the Pass beneath the peak of Mango Guror, Captain Godwin-Austen held eastward to the little hamlet of Askoleh, where the Bialdoh is crossed by a rope-bridge of 270 feet span, very safe, but very lax, and proportionately difficult. Thence over the glacier of Biafo, whence he held northward to the station known as Isok, 35° 47′ N., 76° 2′ E., the very centre of a ganglion of glaciers, streaming down from the west flank of the Masherbrum. In the very heart of this bleak region they encountered four Balti emigrants, returning

from Yarkand to pay a visit to their native vales, who gave a grim account of their sufferings crossing the Kuen-Lun.

Arrived at a point where four glaciers meet, he prosecuted his search up that to the north-west, known as Nobundi-Sobundi; returning from which, after a constant succession of ascents, including frequent bivouacs at great elevations, or on the ice, he reached the Mustakh Pass, which he ascended to within 500 feet of the top, when the weather compelled him to return. From this point he retraced his steps by the opposite side of the glaciers previously explored, to the junction of the Bialdoh with the Biafo, which is the outlet for the melted snow and ice contributed by the great glacier of Biafo, extending north-west 35 miles at a stretch to the ridge bounding the valley of Nagayr. There is also another glacier-feeder from the N.N.E., which was first examined; over which, immediately below the Masherbrum—which though unseen, owing to clouds, towered immediately overhead—lay the old Pass to Yarkand, discontinued on account of the great increase of late years of snow and ice, and the abandonment of which led to the Mustakh Pass being made use of. Examples of such changes within the memory of living men are quite common, and the Paper instanced two or three such.

Still penetrating into the heart of the glacier, the author began to look out for the great Kara-Korum Peak already mentioned, and not seeing it, began to fear that it lay beyond the watershed dividing the Upper Indus from Thibet. But a sudden turn, at one part of his route, revealed the giant peak towering in all its glory, an almost perfect cone, rising 14,000 feet above the point of view, and almost exactly on the line of demarcation. The weather now changed once more, and became so bad that it was impossible to push up the Biafo glacier as intended, and so pass over into Nagayr, whence he proposed to return by the pass of Nushik, 36° 13′ N., 75° 13′ E. Accordingly the party descended the Bialdoh, passing the Holy Rock of Shandseo Pîr, over the village of Dasso, and so reached Tandoro on the Shigar.

From this point preparations were made for a short exploration of the other chief stream of these regions, the Basha. Leaving Tandoro 29th August, Chutrum was reached on the second day, whence the road (the travelling on which is excellent) lies up a singularly picturesque valley, that of the Basha, running first north, then west, as far as Arindoh (35° 52′ N., 75° 23′ E.). At Doko, about halfway up the valley, a magnificent view was obtained over the great glacier feeding the river, and to the Haramosh Mountains, (35° 50′ N., 74° 57′ E.) to the west. After a ten days' excursion on the glacier, on which their night's bivouac was made, the exploring

party passed up the Kerò Loombah (Loombah means ravine in Thibetan; La, a pass; and Ganse, a glacier), where were numerous traces of bears, though none were seen. Beyond this the Kerò glacier, which had now been reached, split into two; following up the main branch of which, two "kennels" for the use of travellers were passed, and the pass of Nushik came into view, an ice-bed gently sloping upwards between perpendicular cliffs to an elevation of 19,000 feet. This glacier extends unbroken down the other side as far as Hisper in Nagayr, 36° 9′ N., 75° 5′ E. This finished the north watershed of the Basha branch of the Shigar. Returning, ineffectual attempts were made to push to the westward, and ultimately the party returned to Arindoh, having completed an accurate survey of the whole Upper Shigar, the most striking features of which are the great glacier of Biafo, and the ever present proof that the glaciers are everywhere and rapidly encroaching on the soil fitted for agriculture; so that, in some places, land which formerly yielded two crops can now only bear one, owing to the altered temperature.

From Arindoh, the expedition now made for the Tormik, over the Ganto La (Pass), and reached Hŭrimŭl, whence the upper portion of the valley was surveyed, in which a hot spring (104° F.) was found. Captain Godwin-Austen now descended to the confluence of the Tormik with the Indus, which was crossed by the rope-bridge of Mondi, 35° 35′ N., 75° 15′ E., whence he proceeded up the river to Iskardo, passing on the way a terrific pass cut along the face of a precipice overhanging the river, hundreds of feet below. At Shigar-Thang, 35° 18′ N., 75° 23′ E., the surveyor turned south-west to the Alumpi Pass, on which numerous skeletons were found, attesting the fate of a large party lost in the snow some years before. From this point, the season being broken and the survey ended, they pushed on into Cashmere.

The PRESIDENT, after expressing the thanks of the Society to Captain Godwin-Austen, said he was delighted that this communication should have come from the son of a man who had done more than any Englishman he knew to connect physical geography with ancient geological phenomena—Mr. Godwin-Austen; and as that gentleman was present, he congratulated him upon having a son to produce such a Paper. They were fortunate in having a gentleman present who had carefully explored these high regions,—that distinguished geologist and naturalist, Dr. Falconer, who was so long at the head of the Botanical Gardens of Calcutta. They would be delighted to hear from him a confirmation of the Paper. The great value of the Paper was that Captain Godwin-Austen, as one of the Trignometrical Survey of India, had actually fixed the delimitation of these physical features in geography. The Paper might have been read before the Geological Society; and he would only call attention to one fact contained in it, that all the glaciers which the Alpine Club were in the habit of ascending were mere pigmies in comparison with these glaciers of the Himalayahs. The very

tributaries to these glaciers were eight or ten miles long, while the great glacier of Mustakh, to which their attention had been called, was thirty-six miles long in the part of it which was surveyed.

DR. FALCONER, after describing the progress of the Trigonometrical Survey in India, next drew attention to the glacier system of the Himalayahs. All the best observers—Dr. Thomson, Jacquemont, and others—had been of opinion that there was but one great system of mountains. There was no such thing as any break of mountain-range, or any distinct mountain-chains. There were great rivers which cut them across, rivers like the Indus, the Sutlej, and some feeders of the Ganges; but, regarded in one grand aspect, they constituted a series or mass of mountains with ravines and valleys intervening. Viewed, then, in this light, there were two great ranges which culminated to especially great altitudes, and which bounded the Indus river to the south and the north; and this being one of the points where the Himalayan chain attained its greatest elevation, there the glacial phenomena were developed in most grandeur and upon the loftiest scale. The paper referred to that part of the range which bounded the valley of the Indus upon the north, the Kara-Korum or Mooz-tagh or the "Icy Range of mountains," and the other great series of them were the mountains which bounded the Indus upon the south. Although the glaciers upon the Shigar valley and in the valley of Bialdoh, which he himself had visited in 1838, were of such surpassing grandeur and importance, as had been mentioned by Sir Roderick Murchison, it was but fair to other observers to say that upon the northern side there were glaciers which, so far as description went, were equally grand, if not grander. Those to which he should especially refer were the glaciers at the head of the Zanscar river, the sublime features of which had been so well described by Dr. Thomson. Mr. J. Arrowsmith, from his labours on the maps of Hugel, Thomson, and other explorers, was well acquainted with the mountain-ridge to which he referred and the glaciers which arose from it. There was the river called the Chenab, and a mountain-range which stretched across between the Indus and the Chenab. The pass of the dividing ridge at this point was 18,000 feet above the level of the sea; and upon either side, but more especially upon the north, at the heads of the Zanscar river, were some of the grandest glacier phenomena which were to be seen in any part of the world. There were glaciers extending from a very great distance, which attained enormous width—confluent into a sea of ice—and which, until the description that had been given by Captain Godwin-Austen, had been unrivalled by any glacial phenomena with which they were acquainted, except the glacial formations in the Arctic regions, such as the Humboldt glacier in Smith's Sound, described by Dr. Kane.

With regard to the glaciers upon the north, the Indus ran through a long depressed valley westward, receiving from the north three great branches; the first branch, called Shayúk, from the Kara-Korum, next the Nubra river, and also the Shigar, which was the especial object of Captain Godwin-Austen's communication. Now, the Shigar valley was the third of importance of all the affluents of the Indus, and was bounded by mountains of a great elevation. Some of them which had been measured by Major Montgomery attained a very great elevation; one a height of 28,000 feet above the level of the sea. This naturally entailed a prodigious amount of condensation of the moisture of the atmosphere, and led to a very heavy fall of snow, the result of which was seen in these glacial phenomena. Twenty-seven years ago he had been up to Arindoh, the extreme termination of the western or Basha branch, and from that point by a détour he got across upon the other valley by the Scora-là Pass to the glacier of the Bialdoh river, where he saw all the phenomena which had been described by Captain Godwin-Austen.

Having premised this much with regard to special details, there were one

or two points which he was desirous to bring before them. One was, What were the peculiar characteristics of the Himalayahs, as well as of all tropical mountains, as compared with our European mountain-chains? There was one characteristic of the Himalayan chain so remarkable that he should take the liberty of explaining it at some length. He presumed that most of his audience had visited either the northern or southern side of the Alps; and those who had been in the plains of Italy, along the valley of the Po, were well acquainted with the numerous lakes which jutted out from the Alps into the plain of Italy. Commencing on the west they had got the Lago d' Orta, the Lago Maggiore, the Lago Lugano, the Lago di Como, the Lago d' Iseo, and the Lago di Garda; in fact, wherever a great valley projected itself from the chain of the Alps at right angles to the strike of the chain, there they had with a single exception uniformly a great lake. Regarding these lakes in a general way, without reference to detailed phenomena, they found one thing which was constant about them—"they were invariably narrow, and some forty or fifty miles long, as notably in the case of Maggiore, Como, and Garda." The next remarkable thing about them was that they invariably radiated out at right angles to the strike of the great chain of the Alps. The Alps made a curve from the Pennine round to the Rhœtian Alps. They would also observe that those lakes were severally fed by a considerable river which proceeded from a high ridge of the chain, and which was thrown forward into the plains of the valley of the Po.

If they would consider the Himalayahs, or any tropical range of mountains whatever, in a similar way, they would find that those lake-phenomena were invariably wanting. Great rivers like the Indus, the Chenab, the Sutlej, and the Ganges, which passed through the Himalayan Mountains and debouched into the plains of India, had got valleys of infinitely greater importance than the valleys either to the north or south of the Alps; but they were never connected with a lake.

The question then arose, What was the physical reason of this great difference between the tropical mountains and those of temperate Europe? Nearly thirty years ago, he was for ten or twelve years rambling about the Himalayahs along a stretch of 800 miles, and he used to open a map before him, and try to make out the comparative features of European and Eastern mountains. He looked to the numerous lakes to the north and south of the Alps; and he would put the map of India alongside, where the same kind of rivers were debouching into the plains, but where there was an utter absence of lakes in connexion with them; and he used to puzzle himself in trying to discover a physical explanation of this difference. He was perfectly satisfied there must be some secondary conditions which were not common to the two, and he determined that, on his return to Europe, he should make them the subject of special research; for at that time the glacial investigations of Charpentier and Agazir in the Alps were unknown to a solitary wanderer in the Himalayahs. That intention he had carried out, by repeated visits to the Italian valleys of the Alps. There was the same kind of elevation above the level of the sea, the same kind of valleys, the same kind of fissures intersecting the great ridges,—What then was the explanation? This he would endeavour to indicate. About two years ago, as his friend Sir Roderick Murchison was aware, a Paper was brought before the Geological Society of London, by Professor Ramsay, which excited a great deal of attention, and gave rise to a very animated discussion. The theory of the Paper was that, as a rule, lakes in all the temperate and cold regions of the world were the product of glacial excavation; that is to say, that wherever a glacier descended from a high ridge of mountains into a plain, it ploughed its way down into the solid rocks and carved out a great lake. This was the theory or rather hypothesis which Professor Ramsay put forward, to explain the lakes which were so abundant in the

solution which science could suggest was that, within a comparatively modern period, a period closely trenching upon the time when man made his appearance upon the face of the earth, the Himalayahs had been thrown up by an increment closely approaching 8000 or 10,000 feet.

The PRESIDENT said he was sure that every person present had been delighted with the philosophical observations which had fallen from Dr. Falconer; and it would be very gratifying to him if so great a traveller and so eminent a naturalist would become a Fellow of the Royal Geographical Society.

Mr. GODWIN-AUSTEN, having been called upon by the Chairman, said, since the Paper was written, his son had visited other districts. The survey was now being carried on from the Kara-Korum Pass into Thibet, and the work of last year had been carried round the Pangong lake. The district was the most remarkable of any that he had yet seen in the great Himalayan range. It was out of the British dominions; and the survey was being carried out by the Government of India solely in the interests of geographical science. This particular work was undertaken in consequence of the reports of travellers that there were to be found in this district some of the largest glaciers in the world. In the Report to the Indian Government* it was stated that the survey was undertaken simply to verify that point, and it had turned out to be the case. He did not know whether all persons present had any conception of the enormous dimensions of this Himalayan glacier system. It would enable them to form some idea of the magnitude of these glaciers if he stated that, assuming Hampstead and Highgate to be high mountains, the glaciers would extend as far south as Tunbridge in one direction, and two-thirds of the way to Cambridge in the other. Or, if they were to start from Neufchâtel, they might cross the Oberland and Monte Rosa, down to Ivrea, and even then they would be within the limits of this glacier system of the Himalayahs.

The meeting was then adjourned to 25th January.

Fifth Meeting, January 25, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Lieut. A. G. Clark (late I. N.); Hugh Thurburn; and John Conder, Esqs.*

ELECTIONS.—*Lord Richard Cavendish; F. A. Eaton; George Green; John Kempster; Simon Keir; Edward Mackeson; Rev. J. W. Tottenham; Hugh Thurburn.*

ACCESSIONS TO LIBRARY.—'Explorations in the Interior of the Labrador Peninsula,' by Professor H. Y. Hind, F.R.G.S. Continuation of Transactions (various), &c.

ACCESSIONS TO THE MAP-ROOM since 23rd December, 1863.—Philip's Atlas, Part 18—the Consulting Index. Railway Map of London, by E. Stanford. Two Geological Maps of Grossherzogthum Hessen-Darmstadt. Continuation of the Admiralty Charts and Ordnance Maps.

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* By Major-General Sir A. S. Waugh, at that time (1860) the Surveyor-General of India.

EXHIBITIONS.—Sketches taken on the Moisie River, Labrador, by Professor H. Y. Hind. Profile section of the bed of the Moisie. Selection of Indian Pipes, to illustrate the ethnographic and philological analogies of the various main races of the Red Man, and their respective subdivisions.

The PRESIDENT then announced the names of the gentlemen who had that day been selected by the Council for election as Honorary Corresponding Fellows, with a brief abstract of the distinguished services to the cause of geographical science which had induced the Council of the Society to nominate them.

NAMES of distinguished Foreigners who have been added by the Council to the list of HONORARY CORRESPONDING MEMBERS of the ROYAL GEOGRAPHICAL SOCIETY.

Barth, Dr. Heinrich (Berlin), Gold Medallist of the Royal Geographical Society, author of many publications on African geography. President of the Berlin Geographical Society. Now engaged in the issue of an elaborate treatise on the languages of Northern Africa.

Dufour, General (Berne), Director of the Topographical Department of Switzerland. The faithful maps of that country, issued under his supervision, have earned the grateful acknowledgments of English travellers of widely different vocations.

Khanikoff, M. (Russia). Eminent as an Asiatic traveller and geographer; author of a well-known work on Bokhara.

Linant, Pasha (Alexandria). The earliest explorer of the White Nile, and otherwise distinguished as an Egyptian geographer.

Petermann, Dr. Augustus (Gotha). Originator and editor of the well-known 'Mittheilungen,' in which capacity he has contributed, more than any other person in Germany, to disseminate a wide knowledge of sound geography.

Raimondy, Don Antonio (Lima). Author of a work on the Amazonian provinces of Peru. Now engaged in exploring the unknown parts of that Republic.

Scherzer, Dr. Karl, Ritter von (Vienna). Editor of the 'Voyage of the *Novara*.' Eminent as an American geographer and ethnologist.

Berbrugger, M. M. (Algiers). Author of 'Algérie historique et monumentale;' editor of the 'Revue Africaine,' Algiers.

Dana, Professor J. D. (New Haven, Connecticut). Distinguished as a physical geographer and naturalist. Author of various Memoirs, including Essays on the Origin of the Great Features of the Earth.

Duveyrier, Henri (Paris). Known by his extensive travels in the Sahara, notices of which have appeared from time to time in the 'Transactions of the French Geographical Society.'

Faidherbe, le Colonel, Governor of the *Senegal* (West Africa). Eminent for his successful encouragement of geographical enterprise in the French Colony of the Senegal.

Figanière, Command. Jorgé César (Foreign Office, Lisbon). Distinguished for his researches into the ancient geographical records of the Portuguese empire.

Forchhammer, Professor (Kiel). Professor in the University of Kiel. Author of Memoirs on Scandinavian Geography and on Greece, and on the Troad.

Leal, José da Silva Mendes (Minister of the Colonies, Lisbon). A statesman interested and actively engaged in the development of the Portuguese possessions in Africa.

Scheda, Herr von (Vienna). Director of the Imperial Institute of Military Geography.

Tschudi, Herr von (Vienna). Traveller, naturalist, and writer on Peru. Author of a well-known work on Switzerland.

Decken, Baron Carl von der (Hanover). Explorer of Kilima-Njaro, in E. Africa; to which region he is preparing a new expedition, at great cost, and wholly at his own expense.

Fremont, General (New York). Explorer in the Rocky Mountains, and Gold Medallist of the Royal Geographical Society.

The PRESIDENT then said that, before proceeding to the business of the evening, he felt it his duty to say a word or two upon the most distressing intelligence which had appeared in some of the papers regarding the fate of his very eminent, dear, and distinguished friend, Dr. Livingstone. If he had felt persuaded that Dr. Livingstone had lost his life, he should have been incapacitated by his deep affection for him, from alluding to the subject at all. He had good hopes that he had only been wounded, and that the Makololo who accompanied him had alone perished. In the 'South African Advertiser' there was a letter from Dr. Livingstone in reference to his recall. Being still anxious, like a good geographer, to do something more before he left the country, he determined to visit Lake Nyassa, and terminate his discoveries with respect to the sources of the great Shiré river, upon which he had so long been employed. He started, it appeared, without any of his own countrymen, taking with him only five of the Makololo nation, people whom he knew to be particularly attached to himself, and on whom he could depend. He alluded to this in the letter which he wrote to a friend at the Cape:—"I take Makololo with me, the only reliable fellows in the country;" and, he adds, "If we could have stopped the enormous slave-trade of Lake Nyassa, I would gladly have spent all the money I ever received." These were the sentiments that this noble fellow expressed when about to start upon this expedition. With regard to the catastrophe itself, he gathered from a letter from Simon's Bay that the *Ariel* had brought intelligence that Dr. Livingstone had received some injury in the foot when landing on the shores of Lake Nyassa. He hoped this was really the extent of the disaster; for, though the Makololo, who were strangers and hated by the natives of that region, might have been slain, Livingstone, who was beloved by all, was probably spared.

The first Paper read was—

Narrative of an Exploring Expedition into the Interior of Western Australia, Eastward of the District of York, Commanded by HENRY MAXWELL LEFROY, Esq. (Superintendent of Convicts), from May to July, 1863.

THE object of the expedition was to discover new districts suitable for sheep-farming, the outmost station at present being Smith's, about three days' journey only east of York. It was found that primeval granite was the chief formation for full 6° east of York, occasionally fissured but nowhere upheaved, except towards the western face of Darling Range. This is covered in certain spots by sedimentary rocks, nowhere more than 100 feet in thickness. The general effect of the scenery consequent upon the (meridional) facture mentioned above, is imposing, but their agricultural fertility is slight. From the Avon eastward to the limit of the drainage basin (118° 30′ E.) the country is flat, with abundance of wide shallow valleys. Leaving Smith's Station the country improves, the grass being good, with a sprinkling of trees resembling the mimosa, and a species of dwarf pine. Animal life is so scarce, that in 155 miles the party only saw four kangaroos, three emus, and no natives; though they one day came upon a recent track of a solitary individual. On the numerous lakes passed, there were noticed only four ducks, and neither cockatoos, turkeys, nor parrots. As they proceeded inland they came upon a chain of lakes bordered by samphire plains, at present 10 feet above the level of the stream, but probably less in the rainy season. Beyond this a rise of 5 feet in the lake waters would probably inundate a tract five miles wide. A careful examination led to the conclusion that there had been no overflow for many years, possibly for centuries, and that for several winters the average depth of the water had not reached 2 feet. Some fine cypresses were visible here. If grazed closely by sheep, the young grass would be of the most nutritious quality, the depth of the rich alluvial soil being 15 feet, as evidenced by numerous natural surface-drains. Little or no wind was experienced throughout.

The PRESIDENT said the Paper had been curtailed with reference to the geological phenomena of the region in question, which, as a geologist, he almost regretted. The idea of the author seemed to be, that there was a mass of granite here, the nucleus, as it were, of the original formation of the globe, which had remained undisturbed for many ages. It was a phenomenon which ought to be discussed in the Geological Society. The Paper was one of merit, written by a gentleman who had passed a period of twenty years in the colony, and who had no doubt made accurate observations upon the country. He had also brought forward clear proofs that there were in this

region large tracts of valuable alluvial land, which might be cultivated with great profit to the colony.

General LEFROY said, when his brother told us, with the experience of a settler of more than twenty years in West Australia, that the region he had been the first to explore contained an extent of valuable agricultural and sheep-farming country unequalled in the colony, it opened up some good news to those who were well-disposed towards that unfortunate colony. His brother dwelt very strongly upon this point, particularly upon the extraordinary richness of the granite in those felspars which were the element of agricultural fertility, wherever they were found. There was also great interest in the view which he announced as to the possibility of our having in this portion of the Australian continent access to the primeval nucleus of our planet, the primeval granite over which there has never been any great depth of sedimentary deposit, which has never been disturbed by fissures or disrupted by intrusive rocks, and which is nearly in the condition in which our globe would have been originally if it had been a granite sphere cooling gradually. Mr. Lefroy was deeply impressed with the evidence presented in many directions of the extreme antiquity of this region. We find in the vegetation of Australia the living representatives of the most ancient vegetation of the globe. It is the same with a portion of its animal kingdom, and also with its representatives of the human race. For example, the only native Australians met with by the expedition was one female and her child, both in a state of absolute nudity. The extraordinary sparseness of the human race, and the very peculiar conditions under which they exist there, point to a degree of primitive simplicity and antiquity which he thought would be found of considerable interest hereafter. Houseless through three-quarters of the year, perfectly naked in all weathers, and distributed over the country at a rate probably not exceeding one family to forty or fifty square miles, it is difficult to conceive of human beings in a deeper state of degradation. "Man," says Mr. Lefroy, in one of his letters, "is here only another species of the mammalian fauna who has the singular property of being both carnivorous and graminivorous, and is as unconscious of traditions, laws, moral principles, and social institutions as the scanty kangaroos or emus who share the country with him." The language of this female was unintelligible to the native from York who accompanied the party. No kindness could overcome her terror, or induce her to accept what they offered her. Having no personal acquaintance with Western Australia, General Lefroy could not venture to say how far his brother's anticipations of a beneficial change in the vegetation of those great plains, to be brought about by cattle-feeding, would be realized; but it would appear that a moderate expenditure of labour would remove the curse of aridity by saving the abundant water which is sent by heaven, but, in the singular conformation of the surface, finds no valleys to drain it off, no basins to collect it, and no depth of soil into which it can subside. It seems to evaporate with the minimum of benefit to the earth. The expedition had suffered much, both from the want of this necessary and from the muddiness of what they could collect. On one occasion they were 36 hours without it; but, notwithstanding this, he was glad to say they lost only two or three horses, and returned themselves all the better for their hardships.

The next two Papers related to New Zealand, and were therefore read consecutively. They were respectively entitled—

(*a.*) *Expedition to the West Coast of Middle Island, New Zealand (Otago Province)*. By JAMES HECTOR, M.D., &c., and

(*b.*) *Survey of the Lake Districts of the Province of Otago.* By JAMES M'KERROW, Esq., District Surveyor.

DR. HECTOR'S party were absent from January to March, during which period, after proceeding up the valley of the Waitaki and thence into that of the Ahuriri, they traversed the magnificent plains across which lies the boundary-line between Otago and Canterbury, and gained the river Clutha. This they followed up to the Wanuka Lake, whence they had to push forward on lightly-packed horses. They now followed the Matuki-tuki River, where the head-quarters were fixed for farther exploration westwards. As they advanced they began to see the ice-pinnacles of Mount Aspiring, a beautiful and very abrupt cone, which dominates over the other lofty ranges of the region. Hereabouts a noble forest of beech covered the hillsides to a height of 2000 feet, the scenery being magnificent, with noble cascades leaping several hundred feet down the sheer face of the precipice (in one instance 1200 feet), the water being dispersed in spray ere it reaches the valley below. Farther on, amid a profusion of white-blossomed willow-trees, the river enters a deep gorge, on emerging from which a fine view is obtained of the glaciers that descend from the flanks of Mount Aspiring. At this point it was found impossible to take the horses further, which were therefore left at a secure point, while the party advanced on foot—a most arduous march over huge boulders, especially as each man had to carry a light pack of 50 lbs., afterwards reduced to 25 lbs. At length, after leaving the wooded belt, which here reaches an elevation of 3500 feet, they gained the source of the Matuki-tuki, in two enormous old glaciers. At this point, close to the north-west boundary-line of Canterbury Province, they ascended a saddle-hill, 5500 feet high, overlooking a grand glacier in the valley below, 500 feet thick, and named after Dr. Haast, while immense masses of pinnacled mountains filled the valley below. The descent on the farther side was so precipitous as to be exceedingly dangerous, and after crossing the foot of Haast's glacier they struck a river named after the same eminent geologist, which passes through numerous gloomy gorges. Here they climbed another peak (elevation not stated), whence they had a view of the sea, 15 miles distant. To the left of the landscape was the glacier of Mount Richards, in which the Jackson rises. They now attempted to push on, and in doing so discovered track-marks, at first supposed to be made by Maories, but which Dr. Hector, on minute examination, pronounced to be those of birds, either extinct or exceedingly rare (possibly Moas). These never entered the woods, the magnificence of which in this region must be seen to be appreciated, even the *fuchsia* and *tutu*

growing into trees with trunks 2 feet in diameter. An ineffectual attempt was now made to descend the Jackson; but the rain proved an insurmountable hindrance, and they had to stop within eight miles of the sea. In returning they suffered severely from famine, but ultimately reached their various *caches* without mishap.

[The foregoing is the latest intelligence received; but Dr. Hector has gone round in a schooner to the west coast, whence he is said to have sailed up a stream into a large lake, within easy distance of Lake Wakatipi. But no report of this has yet reached England.*]

(*b.*) This was a survey of 4883 square miles in the province of Otago; the general result of which was to establish, as the most striking physical feature of the country, the very sudden differences of elevation which diversify its surface, the gorges or valleys being generally filled by lakes. The mountains range from 4000 to 9000 feet, the line of perpetual congelation being 8000 feet. The ranges usually run from N.N.E. to S.S.W. directly across the track of the prevailing winds in the Pacific, and hence they materially affect the climatology of the island by acting as condensers of the vapour-laden atmospheric currents, which but for their interposition might pass over the island without parting with their moisture. The snow-line was higher on the north-west, or windy side of the mountain, than on the other side; hence the floodmarks of the rivers show rises and falls of almost incredible amount; some of those running into the Te-Anau and Manipori Lakes (which drain a region of hundreds of square miles, and are themselves of immense area), showing a difference of level between winter and summer of as much as 9 feet. Such basins serve in great measure to regulate the otherwise overwhelming impetuosity of the streams, by confining them within a regular channel, instead of presenting a mere useless wide shingle-bed to the very edge of the sea. These lakes show geological traces of their having been at a remote period of much greater extent than they are now. At present they are supposed to be hundreds of feet in depth; their sides, like those of the sea-fiords at the lower end of the north-west side having frequently no beaches of any sort, the rocks rising sheer out of the water to several hundred feet in height. Of the country surveyed, 1636 square miles was pastoral country in detached sections, 959 was forest, chiefly beech, pine, and *totaru*, and 1960 barren mountain—the remaining 328 square miles being lake or river.

The PRESIDENT said this was the first time the physical geography of the southern portion of New Zealand had been opened out to us. The task had been performed in an admirable manner in both communications, and the results of

* Just as the present number of Proceedings is passing through the press, a narrative of the Expedition has come to hand.

the exploration were certainly very striking, considering the enormous difficulties these two gentlemen had to encounter. Dr. Hector was the well-known naturalist, geologist, and geographer who accompanied Captain Palliser in his expedition to the Rocky Mountains, and he was very well entitled to be recommended as the Chief of the present exploration. Among other striking features alluded to, Dr. Hector spoke of certain tracks, which he described as paths that only could have been followed by great birds, of which a skeleton was to be seen at the British Museum, and of which we had recently had reports that some of the species were still living. He had also alluded to the glaciers of the country. Dr. Hector described a great mass of erratic blocks and large moraines that had been brought down by glaciers of still greater extent than those now existing there. In fact, the whole of the western coast of New Zealand was a highly Alpine region. The President further stated that he had received from Dr. Haast, the Provincial Geologist of Canterbury, in New Zealand, a most valuable memoir, describing a map of that province and illustrated by numerous exquisite pictorial sketches of mountains and glaciers, which would be read at the next Meeting.

Mr. HARPER asked to be allowed to point out a route which he took in 1857, undertaken merely from a desire to explore this hitherto unknown part of the island and for his own purposes as a sheep-farmer. Accompanied by a few natives, he passed across New Zealand, from Canterbury up the Hurunui River to the lakes in the mountains, and thence down the river Teramakau on the other side to the west coast and Jackson Bay. On that occasion he had an opportunity of observing the geography of the country. There is a great dividing range, extending almost right through the centre of the island, from north-east to the south-west, about 100 miles from the west coast at the part where he crossed them, but gradually trending to the westward—so that in the Otago province the watershed line would be hardly more than 30 miles from the coast-line—and terminating in the cliffs surrounding Milford Haven and the fiords to the south. He ascended the watershed and stood upon the saddle of the range, with high snowy mountains and glaciers on both sides of him; and from that point he saw the Hurunui running to the eastward, and the corresponding river, the Teramakau, running to the westward. By following the Teramakau down from its source, as he had followed the Hurunui up to its source, he avoided the difficulties of cliffs and forests which Dr. Hector met with. It took him twenty-six days to get down to the west coast. During that time he was unprovided with necessary food, having only started with sufficient for a month, which they had to carry on their backs, and much of it got spoiled from the difficulty there was in crossing and recrossing the river, which they had to do by fording and swimming, and with their provisions on their backs, the dense impenetrable forests on both sides obliging them to keep as much as possible to the bed of the river. They were utterly destitute before they got to the coast, and had to live on native birds, which he brought down with his gun. On getting down towards the coast the river was too deep to ford, and they had to make a raft. The stream was very rapid, and in the course of a few hours they found themselves in the breakers on the beach. He met with very few natives on the coast. He went down the coast with one old man and explored: it is nothing but a long sandy beach, with a dense forest reaching up to the Snowy Mountains, every 20 miles or so broken by large rivers with bar harbours, mostly impracticable for navigation. These rivers rise, as do all the rivers of any size in the Middle Island, in the Snowy Mountains, fed by glaciers, &c., and having corresponding rivers rising in the same part of the mountains, and flowing eastward. Mount Cook stands out a grand sight about 30 miles from the coast, and the whole of the intervening country is covered with dense primeval forest. From Jackson Bay he endeavoured to strike inland, but having no provisions he was compelled to return to the point where

he struck the coast, and recross the island by his former route. The expedition took about three months.

Lord DONOUGHMORE asked if on the western coast there was any harbour or roadstead likely to give protection to shipping, because these forests then might be rendered extremely valuable.

Mr. HARPER replied, there was no harbour worth speaking of until you came down to Milford Haven, in the south-west corner of the island, and all round there the coast was indented with fiords. But where the Mawhera or Grey River entered the sea small steamers had lately crossed the bar, and a settlement was being formed there, the Government of Canterbury having spent a great deal of money in opening up a road along the route which he took. A harbour on the west coast would have been a great boon, because it would have placed Canterbury in direct communication with Australia.

The PRESIDENT asked if the fiords on the west of Otago Province were deep.

Mr. HARPER said they were very fine harbours, but so deep that it was difficult to find anchorage.

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3. The fourth and concluding Paper was—

An Exploration up the Moisie River to the edge of the Table-Land of the Labrador Peninsula. By HENRY YULE HIND, M.A., F.R.G.S., &c., Trinity College, Toronto.

THIS river had been for centuries the canoe-route of the Montagnais Indians, from the Gulf of St. Lawrence to the interior, and latterly has been similarly used by the Nasquapee Indians, whose hunting-grounds are on the table-land. Its mouth is 18 miles east of Bay of Seven Islands, and its course is almost due north. The north-east branch is separated by a very low water-parting from the headwaters of the Ashwanipi, or Hamilton River, the chief stream of the table-land, 1400 miles in length, by which it is possible to navigate its course to this point, and so complete the system of canal navigation through the interior. The numerous portage-paths, by their condition, indicate the antiquity of this route. The distinguishing features of the Moisie portion of which are the constant succession of rapids, falls, and impetuous currents; alternating with lakes of widely different levels, into which occasionally may be seen half-frozen streams descending from the barren hill-tops, which in winter become masses of ice, that fall with inconceivable violence into the valley below. Where the stream becomes too rapid for the canoes to stem it there are portages, one of which occurs so low down as 45 miles from its mouth. Where the north-east and north-west branches unite (both being of about equal volume), the channel is about 150 yards wide in June. The canoe-route lies for 25 miles up the Coldwater, a small affluent rising in Trout Lake, which, singular to say, throws off two considerable streams flowing in opposite directions. In this 25 miles the river falls fully 1500 feet. Beyond this lake occurs a comparatively level lake-track, strewn with innumerable boulders,

richly clothed with mosses and lichens, and sometimes 20 feet in diameter. Reaching the ledge of the table-land, the elevation was discovered to be about 1850 feet, the highest mountain visible being 2200. The course of the Ashwanipi, which forms the connecting link in the internal system of navigation, is roughly parallel to the gulf. Further on, a range of snow-capped mountains, two days' journey (about 60 miles) distant, was discernible in the north-east; while north and north-west was a bare undulating country, devastated by the numerous conflagrations that have swept over the country, and has greatly diminished the animals of the country, on the chase of which the Indians depended; in consequence of which the Montagnais Indians have been reduced to a handful, leading a miserable existence on the table-land.

The PRESIDENT, after thanking Professor Hind for his valuable communication, asked him to explain the peculiarity in the form of the pipes used by the different tribes of North American Indians near the course of the Moisie River, and also to mention some instances of lakes having two outlets; observing that correspondents of the 'Athenæum' had questioned the truth of Captain Speke's statement with reference to Lake Nyanza having two outlets.

Professor HIND said he would mention some instances that had come under his own observation of the existence of two outlets in lakes. The first was at Trout Lake, which occupied the summit of a subordinate mountain-range at an altitude of 1460 feet. It sent out in a north-east direction a tributary to the Moisie River, and in another direction the Coldwater River. He passed into Trout Lake by the Coldwater River, and passed out of it by the Moisie River tributary. The next was the Prairie-Portage Lake, which also has two outlets, one flowing into Lake Winnipeg and the other into Lake Superior. The natives are in the habit of passing from the Winnipeg watershed to that of Lake Superior by means of the Prairie-Portage Lake and its outlets, without taking their canoes out of the water. Then, from a lake and marsh in the Q'Appelle River valley there is a small river which flows into the elbow of the south branch of the Saskatchewan in a westerly direction, while from the same lake issues the Q'Appelle River, which, after a course of 276 miles, reaches the Assiniboine River in an easterly direction. The fourth instance consists of a series of lakes, three in number, known as the Backfat Lakes; they have a communication with the Souris River on the one hand, and with the Pembina River, an affluent of Red River, on the other. These were four instances of two outlets from lakes, through three of which he had himself passed, and the fourth he had seen from the summit of a mountain. Professor Hind then called attention to varieties of stone pipes on the table of different forms, and pointed out the peculiarity of each specimen as probably distinctive of the Indian nation by which it had been adopted. A certain type of pipe is used by the Chipewyans, whose hunting-grounds lie to the north of those belonging to the great Cree nation. The Crees have a type of pipe peculiar to themselves, and the form of those used by the Plain Crees at the foot of the Rocky Mountains is almost identical with the pipe of the Nasquapees, a tribe of the great Cree nation, on the table-land of the Labrador peninsula. The Ojibways, whose hunting-grounds lie to the south of the country inhabited by the Crees, have also a very distinct and well-marked form of stone pipe, which enables any one conversant with the customs of Indians to recognise it as characteristic of the Ojibway people. It was suggested that if this peculiarity in the form of

the stone pipes in use by different Indian nations in their natural state should be found to be constant, it might form a valuable mean in the hands of the archæologist of arriving at some clue respecting the "Mound builders" of the valleys of the Mississippi, the St. Lawrence, and elsewhere.

Colonel LEFROY stated that, in the Rocky Mountains, there existed another lake, called the Punchbowl, from which the water flowed in one direction into the Pacific and in the other into the Arctic basin.

Captain SPEKE, with reference to Lake Nyanza, said he had only seen one outlet, but he had been informed there were four outlets, and he had no reason to doubt the accuracy of the statement.

The meeting was then adjourned to Monday, the 8th of February.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Extracts from Private Letters received from* M. DU CHAILLU.

THE following extracts from letters recently received from M. du Chaillu by Fellows of the Society, who have kindly placed them at the disposal of the Council for publication, explain the position and prospect of that enthusiastic traveller at latest accounts, and may be considered supplementary to the letter read by the President at the Society's Meeting of 23rd November (*v.* Proceedings, Vol. viii. No. 1, p. 18).

"Fernand Vaz River, 18th October, 1863.

"I have arrived, as you will see by the heading of my letter, at the intended field of my explorations. I have met with a great misfortune, the boat containing my scientific instruments upset, and most of them have been spoilt. I was on board myself, but thanks to a kind Providence my life was spared.

"I send to Gaboon a little box containing a gold watch, a pocket chronometer, and a small sextant, to be forwarded to your care, and should be exceedingly obliged if you would forward them to the care of the Royal Geographical Society."*

* * * * *

"Fernand Vaz, 19th October, 1863.

"I shall stay near the sea-shore until the end of the rainy season, say the beginning of May, so that I shall have time to receive a further supply of scientific instruments before proceeding into the interior. Just now I am building a large bamboo house, which is to be my abode till I leave the coast. Housebuilding is not very expensive; my new abode, which will be a palace as compared with my present wretched hut, will only cost me some 25*l*.

"Everything looks well in regard to my future explorations. The way is clear before me. I have been very heartily received by the natives, who said they never expected to see me again, as I had been so long of returning to them. I have thus far enjoyed pretty good health; but one attack of fever, which I got over in a few days. As soon as my house is finished, I intend to begin taking photographs, as these will add greatly to the interest of any new geographical facts I may obtain for my next work. At present, living as I do in a dark native hut, I do not care to unpack my chemicals.

"The weather is beginning to become very hot."

* The box with enclosures was received, and repairs made good.

2. *Resources of the Niger as regards legitimate Trade.*

(Extract from a Letter from Commodore WILMOT, H.M.S. *Rattlesnake*, to the Commander-in-Chief of the Cape Station, dated 9th December, 1863.)

"Lieutenant Gambier ascended in the steamer as far as Egga, about 360 miles from the entrance of the river. From thence he advanced a further distance of 5 miles in his boats, and entered a small river, up which he went 50 miles to a village called Wunagi, 7 miles from Beda, the capital of King Massaba. Dr. Baikie accompanied him.

"At Wunagi they were met by King Massaba's messengers, who informed them that horses would be sent down for their conveyance to his town.

"The name of the river is not given in any chart, neither has it been surveyed. It will be well to call it by some name connected with this year's expedition. It is about 300 yards across in the broadest part, and from 30 to 40 in its narrowest part. Depth unknown; but Lieutenant Gambier thinks it to average quite 2 fathoms.

"The banks are thick with mangrove, and a few trees; but the country is well cultivated, yielding Indian corn and yam. There is also the 'butter-tree,' which is about 10 feet high, and produces 'shea butter,' which is used by the natives for food and for greasing their bodies. There is plenty of cotton, red and white, and large quantities might be grown. At every village cotton was brought down for sale.

"The country seems well populated with much of the same description of people as in other parts of Africa. All were very friendly, and anxious for trade.

"The soil appears to be most fertile; cotton, Indian and Guinea corn, cassava, date-palm, yams, &c., growing in great abundance. The yams are superior to those of most places on the coast; and the climate from all accounts is very healthy, a fresh breeze blowing up from the sea.

"There are partridges and guinea-fowl, also elephants and buffaloes, in the neighbourhood.

"Dr. Baikie came on board at Lukoja, his own place about 220 miles up; and was greatly rejoiced to see the *Investigator*, as his supplies were exhausted, and he had given up all hopes of being relieved this year.

"The missionaries were all landed at those places where they had missions, embarking again when the *Investigator* returned. . . . . .

"From the entrance of the Niger to Egga, a distance of 360 miles, the average depth in the rainy season is between 4 and 5 fathoms, excepting in one part of the ship-channel, which has only 10 feet. This, of course, makes it impossible for vessels drawing more water to proceed further than this shallow part, which is about 200 miles up.

"There is another passage on the other side of the island, near which this 10-feet channel is, which has not yet been surveyed; and Lieutenant Gambier thinks it highly probable that a deep channel may be found there.

"My opinion, formed upon the information I have been able to obtain, is that it would well repay one Company to take the trade of the Niger into its own hands, encouraged and assisted by a yearly subsidy from the Government, until the trade is regularly and permanently established, and certain profits arise.

"After this it would be, of course, for Her Majesty's Government to rescind the charter and do away with the monopoly, as they think proper.

"It appears that this single 10-feet channel mentioned above, is the only obstacle, excepting the river-bar, to vessels of large draught of water navigating the river, after passing the bar, and taking in their cargoes 300 miles up.

"This is a very serious obstacle, but can be overcome by steamers of light draught towing up large cargo boats, or hulks of a considerable size. The bar is another drawback to vessels drawing much water. There is only 12 feet on it in the rainy season.

"A Company must therefore be prepared to enter upon their work with two powerful paddle-wheel steamers drawing when loaded 9 feet of water, which is only one foot less than the depth of the channel in its shallowest part, with a good supply of cargo-boats or other conveyances, as they may deem expedient for river-work.

"The ship to receive the cargo must be at anchor outside the bar. These steamers should be armed with one heavy and one light gun, also a proportion of small-arms, rockets, &c., in case of necessity. They should be very fast, well ventilated, and carry at least 100 tons of coal. A depôt of coal must be in the river at the best selected place, and wood can be obtained very cheap. I should say that steamers with two rudders would be the best, which will prevent the necessity of turning.

"At first some little difficulty will doubtless arise, which must be expected; but the enterprise of British merchants, backed up by the energy and skill of British seamen, will conquer every obstacle, and establish a trade in the Niger that will fully satisfy, in a few years, every one that is really interested in the happiness and prosperity of this part of Africa."

NOTICE.

The Library of the Royal Geographical Society will on and after 1st March, 1860, open at 10·30 A.M., and close at 4·30 P.M. on ordinary days, and at 2·30 P.M. on Saturdays.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

[ISSUED 28TH APRIL, 1864.]

SESSION 1863–64.

Sixth Meeting, 8th February, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Revs. G. P. Badger and J. J. Mercier, John Kempster and G. Clowes, Esqrs.*

ELECTIONS.—*Rev. G. P. Badger; J. Cockfield Dimsdale, Esq.; Sir Frederick Halliday*, K.C.B.; *Gavin Hardie; Charles Savile Roundell; Edmund Trimmer; and Henry Weguelin, Esqrs.*

ACCESSIONS TO LIBRARY.—'The Cotton Trade; its bearing upon the Prosperity of Great Britain and Commerce of the American Republics, considered in connection with the System of Negro Slavery in the Confederate States;' by George McHenry. 'Narrative of Canadian Exploring Expeditions,' by Professor W. Y. Hind; presented by the Author. Continuations of 'Transactions,' &c.

ACCESSIONS TO MAP-ROOM since last Meeting (Jan. 25).—Sources of the Nile, by Captains Speke and Grant; 8 sheets, MS. Mapa Topografico de la Altiplanicie Central de Bolivia, by Hugo Reck; 1862. New Zealand—Province of Canterbury, showing the Glaciers and Alpine range, illustrated by 12 large-sized Drawings by Dr. Haast, P.G. New Zealand—showing the Seat of War, Auckland; published by the Editors of the 'Daily Southern Cross,' New Zealand. Ancient Map of Africa, preserved in the British Museum, presented by his Excellency Conde de Lavradio. Die Britischen Inseln und das Umliegende Meer; by A. Petermann. Special-Karte Süd-Schleswig; by A. Petermann. Plan of the District around Shanghai, under the protection of the Allied Forces (2 copies); presented by the War Office, through Sir E. Lugard, K.C.B. Continuation of Ordnance Maps and Admiralty Charts.

EXHIBITIONS.—Twelve chromo-lithographs of glacier and other Views in the Southern Alps of Middle Island, New Zealand, to

illustrate Dr. Haast's Paper; from water-colour sketches taken on the spot.

Previous to reading the first Paper of the evening, the PRESIDENT called attention to the series of the above-mentioned beautiful chromo-lithograph views of the mountain-scenery of New Zealand, after which

The first Paper, which was entitled "*On the Southern Alps of Canterbury, Middle Island, New Zealand*," by Dr. HAAST, Provincial Geologist, was read, in which the author briefly summarized the results of his numerous surveys during the years 1861-62-63. This magnificent snow-clad range, from which descend enormous glaciers, reaches in this province its greatest elevation, forming the culminating point of the great back-bone that runs through both islands from north-east to south-west, which is only broken through at Cook's Straits, and rises in the North Island to peaks almost as lofty, such as the well-known cone of Mount Egmont. The pyramidal form is everywhere the marked feature of the huge masses, numbers of which exceed 10,000 feet in height; while Mount Cook, the highest summit of all, is 12,460 feet, and about 30 miles from the west coast. Between each mountain-system, as it were (some of which, however run for many miles without any traces of a *col*), occurs a pass of varying altitude, generally very inaccessible, some as high as 6500 feet to about 8000 feet; and these intervening depressions form the watershed of rapid and formidable mountain-torrents which fall into the ocean on the west coast. The eastern flanks are drained in like manner by glacier-streams, which, however, having a longer distance to run ere reaching the east coast, and encountering huge lakes which regulate their flow to some extent, make this side of the range eminently suitable for an emigration-field. Nothing can exceed the beauty of the tints both of sky and vegetation, or the singular glacial anomalies that present themselves on some of the glaciers; as, for instance, that of the River Godley, which has two waterfalls falling from its eastern edge into two deep gorges, only separated by a buttress of rock, as depicted in one of the spirited sketches made on the spot, which were exhibited at the Meeting. Between Mount Cook and Mount Stokes (in immediate proximity and almost as lofty as the former) there is a deep very abrupt cleft, as it were, constituting a col about 7000 feet above sea-level; beyond which the chain again rises, but is now bifurcated as it proceeds south-west, till a singular gap or break occurs—not above 1000 feet high, with a swamp on the summit, emptying in both directions, and presenting physical features which, it is believed, are without a parallel in any other portion of the globe—through which alone it is possible to reach the west coast from the

eastern portion of the province. This pass will probably be ere long made available for ponies at least. Beyond this singular pass the two chains reunite, as they approach Mount Aspiring on the frontier-line between Canterbury and Otago. All the valleys on either side of the chain are universally densely clothed with forest-trees; but while the chain on its western aspect has the appearance of an undulating rampart, on the east there extend numerous lofty chains running north and south, or at right angles to the main "back-bone," as it has been aptly termed. This configuration necessarily leads to there being an enormous amount of glacier surface, the moraines on which are unusually clearly defined and plentiful. The Tasman Glacier is 12 miles long, and at its lower extremity 1¼ mile wide. Traces everywhere present themselves of many of these glaciers having at no remote period extended several hundred feet further than their present limits; and in the course of explaining the drawings, reference was made to several indications confirmatory of received theories of the mode of progression of glaciers under various physical conditions.

The PRESIDENT said he was proud to preside upon an occasion when a gentleman who was a geologist by profession had proved himself to be a good geographer, and had shown how intimately the subjects of physical geography and geology were united. Dr. Haast's labours were worthy of all commendation. His illustrations of the glaciers proved that the south-western part of New Zealand was in that intermediate state which all geologists were agreed upon was formerly the condition of the northern part of our own islands. In his last Anniversary Address he adverted to the belief of geologists, that all the northern part of Scotland was once in the condition that Greenland is at the present day; that is, covered with snow, with glaciers descending from the snowy mountains. In the illustrations and in the Paper which had been brought before them, they had a description of those phenomena as now at work in New Zealand, and in this respect it was a valuable communication, as presenting a history of an intermediate link in the development of glacial action descending from ancient to modern periods.

Mr. COOKSON, at the invitation of the President, pointed out on the map the locality of the various gold-diggings and coal-mines in the Otago and Canterbury districts. He also pointed out the locality of the Tirimakau River, at the mouth of which Mr. Whitcombe, the explorer, was drowned by the upsetting of his canoe.

The PRESIDENT related some of the circumstances connected with the death of Mr. Whitcombe, as set out at length in a letter, which, owing to accident, was not brought to the meeting. Sir Roderick particularly dwelt on the bold spirit of discovery which had led this explorer to sacrifice his life, and he was therefore most unwilling that the evening should pass without a tribute to his merit from all geographers present.

The following is an extract from the letter alluded to:—

Extract of Letter from Dr. Haast to the President, dated Christchurch, N.Z., 15th June, 1863.

"Knowing that an Alpine pass, about 5000 feet high, existed at the head-waters of the southern branch of the Rakaia, the Canterbury Government sent Mr. Henry Whitcombe to ascertain if this pass could be made available to

reach the west coast from Christchurch. He reached this saddle on the 20th of April, but, instead of returning, he continued the journey with one of his men, sending the rest of the party back to wait for him on the known Alpine saddle between the sources of the Hurunui (east coast) and Taramakau (west coast).

"Having crossed the pass, he arrived at the sources of the Hokitika, an important river which reaches the sea about 15 miles south of the Taramakau, on the 3rd of May. Although Mr. Whitcombe was an accomplished surveyor, a good mathematician and astronomer, who had worked successfully in India and Australia, he had had no experience in New Zealand bush-travelling, which requires not only strong men, able to carry a heavy load and to stand hunger, fatigue, and cold, but also a general knowledge of the nature of rivers and the best way of crossing them.

"Owing to his deficient arrangements, Mr. Whitcombe on reaching the coast was so exhausted, that he had great difficulty in walking to the Taramakau, where he hoped to find a Maori settlement, in order to procure some provisions, as they had finished all theirs.

"Unfortunately the few Maories who lived there had left the settlement, so they determined on following the coast to the mouth of the river Grey; for this purpose they had to cross the Taramakau, which is a large and rapid river.

"As no large canoe was to be found, they tied two small old ones together; but when they reached the current, their contrivance began to sink and drift towards the bar. Mr. Whitcombe, who was a good swimmer, jumped into the water and attempted to reach the shore; but, being in such an exhausted condition, he was drifted into the surf at the mouth of the river, and unfortunately was drowned. His companion, who could not swim, had a most miraculous escape; by tying his right hand to one of the canoes, he succeeded in remaining with it, being tossed about for many hours by the advancing and receding waves. He was at last cast on shore, and, on recovering himself, he worked his way up the banks of the Taramakau for a few miles, and fortunately fell in with some Maories, who gave him a few potatoes. He at last arrived at the saddle of the Taramakau, where his former companions awaited them; and I may here state, as an instance of the sufferings which he had endured, that his companions, even after conversing with him for some time, did not recognise him, so much was he altered, and this after an absence of only twenty days."

The second Paper was entitled:—

"*On the Frontier Province of Loreto in North Peru.*" By Professor Don ANTONIO RAIMONDY of Lima (Honorary Corresponding Member, R.G.S.).

Communicated by W. BOLLAERT.

THIS communication gives an instalment of the author's labours during the past twelve years, to make known the many valuable products of Peru, in carrying out which object he has made numerous excursions in all directions into the interior.

The province of Loreto is as large as all the other departments together, and extends from the Cordillera region of Pasco to the junction of the Amazon with the Jarava, its south-west portion being mountainous, while its eastern districts consist of extensive plains, well-watered and covered with luxuriant vegetation. In the

mountainous region the most prominent physical features are the passage of the Huallaga through a gap in the mountain-chain, and the renowned Pongo de Manseriche through which the Marañon effects its escape. The plains consist of the usual alluvial soil, entirely free from pebbles, which is characteristic of the great South American plains bordering on the Amazon.

The climate of Loreto is hot and moist, the mean temperature being 21° to 22° C. (71°–73° F.), while such is the humidity that in a few days, boots, clothes, &c., become covered with microscopic vegetation. At midday, however, the thermometer indicates as high as 93° temperature, which, owing to the immense amount of moisture, becomes almost insupportable. The rainfall here is probably at least as heavy as at any other spot on the globe, which the author is inclined to attribute in great measure to the congelation and condensation of the s.s.w. winds upon the snow-covered summits of the Andes, combined with the known phenomena of the north-east and south-east trades upon their eastern slope, as hitherto maintained.

After noticing the layer of sand, 40 to 60 miles in width, which covers the sea-coast of Peru, the sea-shells found in which in large quantities, of descriptions similar to those which abound in the adjacent sea, seem to indicate that it was upheaved at a recent date from the ocean, and commenting on the phenomena of temperature likely to occur from these physical features, Señor Raimondy elucidates his theory that this peculiarity of soil has, coupled with the prevailing winds on the opposide side of the mountain-range, a great deal to do with the climatic extremes already alluded to. He then examines the origin and cause of the network of rivers of the lower region of Loreto, and considers fully what stream is really entitled to be regarded as the parent stream of the mighty Amazon (the name Orellana, imposed on it in honour of its discoverer, has become entirely disused).

A list of affluents follows, furnishing a very much needed contribution to the geography of that region, which concluded, he passes to the consideration of the three main streams, the Marañon, the Huallaga, and the Ucayali; most of the various affluents from the north alluded to or named as flowing through Peruvian territory, having their sources and the upper portions of their course lying within the state of Ecuador.

The roads * entering this extensive territory are only three in number—one from the north, one in Central Peru, and one from the

* Besides these "roads" (as Señor Raimondy terms them, though a recent letter suggests "broken ladders after an earthquake" as a much more faithful and apposite description of them), the author of the Paper mentions several other paths leading over the Cordillera into Loreto province.

south; the capital, Moyobamba, a city of 8000 souls, but covering as much ground as Lima, being situated in the extreme north-west corner of the province, not far eastward of Chachapoyas, with which one of these roads communicates. The soil is a sandstone so loose that one single very heavy rain will occasionally work a channel of immense depth. The food is chiefly vegetable, and the principal manufacture that of what is known in Europe as Panamá straw-ware. In one province, that of Tarapto, the exchange medium is wax, a hard day's work being remunerated by 4 oz. wax! Several particulars were given of the towns and villages of this immense region, in one of which the circulating currency is large needles, each representing 1*d.* sterling. The universal currency, however, is cotton cloth, which, as in Africa, has a fluctuating value; but always commands its own value in barter.

The mineral products of the district adjoining the rising grounds are rock-salt (with lime-springs near), sulphate of lime, alum, sulphur (pure), iron-ore and lignite; and gold is found on the great river Napo. This whole region has recently been opened up by improved steamers, when it is at least probable that a very great development of trade must take place to Pará and Europe on one side, and to Callao and the Far East on the other. At present, however, the navigation of the river is only open by the jealousy of the Brazilian Government to the Peruvians, in order that they may reach their own country from the Atlantic.

The PRESIDENT stated that Don Antonio Raimondy had been employed during twelve years by the Government of Peru in collecting statistical and geographical materials in regard to the produce of the country; and the Council had thought him well worthy of being elected an Honorary Corresponding Member of the Royal Geographical Society. The subject brought before them was of vast extent, and he hoped there were gentlemen present who could point out the great advantages to be derived from a trade with Peru carried on by ascending the Amazon to those great affluents which flow into it from the Cordilleras. When they considered the comparatively waterless condition of the region on the Peruvian side of the Andes, and also what easy communication all that region could have with the Atlantic by means of these tributary rivers flowing eastward into the great stream of the Amazon, they would see how important it was to the commerce of the world to have this communication opened up. He knew no gentleman so competent to speak upon this subject as Mr. Markham, who had travelled in Peru, and who had written most instructively and eloquently upon that region.

Mr. CLEMENTS MARKHAM said he had descended many of the tributaries of the Amazon a considerable distance, but he had never entered upon the province of Loreto. He had, however, studied the subject of the Paper a great deal while in Peru and since his return to England. It was very remarkable that such an enormous surface as the 2,500,000 square miles which comprise the basin of the Amazon had been so little explored during the three hundred years that the coast-line of South America had been known to geographers. Some daring spirits did in the sixteenth century descend into these forests in search of the lake in which dwelt the man who was covered with gold-dust, and

they penetrated hundreds of miles on foot to points on the Caqueta, Purus, and other large streams, which had never been reached by any scientific or mercantile traveller since their time. They were the great explorers of the Amazon valley. In the succeeding century the missionaries descended some of the rivers, but they appeared to have been very superstitious and very timid. He had in his possession the manuscript journal of one of these missionaries, who observing, one morning, a jaguar crawl along the branch of a tree and pounce down upon a great porpoise, which was browsing upon the banks of a river, and drag it on to the beach, was so dismayed at the thought that a similar fate might befal him if his canoe happened to be under the branches of one of the trees at night, that he relinquished his mission and returned. In the present century scientific men had shown greater zeal and greater energy, and had spent many years of their lives, separated from all their friends, in exploring these unhealthy regions.

The PRESIDENT introduced Mr. Bates and Mr. Wallace, as gentlemen who had a personal knowledge of the physical features of the Amazon.

Mr. BATES said he had ascended the Amazon from its mouth as far as the Peruvian frontier, a distance of 1800 miles from the Atlantic, and had travelled over large portions of it many times. The breadth of the river varied from a mile and a-half to seven miles. It winds along in lengthy curves, forming magnificent reaches. Every inch of the banks is covered with forest vegetation; indeed, the whole country is covered with one vast matted forest, growing to an enormous height, and presenting a most picturesque and varied scene. It is a very healthy country. He knew Englishmen both at Pará and Santarem, who had lived there thirty or forty years, and they still bore the florid complexions of their countrymen. The whole of this distance of 1800 miles lay in Brazilian territory, which in the valley of the Amazon embraces a region 800,000 square miles in extent, of the most fertile soil in the world. In passing along the river in native canoes he frequently noticed that the banks are composed of a rich crumbling vegetable mould, fifteen to twenty feet in depth. Yet this grand country is almost without inhabitants. The population at the last census exceeded but little 230,000 souls, which is in the ratio of one person to every four square miles. In the province of Archangel, the most forbidding country in northern Europe, the population is in the ratio of four persons to one square mile. In consequence of this scantiness of population in the valley of the Amazon, there was no agriculture carried on. He never saw a plough, and he could count on his fingers the number of hoes and spades that he saw during the whole of the eleven years he was there. The trade is entirely confined to gathering the spontaneous productions of the forest—india-rubber, chocolate-nuts, brazil-nuts, sarsaparilla, vanilla, &c. Timber is scarcely yet become an article of export, though the country abounds in the most beautiful and varied descriptions of woods. The total exports from this country all pass through the port of Parà, and do not exceed 400,000*l.* per annum, of which india-rubber comprises about one-third, and chocolate-nuts one-half. It is an interesting problem how this country is to be peopled. The Brazilian Government have set their faces against the importation of negro slaves, and he was afraid that European immigrants will be of little use in field labour.

MR. WALLACE said he went about a thousand miles up the Amazon and ascended the Rio Negro. During the four years he spent there, he acquired all the information he could respecting the country. The surface is covered with the largest unbroken forest in the world; it is the great physical feature of South America. At the mouth of the Amazon the forest extends only a few hundred miles into the interior, and then you get to the mountainous district of Brazil and Guiana, which is partly open country mixed with wood. Farther up the river an enormous plain opens out north and south, extending to the foot of the Andes, entirely covered with forest. The forest is of such

extent that countries like England, France, Spain, and Germany might be thrown down in different parts of it, and they would be absolutely lost there—you might travel about for years and never hit upon them. It is an interesting problem to ascertain why it should cease so abruptly to the north and to the south. To the north you come at once to the open grassy plains on the Orinoco, and to the south you come to similar open plains on the Paraná. The river is also equally note-worthy from its enormous extent and the isolation of those nations that dwell in the interior. The people, the greater part of them, are utterly ignorant of any other country but their own except by vague report. All their ideas of geography are connected with this river; the position of other countries is conceived of as either on one side of the river or the other. Even comparatively educated people, Brazilians and Spaniards, who have been born and educated there, in questioning him about France and England, have asked on which side of the river they are situated. They imagine that the Amazon river flows all round the world, and that every country must be situated on one side or the other.

MR. GERSTENBERG gave some particulars relative to a German settlement which, on the invitation of the Peruvian Government, had established itself on the eastern slope of the Andes, in the year 1856, adding that it was the great wish of the country to introduce European emigrants. But to accomplish that object successfully, it was necessary, he argued, that the emigrants should be able to ascend the Amazon by way of Pará. At present the navigation of this river was hermetically sealed by the Brazilian Government against the flags of all nations, except the riverain states, Peru, Ecuador, Venezuela, Granada, and Brazil. But these four republics had no ships, consequently the whole of the navigation was entirely in the hands of Brazil. He mentioned special instances of the difficulties to which this restriction had given rise, and alluded more particularly to a monopoly for 30 years, terminating in 1880, which had been conceded to the Pará Steam Navigation Company, by which during the whole of that period the Amazon would be closed to the commerce of the world. He considered this a great hardship, and he hoped, whenever an arrangement of our present difficulties with Brazil took place, that the British Government would bring forward the question of the opening of the Amazon.

MR. BOLLAERT, the translator of the Paper, said he would advert to only one point—the healthiness or the unhealthiness of the climate in the province which was the subject of the Paper. The only unhealthy parts are some of the valleys which run down from the great chains of mountains, where there are occasional visitations of intermittent fever. But lower down, in the great bends of the river, the climate is perfectly healthy. He had paid some attention himself to the geography and geology of the country, and he thought Professor Raimondy had done justice to both those branches of the subject in his Paper. A serious consideration, however, pressed itself upon his mind, namely, the continued opposition of Brazil to the general navigation of the sea-like river Amazon, and he would suggest, if Brazil persisted in keeping the navigation of it closed, that the Mersey and the Thames be closed to the Brazilian flag.

The meeting was then adjourned to 22nd February.

Seventh Meeting, February 22, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

ELECTIONS.—*R. J. Ashton, Esq.; G. S. Brodie, Esq.; R. C. Carrington, Esq.; Geo. Clowes, Esq., jun.; H. Cunningham, Esq.; Capt. L. Flower; Cornelius Grinnell, Esq.; J. Harvey, Esq.; J. C. Irving, Esq.; C. M. Lampson, Esq.; J. M'Laren, Esq.; Hon. E. Powys; Wm. Rennie, Esq.; R. B. Ross, Esq.; J. Scott, Esq.; N. D. J. Straton, Esq.*, B.A.; *Hon. C. H. Tracy; G. Turnbull, Esq.*

ACCESSIONS TO LIBRARY.—'The Cotton Trade; its bearing upon the Prosperity of Great Britain and Commerce of the American Republics, considered in connexion with the System of Negro Slavery in the Confederate States,' by Geo. McHenry. 'Narrative of Canadian Exploring Expeditions,' by Professor H. Y. Hind; presented by the Author. Continuations of Transactions, Miscellaneous Periodicals, &c. &c.

ACCESSIONS TO MAP-ROOM.—Map of Africa, on 3 sheets, by E. G. Ravenstein, F.R.G.S. Map of Nord-Schlessing, by A. von Petermann, H.C.F.R.G.S.

The Paper read was—

"*Notes of a Journey from Gaza, through the interior of Arabia, to El Khatif on the Persian Gulf, and thence to Omàn, in* 1862-63. By GIFFORD PALGRAVE.

AFTER recounting how, in order to conceal their intentions, the author and his companions first wandered into Galilee, in April, 1862, where they met the Prince of Wales, while a friend at Jaffa was preparing their disguises, arranging for their camel-transport, &c., an account is given of the characters they respectively played: Mr. Palgrave passing for a doctor, as best calculated to bring him in contact with all classes. On 4th May they left Jaffa, from which period, till their arrival at Bagdad the following year, all trace of them was lost. On the 5th they reached Gaza, their final starting-point, where they stayed three weeks in order to get guides, &c. At length, on 27th May, they left in charge of some Arabs of the Beni-Ahîjeh who were to conduct them as far as Maan on the Haj or pilgrimage-route from Damascus to Mecca. In this part of their road they crossed the desert of El Tîh, through the rocky gorges of which they travelled for four days, usually on a S.S.E. course. After passing south so far as to be within two days of Akaba, the road turned north-east to Maan, where another detention of twelve days took place. Between this and the Jaûf province of the Upper

Nejed is waterless desert, inhabited by the most desperate of all the Bedouin tribes. In crossing this they found but one watering-place, and had nearly perished in a Samûm (simoom of ordinary current use). No living thing was encountered here, but a few serpents and lizards, till the frontier of the independent principality of Jebel Shomer had been reached, marked by the Wadi Serhan. Seven days the road continued through this valley, as far as Magua, a large encampment of the Sherarats, and on 30th June they entered Jaûf. Here are groups of lovely villages nestling under palm-trees, and two ancient Christian towers, but not of the Roman period, which command the place and the entrance of the wadi; this being a great centre of commerce for the Bedouins of Northern Arabia.

The kingdom of Jebel Shomer lies between 26° 30′ and 32° N., and 33° 40′ and 44° E., and its inhabitants are part nomad, part stationary, so that both trade and agriculture are to some extent represented, though two-thirds of the area is desert. The inhabitants of the rugged defiles which form the chief physico-geographical features of the country were in early times Christians, and long withstood El Islam. The state-religion is now Mohammedan, but it is only prominent in the towns. Away from these a few loose superstitions seem to represent the religious element.

From this point, after nineteen days' incessant intercourse with the chiefs and people, many of whom were treated medicinally, the party left for Haîl, the capital of the kingdom of Jebel Shomer. Their road hitherto had but one well in seven days' march over a sterile stony tract, alternating with sandhills which reflected the heat till it became insupportable. The entire distance to Haîl was ten days' journey, the latter portion through fertile valleys hemmed in by rocky mountains.

At the capital they remained six weeks, being kindly treated by the King Jelab, whose subjects are described as a fine race. There is really a considerable amount of trade here.

On 8th July they left, sixteen in number, and next day crossed the Jebel Salma, the seat in pre-Islamite times of Koleïb-Waäl, whose sway extended over half Arabia. On the 10th they reached Faid, a village on the road from Bagdad to Medina, and on the 13th entered the kingdom of the celebrated sect known as the Wahabites, whose king, Ibn Saûd, is generally known as the Sultan of Nejed. The road they had just traversed had lain chiefly through long valleys running from north-east to south-west, well watered and abounding in gardens, but monotonous from the absence of mountains. At noon on the 14th, the crest of an elevation

revealed to them lying below, the plains of Kasim, the frontier province of the Wahabites; and Argûn, the seat of the local governor, was reached in safety.

Here the climate becomes tropical, as the plateau has been left behind. The kingdom extends over 10° of latitude by 7° of longitude, being bounded west by the Haj road, east by the Persian Gulf. Beradeh, a large town, was reached on the 16th, which is the seat of the Wahabite Governor of Kasim, and is a station for the Persian pilgrims. The inhabitants are enterprising traders, and cotton is successfully cultivated in the neighbourhood. A revolt in the neighbourhood detained them here seventeen days, travelling being exceedingly insecure towards the capital, in consequence of most of the inhabitants of the Beradeh district sympathising with the insurgents.

At length the chief guide of the Persian pilgrims to Mecca offered his services to conduct the party to Riadh, the capital. They passed several towns more or less in size, and on the 7th October reached the large fortified town of Mejmad. On the 9th they crossed a running stream, a phenomenon in Arabia; and in two days, after ascending another plateau, reached the town of Sadek. On the 10th they reached Hormeimeleh, birth-place of Ibn-Abd-el-Wahab, founder of the sect named after him. Here the gubernatorial residence is a palace built by Ibrahim Pasha in 1818. Thence they passed by the large ruinous town of Aujoush, at the mouth of what is called Wadi Henifeh (Orthodox Valley). This city was formerly called Moseilemeh, after a rival of Mahomet (probably the pseudo-prophet of that name mentioned in Gibbon's 'Decline and Fall'), whose capital was at Riadh, and who reigned over this region. Riadh was reached at noon on the 13th October, where the King assigned them lodgings, which they inhabited till 25th November. Some of the houses here are two and even three stories high. The people are, in accordance with the dogmas of their sect, excessively fanatical and austere; and a foreigner's life is far from safe among them. On leaving, the party, now reduced to three, had to avoid the large towns; two of which, Manfuleh and Solemieh, are specified, and concealed themselves in the small valley of Yamanieh till their faithful guide and friend Khalif, who was convoying some Persian merchants, could rejoin them. On his overtaking them, they held eastward through fine plains, camping at water each night. On 1st December they were at a well, where the great caravan-routes meet from Nejed, Hasa, and Harik. Beyond this lies the Dohur Desert, an offshoot of the Great Southern Desert, two days' journey across, forming a plateau, on

for instance, as sketching or taking notes before people, or having with me geographical implements or similar objects. Of course I was obliged to put these entirely out of the question; and not only that, but I was obliged not to appear curious, when at the very moment I was, of course, most desirous of obtaining the fullest and exactest information. In a word, I was obliged to look as great a simpleton as I possibly could, and to seem to care about nothing else but to get my fees, which was not always easy, because the Arabs only pay the doctor when he has succeeded in effecting a cure.

However, this profession answered very well in the long run, because it brought me into communication with every rank and with every character of person whom one could meet with in the countries thus traversed during a journey which lay in a more or less diagonal direction nearly across the whole of Arabia; and at the same time I could thus, under different pretexts—such as that of inquiring about patients and medicines, or similar subjects—ascertain what was going on even in the neighbouring provinces, which I was not able to visit in person. As I said, in the first place, there are no good doctors in Arabia, or else it might seem almost audacious to say that the fame of my medicines sometimes often gained me patients for several days' journey distant; and this I was glad of, not of course for the sake of the remuneration, but on account of the news which I could thus obtain of the countries from which they came. On some occasions I found persons who had come to visit me and ask for medical advice from ten or even twelve days' journey distant; and these frequently proved to me a very valuable source of information.

Well, let us cut this short; for of course, in one evening, it would be impossible to give a detailed account of all such circumstances. What has just been read is simply a skeleton of the route itself, without entering into any particular details. As, however, the honourable President has alluded to one or two points, which he very justly thinks it would be fitting to dwell upon, I will briefly mention them as far as I can in a general way; and shall be happy to answer any questions which may suggest themselves, and which may throw light upon the details.

Now, the first point that struck me in Arabia was this:—Having been always accustomed to consider Arabia as a kind of home of the Bedouins, a sort of enormous plateau of bad pasturage, over which an uncertain number of Bedouins and camels might be continually walking up and down, with tribes interchanging wars and alliances with very little fixity: I found, on the contrary, that the Bedouin population was almost limited to a desert-circle surrounding Central Arabia; and that the great mass of this Bedouin population is concentrated upon the northern frontier, upon the limits of the desert which divide Arabia from Syria, and that once within the limits of Arabia itself south of the Jâuf, which has been already visited by Dr. Wallin, the stationary or fixed population was much more numerous and infinitely more important than the Bedouin population; and that that proportion of the fixed population over the Bedouin increased the further south I went, until in the central Wahabite provinces, which are strongly marked by a mountainous line around them, in many provinces not a single Bedouin, properly speaking, could be found; the whole of the population being fixed, and the few Bedouins who subsisted in the Wahabite empire being entirely in a state of servitude—in fact, crushed by the force of the Arab Government.

At the same time, these governments and these countries existing in the interior of Arabia are well organised, exceedingly centralised; in short, they are regular and established monarchies existing with known traditions, fixed laws, and in a form better regulated, perhaps—of course I say it without any ulterior meaning but merely as giving an illustration—than most parts of the Turkish empire. Great was the effect produced on my companion, who had come with me from Syria, when arriving at the Wahabite country; and he

remarked to me, with much astonishment, that this really seemed to be a government—a thing which he had never met with in Syria.

The principal divisions of this vast region which I noticed myself, were the three following:—First, the Northern, of which the capital is Hail (visited as you know by Dr. Wallin), and which is called the province of Jebel Shomer. "Jebel" means mountain, so it is as if you were to say, "the Mountains of Shomer." The capital of this province is called Hail, a town which at the present moment contains about 20,000 inhabitants. It is a very respectable town in its way, with a good market-place, tolerable shops, and a grand palace belonging to the Government in the centre; it is surrounded by fortifications and walls. In the town resides the actual king of the province, of the name of Zelal Ebn Rashid; and this kingdom was only founded in the time of his father, whose name was Abd Allah Ebn Rashid: so that it is a kingdom which has lasted altogether about sixty years, but which is, at the present moment, very well organised and subdivided into several provinces, in each of which is a governor dependent upon the central king, and the whole under the control of one administrative and executive power.

The second Government, which is yet more remarkable, is the Wahabite Government, which occupies nearly the whole of the interior of Arabia, stretching from the Persian Gulf to the neighbourhood of Mecca. It does not come down quite to the Red Sea, because Mecca and the adjoining province of Hejaz are under the protection of the Turkish Government. With that exception, the whole of Central Arabia belongs to the Wahabites. There, again, we have a monarchy, and a monarchy of the most absolute form—a despotism, I might say, such as perhaps has seldom been seen in Europe—a despotism to which any you might read of in history, or hear of in the newspapers, would bear but a faint resemblance. I could not have imagined such an entire political and religious absolutism as that existing in the Wahabite country, and of which I will afterwards say a few words. It is at the same time a government perfectly well organised, and divided into eleven distinct provinces, with their separate governors, and subordinate governors under these, with a certain number of military men to be levied from every town and every village, with fixed taxes and duties, and whatever attends on commercial and agricultural life.

The third main division of Arabia which I visited is the government of Omàn, which appertains to a personage who is known in our books as the Imaum of Muscat, although that title does not exist in the country itself; Muscat not being in reality the capital of the kingdom, and the title Imaum being unknown there. However, the name was given by the Portuguese in the time of Albuquerque, about 300 years ago, and writers have since retained the word Imaum, which, however, is applicable to the Wahabite king, and not to that of Omàn. The royal capital is, in fact, the town of Nezweh, which is at some distance from the coast, in the mountains higher up. Muscat is, however, at present in a way the most important town, as being that with which most European commerce is carried on. The kingdom extends from the limits of the Wahabite country along the coast, and goes away into the interior, and then down again towards the territory which is known by the name of Yemen. Between that and the Wahabite country extends the Great Desert, whither there would be very little object in going; and if one went, very little hope of returning. The Arabs themselves hardly ever traverse it in a regular way, if even they journey in it at all. I only found two Arabs of the country who were introduced to me in the village as remarkable men on this very account, that they had traversed the whole of the Great Desert. I asked them what they had seen, and what was to be found in it. They described it to me as such a desert as I had seen: in part, moving sand, little oases or semi-cultivated spots where a scattered vegetation might be found, a few dwarf palm-trees, and a little brackish water, with here and there negro

villages and an Ethiopian population, which seemed to be, as far as I can judge, the very Himyaritic population about which a great deal has been said in France lately: they appear to be an Abyssinian colony.

I was able to stay in each of these countries a considerable time, and to make acquaintance with the chiefs and with the principal members of society, so to speak, in these different provinces. At the Wahabite capital (which is not the old capital of Derayeh, for that was destroyed by Ibrahim Pasha, but the modern capital of Riadh, which is about half a day's journey to the south-east of Derayeh), I remained nearly two months, lodged by the hospitality and at the expense of the Wahabee king, as his privileged physician for the time being, practising, under his royal protection, my art upon such has had the good or bad fortune to come under it. While there, being in continual communication with the court and with those who inhabited the court, and also with anybody else who came to ask my advice during that time, I was ever looking into the life and habits of the inhabitants, and watching them as closely as possible.

Now, I think it would be proceeding in accordance with the wish which has been signified if I were to say a word or two about the administrative system of the Wahabite Government and the nature of its religion. The religion of the Wahabite provinces I must touch upon, because in the East religion and government always go together in so remarkable a manner that the distinctions between nationality and nationality, or government and government, are very often mainly, if not entirely, dependent upon the different forms of religious opinion which may prevail in the countries. Such is the fact, whatever comments it may give rise to, and it will naturally give rise to a great many; and consequently, in speaking of the Wahabite Government, one must first speak of the particular form of religious opinion, in order that you may understand the form of their government. The character of their religious opinion is this: Mohammedanism in its strictest, its most primitive form, exactly such as Mohammed conceived it, such as he taught it to his companions, and such, with very little exception I believe, as they preached it. It seemed to me, when I was in the country, that I was actually living in the age of Mohammed and his companions. The exactest picture that could be drawn of their way of living, their way of thinking, and their way of acting, such as you have it in the contemporary traditions of Mohammed, you may find at the present moment in that population. This is not very astonishing, because it is an entirely unmixed population; they have never married, nor been given in marriage, with any other people. They have entirely kept aloof from other nations, they have had very little commercial correspondence with any other people, hardly any political intercourse with such, hardly anybody has ever visited them, and they hardly visit any one; in consequence they have remained, so to speak, fossilized in the midst of a changing world. I should fancy that on the face of the globe, perhaps, no nation has changed so little. They have not gone back; they have not gone forward: they have not advanced, as far as I can judge, in civilisation, from the accounts which I have of Arab life at the time at the time of Mohammed, nor yet have they retrograded. With the fixity peculiar, I believe, to the Semitic families, of which we have such a remarkable and well-known example nearer home in the Israelitic race, they have remained exactly at the point they were; and thus have they retained, yet not improved, their primæval condition. For instance, a stranger who presents himself, like myself—What was I known as? I was known as a travelling doctor; an expression not exactly synonymous with a quack in that country. I might be a respectable person—that remained to be seen—and even a good doctor, for aught they knew. I was known in the town, generally speaking, as a Christian; for though, of course, in that country they never ask you directly what your religion is, that question not being considered polite, at the same time it is very easy to find out whether a man is a

Mohammedan or not—who is in a town where everybody is—according to an expression used in one of Captain Head's works—obliged, under the fear of the Lord and a broomstick, to attend daily at public worship, and if any person of the town is not present at the prayers he is sure to be well beaten: and thus any person absenting himself from them must give good reason for his doing so. I might have been a bad Mohammedan, but they seldom took the trouble to ascertain that. I was known, in consequence, as a native Syrian Christian. They knew that I came from Damascus; that I made no great secret of in the country, for I published it to everybody. I was there set down as a Christian of Damascus. Well, nobody said a single word that could possibly insult or reflect either upon the religion or upon the country to which I was supposed to belong, although I was supposed to belong to the Sultan's Government, with which they were almost at war, and to come from a country with which they had no sympathy, and to belong to a religion regarded by them as infidel. I met with the kindest reception and treatment almost everywhere. I was very hospitably received, very kindly treated, and well lodged. The dwellings there are not tents, but very respectable houses made of unbaked bricks, because in a country where there is little rain, indeed, scarcely any at all, and the tenacious soil becomes as hard as any stone under the influence of the sun—for in these regions you may imagine what the sun does—there is no need of baked bricks; and the houses are as firm and solid as any house in London. They are even built with a certain kind of architectural beauty; they are also very respectably furnished with carpets, cushions, and everything else that will conduce to the comfort of the inhabitants. Nobody can enter without permission. They have locks and double locks upon their outer and inner doors. They have often a garden in the court of the house, in which they sit and take the air, as they might in many European towns. In fact, there is a certain amount of exterior comfort. I remained there fifty days, and should have remained there very well contented, and very well viewed by everybody, were it not for the singular character of this Government, occasioned by the particular fanaticism which has developed the Wahabite power, and which ultimately caused me to leave the country in rather a precipitate manner.

You know, of course, that about 100 years since, at the time when Arabia was in a perfect state of anarchy, and when religion had fallen into a strange state of confusion,—of which I will, please God, speak a little afterwards, when I have finished about the Wahabite, because it touches upon the point of the fire-worshipping:—at that time there arose a celebrated fanatic, Mohammed Ebn Abd-al-Wahab, who founded the Wahabite sect, but did not found the dynasty, as some have supposed, having been simply a religious teacher. He, by means of his doctrines and his teaching, having placed them in the hands of a very important chief of the neighbouring town of Derayeh, enabled that chief to become the founder of a new dynasty. This chief became the instrument—the means the sword—of propagating the doctrines of Mohammed Ebn Abd-al-Wahab, which are called the Wahabite doctrines, and which are, in fact, the purism of Mohammedanism—primitive Mohammedanism—such as it was at its first origin. There were, then, two families side by side—the family of the founder of the sect, and the family of the founder of the government. These two families remained together in the capital; the one exercising the religious functions generally existing in Mohammedan countries—I mean where Mohammedanism is strictly practised—such as the function of Imaum at the public prayers, a kind of preacher or sort of clerk, nothing more; or the function of judge, which also is, as you know, a semi-religious function in Mohammedan countries, legal questions being decided from the sacred book—the Koran; and the other exercising the governmental power of the country. There is no need to relate to you how this government was developed—how it conquered almost the whole of Arabia—how it quarrelled with the Turkish Government

—how Ibrahim Pasha was finally successful in invading the country and destroying the capital,—and how, after a long while, the shattered elements re-constructed themselves and formed the existing Wahabite Government, whose limits, although considerably extended, do not at the present day contain more than one-third of Arabia. From these two families radiates up to the present time the double principle in the capital; the reigning family representing the political and executive force, while the family of the original founder of the sect having no direct political position, nevertheless exercise an enormous religious influence in the town, and have always a great command throughout the empire, and even over the monarch himself; a force which they exercise in what one may call a narrow or fanatical manner, and in such a manner as to draw the cords tighter, and to render their nation more and more exclusive, and to foster the hatred of the nation against all who might not be of the same way of thinking as themselves.

About six years ago the cholera visited that country at the end of its world's journey. It took Central Arabia at last. The Arabs had never seen anything like it before. They had not at the moment the advantage of having such doctors as myself amongst them; and the result was that an enormous mortality took place. Of course they took fright, and the zealot party, who represented the family of the old sect, took occasion to say that this was a Divine vengeance upon the people for having relaxed from strict principles. What are their strict principles? In the first place, smoking tobacco is a deadly sin; and whatever you may imagine in the way of horror, of condemnation, or turpitude, comes entirely short of smoking tobacco. I am sorry to say that the cholera showed the necessity of something very severe being done to bring back the people to good order. They had begun to smoke tobacco, which in their eyes fully explained the invasion of the disease. To give you an idea of their hatred to smoking tobacco, I will relate a simple incident that occurred to myself. There was a very severe and zealous bigot, one of the family, who came to me to ask my advice upon a little affection of his throat, and my medicine had been successful. I had been about twenty days in the town, when one day when we were sitting together, I was determined to see what were their real thoughts about smoking tobacco, and what was their real standard of morality. So I appeared to be very anxious to inform myself of certain points in order to settle some scruples in my own mind; and after a suitable prelude, I began to say that the Syrians were very much divided as to the distinction between great and little sins—that distinction is to be found in the Mohammedan religion as well as in the Christian—the great sins being those that are punished in the next world, and the little sins those which are to be expiated in this world by saying "God forgive me," or the like. I stated that my own conscience was rather anxious in the matter; and I wished to know from my friend what he and his family conceived to be the distinction between great and little sins, and which were the great ones that were to be carefully avoided.

My friend looked very grave, as those people usually do; they have a very serious appearance, having their handkerchiefs always pulled down over their eyes; and so putting on an exceedingly serious, pharisaical look, in fact graver than usual, he said: "The greatest and first sin was Polytheism, or worshipping anything else but God." I said that we all knew that Polytheism is the greatest of all sins; but, after that, what is the next great sin? Upon which my friend, without the slightest hesitation, answered that the second irremissible great sin was that of "drinking the shameful"—meaning smoking tobacco, smoking being called drinking, and the "shameful" being the synonym for tobacco; and consequently he stated this to be the second great sin. Whereupon I suggested, "and murder, theft, false witness, and similar actions?" "Oh!" answered he, "God is merciful; those are all little sins." Hence the two only mortal sins were Polytheism and smoking. On the occa-

sion of the cholera-visit, already mentioned, it was said that it was all in consequence of smoking tobacco, and of wearing silk dresses; which is another dreadful sin, and entirely to be prohibited. As for the hatred to smoking tobacco, that, perhaps, might find an echo even nearer home; but as for wearing silk dresses, I fancy that even where tobacco is not liked, that would hardly pass. Then, again, swearing by another name but that of God is a positive idolatry, which renders a man worthy of death. Don't imagine on that account that they do not swear; but the natural result of this is, I am sorry to say, to make the transgression of the Commandment which forbids the taking of the name of God in vain, a great deal more common than it would otherwise be. They will swear on every occasion, and they bring the holy name in every moment. The Government was in a state of great anxiety, and considering that the cause of the cholera was due to the fact of pure and primitive Mahommedanism being no longer observed, they resolved that something should be done to stop its progress. On this occasion the reigning king, who is the son of Zurki, the son of Abd Allah Ebn Saoud, who was put to death at Constantinople, called together the gravest and most religious men of the capital, which may contain at the present day about thirty thousand inhabitants. It is a very beautiful and populous town. Except Damascus, I have never seen a town so beautifully situated than that of Riadh. Riadh means "The Gardens," from the lovely gardens which surround the town on every side. The King, then, called together his council, and said:—"I discharge my conscience upon you. I cannot myself look after all the religious observances and exact moral condition of each town or individual in my empire. I have called for you as the most respectable, most venerable, and most important of my people, and I discharge my conscience on your conscience, and I charge you before God to see to it." The most absolute kings are generally the most constitutional, because they are obliged to be so. On this occasion a council of twenty-two was formed. These twenty-two were to be chosen from the most unspotted, the most fanatic characters that could be found in the town; and several of them were of the family of Mohammed Ebn Abd-al-Wahab. They had full power given them, censorial power, like that in the old Roman time, full and absolute power to examine into and to punish whatever offences might be committed against morals and religion in the towns, in the provinces, in the empire; and all this was by delegation. They were immediately all armed, as a symbol of their power, with a long rod, a rod which was rarely suffered to be idle, attended by a quantity of satellites, bearing in their hands the sticks of palm-tree, no despicable cudgels, and a common implement of fighting in the East. They were commissioned to examine into the public and the private life of everybody, without distinction, beginning from the royal family downwards, and punish every one whom they found guilty. The brother of the King, in whose house I had been lodging, was convicted of having smoked tobacco, and was publicly hoisted and beaten at his own palace-gate by these people. One of the principal members—I won't say of the Cabinet, because I do not wish to insult English names by using them in this way, but I don't know how else to explain myself, for they are a ministerial body; there is a minister for external affairs, a minister of the interior, and others; it is really a kind of cabinet—well! one of the principal ministers, who had charge of the treasury, was so well beaten that he died the next day, because it was proved against him that he had committed some offence of an analogous character. Many others were put to death at the same time. Prayers five times a-day were enforced also on pain of beating, generally severe, in case of non-compliance. Even talking in a private house after evening prayers until morning prayers was prohibited, everybody being supposed after saying his last word in prayer, before going to sleep like a good Mohammedan, and not to talk again until the morning. In the streets of the capital and of the principal towns, up to the present moment, children cannot

play. Everywhere else throughout the world you see them playing:—in this town alone they cannot; or if they do play, it is at going through the form of prayer, having no other form of diversion but that. The strictest and severest discipline that could be imagined was enforced, and, of course, the natural result followed, that an enormous amount of vice and profligacy increased in the town, much more than had been before, as always will happen.

If you wish to have an idea of the children of the country I will give you an instance. One of the principal dogmas or opinions of these Wahabites is this,—the absolute, universal, all-pervading, all-existing, power of the Divinity in everything; that is to say, that nothing is angelic or human, or even animal action, not even physical—everything is divine. For instance, if I take up a pen, it is not I that take it up—of course I am speaking now in the Wahabite sense—in their sense, literally speaking, God takes up the pen. Again, if I lay it down, the same. If a man writes, it is not the man, but God that writes. If fire burns, the fire does not burn of itself, but it is God that effects the burning. If a stone falls, it is the same. And from this, in consequence, springs up the most absolute system of fatalism that can be imagined. I said that I would give you an idea of the children of the country, that you may see how they grow under that kind of teaching. One day my companion and myself—it was in the month of October, when the heat was still considerable, though it afterwards rapidly diminishes, so that in December it was already cold enough to have fires in the evening; however, in October it was still very hot, when one long day, after having been giving advice from morning to the afternoon, of course obtaining at the same time non-medical information from the people, and feeling very tired, for there had been a crowd of people during the day, about 3 o'clock I shut up the house and the shop, for the shop and the house were all one, and walked out of the town with my companion, to hide ourselves in a grove of palm-trees in one of the neighbouring gardens—there, of course in private, to enjoy the nicotian weed, which we could not do in the town; for, although it was known, I am sorry to say, by the fatal testimony of the vapour that it always produces, that I did smoke, at the same time I took care not to do so offensive a thing before them. My companion and I, who was as bad as myself in that respect, had retired from the crowd, and got out of the town and beyond the walls, and coasting along the gardens, turned aside into a nice little orchard, where we sat down under a palm-tree, lit our pipes, and enjoyed ourselves. While sitting there we saw, to our great dismay, a lad about twelve years of age—one of the poor lads of the town—walking about not far off; and, seeing us from a distance, of course he came up to talk with us, for an Arab is the most sociable creature in the world: he cannot avoid talking, especially to a stranger, and he will always converse in a friendly manner. Well, this boy saw us, so I said to my companion, "He won't matter, this is a poor fellow; we can go on with our smoking before him." We continued smoking, and the lad came up, habited in the dress of the country, a long kind of robe, resembling more a night-gown than anything else—a long shirt, fitting quite closely at the collar, and reaching down to the feet, and a kind of handkerchief about his head. The lad came up and made his salaam. He was spinning a peg-top on his hand. He saluted us; we answered his salute. He wanted to talk, but he did not know exactly what to say; sometimes people are thus awkward at their first meeting. So, in order to introduce a subject, he took his top in his hand and spun it on his left hand, then took it upon his right-hand forefinger, and keeping it spinning while holding it up, he said to us, "Not by my strength, nor by my cleverness, but by the strength of God, and by the cleverness of God." Whereupon my companion answered, "You have set God to work for very little." From this little incident you can thoroughly understand how that way of thinking prevails among the people of those countries from their

earliest years, and you may judge how far it renders them incapable of change or advancement.

Well, I said I would say a word or two about the town, and the manner in which I left the town; for in that manner the character of the country can best be exhibited. I had remained about thirty days in the town, and during that time was strongly supported by the Royal party, that is to say, the governmental party of the town, because I had cured a great many of them; and I was almost every evening at the palace, either with the King or with some of his own people, and was looked upon in a favourable light. At the same time those twenty-two zealots, I cannot call them fanatics—fanatics is a general word, they were officially so, not only fanatics in matter of fact, but fanatics because of their position—but, however, those were my enemies, because they knew me to be a Christian, or what they called a dangerous person—a revolutionist, a person to be looked on with suspicion, who probably is machinating something against the church or state, or against both; in which conjecture they were not very far wrong, although it was not to my interest to tell them so. The fact was these men were always working against me as much as they could; and I was upheld for a long time by the Royal party. However, the waters began to get troubled.

The first symptom I had of suspicion in the Royal party and the King himself was this. I had notice given me that those who went to that country hardly ever returned, and that scarcely anybody, in the first place, ever got admittance to the capital, much less to the presence of the King; but when one did, one was in danger of two things: either of being put to death, which is by no means an uncommon thing in that town, for the present King has put to death a great many after inviting them; or if you are supposed to be a person whom, on the one hand, they are afraid of, or, on the other hand, whom they have too much regard for to put to death, they offer you a house, and attendants, and wife; and when you are once fixed in the town, once married, you are caught, and cannot get out again. I once met, myself, a very clever fellow, a native of Bokhara, who had been caught in that manner, and who wishing to get away could not do so, being tied by those chains which are well known to be the strongest. The first symptom, then, I had of mistrust manifested itself in this way. I had a particular invitation to go and see the King, at rather an unusual hour, in the palace. The King, after a long preamble of the services which I had already rendered, the great effect which my medicines had produced, and so forth, told me that I was too valuable a person to lose; and he offered me then and there a fine house with attendants, and servants, and with an honourable alliance in the town. Of course, I understood what that meant. I fought off as best I could, and so effectually that the King was obliged to accept my refusal. However, I felt from that moment that I was becoming an object of suspicion. The next thing which got me into bad odour with the King was a thing which I had a great deal of difficulty not to do. While I was playing, so to speak, the part of the poor dependent man amongst these people, I could not help letting it very often appear that I was more independent than I ought to have seemed. Now about this time one of the King's horses had had a kick in the shoulder which had festered, and had produced a certain equine disease. The King asked me whether I could cure the horse. I was too glad to get hold of an opportunity to see the Royal stables. They are in some respects the first stables of the world. It is well known that the first breed is the Arabian breed, and the best of the Arabian breed is the Nejed; and, of course, the very best of the Nejed breed would be at the stables of the King himself. Whatever one can imagine in the way of perfect beauty of horses, I was now privileged to see. I never could have imagined such perfect animals, although I have seen the very best horses of the sort which are imported into Europe. Those which go to Europe are either, like those which go to France, of the Algeria or Barbary breed, or like

those which are sent from Syria to breed in the desert to the north of Arabia running up towards Damascus and so on; but never was a Nejed horse sent to Europe, and they never will be. They are never sold by any chance, neither male nor female—they never sell a horse of that breed. They are only to be got in one of these ways: either in war, or as a present, or a heritage from father to son; they are never sold and never bartered. They are a small breed, not very high; I believe never above 15 hands 2 fingers; none of them approached 16 hands. About 14 or 15 hands in height would be the average. The prevailing colour is gray. I did not see a single dark bay; chesnut a fair amount, grey very common, mottled not altogether uncommon, very few white, and still fewer black. I did not see a full bay among them. The principal features of the race are the excessive cleanness of the legs—in this more resembling a stag's legs than a horse's—the fulness of the haunches, the extraordinary delicacy of the muzzle, the beautiful set-on of the tail, and the extreme slope of the shoulder-blade, which gives the animal a pliancy such as I never saw in any other breed, very different from the Persian breed, and even from what is called the Arabian breed of Upper Arabia. I had full leisure for examining the King's stables. There were in the stables about 130 horses, and there were a great many others that were not present.

After looking them over I asked to see my sick horse, and it was shown me. I gave some slight prescription, and thus got another opportunity to visit the stables. After that the King pressed me very much to go on with the cure. I said I had seen the horse; and I felt I was compromising my own position very seriously in doctoring an animal for a disease that I knew little about. I was obliged to explain to the King that doctoring a horse was one thing and doctoring a man was another. The King insisted upon my doctoring the horse. At last I got angry and I said, "Your Majesty must please to remember that in this country I am a doctor for asses and not for horses." The King understood the joke perfectly well, and it did not please him.

Matters went on in this way until at last they came to a crisis, which obliged me to leave the country. The King had already become a little indisposed towards me. Those who were my enemies of course took every occasion to turn the King against me, and at last they found the means of doing so. There was a man in the town who had a species of facial palsy, of a kind which I judged might be treated, according to some practitioners, by an external application of strychnine. Everybody knows the exceedingly small quantities in which such a drug can be administered even externally, as well as the exceedingly powerful effect which it produces, let the administration be the most cautious. The man whom I had to deal with was nearly deaf, besides having an impediment in his speech. I judged that an external application of strychnine with appropriate treatment would produce a good effect, if applied in the manner which anybody in the faculty can understand. Of course the effect was very strong, as might have been expected. I must remark, that with the Arabs you may always double the dose, because they have very strong constitutions. The effect was such, that after four or five days the individual entirely recovered the use of his tongue, and was able to take part in conversation. The patient's hearing was also very nearly restored, and he was in fact going on very well.

This produced a great effect in the town. Everybody was very much surprised, and especially that so much effect had been produced by so small a quantity of medicine. The fame of the cure reached the King. The King sent for me; and as his Majesty was fond of dabbling in medicine, and wanted to understand more about it, he was very curious to know what this wonderful drug was, and asked me to give him some of it, so that after I was gone some of his people might use it. I of course fought shy, from the natural feeling which anybody would have of putting such things into the hands of an ignorant man; and, without reflecting on what consequences my words

might have, somewhat rashly explained to the King the exceedingly dangerous nature of the drug, and that it was one of the most deadly poisons known. He had hardly heard that, when, lifting up the handkerchief which I wore over my head, and lifting up his own, which is the custom when people want to talk a secret in Arabia in a manner inaudible to those present, he whispered in my ear, "Give me some of it!"—in a most unmistakeable tone.

Now the King had very powerful enemies in the Court, and these enemies were in the town at the very time. It was well known that he would be exceedingly glad to get rid of them, and that they also would be glad to get rid of him; and it was known that he was a man who stuck at nothing, who had put his own guests to death in his own house, and consequently he was a person perfectly capable of using the poison, if not in a legal, at any rate in another way.

I feigned not to understand what he meant, and to imagine that his enormous zeal to have it was entirely to do good. So I fought off, and said, "I am afraid you would not know how to use it, nor understand the proper proportions," and so on. Like a judicious man, he did not press the subject any farther. The next day he brought it on again, and again I put him off. The third day he again brought forward the subject in question, and asked me for the third time to give him some of the drug, saying, "I believe you really do mean to leave the country shortly, and you must first give me some of it." I lost patience, being very provoked at his asking me again and again to give him the poison after my repeated refusal. So I told him positively, and in the most solemn manner I could assure him, that I would never give it to him. He still insisted; whereupon I looked him in the face, and said, "Abd-Allah, I know perfectly well what you want it for, and I don't want to be your accomplice in what you will have to answer for before God's judgment seat, nor to be charged with crimes that you will be charged with. You shall never have it." At these words his face changed in a frightful manner, and became positively black. He looked more than words could say. However, he added nothing more for the moment. With customary Arab self-possession he said nothing, and swallowed the insult. I on my part dropped the subject, and after sitting a while I got up and took my leave; but I saw that such a conversation must necessarily lead to sinister results—in a word, that I had committed myself.

The next day and the day after I had no further news from the palace. On the third day, at night, between nine and ten, I was sent for suddenly to the palace, and was informed that I was to go alone. I told my companion to keep awake, and to keep the fire up, because it was the end of November, and "that there would be news to-night." So I went alone to the palace. When I got there I found the King sitting in an inner chamber, by the light of a fire. Around him and in front of him were sitting my most deadly enemies, including the great-grandson of the founder of the sect, who, as the Arabs say, would willingly have eaten me raw, could he have done it. There were two or three others of the same stamp who hated me as much as they could, and a few others who were my friends as long and as much as his Majesty should please to be so. All this was at night, and in an interior apartment. Of course when I entered I saluted the King. In these countries one does not use the long formulas of Turkish salutation, which are considered by the Wahabite as derogatory to the honour which ought to be paid to the Supreme Being alone. Instead of saying "My prince," they say, "Peace be with you, thou who art guarded" (*i.e.*, "by God"); no other title is allowed. He answered my salutation very coldly, and told me to sit down. I sat down close by him, on which he turned round to me, and began by saying, "I know perfectly well what your real object is; it is not medicine, nor anything of the kind: you are really a revolutionist. You come here against our Government and against our religion. You know the penalty is death, and I shall put the law in execution against you, and have you executed without delay." His saying so put me in mind of

the proverb, "Threatened folks live long." I thought it was hardly probable he would do it at the time, though he might put his threat in execution a little later. So I thought the best thing was to seem unmoved. I looked at him, and merely answered him with the common phrase in the East, "Beg pardon of God!" It means, when a person says anything foolish, "Beg pardon of God for saying such foolish things." He looked surprised, and said, "Why?" I said, "How could you kill me? You dare not." He said, "Why can't I? why dare I not?" I said, "Because I am your guest; have been lodged in your house; have been employed by yourself, and as such I am known to everybody in the town, and looked up to by everybody in the town, even by you. *You* talk of putting me to death! It is perfectly ridiculous! You cannot do it, and you dare not." He answered me that it might be done without its being known that he did it, and that he had the means if he chose. Upon which I answered him that he could not do even that. He asked, "Why?" "Because," I said, "there are several sitting here who have heard what you say; they have tongues, and they will talk about it. I will take care meanwhile to let everybody know what you have said to me to-night, and if anything happens to me in the whole region which lies between this town and the Persian Gulf, it will be known who has done it." I added, "Your brother will be the first to know it." His brother was almost as powerful as himself, his most deadly enemy, and the very person whom he wished to kill. After half an hour's more conversation, much in this style, I left him.

Of course I understood that there was no remaining long in the place after such an outbreak, so I took counsel with my companion, and with an individual whose name is mentioned in the Journal, Khalef Ebn Aisa, our guide. We agreed not to show the white feather, by leaving the town immediately, but to keep quiet, and go on doctoring the people of the second and third ranks of society for the next two or three days, and then secretly to get away. So we remained three days, attracting as little notice as possible, and keeping mainly in-doors. On the third day we took the opportunity of the long evening prayer, when everybody was in the mosque; and having got our camels ready beforehand, we mounted on their backs and left the town; before the prayers were finished we were a good way off, and night was setting in. Other arrangements were made, which enabled us to escape the notice of the King until we were quite beyond the reach of anything like pursuit.

I am afraid I have trespassed too much upon your time. However, I have been requested to say a word about the fire-worshippers, and that form of religion which exists in Arabia. This is an interesting subject, especially in this point of view, viz., that I do not know that anybody has mentioned or stated it in a distinct manner, and I was myself exceedingly surprised by what I saw of it.

The first circumstance I noticed was this. Of course you have all heard—it is a thing which is always said—that the Mohammedan religion, strictly speaking, is only practised in its rigorous forms in the towns and villages; that the Bedouins or nomad Arabs have only the name of Mohammedans, without the practices. Now I found that many of the tribes, before we came to the country where, properly speaking, that form of religion is dominant, still kept up something of the old religious usages which existed in Arabia before the time of Mohammed. This I had not suspected. However, such was the case. I do not know whether any European, except the gentleman whose name was mentioned by the President, Dr. Wallin, who travelled over a part of the same country as myself,—I do not know that any European has ever been precisely into the part of the desert which lies towards the Jâuf and beyond it. However that may be, I can assure you that anybody who should travel there under the appearance of a Mohammedan, or pretending in any way to uphold what would have to do with the Mohammedan religion, would never rightly know what the religious practices of the nomad tribes in that part of

Arabia are,—for this simple reason, that in those countries which are still frontier to the Turkish empire, though not belonging to it, Mohammedanism being the State religion, and being rigorously maintained by the State, nobody of Arab race dares, generally speaking, to profess himself openly of any other creed. Much in the same way, a traveller in Syria itself, meeting with a Druse, or those remarkable sects which abound in that region, would be often told by them that they are Mohammedans, simply in order that they may not get the bad name of being anything else, and because they are afraid of being reported. In the same way the Bedouins or nomad Arabs, who are very timid and cautious, and exceedingly afraid of getting into a scrape, will very often say in a general way, "We are Mohammedans," in order not to compromise themselves with a traveller whom they believe to be a Mohammedan, or more or less a friend of the Turkish Government, which is a Mohammedan Government. In that case, though they would not know how to say Mohammedan prayers, they yet would always call themselves Mohammedans.

Having said this by way of explanation, I was myself fully known in that part of the country as a Christian of Damascus, and as an individual who, as they themselves frequently judged, might have committed some great civil crime at Damascus, and had escaped from the pursuit of Government, in order to take refuge in Arabia. Though such a supposition was not very honourable to my character, I readily allowed it to pass uncontradicted, as the most convenient screen that could be imagined. Consequently, I put no restraint upon them.

The first thing I remarked, and it surprised me very much, was with respect to a great number of these nomad tribes in the north of the central part of Arabia, that their only form of religion was to turn to the sun morning and evening; that is, exactly at the moment that the sun's disc arises, counting from the moment when the first ray appears above the horizon to the moment when the disc is complete, they turned their faces to the sun, and alternately recited certain prayers; repeating the same again when the sun is setting in the evening. Everybody knows that to say prayers at the moment the sun's disc is rising or setting, is strictly forbidden by the Mohammedan religion; the prayers are either said a little before or a little after sunrise and sunset—generally speaking, a little after; because it is supposed, in Mohammedan tradition, that the sun rises and sets between the horns of Eblis, and consequently, whoever prays at that moment is supposed to pray to his Satanic Majesty's horns. Every morning and evening these Arabs said their prayers—not turning their faces to the Caaba at Mecca, which is the point to which the Mohammedans turn, but turning to the sun; and these prayers are addressed by them to some divinity supposed to reside in the sun. I often heard the prayers themselves. I was enabled to write them down. They were simple forms of adoration and of petition, addressed in the name of God towards the sun. I do not say exactly to the sun, but towards the sun.

Another point of religion which they had, and which they talked about very freely to me, as well as among themselves, was the practice of sacrifice at the tombs of their relations; not at the tombs of any supposed saints, or anything of that kind, such as may be found existing in Mohammedan countries, but at the tombs of their nearest relations. These sacrifices were generally annual, commemorative of the death or the individual, and consisting of sheep or camels. The object was to put themselves in communication with the souls or spirits of the dead, a certain Eastern form of spiritualism, and rather barbarous, though not less superstitious than the Western one.

Going on and entering Arabia I found these practices very general. When I got into the kingdom of Shomer or Hail, among the stationary inhabitants, I found the same practices very generally existing in the villages, but not in the principal towns; and they added to it the worship of trees. I was shown one tree which had received honours for powers far above its own nature, especially when rain did not fall. This tree was supposed to answer their

prayers by sending it. Dances were performed round the trunk, and prayers addressed to it that it might procure rain. It was not a palm-tree; it was one of those large thorny trees common in Arabia, and named the "Zulh;" it is a kind of acacia. I was not so much surprised at these forms of religion in themselves as at their being so wide-spread. They are vestiges of the old religion which covered the principal parts of Arabia before the time of Mohammedanism.

When I got further on, after passing through the Wahabite kingdom, where again I found Mohammedanism, and drawing towards the Omàn kingdom, on the Persian Gulf, I once more lit upon the practices of fire-worshipping and of worshipping the sun. They worshipped fire in this manner: they lighted fires upon sacred peaks and mountains, danced round them, and worshipped them. Only in one case did I get permission to be present at the ceremony. I found it was generally practised on the first day of the month, which seemed the day set particularly apart for celebrating these ceremonies. I could not discover in the country any regular priesthood, such as exists in India or in Persia, nor anything of the Persian dualism of the two principles, the Good Principle and the Evil Principle. It seems to me an old form of Sabæanism, the simple worship of the element of fire, whether in itself, or in the sun, or in the planets.

Another thing that I noticed, and it was a very remarkable one, exceedingly surprised me. I have since mentioned it to a very learned and well-known professor at Oxford, and he was unable to give me any explanation of it. I had seen notices in some of the Mahommedan books that the Sabæans when they prayed, turned to the north and not to the sun alone. Now I found these people in the interior of the country very often, not at morning and evening prayers—when they prayed, properly speaking, to the disc of the sun, —but at other times, praying with their faces to the north; and not only that, but they gave the North Star the name which in the Hebrew Bible, in the Book of Exodus, is attributed as the uncommunicable title of God, the well-known name composed of the letters J A H. That name was given by them to the North Star, probably from an idea of its fixity, as being the only fixed point in the heavens, around which the rest of the universe seemed to turn. From that circumstance, they had given it the name of J A H. I only repeat what they say; for God forbid that any one should make anything like an improper allusion to the very name by which God revealed Himself to Moses in sacred history.

This fact, along with its natural explanation from the character of the North Star, and with the practice of their turning to the north, as well as the particularly simple form of fire-worship that exists, made me believe that this is not a new form of religion, but a wreck of the old Sabæan religion, which, as is well-known, overspread almost the whole of Arabia before Mohammed's time; for before his time idolatry, in its grosser form, was confined almost exclusively to the narrow strip near the Red Sea, where certain idols of rough hewn stone were adored, and of which some vestiges are still to be found. But the rest of Arabia practised fire-worship; and thus—though without having sufficient exact critical data to give entire certainty, yet as far as I could judge by other details which are too long and too particular to be entered into at the present moment—I cannot doubt that these are the remains of the old Sabæan religion which had formerly occupied almost the whole of Arabia, and which we see yet exists in the lower part of Central Arabia, as well as in the eastern and southern provinces which form the kingdom of Omàn. The latter is a very rich and beautiful province, the most beautiful part of Arabia I have seen, much resembling the Indian coast, and almost separated from the rest of Arabia by an enormous expanse of desert. Consequently, the Mohammedan influence has been but faintly felt there, and the people have maintained themselves in the old religion. Ethnological considerations may also have had

something to do with it; and these perhaps may be described on another occasion.

I must here mention the existence in Arabia of those circular ranges of huge stones, well known in some parts of England and Brittany, of which Stonehenge is a familiar example. Of such I met with one in the Kasim near the town of Rass; two enormous blocks, set on end, supported a third, so high that I passed under it on my camel's back; some blocks have a transverse mass across their top, others stand alone, many lie scattered in the valley. Those yet upright form the segment of a circle; their average height is about 12 to 14 feet. On my inquiry if similar ruins existed elsewhere, I was told of two others at some distance, but in the same province. The Arabs considered them as belonging to the ancient and gigantic races whom they believe to have once occupied the land; but could give no approximative date. Similar vestiges might, I feel sure, be discovered in the interior of Omàn, and other southern provinces.

Sir HENRY RAWLINSON said at so late an hour he should not attempt to detain the Meeting with any lengthened observations; but merely in a few words add his testimony to that of Sir Roderick Murchison as to the extraordinary merits of the address they had just heard. It contained an immense amount of entirely new matter to himself, and was as interesting as anything he had ever heard in that room. His own experience of Arabia was confined mainly to the upper desert during a residence of twelve years at Bagdad. He had come into contact with a great number of Bedouin chiefs from Jebel Shomer and other parts of Arabia; and he could bear witness to the minute accuracy of many of the facts which Mr. Palgrave had mentioned respecting them. Although it was not generally known, yet there had been previous instances of gentlemen travelling across Arabia. The first instance he knew was that of Captain Sadleir, who crossed from Katif, by Medina, to Jiddah. According to the tradition of the Arab chiefs in the north, he passed through absolutely as a bale of goods. He was consigned at Katif to the agent at Jiddah, and was passed from one chief to the other, labelled and receipted; and in that way he reached the opposite coast—as they might suppose with no very great advantage to science or geography. On another occasion three medical gentlemen came with Khurshid Pasha in 1838 and 1839. They crossed the whole penisula also; but they were merely with the army, and had not the advantage of coming in contact with the chiefs of the Bedouin tribes as Mr. Palgrave had. So that Mr. Palgrave might really lay claim to being the first traveller who had utilised his travels in Arabia. The practice of sun-worship was well-known to him. It existed in all parts, not only in the deserts of Arabia, but up to the Sinjars and Mardin hills. With regard to the other point, the worship of fire, he did not think that was a genuine Arab custom. He believed the people on the coast of Oman must have imbibed fire-worship from the opposite coast. The Persians, when they were overcome by the Mohammedans retreated, some of them to India; others to inaccessible places in the deserts where they could find refuge; and some, probably, to those precipitous rocks along the coast of Arabia from Muscat to Shohar. He could not think it was an Arab custom. The Sabæans of Arabia were not at all the same as the Mohammedan Sabæans. The people, that is, described by the Mohammedans as Sabæans, had nothing to do with the old Sabæans of Arabia; they were merely a remnant of the ancient Assyrian population, whose head-quarters were at Harran. Mr. Palgrave had also spoken of idolatry; the Arab books were full of accounts of idolatry in different parts of the country, and the Himyaritic Inscriptions testified to a general idolatry along the southern coast of Arabia. There was only one other point he should like to mention; it was in reference to the Arabian horse. He felt some interest in the subject, because he had brought home, and had still in his stable, what he considered and what was considered in the country a pure specimen of the El Nejed breed.

Mr. PALGRAVE: From whom did you get it?

Sir H. RAWLINSON said he brought it from Bagdad. It was a present. It might not belong to the chief breed, but it certainly is a Nejed horse. It is not one of those beautiful white creatures that Mr. Palgrave mentioned; but it is a bay, which appears to be a colour taboo in the chief's stable.

Mr. PALGRAVE: I saw none there.

Sir H. RAWLINSON remarked, the Nejed was an enormous province containing a third of Arabia, and of course there must be horses of different breeds. There may be different breeds of the Nejed, the same as there are of other breeds; and some of the horses that have come from Nejed are bay. He was particularly struck with Mr. Palgrave's description of the chief's stable, the merits of which he had often heard mentioned. He could only reiterate what Sir Roderick Murchison had said, that Mr. Palgrave's address was about as important and interesting as any he had ever heard in that room.

The PRESIDENT formally conveyed the thanks of the Society to Mr. Palgrave for his communications, which that gentleman briefly and appropriately acknowledged.

In adjourning the Meeting to the 14th March, the PRESIDENT felt himself bound to remark, that the extraordinary adventures of Mr. Palgrave, coupled as they were with such striking sketches of the inner life of these primitive Mohammedans, the Wahabites, fully entitled him, the President, to declare that, whilst this narrative had conveyed to the meeting much valuable knowledge, it had at the same time produced such a deep interest in all who were present, that it might be also set down as the Thousand and Second of the Arabian Nights' Entertainments.

[For further particulars relating to the subject of Mr. Palgrave's paper, see Rev. G. P. Badger's letter, and Mr. Palgrave's reply thereto, in "Additional Notices," pp. 97–105.]

Eighth Meeting, March 14, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Sir Frederick Halliday; Lord Gilbert Kennedy; the Hon. C. H. Tracey.*

ELECTIONS.—*Capt. J. P. Basevi*, R.E.; *Edward Blore, Esq.*, F.R.S.; *George Gladstone, Esq.; Major W. Goodenough*, R.A.; *Charles Lambert, Esq.; Rev. J. H. Marsden; Alfred Parish, and George Ridley, Esqrs.*

ACCESSIONS TO LIBRARY.—'Eight Years in Asia and Africa, from 1846 to 1855,' and 'Three Years in America;' by J. J. Benjamin. 'A Compendium of Mathematical Geography;' by A. H. Dick, M.A. 'The Naturalist on the Amazons;' by Henry W. Bates. Stevenson's 'South America.' Continuation of 'Transactions,' &c.

ACCESSIONS TO MAP-ROOM since last Meeting (Feb. 22).—New Zealand—Map of the Neighbourhood of the Waikato River. Sketch of the Ground at Rangiriri, showing the action of Nov. 20, 1863. Denmark—Island of Alsen, lithographed at the War Office, and presented through Sir E. Lugard. India—Chart of Bombay Harbour, and Report on the better Lighting of the Port; by Captain W. C. Barker. France—Plan of the Military Operations at Bayonne

in 1814, on rollers; presented by Sir R. I. Murchison. Atlas by H. Moll, on 62 sheets; presented by S. M. Drach, Esq. World, on Mercator's projection (printed in colours by Berghaus and Stülpnagel); by purchase. Atlas—Fortified Towns of Europe, on 25 sheets, 1565; by purchase. Africa—Five Views, coloured, of Free Town, Sierra Leone (Ackerman); by purchase. Atlas—Zur Industrie und Handelsgeographie, 3 sheets; by Drs. Klein and Lange. Netherlands—10 sheets of the Topographical Atlas; presented by Chev. T. Swart, H.C.M.R.G.S. Continuation of the Ordnance Survey Maps.

EXHIBITIONS.—Three larger-sized Photographs to illustrate Lieut. Palmer's Paper, viz.:—Town of Victoria, Vancouver Island; Treasury and Assay Offices, New Westminster, British Columbia; Holy Trinity Church, New Westminster, British Columbia.

The first Paper read was—

"*Vancouver Island; its Physical Geography, Climate, and Mineral Resources.*" By Dr. C. FORBES, R.N.

AFTER noticing the contradictory statements current as to our Pacific colonies in North America, the Paper described the abrupt character of the seaboard scenery of Vancouver, alternating with numerous fiord-like harbours, that had been worn in the metamorphic and trap rocks which form the basis of the island. The inland or north-eastern shore, on the other hand, is more undulating, attesting the existence of sedimentary rocks, chiefly carboniferous sandstone with occasional belts of limestone. The face of the country is almost uniformly covered with dense forest; but tracts of grass-land are occasionally met with, and lovely lakes and tarns abound. The very irregular configuration of the coast precludes the possibility of a navigable river being found anywhere throughout the island; what streams there are being usually winter-torrents, dry in summer, but with a little management capable of supplying water-power throughout the year—possibly to be utilised in the future for much-needed irrigation of many portions. Owing to the clay-subsoil, there are numerous springs "of excellent water."

After glancing at the geological structure of the island, the main feature of which is that it is occupied throughout almost its whole length by a backbone of trap, the author pointedly calls attention to certain strongly-marked features of glacial action, where ice-drift has scooped out the hard trap-rock, and deposited enormous areas of trap and granitic boulders, chiefly at the south-eastern

extremity of the island. These and their localized cognates furnish excellent building material in unlimited quantities.

The soils are:—1. Coarse gravel, bearing fine timber. 2. A calcareous loam of good quality, producing excellent crops of vegetables, and suitable for clover. 3. A rich dark-brown *humus*, which only requires subsoil drainage to produce the very heaviest crops of wheat and cereals.

As to hydrography, Dr. Forbes cited as exhaustive the admirable 'Sailing Directions' of Captain Richards, the present Hydrographer to the Admiralty, who has dwelt at great length upon the tidal irregularities of the sound separating Vancouver from the mainland. The author then invited attention to the very low temperature throughout the year of this portion of the Pacific, owing to the prevalence of Arctic-currents, and the numerous rivers fed by molten snows that debouch into it; its boreal character being indicated by the presence of numerous marine-shells, hitherto supposed to be confined to the Arctic zone. Along the western shore extends a chain of banks, stocked with abundance of excellent fish.

The climate of Vancouver Island in its general thermal conditions somewhat resembles that of England; but is modified by the low temperature of the ocean and the snowy mountain-chains, while even to the south-east the Olympus Range of Washington (U.S.) Territory, which run east and west, presents to the colony a northern aspect usually covered with snow. The result is that, till as late as Midsummer-day, there is a bright clear atmosphere with cold winds. The winter-frosts are occasionally very severe, but, as a rule, what is called an open winter is the characteristic of Vancouver—somewhat resembling that of the West of England. In summer the winds are usually south-west and north-west, and more rarely north; the latter hot and dry, owing to their having traversed the parched and heated soil. The autumn is of greater duration than that of Europe, in consequence of the Indian summer prolonging it. In brief there are two seasons, passably marked, a dry and wet, the heaviest rainfall invariably occurring at night. The whole surface may be roughly estimated at 12,000,000 acres (about four times the area of Yorkshire), of which only 1,000,000 are available for the stock-breeder and agriculturist. The most important position commercially and strategically is in Tooke district, abutting on San Juan de Fuca Straits, where the employment of a few steam-tugs would greatly facilitate the approach to one of the most commodious land-locked harbours on the entire coast.

Another available harbour which can be entered at all times, and possesses excellent holding ground, is Esquimalt Bay, which is

admirably situated to form the head-quarters of the Royal Naval force in the Pacific.

After describing Victoria, the present capital, and its harbour, which—being only accessible for large vessels at or near high-water, while the anchorage outside is unsafe—makes the site of the capital anything but well-chosen, the author records his opinion in favour of a short canal being constructed to connect it with Esquimalt Harbour already described.

The Paper then glanced at the attempts that have been made to open up a new route by the Sound, and up some of the numerous lateral fiords, to the Gold District, instead of the present difficult route up the Fraser. One of these is by Bentinck Arm, the other by Bute Inlet; but the officer detached reported unfavourably against both, though admitting that, being pressed for time, he had scant opportunity for examining whether a more available route might not exist. Should either of these be opened, Nanaimo, situate on a land-locked bay of the Gulf of Georgia, would become the great centre of business. The carboniferous deposit here has been proved by boring to extend to the depth of at least 84 feet, in which two thin seams of coal were passed through; and a good vein of copper has been struck, and is being worked. As, moreover, this point commands both these routes, it will become a great commercial station, whence steam-lines would radiate to the Russian settlements, and all the principal settlements of the Colony, as they could coal here at the pit-mouth. One single seam irregularly worked by the Hudson's Bay Company, with their scanty staff, has yielded 63,154 tons, valued at 8 dollars per ton, or 101,046*l*. The price is now 6 dollars at the pit-mouth, but a far larger quantity is being raised of late; 22,000 tons the first year, chiefly for San Francisco; and vessels of large size (one of 1500 tons) now frequent a harbour, where, except Her Majesty's ships, a few small trading-schooners were once the largest craft. The coal is hard and lustrous. This seam, which has been most favourably reported on by analytical geologists and practical men, is 3 ft. 10 in. thick, and has been found over an area which, supposing it preserves the same average, implies a supply of at least 1,000,000 tons. Beneath there are a 5 ft. seam and a 2 ft. 6 in. seam, the uppermost being found at a depth of 60 fathoms. Another carboniferous seam, possibly the same as that of Nanaimo, occurs at the extreme north-west point of the island, where Johnson's Straits, full of excellent anchorage for steamers, lose themselves in the Pacific; the country immediately to the south being a kind of prairie-land, little explored, and very imperfectly surveyed. The strata of coal lie here horizontally.

Somewhat similar features occur at intervals along even the precipitous west coast, where a Company is working another seam of coal.

Clayoquot Sound differs from all others in being beset at its entrance by banks and shoals, and has a sandy bottom instead of the usual mud. Barclay Sound is studded with islands affording good anchorage. At the upper end is a remarkable cleft, known as Alberni Canal, giving passage to the outlet of a chain of lakes, on a level plateau; on the opposite descent from which lies at a short distance, Nanaimo, already mentioned. At Alberni about 15,000,000 superficial feet of Douglas pine and other excellent planking, besides vast numbers of ships' spars, are turned out here by one firm alone (a London one), which has the honour of opening up to commerce the splendid timber of the region. To give an idea of the amount of the timber-trade here, it may suffice to state that in the first nine months of 1863, no fewer than 13,500 tons of shipping cleared hence with timber; the Americans claiming 7280. The markets were widely scattered; Europe, China, Manilla, and Chili being among those enumerated, besides the ordinary local demand. Ship-building, fish-curing, furs, oil, &c., constitute the staple branches of commerce from Barclay Sound.

Agriculture usually follows the same four-course rotation as in England, and the green crops are almost identical. The wheat averages 25 to 30 bushels to the acre.

There is ample employment for the rod and gun, and the hunter (as distinguished from the sportsman) will find in the forest plenty of opportunity for proving his prowess upon the puma, the bear, and the wolf, besides elk and various kinds of deer. The salmon here will not, according to Dr. Forbes, rise to the fly.

The Paper concluded by emphatically disclaiming that mere farming could for many years to come be regarded as a money-making speculation; but *tilling the soil himself*, the agriculturist might surround himself with every comfort, exchanging his dairy-produce and fruit against imported articles. The author, above all, cautioned the lower classes at home from emigrating in the hope of finding at any of the gold-fields what are called "Poor Men's diggings." That business has passed into the hands of a class possessing large capital; and, as a general summary, it may be broadly stated that the prospects of Vancouver are *prospective*—to be reaped by the first suitable emigrants and capitalists who can develop its resources.

The PRESIDENT remarked, that on many occasions we had had communications from medical men attached to our naval squadrons; but, during his connection with the Society, he recollected no occasion on which a Paper more replete with knowledge upon various branches of science had been pre-

sented than this of Dr. Forbes. He might have fancied that he was presiding at the Geological Society, so admirable were the observations of Dr. Forbes upon the geology and structure of Vancouver Island. Whether it respected the geology, the meteorology, the botany, or the statistics of that island, all these were so well combined in this Paper, that he had much pleasure in calling upon the Meeting to return thanks to Dr. Forbes for his valuable communication. He should not request any gentleman to address the Meeting until after the next Paper had been read, as the two subjects were intimately connected; and then he would first call upon Captain Richards, under whose orders Dr. Forbes had obtained his knowledge, and who had himself made an admirable survey of Vancouver Island.

The second Paper treated of—

The Geography of British Columbia and the Condition of the Cariboo Gold District. By Lieut. H. S. PALMER, R.E.

LIEUT. PALMER mentioned that since the first discovery of gold in British Columbia in 1858, fresh deposits had gradually been traced farther and farther northward, till ultimately the well-known fields of Cariboo had been reached, 500 miles from the mouth of the Fraser. Entrusted with the task of a general survey, he details the geographical outline of the colony, the seaboard of which extends 500 miles, protected throughout almost its entire length by Vancouver and Queen Charlotte islands. This seaboard is indented in the most extraordinary manner by deep bays and arms of the sea, presenting an extent of sheltered inland navigation, and an actual length of shore-line, such as are nowhere equalled on any similar stretch of coast in the world.

The most marked physical feature of the country, viewing it from the shore inland, is the parallelism of two mountain ranges with an elevated intervening plateau of rolling country 100 miles in breadth. The coast-line of mountains is known as the Cascade or Coast range, 120 miles wide, the western slopes of which are covered with the most magnificent forest. Its sea-front is everywhere bluff and abrupt and quite close to the shore, except where the Fraser falls into the San Juan Fuca Sound, when it recedes some 40 miles. The eastern side of the range is drier, the trees more scattered, and the general profile less abrupt. The principal crest of this chain is about 5000 feet above the sea, a peculiar characteristic being the almost entire absence of peaks. The rivers on the east side are naturally longer and less impetuous than those on the west, but occasionally some of them rise on the plateau, and thread the mountains till they fall into the sounds. Above some of these, glaciers are said to have been seen; but nothing authentic seems to be known on this subject.

The scenery of the table-land, which is well suited for pastoral purposes, is described in high terms; the rivers having occasionally hollowed out for themselves channels of immense depth, in which occur splendid cascades, some of which are mere fissures, others are met with in broad-terraced valleys, or in vales of gently undulating slopes, covered with grass and picturesquely dotted with yellow pines. Here and there are pretty sheets of water, which, like the rivers, are well supplied with numerous kinds of fresh-water fish. Above 3000 feet, the grass, which gradually gets less nutritive with the increased elevation, gives place to a universal mantle of dwarf fir. Here farming has proved moderately successful at an elevation of 2100 feet, but Lieut. Palmer doubts whether a considerable time must not elapse ere enough grain can be raised in the more sheltered and well-irrigated valleys, to admit of its finding a market at the mines or settlements. At present the insects are a severe annoyance to man and beast, but these will probably recede before man. The west side of the Fraser is rather more elevated and the rivers are fewer, but the east side is the most pleasant and desirable part of the colony.

Just beyond begins the second mountainous range, which extends without a break to the watershed of the Rocky Mountains, which as far north as the Peace River, flowing eastward, forms the eastern boundary of the colony on this side. The only portion of this unexplored region where white men are to be met, is Cariboo.

The Fraser, which drains one-half the entire territory, has frequent stretches free from rapids, where steamers of small draught can run; while from Fort Alexander down to New Westminster there is now excellent communication, passing through the most sublime scenery. A marked characteristic of the Fraser, in which it differs from every other river, is that there is no lake throughout its course; the flow of water is rapid, and the waters consequently dark and muddy. Another peculiarity, in which it resembles the Mississippi, is that the frequent accession of considerable volumes of water from large tributaries does not perceptibly increase its width till it approaches its mouth.

Cariboo lies in the elbow formed by the upper waters of the Fraser, and is bounded on the south by the Quesnelle River. A marked phenomenon is the confused congeries of hills of considerable altitude, from 6000 to 7000 feet high, thickly timbered, whence subordinate ranges radiate as centres. Each valley thus formed is the bed of a stream of more or less proportions, from the tiniest, called "gulches" by the miners, which may be jumped over, to respectable-sized rivers. All these have long since been "pro-

spected," every creek having been discovered to be more or less the site of the richest deposits of gold. A circle of three miles radius from the top of Bald Mountain contains five creeks, two of which are the most notorious gold-beds in the colony. Snowshoe Mountain contains the headwaters of no fewer than six of these within a similar area, the streams in every case radiating to every point of the periphery. The views from the summits of these mountains are described as splendid.

After adverting to the prospects and past history of the diggings, the unfavourable accounts of which, and of the colony, he, like Dr. Forbes, traced to their true source in ignorance of physical geography and most unjustifiably sanguine expectations, the author reverts to the phenomena above noticed; whence he draws the conclusion that these mountains have supplied the gold, and that they are so many *foci*, as it were, of the precious deposit. If this be true, he concludes that, even as it stands, Cariboo will be found the richest and most inexhaustible gold-field on the globe. He then remarks a curious fact, that the intrinsic value of the gold washed out of the creeks varies greatly within a very few miles; the difference amounting in some instances to as much as 8*s.* per ounce.

A succession of auriferous deposits have been traced, following the general trend of the main chain of mountains extending from the southern boundary of the colony to the Peace River, *i. e.* over 7° of latitude, while the extremities so far as ascertained lie between the meridians of 119° and 122° w.

The winter of Cariboo appears to be much more severe and porlonged than that of the coast or Vancouver Island, and will much retard the development of the mines, which are accordingly during that season "laid over," as it is termed—*i. e.* the laws enforcing the mode of working them, &c., are remitted for the time. The thermometer sometimes falls to — 35° c. (31° below zero of Fahr.), when of course nothing but underground claims can be worked. The thaw, which commences about April, renders Cariboo for a season anything but an enviable residence, owing to the rains and the steaming mists, while locomotion is all but impossible. In past years the trail at this season was loathsome from the numbers of horses that lay unburied after succumbing to the tremendous toil of conveying the first convoys of provisions.

Although for ten or eleven months in the year the country has a gloomy, cheerless aspect, August and September being the only bright exceptions, it is remarkably healthy. The sun is late of making his appearance, even in midsummer, owing to the hills enclosing the diggings on every side.

Of late 400 miles of excellent waggon-roads lead from Yale, the present head of steam-navigation, so that the entire distance from New Westminster to Cariboo can now be accomplished in from six to seven days. At the estuary of the Fraser, the author, in summing up, said that the winters somewhat resembled those of England, though the extremes were greater; and that the rainfall there is about 54 inches annually.

The PRESIDENT was glad Lieutenant Palmer had prefaced his account of the Cariboo Mines with a graphic description of the physical geography of the whole region. It was as clear an account in a small compass as he had ever heard given. The writer having alluded to himself, when speaking of the radiation of the gold-streams from the Bald Mountains, he had one observation to make. He hoped no gentleman would go away with the idea that gold *in situ* radiated after that fashion. These, as the author had explained, were only the streams that carried down the gold from the auriferous mountains in which it had been originally imbedded. The line which the gold-veins in the slaty rocks took, as laid down on the map by Lieutenant Palmer, was on the whole from North to South. Such too was the general line in the auriferous veins in Victoria, as delineated in the excellent maps of Mr. Selwyn; and the same remarkable fact occurred in the great continent of America. The great object of the two Papers was to put before the British public the truth respecting the geology, the geography, the climate, the minerals, and the advantages and disadvantages for colonisation of these regions. He was informed by Lieutenant Palmer that not more than one-third of the population of British Columbia was truly composed of British people; consequently, the Americans, who were very active miners, were putting a considerable portion of the gold into their own pockets, while our countrymen at home were not aware of the resources which awaited them there. In calling upon Captain Richards to speak to the merits of the first Paper, he took the opportunity of congratulating the Society upon the accession of so distinguished a naval surveyor as Captain Richards to the post of Hydrographer to the Admiralty, which had been so ably filled by the lamented Admiral Washington.

CAPTAIN RICHARDS, R.N., said he was happy to bear testimony to Dr. Forbes's Paper as conveying a very truthful idea of the country, and as affording a fair and not overdrawn picture of the prospects of intending emigrants to these colonies. Dr. Forbes was a distinguished geologist, and an accomplished general observer, and he had not failed in his endeavour to communicate to others the information he had gained during his long service in various parts of the world. He (Captain Richards) would particularly recommend the perusal of Dr. Forbes' Prize Essay on Vancouver Island to those who took an interest in that important colony; and he begged to add that it was with much pleasure and gratification he had listened to the high and well-deserved compliment paid to Dr. Forbes by their distinguished President.

After the Paper just read, it would be unnecessary for him to take up the time of the Meeting by any lengthened remarks on Vancouver Island, although, from having passed many years of his life in the exploration of its shores, he naturally felt much at home on the subject. It was evident that it was not destined to become a great agricultural country, though there were highly favoured spots of considerable extent which held out great encouragement to the farmer, and many of these were still unoccupied. But it was already a great commercial country, and daily increasing in importance. The rise of the British colonies in the North Pacific had not been, perhaps, so rapid, nor their resources

so speedily developed as those of the neighbouring countries to the southward; still their progress had been rapid, steady, and was secure beyond a doubt. Vancouver Island was most important in a geographical point of view, and its value to Great Britain could not be overrated. It was the head-quarters of the naval power of England in the Pacific, and was already a great coal and timber producing country. It was not too much to say that its spars were the finest in the world, and, though it might not be generally known, were now supplied to most of the naval powers of Europe. The fisheries also in due course of time would prove a source of great wealth to the colony. They had long been known, and now that the survey of the sea-coast had been completed, and the seaman knew where he could run for safety and shelter, they would soon become developed.

As regards the sister colony of British Columbia, no one was better qualified to speak than his friend, Colonel Moody, of the Royal Engineers. He (Captain Richards) was well acquainted with its coasts, and many of the advantages possessed by Vancouver Island equally belonged to British Columbia. Some little rivalry, perhaps jealousy, naturally existed between two colonies in such close proximity to each other; the one with a free port, the other dependent at present principally on its import duties for its revenue. But these would soon vanish. In his opinion, the two colonies would be mutually dependent on each other for their prosperity. British Columbia possessed a magnificent river, the Fraser, affording water-communication for 100 miles into the interior, with roads diverging to the different gold and agricultural regions, and which at no distant date would connect it with Canada. The tranquil character of this river, and its entire freedom from those dangers to which most others on this coast are subject, is entirely due to the position of Vancouver Island, so that a debt of gratitude is due to the smaller, though elder sister, on this account alone. He repeated that there should be no jealousy between the two colonies. Though mutually necessary to each other, their interests were widely different. British Columbia was a rich gold-bearing and extensive agricultural region, and would soon be second to no colony of Great Britain; while Vancouver Island, from its admirable geographical position, must always be the great entrepôt of commerce, and was already a powerful rival of that great emporium of the Western world—San Francisco.

The PRESIDENT, in announcing that Colonel Moody, of the Royal Engineers, under whom Lieutenant Palmer served, and who had occupied a high station in the region under review, was present, said, he hoped that a person so intimately acquainted with the country would favour them with his views on the subject of British Columbia, and its value as a colony.

Colonel MOODY said, in reference to the last observation of Captain Richards respecting the two colonies, that there was not the slightest local feeling in the matter. Captain Richards was a most disinterested person, and nobody had done more than he to keep down any feeling of rivalry between Vancouver Island and British Columbia. There were one or two points in Dr. Forbes's Paper which he should like to remark upon. One was with reference to the terminus of the railway, which, no doubt, would come one of these days. Dr. Forbes spoke, not too strongly, of the importance of and the future of Nanaimo. It was destined to be a Newcastle, a Glasgow, a Birmingham, and a Swansea, all in one: it would be an important place for manufactures. It was the seat of the coal, and it was where all the ores that abounded along the coast both of Vancouver Island and British Columbia would be brought. It would be the most important manufacturing town in the North Pacific. With regard to Victoria and Esquimalt, their future was entirely commercial. Touching the point for the railway terminus, it appeared that there were three chief points known at present: Bentinck Arm, to the north; then, Bute Inlet; and then, the mouth of the Fraser River. There were other inlets and gulfs which pierced the mountain ranges, and some of these might

afford opportunities for penetrating into the interior. For a railway terminus, however, Bute Inlet presented great difficulties. No doubt a good road would be made there some day; but he thought the terminus of railway communication would be, not at Bute Inlet, but at the mouth of the Fraser. There was really no other good line of country through which a railway could be carried, and from the reports he had received, and from what he had seen, he was happy to believe there were no physical difficulties which our engineers could not overcome in carrying a line of railway over the Rocky Mountains down to that part of the coast. Another point was—and as a soldier they would forgive him if his ears pricked up at hearing it—that the island of San Juan was not of military importance. It would be of military importance if it were fortified. If the Americans held possession of it, and left it as it was, it would be of no moment; but, if they should fortify it, they might make it a serious difficulty to us, for it would enable them to a great extent to command the passage to the mainland. He regretted to see the expression "the disputed island of San Juan" slipping into the newspapers both in England and America; for it was not that island alone, but the whole archipelago that was involved in the question. With regard to the pine-forests, there were very valuable pines on the coast of British Columbia and in the interior. The value of the timber could scarcely be exaggerated; great quantities would be sent to China, and much might be brought home. The size of the trees was extraordinary. He had measured numbers, and he made out that the average of the Douglas pine ranged somewhat over 300 feet in height. One or two measured 320 feet to where the top branches had been broken and splintered off by the trees falling; and where he left off measuring, the tree was as thick round as his waist. Settlers looked upon these trees with abhorrence, because of the difficulty of clearing the ground which they entailed; but the day would come when the trees would find their market value. On one occasion he was out riding with Governor Douglas, and they came upon the ruins of a great cedar-tree. Governor Douglas got off his horse, and, with a 3-foot rule, he measured the trunk about 5 feet 6 inches above the ground; and, although the bark had been burnt off, the tree measured 57 feet in circumference. This would give some idea of the vastness of these trees. According to an article in the 'Gardener's Chronicle,' based upon the meteorological journals kept in their camp, the climate round New Westminster might be compared with that of Chiswick; a greater quantity of rain fell, but there were not more rainy days; and the general character of the climate was as near as possible like that of Chiswick. Occasionally the winters were severe. The winter he was there was such a winter as we occasionally have in England when the Thames is frozen over. It is a thorough grain-ripening country. The farmer would rejoice in it, because almost every year he would be safe in getting in his hay and wheat crops. The seasons are well and clearly marked. There is no jump from winter to summer, as there is in Canada; but a regular winter, spring, summer, and autumn. There is a great deal of rain in the latter part of the year, and some fog in the winter. There is an absence of east wind, and, on the whole, it is a climate most suitable for a Briton. The healthiness of the country is something remarkable. These observations referred to the neighbourhood of New Westminster. British Columbia consisted chiefly of plateaux of different degrees of elevation; accordingly, there were many varieties of climate. Beyond the Cascade Range you get quite a different description of climate, where there is very little rain, and where it is very hot; the thermometer ranging to 90° and 95°, and sometimes to 100° in the shade. A certain description of *cacti* flourished there; rattlesnakes were found among the rocks, grapes ripened fully, and grain was winnowed in the open air. Though the winters are cold, cattle and sheep seem to thrive there; and, as there is not much wind, the sensation of cold is not felt. The bunch-grass rises above the average depth of snow, so that cattle can feed out of doors in the winter. It is

a common thing for the Indians and the packers, who take goods up to Cariboo, to send their horses to graze here in the winter, though the climate is much colder than it is in New Westminster. The character of the plateaux is very remarkable; they range from 2,000 to 3,000 feet high above one another, and when you are upon them, you are not conscious that you are upon mountain land. Another remarkable feature is that the principal valleys and the secondary valleys crossing them are rhomboidal, and the western escarpments are upheaved, so that they slope slightly to the east and upwards to the north. Thus they are placed *en échelon*, like columns of troops; they are not in a continuous series, but, in this *en échelon* form, ascending northwards.

There was another striking peculiarity which distinguished British Columbia from Vancouver Island. In Vancouver Island there is a great deal of rich black mould lying on a stiff clay; in British Columbia the general character of the soil is a light sandy loam. In summer time it is quite light; in winter you are conscious of a greasy feel, your feet slip in it. It is more like a barley soil in England than anything else. Under the application of the most ordinary operations of industry, with irrigation, the soil springs into the utmost fertility immediately, and the yield is abundant. Another singular feature is, that there is a line of soil running obliquely across the country in a north-easterly and south-westerly direction. On one side of that line you have the bunch-grass and the *Pinus ponderosa*, while on the other side of the line you have neither the one nor the other. This line follows the rhomboidal arrangement of the valleys that he had alluded to; and it is so remarkable that he requested his officers to note it whenever they came across it, and their reports showed that the line was as straight as possible. With respect to the future of the two colonies, he would take the opportunity of saying that the advance of one contributed to the advance of the other. Vancouver Island depended entirely upon maintaining its free port; it was adapted eminently to be the great commercial depôt of the North Pacific, and it could only be that for many years to come by maintaining its free ports. In like manner from the circumstance of Nanaimo being so well supplied with coal, and possessing a harbour so easily accessible, it, too, was destined to be a great manufacturing place. He considered Nanaimo the manufacturing capital, and Victoria the commercial capital of Vancouver Island. Vancouver Island could do with a very small revenue. British Columbia, on the other hand, required a large revenue, on account of the great public works that were required. She intended to carry out these works herself, but at present she required a loan from the old country, which no doubt would be repaid. The great works at present carried out had been achieved by Americans and Canadians. The contractors, who were Americans, borrowed the money in San Francisco. The Americans were eminently a pushing race, and he would take this opportunity of saying that the Americans were among the best subjects of Her Majesty in British Columbia. He for one should be very sorry, indeed, were they to withdraw. He believed that a great deal of the gold got out by the Americans was permanently invested in British Columbia, and that it was the intention of the Americans to become permanent residents there with their children. All that the country needs is greater confidence in her at home, and a more liberal, yet judicious, laying out of capital to develope her resources.

Lieutenant PALMER, having been asked by the President to narrate his experience among the natives, said, many reports had appeared in print as to the natives being murderous, yelling savages; but he could assert that such reports were mostly untrue. It could not be denied that sometimes the natives, exasperated by interference with their lands, their customs, and superstitions, had committed dreadful crimes; but they had become debased and degraded by the vices which they had learned from the white man. They were not by nature a blood-shedding people. He had travelled all through the

country, and he only once met with interference from them. When near the coast he gave unintentional offence to the natives with regard to their rights about the salmon. They became so troublesome that he had to expel two or three of them from the camp. He had no sooner done so than twenty or thirty who were sitting round rushed off to their lodges, and returned with an extraordinary collection of old fire-arms, all loaded and primed, and pointed at him. Knowing the character of the natives, he thought the best way was to approach them unarmed. They did not take their arms down, but they consented to enter into an argument, and then he felt sure he should soon persuade them that they were wrong. He succeeded in this; peace was declared, and he had to shake hands with the whole tribe, squaws and all. They became friends, and the leader of the tribe became a great friend of his, and was of great assistance in guiding him through the country. Before the termination of the ride, they were so pleased with him that they used their best endeavours to get him and his companions married into the tribe. As a general rule they respected "King George men." "King George" was the name in which in olden times the Hudson Bay Company impressed upon them the existence of a great white chief, George III., and since then the natives have ever recognised the British people as King George men. He found that by calling himself a King George man, or wearing a bit of King George lace, or saying that he was a friend of King George, he got them to assist him. They were a very harmless race, and he believed in a few years they might be improved, and made a peaceful people. At present they were still degraded. As faithful guides through the forest, and untiring bushmen, they were worthy of a great deal of our admiration.

The PRESIDENT, in conclusion, congratulated the Society upon the great amount of useful knowledge which had been elicited respecting British Columbia and Vancouver Island, and adjourned the Meeting to the 11th of April.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1.—*Extracts from Correspondence between* M. ROHLFS GÉRARD *and the Council.*

I. *Translation of Extract from a Letter addressed to Sir Roderick I. Murchison, President of the Royal Geographical Society, from* M. ROHLFS GÉRARD, *dated Oran (Algeria), 18th December,* 1863, *requesting pecuniary aid for a proposed journey from Morocco to Timbuctu.*

"Oran, 18th December, 1863.

"On my return from a tour in the direction of Morocco and the deserts of that empire, of which I traversed the provinces of Sus, Oued-Draa, the Tafilelt, Ertib, and Figuig, an account of which series of travels has been published by Dr. Petermann on one hand, besides being reproduced by M. Berbrugger,* editor of 'La Revue Africaine,' which appears at Algiers, I am at present preparing to start once more for the interior; and having, on what I may call my preparatory travels, obtained the necessary acquaintance with the manners and customs of the natives, I look forward to penetrating as far as Timbuctu.

* Now Honorary Corresponding Member, Royal Geographical Society.

"Having received from the Senate of the Hanseatic City of Bremen, my native city, a sum of 1200 francs (48*l.*), and unfortunately not possessing a similar sum myself, it seemed to me that you, better than any man, could appreciate the difficulties which must harass my progress with means so very limited. For this reason I have ventured to make application to the Royal Geographical Society for a little assistance in money. As my own Government has left me quite at liberty to lay out my own plan of travel, I shall for my part conform myself scrupulously to carrying out whatever instructions you may honour me with.

"As to personal reference, either the Senate of Bremen or Dr. Petermann will supply all necessary information.

"(Signed) ROHLFS GÉRARD."

II. A communication dated 15th January (not necessary to reproduce here) reached M. Rohlfs Gérard, informing him that the Council were debating as to the route he should follow, subject, of course, to all or any emergencies of travel which might compel him to deviate therefrom; and to this M. Gérard replies in a letter of the 24th January,—

III. *Extracts of which we now proceed to translate*:—

"Oran, 24th January, 1863.

"I had intended at first to set out direct from here—in other words from the oasis of the Algerian desert; but the Expedition recently equipped (however peaceable its intentions) for reaching Wargla and el Golèa has reawakened such hatred and mistrust of the people inhabiting the oases of Gourara, Towat, and Tidikelt against all Europeans—especially against all who approach from the French side—that it would be but labour lost to endeavour to penetrate thither. I should be exposing myself at the very least to meeting the same fate as MM. Colomb, Colonen, and Burine.

"I have therefore permanently decided on going *viâ* Morocco, which will be so far, that I shall find there persons who will assist me in holding in check the Oued-Draa, and with whom, in my way up, I renewed the ties of hospitality of other days. I shall therefore leave Oran by sea for Tangier; thence by Onegan for Fez, leaving which city I shall fall in with the Oued-Fez, whose source cannot be far from Djebel Marisan. I shall then cross Djebel Trit-el-Abbari; and thence following the river through the oases of Mdora, Ertib, and Tafilelt, I can decide which route to follow; because the caravans of the latter-named oasis proceed to unite with that which passes down the Oued-Draa, near the Sanio Nasria, and follows the road by which M. Réné Caillé returned in 1828. On the other hand, I might rejoin the caravan from Gourara and Tawat, which starts from Ain-Salah; but this is the route on which Major Laing was killed. As for myself, I prefer the latter, if practicable: on the one hand, that I should enjoy thereby the best chance of exploring the oases of Gourara, Tidikelt, Tinnini, and Tawat (for when I approach these from the side of Morocco, far less difficulties are interposed in the way of penetrating the interior than in coming from Algeria). On the other hand, it is well known that Major Laing left maps, &c., in the hands of the Tawarek, who keep up a good understanding all along the frontier-line from Ain-Salah to Timbuctu.

"Arrived at Timbuctu, a Merciful Father will inspire me which road to adopt for my return-journey—it is impossible, at this stage, to present any plans formed on so remote a contingency!

"As to the sum which the Geographical Society kindly proposes to advance me, I beg to state beforehand that, confiding in its well-known generosity, I shall accept whatever they present me with as a special benefit; but as I do not know what is their intention, I must not specify. The Society is,

moreover, aware of the means at my disposal, which have been materially diminished by the requisite purchase of necessary instruments, such as barometers, for transport, thermometers, &c.

"I would remark, finally, that whatever sum the Society send, it should be sent with all speed, in order that I may start immediately by joining the caravan for Timbuctu, which is on the eve of starting from the Great Oasis.

"Your obliged servant,

"(Signed) ROHLFS GÉRARD.

"P.S.—I trust I need hardly mention that if the Royal Geographical Society should not approve of the route above laid down, I should in everything follow as far as practicable its prescriptions, and avail myself of the collateral information it may supply."

IV. *Copy of Council Letter in reply.*

"SIR," "15, Whitehall Place, London, 10th Feb., 1864.

"I have laid your letters dated Oran, December 18th, 1863, and 24th ult., before the Council of the Royal Geographical Society. You ask in them for immediate pecuniary assistance in a journey you are about to undertake from Morocco to Timbuctu; and you give assurance that you will follow the directions of this Society.

"In reply, I have the pleasure to inform you that the Council have favourably considered your application. They are satisfied you will devote the same energy to your present undertaking, that brought your recent solitary journey from the Atlantic through Morocco to Algeria to a successful termination. They therefore place fifty pounds (50*l.*) at your disposal free from all conditions, save that you send frequent, full and precise accounts of your journey, together with copious collections of native itineraries, whenever opportunities shall occur of sending letters to Europe.

"Although the Council of the Royal Geographical Society abstain from hampering your movements by minute instructions, in a land where so much depends on accident, it would, no doubt, be acceptable to receive some remarks on the geographical importance of the several routes under your consideration. Nothing need be said of the way to Tafilet; but of the two routes you mention, southward from that place, the one that leads to Tawat is unquestionably the most important. The oasis of Tawat is, perhaps, the most interesting to travellers in the whole of the Sahara; and if you succeed in reaching it, you would act wisely by making a prolonged stay in its neighbourhood, and collecting all the information you can of the routes that radiate from it.

"Any considerable accession to our present knowledge of the Tawareek language would be appreciated.

"Of the routes you might pursue from Tawat, either is full of interest. The recovery of the long-lost papers of Major Laing, which may still be preserved by some chief on the way between Tawat and Timbuctu would be eminently desirable; and on the other hand, if the route to Timbuctu be found impassable, you should bear in mind that a journey through the Jebel Hogar to Ghaat (for Tripoli) would pass through an unknown and interesting district.

"I remain, yours faithfully,

"FRANCIS GALTON,

"(Acting) Foreign Secretary."

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2. *Communication on Mr. Palgrave's Paper.* By Rev. G. P. BADGER, F.R.G.S.

11th March, 1864.

AFTER listening to Mr. Palgrave's most interesting account of his adventures in En-Nejd, delivered at Burlington House on the 22nd ultimo, I was very desirous of eliciting from him some information regarding the Wâdi Aftân; but, as there was no time to do so at the Meeting, I drew up the following queries on the subject, which were subsequently submitted to him:—

"You mentioned a 'labyrinth of watercourses' near the coast between Hufhûf and El-Kattf.* Do you suppose that the water proceeds from the Wâdi Aftân, and has that wâdi, or river, an issue, as a stream, into the Persian Gulf?

"Was there any water in the Wâdi Hanîfah, and at what point does that wâdi, or stream, join the Wâdi Aftân?

"Did you hear anything of the principal sources of the Aftân? If so, where are they placed? Jomard supposes them to spring from the 'Aseir country, situated between the Hijâz and Yemen; in fact, he conjectures that the Wâdi Aftân (or river, as he calls it,) is a continuation of the Bisheh river, which, with its affluents, has its origin in the mountains of 'Aseir.

"There is another stream supposed to run into the Wâdi Aftân from the district of El-Harîk towards the south-east. Can you afford any definite information on the subject?"

Mr. Palgrave has taken such pains to answer these queries † that I very much regret not having availed myself more largely of his courtesy and experience. Before proceeding, however, to indicate several other doubtful points connected with the geography of El-Hassa, which the same enterprising traveller may find leisure to solve at some future period, I deem it desirable to state the grounds whereon my questions touching the hydrography of Central Arabia, with special reference to the Wâdi Aftân, were based. They are comprised in the following extracts from M. Jomard's Appendix on the Geography of Arabia, attached to M. Mengin's *Histoire Sommaire de l'Egypte*, under the head of *Cours des Eaux*. M. Jomard writes:—

"It is a very general opinion that Arabia possesses no rivers properly so called; that its streams are mere torrents; and that during the hot season the ravines through which they run are quite dry. . . . I am inclined to believe, however, that this idea is not to be received in an absolute sense. Arabian authors describe several rivers in Arabia. The Jihân Nâmeh places three in Yemâmah alone, besides two others flowing towards the east and north; and the Aftân of El-Edrîsi is a river with a very considerable course. It is quite certain, however, that none of these rivers is navigable.

"The mountains of Yemen have always contained, and still undoubtedly contain, many extensive basins, wherein the waters are confined by dykes. Of these, there are some of very ancient date, celebrated in the history of the country; and it is well known that the rupture of one of them (reference is here made to the famous dyke at Mâreb, to the eastward of Sanâa,) is an event of considerable importance in the annals of the period antecedent to Muhammed. This basin is supposed to have covered an area of eighteen miles, leading us to infer the existence of streams from superior heights as well as of large rainfalls. Without placing much reliance on the four rivers which Ptolemy so liberally bestows on Southern Arabia, it is undeniable that Pliny, Strabo, Herodotus, and Diodorus Siculus concur in placing rivers in the peninsula. And now, when it is positively known that Arabia possesses several

* Generally written *El-Kutaif* by Arabian Geographers.

† His reply is given in full at the conclusion of this letter.

fectly with Mr. Palgrave's account it should be carried farther north towards Kweit.

M. Jomard seems to have assumed that the Aftân flowed as far as El-Katîf, where it emptied itself into the Persian Gulf; but I find no such stream laid down in the latest surveys of that part of the coast, and Lieutenant (now Colonel) Jopp, who visited El-Katîf in 1841, and who speaks of good water being most abundant in the town, and waterpits in the sand as very numerous from El-Hufhûf to El-Katîf, does not mention any stream as occurring between the two places. Mr. Palgrave's researches lead us to conclude that none of the water of the district finds its way to the sea.

Taking up the subject of the Wâdi Aftân to the westward of Jebel Moghâzi, I find from Mr. Palgrave that the very name was almost unknown. El-Edrîsi expressly mentions it, though, with reference to M. Jomard's quotation from that author, I may remark that he is not justified in calling the Aftân "a river." The Arabian geographer styles it "Wâdi Aftân." Now, a *wâdi* means primarily a valley or ravine; secondarily, the bed of a stream; and lastly, the stream itself. In which of these senses he uses it in his description of El-Yemâmah is not obvious, but that of a river is undoubtedly the least probable. His words are, as translated from the original: "By El-'Ardh* in this country is meant Wâdi Aftân, which divides El-Yemâmah from top to bottom; and upon it are inhabited villages, extensive fields, date-plantations, and groves of trees." He then proceeds to give the names of thirteen of these villages, and remarks that they are contiguous to one another. Hitherto, the term "Wâdi Aftân" has been supposed to indicate a distinct valley; but a careful study of the foregoing quotation leads to the conclusion that El-Edrîsi considered it as synonymous with "El-'Ardh," which appears to have been the name of the valley in ordinary use in the country; and if "Wâdi Aftân" was not a common designation in those days, it is not surprising that Mr. Palgrave scarcely heard it mentioned by the present inhabitants.

The "El-'Ardh" of El-Edrîsi is most probably the same with the modern district called "El-'Aridh," and he perhaps took the name of the valley which he describes from the locality where it commenced;† for, according to Mr. Palgrave, it is from "Melka, near Deraiyyeh, in the Aaredh," that the "Wâdi Hanîfeh" splits into two branches: "one goes due east to Deraiyyeh, the other south-east to Riadh. These branches reunite a little below Riadh, near Selamiyyeh. Here runs in the Wâdi Solei, from the southern Yemâmeh: it begins near the Houteh. Thus, its direction is from south-east to north-west. The united valley now loses the name of Hanîfeh and takes that of Solei; then another (which I have forgotten), till it ends, on the skirts of Djebel Toweik, which it has thus traversed in all directions, at the wells of Oueisit, at about 60 miles from Riadh, and is utterly lost in the Dahnâ." This description of the continuation of the Wâdi Hanîfah from El-'Aridh, through the Wâdi Solei, to southern El-Yemâmah and El-Harîk coincides so fully with El-Edrîsi's El-'Ardh, or Wâdi Aftân, which he represents as bisecting El-Yemâmah from top to bottom, that I am inclined to consider the Solei as the actual representative of the ancient geographer's "Wâdi Aftân." The course or site of the valley so called in our maps to the eastward of Ed-Derâyah is occupied, according to Mr. Palgrave, by three wâdis, known respectively as the Farûk,

* He had mentioned El-'Ardh a few lines before in his Itinerary of the route between El-Yemâmah and Meccah, which begins thus:—"From El-Yemâmah to Meccah there is also a road, viz. from Yemâmah to El-'Ardh one stage," &c. Gabriel Sionita in his Latin translation of El-Edrîsi has attached the remark "i. e. Flumen," in a marginal note on the word El-'Ardh in the above quotation, which probably misled M. Jomard.

† In like manner Abulféda styles El-Kharj, the existing name of a district, "a Wâdi of El-Yemâmah."

Ghour, and Ghweir (a diminutive form of Ghour), and by a part of the Dahnâ.

Further: we now possess satisfactory evidence against M. Jomard's hypothesis respecting the course of the Bisheh and its suggested junction with the Wâdi Hanîfah. That river, we are led to infer, must be absorbed by the sands of the Wâdi Dowâsir, in the province of El-Aflaj, which wâdi, according to Mr. Palgrave, becomes entangled and ultimately loses itself in the Jebel Towaik. Taking this statement in conjunction with a subsequent one, "that there is no direct communication between the Wâdi Hanîfeh and the Wâdi Dowâsir," it would appear that the Jebel Towaik extends much farther to the southward than has been hitherto supposed, and that the course of the range in that direction is to the eastward of El-Aflaj and the Wâdi Dowâsir; for Mr. Palgrave says that the track leading to the latter place from Riâdh crosses the Jebel Towaik.

It is much to be regretted that our enterprising traveller was precluded from carrying with him any instruments whereby he might have been able to determine the position of different localities with scientific accuracy; nevertheless, his researches constitute a valuable addition to our present limited knowledge of central Arabia, and indicate several important errors in the existing maps of that region.

Returning to El-Hassa and El-Katîf, we learn from Mr. Palgrave that the watercourses which abound in those districts spring from the low mountain-ranges on the west, and he attributes their origin to the great central plateau of En-Nejd * proper, at an elevation of several hundred feet above the coast.† Now, if this supposition is correct, does it not seem highly probable that the numerous springs existing on the island of Bahrein, and especially on the reefs where fresh water rises out of the sea at a depth of from one to four fathoms, have their source in the same plateau? The island, or rather islands, of Bahrein are generally low, and are situated only fifteen miles from the mainland, nearly midway between El-Hufhûf and El-Katîf, and it is between those two places that the soil is described as being so saturated as to supply watercourses for irrigation which have to be crossed by small bridges made of date-sticks.‡ The question is an interesting one in connection with the hydrography of Arabia, and deserves a fuller investigation than I am competent to give it.

Another subject which merits further inquiry is connected with the comparative geography of El-Ahsâ, and perhaps Mr. Palgrave's recent researches may enable him to clear up some of the existing difficulties. The principal

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* *Nejd* means literally a highland.

† In like manner, if I remember rightly, Dr. Wallin was of opinion that there was a gradual incline from the uplands of the Nufûd to the shores of the Persian Gulf.

‡ This is the district known as *El-Ahsâ*, the original meaning of which aptly describes its principal feature, and was probably applied to it on that account. The word comes from the root *hâsa*, to drink, to absorb; and its derivative nouns *Hîsa*, *Hâsa*, (plural, *Hisâ* and *Ahsâ*) signify a low sandy soil where rain is absorbed, or a pit dug therein to procure water. The name is given to similar localities in other parts of Arabia. There is one of these springs on the mainland of Aden Back Bay, supplied by a mountain torrent in the interior, which is called the *Hâmoah*.

I find this supposition of mine respecting the origin of the name as applied to the district of El-Hassa or El-Ahsâ corroborated by Abulfêda, who remarks, speaking of that locality:—"It is said in the *Moshtarik* that *Ahsâ* is the plural of *Hisâ*, which means *sand*, into which the water sinks, and proceeds until it comes to the hard earth, which retains it; in this the Arabs dig and draw out water. *El-Ahsâ*, therefore, has become the proper name of a place among the districts of the Arabs."

places on the coast of that district, as marked on the modern maps and charts, are El-Katîf and Jilla Ojair,* and in the interior Hufhûf or Fîf.† ‡ The district appears still to be called El-Ahsâ, but we find no existing town with that name, although both Jilla Ojair and El-Hufhûf are sometimes interrogatively marked as occupying its site.

The following quotations comprise what the principal ancient Arabian geographers and travellers have recorded on the subject:—

El-Edrîsi (A.D. 1150) says, "El-Ahsâ is a town on the Persian Gulf facing Awâl.§ It is a country of the Karâmata, and is a fine town. As to the city of El-Kutaif [El-Katîf], it is close to the sea, and is in itself large. From El-Kutaif to El-Ahsâ are two stages; and from El-Kutaif to Hamas, which is on the Persian Gulf, are two days."

And again: "To the north [of 'Ammân *i.e.* Omân] is the country of El-Yemâmah, and one of its cities is Hájar, which is now in ruins. Therein resided the Queen Yemâmah in her time. . . . . And from the coast of Hájar to Basra there is a road by the shore, but it is unfrequented."

Abulféda (cir. A.D. 1300) describes El-Ahsâ as "a small city, abounding in palms and running water, and its springs are very hot. And El-Ahsâ [here he appears to refer to another town of the same name] is in the desert, and is in a south-westerly direction from El-Kutaif about two stages. Its date-groves are as extensive as the vale of Damascus and surround it on all sides. [Then follows the passage about the derivation of the word *El-Ahsâ*, given in a foot-note in a preceding page.] This is the Ahsâ of the tribe Beni Säad of Hájar, and is a residence of the Karâmata in Bahrein. It is also said that the Ahsâ of the Beni Säad is a different Ahsâ from that of the Karâmata. El-Ahsâ has no wall, and between El-Ahsâ and El-Yemâmah is a distance of four days."

Ibn Batûta, who was cotemporary with Abulféda, and who visited those parts A.D. 1322, says: "I then travelled to the city of *Kutaif* (as if it were a word of the diminutive form from *Kutf*). It is, however, a large and handsome place, inhabited by Arabs of the Râfidha sect, extremely enthusiastic, publishing their sentiments and fearing no one. From this place I proceeded to the city of Hájar, which, however, is now called El-Hasâ. We have here a greater abundance of dates than is to be found elsewhere, and which are used as fodder for the beasts. The inhabitants are Arabs of the tribe of 'Abd el-Kais. From this place I travelled to El-Yemâmah, which is also called Hájar, a beautiful and fertile city, abounding with water and gardens."

We readily recognise the El-Kutaif of the foregoing extracts in the modern El-Katîf; but where are we to place the two El-Ahsâs; since it appears tolerably certain that in former times there were two towns of that name: one on the coast two stages from El-Katîf, which seems to be that visited by Ibn Batûta, and which had originally been called Hájar,‖ and one in the desert, in a south-westerly direction from El-Katîf?

The place now known as Ojair, which is two stages from El-Katîf, and is described as the principal port of the district of El-Ahsâ, although it can boast of only forty or fifty dwellings besides the fort, corresponds, as to site, with the old maritime town of El-Ahsâ. The modern name also appears to con-

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* *Jilla* is the Bédawy pronunciation of *Kalâa* or *Kalâat*, a fort or castle.

† I am not certain about the correct orthography of this name.

‡ The route between the two latter places was traversed by Lieutenant Jopp in two days, and that between Hufhûf and El-Katîf in four days, and he estimates the distances respectively at 35 and 70 miles.

§ The principal island of the Bahrein group.

‖ Apparently the same Hájar mentioned by El-Edrîsi as in ruins when he wrote, for that also was on the coast.

firm this identification; for I think it not unlikely that the *Ojair* of our maps should be written *Hojair* (the diminutive form of Hájar), the original designation having in the course of time undergone a change just the reverse of that which has occurred in the case of El-Katîf. But how are we to account for the disuse of the later name of El-Ahsâ? Or, is Ojair still known by that name to any of the Arabs in the neighbourhood?

Abulféda locates the El-Ahsâ of the desert two stages to the south-west of El-Kutaif. I know of no existing town in that direction which can be identified with it unless it be El-Hufhûf, but that is four stages from El-Katîf. Granting, however, that much stress is not to be laid on the discrepancy in distance, is the modern town of El-Hufhûf ever called El-Ahsâ, or have the people there any traditional account of the site and history of the old town of that name?

Lastly, El-Edrîsi mentions a maritime place called Hamas, two days distant from El-Kutaif. I find no such name in the latest surveys of the Persian Gulf.

I submit the foregoing queries and suggestions in the hope that Mr. Palgrave or some of the officers of Her Majesty's late Indian Navy may be able to elucidate them.

Before concluding, I shall venture an observation or two on some remarks made by Mr. Palgrave in the course of his spirited narrative delivered at Burlington House, and I feel persuaded that that gentleman will pardon the friendly criticism. He stated, if I remember rightly, that the prince whom he met at Sohâr was the ruler of 'Ammân; that Sohâr was the capital of that province, and not Máskat; and that the title of *Imâm* was improperly applied to its sovereign,—that it was not indigenous, and was first conferred on the then reigning prince by Albuquerque.

All this is incorrect. Sohâr is the capital of a small province of 'Ammân which is dependent on Máskat; and its present governor, Seyyed Toorki, is a younger brother of Seyyed Thoweyni, the recognised ruler of 'Ammân, to whom he is subject.

Before the arrival of the Portuguese, Nezwah, a city situated two days inland from the coast, was the capital of 'Ammân and the seat of its chief. After the expulsion of the Portuguese from Máskat, the successive native rulers made that place their capital, and it continues to be the sovereign's residence up to the present day.

The original title of the rulers of 'Ammân was *Seyyed*, or Lord; but some, for special reasons, were styled *Imâm*, as Arabian history fully testifies. The late Seyyed Sa'îd's father was so distinguished, and is always called "Seyyed Sultân, El-Imâm," or "El-Imâm Sultân" (Sultân was his proper name). Seyyed Sa'îd never acquired that title from his own people, but Europeans having become accustomed to it through their intercourse with Máskat during the reign of Imâm Sultân continued to use it, and still frequently apply it to the existing ruler Thoweyni, although by the people of 'Ammân and by the Arabs generally he is simply styled "Seyyed."

Reply to the Queries of the Rev. G. P. Badger.

Having passed a considerable time in, and journeyed slowly through, the region in question, I reply, that, as far as I could make out, whether by myself or through the natives of the country—

1. The very name of Wadi Aftan (in the localities where maps place it, as in their neighbourhood) is almost unknown, the corresponding site being occupied by the valleys known as the Wadi Farouk, Ghour, Ghöweir, and part of the Dahna.

2. The watercourses of the Hasa and of Kathif spring, the former from the low mountain-range extending from S.S.E. to N.N.W., from below the Schāabeh and Hofhouf towards Koueit (though it does not reach it), and is called the Djebel Moghazi where it ranges highest (near Djoun); and the latter from the hills above Kathif, a small range nearly parallel with the coast, and the highest point of which is called Djebel Moscharrif.

Now, as the former mountain-chain (that which limits the province of Hasa to the interior) cuts across the imaginary course of Wadi Aftan nearly at right angles, the waters of that valley (did it exist) could never reach Hasa, much less Kathif, but would have to flow S.S.E. or N.N.W., and thus would go parallel to, not into, the Persian Gulf.

In fact, the Wadi Farouk, in its ultimate termination of the Ghour, is here stopped, and comes to an abrupt end as far as its easterly direction is concerned.

3. Wadi Hanifeh is ordinarily deprived of water *above* the ground-level, though the numerous wells all along it attest abundance of water at a very slight depth (varying from about 8 to 20 feet). When the water *does* flow, which happens occasionally in the winter, it is only for a few days, and as a torrent. Much rain fell about the 24th Nov. (1862), while I was at Riadh, in the valley, and no water flowed. But the people said that it did *sometimes*.

Wadi Hanifeh is a valley of a Y shape. It has a double origin; but both branches belong to Djebel Toueik. The first originates between the Kasim and Sedeir (but is considered as belonging to the latter province), near Zulfeh, and comes down from N.N.E. to S.S.W. as far as Shakrah in the Wochem. Here it joins with another valley, which originates below Oueizeh in the Kasim, near Douwademeh (these towns are somewhat misplaced on the map), and runs from E. to W. to Schakrah, where it joins the other. A smaller valley comes in from Kouac, on the Nejed pilgrim-road, running from S.W. to N.E. All this forms the Wadi Hanifeh, which begins, properly speaking, at Shakreh. It then runs S.E.E. to Melka, near Deraiyyeh in the Aaredh. Here it splits into two branches; one goes due E. to Deraiyyeh, the other S.E. to Riadh. These branches reunite a little below Riadh, near Selamiyyeh. Here runs in the Ouadi Solei, from the southern Yemamih; it begins near the Houteh. Thus its direction is from S.E. to N.W. The united valley now loses the name of Hanifeh, and takes that of Solei; then another (which I have forgotten), till it ends on the skirts of Djebel Toueik, which it has thus traversed in all directions, at the wells of Oueisit (at about 60 miles from Riadh), and is utterly lost in the Dahna.

Hereabouts it *ought* to join the Wadi Aftan; but, as I have already said, *that* valley does not exist. Besides, the nature of the Dahna, loose, shifting hills of sand, here extending over a breadth of 25 to 30 miles, precludes any real *valley*. It is not till one has *crossed* the Dahna and the high open grounds beyond it (here called the Nefoud, though quite different from the Nefoud between the Djouf and Djobbeh both in character and in locality) that one finds the Wadi Farouk running, it is true, from E. to W., but only for a short distance—about 15 miles, I should think, guessing by camel-pace.

4. From all this it is evident, that (A) no sources can be found to the Wadi Aftan, or to any corresponding valley, even though under another name. for there is *none;* (B) that the Wadi Hanifeh, which really fills up (at least in its continuation of Wadi Solei) a *part* of that line, has its origin partly in the N.W., in Sedeir, and partly in the W., below the Kasim. And by that *latter* direction it *does* run on, as numerous Arabs of the country told me, as far as the Meghasil, on the Mekka frontier.

But below the mountains of Aasir, and near Kelaat Bischa, commences the long Wadi Dowasir, which then runs from S.W. to N.E. till it entangles, and ultimately loses itself in the Djebel Toweik, in the province of Afladj, about

three days (camel-journey) to the s.w. of Riadh. I visited that province (the Afladj), and can affirm that there is no direct *valley* communication between the Wadi Hanifeh (and consequently the Wadi Solei and supposed Aftan) and the Wadi Dowasir. So that the valley-line up to Kelaat Bischa and Aasir is cut off. There is a track indeed which leads thither from Riadh, but has to ascend the Djebel Toweik.

5. As for the valley from Harik, I have already mentioned it. And I have too much reason to know it, having lain hidden for three anxious days in one of its winding recesses. It is the Wadi Solei. The Arabs say that beyond Harik, to the S., it is lost in the Dahna, or great sandy desert of the S. Of which (D.V.) more hereafter.

Note.—In *all* the *true* Nedjed (which consists of the provinces of Sedeir, Wochem, Afladj, and Aaredh—in a word, in the mountainous plateau, of an oval form called Djebel Toweik, and *excludes* the Yemameh, Khorj, and Harik to the S., Hasa to the E., and Ouadi Dowasir and Kasim to the S.W. and N.W., all these provinces being only called Nedjed, *improperly*, and by a sort of aggregative confusion), I have met with only *one* running stream—I mean running even in summer, and not as a mere winter-torrent. This one privileged stream was in the interior of the province of Sedeir, and high up in the steppes of Toweik. It had its rise at about three hours' distance from Mejmaa, the principal town of the province. Poor little thing! flowing out of its dark pool between its narrow and stony banks, it seemed almost as much surprised at finding itself thus straying to a distance from its source as I was at seeing it. Nor did it go far; the gardens of Djeladjil, at a short day's distance, being destined to absorb it—happy, doubtless, in thus devoting its brief existence to the service of one of the most ancient towns of Central Arabia.

Nor did I hear of any other. As for the water-springs, often very abundant, of the Hasa and Kathif, they belong to quite another level, that of the sea-coast. Their origin is doubtless in the waters of the central plateau—there absorbed under ground, and here bursting out into daylight at a level of several hundred feet below the Nedjed. Those of Oman, again, belong exclusively to its high mountain-range, from which they reach to the sea. And a few of them, as well as all, or almost all, of Hasa and Kathif, are of a very high temperature. Omm Sabaa, a large source to the north of Hofhouf, at about 6 miles' distance, is so hot as hardly to permit one to dip one's hand in it.

W. G. PALGRAVE, S. J.

Paris, 3rd March, 1864.

P.S.—It is a curious coincidence that I had been much prepossessed with the idea of Wadi Aftan and looked forward to exploring it. But when, from the heights above Riadh, I first saw (on the morning of 13th Oct., 1862) the long blue range of Djebel Toweik far in the E., stretching due N. and S. between us and the Hasa, as far as eye could reach, I felt my hopes fade away; and my subsequent explorations only confirmed the effect produced by the first general and distant outline of that region. W. G. P.

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3. *Notes on the Language of South Africa.*

Extract of Letter from le Command. DON JORGÉ DE FIGANIÈRE, H.C.M.R.G.S.

(Communicated by the Chevalier Duprat, F.R.G.S., H.M.F.M.'s Consul in London.)

I AM persuaded there is no similarity between the two languages of Angola and Mozambique.

For the study of the languages "Ambunda" and "Congueza," we have the following works:—

'Dictionary of the Bunda's Language, or Angolense; translated into Portuguese and Latin.' Lisbon, 1804.

'Collection of Grammatical Observations upon the Bunda Language of Angola; to which is added a Brief Dictionary of the Congueza Language; to which is added a Fourth Column, containing the Words of the Bunda's Language similar to those of the Congueza.' Lisbon, 1805.

Each work was composed by Friar Bernardo Maria de Cannacatim, Apostolic Missionary of the Angola and Congo Mission.

'Art of the Angola Language.' Lisbon, 1697. By the Jesuit Pedro Dias.

'The Nation of Angola sufficiently instructed in the Mysteries of our Holy Faith.' Lisbon, 1642. By the Jesuit Antonio de Conto.

'Christian Doctrine, newly translated in the Language of the Kingdom of Congo, by order of Padre Matheus Cordozo, Theologist of the Company of Jesus.' Lisbon, 1624. Published at Rome in the year 1650.

'Explanation of the Christian Doctrine in Portuguese and Angolense, for the use or the Missions in the Interior of Angola.' Lisbon, 1855. Reproduction of another in Latin, Ambunda, and Portuguese, printed in the year 1784, supposed to be in Rome; with a print by Francesco de Saelis Ferreira; and an Appendix, forming a Guide of Conversation in the two languages, Portuguese and Angolense.

With respect to the languages of Mozambique, Sebastião Xavier Botetho, at page 386 of his excellent work 'Statistical Memorandum upon the Portuguese Dominions of Oriental Africa,' printed in 1835, has the following: "As it is very difficult to discover the origin of the languages spoken by the various people of Oriental Africa, we are of opinion, founded on the best authority, that the Caffre language is the common origin of the languages of all this region, but divided into so many dialects that the various tribes are almost entirely unintelligible to one another."

When the Arabs took possession of this part of the globe, they gave to the nations the name of Caffres, or Unbelievers of the Koran, and at the same time imposed on them their habits and their language, which is very different from the language spoken by the Moors of Morocco and of all the Barbary coast; so that we now find considerable similarity between many Arab and Caffre words.

Generally, the Caffre dialects are composed of words very short, sweet, and sonorous, as they are very rich in vowels, simple, and open, pronounced with a sharp accent on the penultimate syllable; not through the nose nor guttural, with the exception of the Hottentot's dialect, which is spoken through the nose and the throat, some of these being even pronounced with a whistling sound entirely unknown in European languages. The dialect of the Caffres of Santa Luzia river, in the territories of the King Capela Inyack and Matola, and at the Bay of Sourenço Marques, is derived from the dialect Makove, having all of them their common origin in the language of Hottentots; they keep the nasal sound as well as the guttural, but they differ in the accentuation and termination of the words.

The natives of Inhambane, the Landins, and those who inhabit the low and high "Quiteve," pronounce their words with greater suavity, and their dialect is a mixture of the language of Monamotapa and Matibana. All the Caffre inhabitants of the lands near the mountains of "Lupata" have dialects derived from the Monomotapa, such as the dialect Mongo, used by the Caffres who live near Rios de Senna; the dialect Bororo, used by the Caffres of the same name who inhabit the lands between "Rios di Senna" and "Tete," the most civilised of all the Caffres, and the only one that observe some rules of syntax in their discourses; the dialect Moviza, which is almost the pure Monomotapa, because those Caffres traffic continually throughout all that immense region; the dialect Maravi, the population using which inhabit one-half of that large tract which extends to Algoa.

The natives of the kingdom of Zinganissa, Cotango, and Abutua speak, with very little difference, the Monomotapa language. It should be noted that this language is more cultivated than all the others, as it can boast of particles.

The Caffres of Tete, Senna, and Quilimane have dialects derived from this same language, mixed with words of other dialects of Caffres in the neighbourhood, but with so little affinity that they do not understand one another. Of all the dialects of the Caffres, but very few are understood away from the territories that they inhabit.

At Quilimane, in the interior and along the coast, are the territories of Matibana, now incorporated in the kingdom of Macua; and farther in the interior there is the kingdom of Mojan, comprehending an immense territory extending to the coast of Mozambique, possessed by a great many chiefs, as far as the neighbourhood of Melinde, and southward to the mouth of the Zambezi river.

All these Caffres, by contact with the Arabs of Quitangonha and Sancedo, with whom their territories are conterminous, and by the neighbourhood of the Portuguese, to whom they are subjects and tributaries, have mixed their language, which is Monomotapa, with Arabic words and Portuguese, altered in the terminations, augmented with particles so various that each of those people has a particular dialect, except the Macuas, who live near the sea, whose language is also that of the Caffres of Quilôa, Sofala, and Mozambique. Near the kingdom Macua is that of Maurusa, a savage nation, which in the sixteenth century invaded Quiloa, Melinde, and all the coast of Zanzibar. Their language is entirely unknown, and quite different from all the others in accentuation and pronunciation. The general opinion is that it is derived from the Macua, Hottentot, and Arabic language, as spoken by the Caffres of Mogadoxo, Tungene, and as far as the coast of Mombaça (Mombas), in the middle of which are situated their territories; besides, the language Majojo, spoken by the natives of Mombaça, Tungue, the islands of Zanzibar, Pemba, Monfia, Angvane, Comoro, and Mulali is a mixture of the dialect Macua and of the Arabic idioma, but very much corrupted. The inhabitants of our islands of Cabo Delgado speak this dialect with very little difference.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

[ISSUED 29TH JUNE, 1864.]

SESSION 1863–64.

Ninth Meeting, April 11th, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*F. S. Fitzpatrick, Esq.; Capt. Lamorock Flower; S. Keir, Esq.; E. Blore, Esq.*

ELECTIONS.—*Sir Victor A. Brooke, Bart.; A. H. Dick, Esq.*, M.A.; *Richard Fort, Esq.; Henry Jeula, Esq.; W. W. Kiddle, Esq.*, R.N.; *James Laforest, Esq.; Rev. John Mills; Hon. Leopold Powys; Hon. C. J. Powys; Richard A. L. Phillips*, M.A.; *W. R. Taylor, Esq.*; *Edward Thomas Wakefield, Esq.*, M.A.

ACCESSIONS TO LIBRARY.—'Notes of a Cruise in H.M.S. *Fawn*, in the Western Pacific, in the year 1862, by T. H. Hood.' 'A Sketch of Assam, with some Account of the Hill Tribes, by an Officer in the H.E.I.C.'s Bengal Native Infantry, in Civil Employ.' Continuations of Transactions of various Societies, &c. &c.

ACCESSIONS TO THE MAP-ROOM since the last Meeting, March 14, 1864.—Denmark: Plan of Düppel, with its Fortifications.—Nörrejylland, Plate 8, presented by the War Office, through Sir Edward Lugard.—Kaart over Slesvigs Fastland, scale $\frac{1}{120000}$, on 3 sheets. Admiralty Charts, up to publication.

The PRESIDENT said the Secretary would read a short communication upon a subject which had attracted some attention among geographers, as to a lake having two issues. Various papers upon the point had appeared in the 'Athenæum' and other journals; and the gentleman who made this communication mentioned two instances of the kind, which had come under his own observation in Norway.

MR. SPOTTISWOODE then read the following

Letter from EARDLEY T. BLACKWELL, ESQ., *to* SIR RODERICK I. MURCHISON.

8, Upper Park Place, Richmond, March 14th, 1864.

SIR,—My attention was called last summer to certain letters in the 'Athenæum,' questioning the accuracy of Captain Speke's assertion, that the great lake "Nyanza," in Central Africa, had more than one outlet. I see also that this subject is touched upon in the Proceedings of the Royal Geographical Society, issued the 25th of February this year.

It has been represented to me that mention should be made of a fact, known to myself (and probably to others in this country), that lakes having more than one outlet occur in Norway.

The most interesting of these lakes is called the "Lessöe-vœrks-vand," lies under 62° 13′ north latitude, and is close to the high road connecting the valleys of Gulbrandsdal and Romsdal. The considerable rivers "Lougen," and "Rauma," escape from opposite ends of the lake, the latter reaching the Atlantic by the Romsdal's fjord at Veblungsnœs; while the former, after a longer course in a south-easterly direction, eventually joins the Glommen, which enters the sea near the Swedish frontier.

Thus the whole of Norway south of these rivers may be said to be an island.

I should mention that the sheet of the Norwegian Government Map (Amtskart) showing this, is in my hands in England; and I shall be happy to send it to yourself, or to any other gentleman desirous of such confirmation of my statement.

I remain, Sir, yours with the greatest respect,

(Signed) EARDLEY T. BLACKWELL.

The PRESIDENT said that, at a former meeting of the Society, Colonel Lefroy mentioned cases in North America with which he was perfectly well acquainted, and other gentlemen had affirmed that there were lakes in different parts of the world that had two issues. It must constantly happen, where the watershed is at no great elevation, that the determination of the water to one side or the other is a phenomenon that might easily occur.

MR. DUNCAN thought the case just recorded hardly bore reference to the outlets we had heard of from Captain Speke. The outlets were both in one direction, while most of those we had heard of flowed in different directions.

The PRESIDENT said, Captain Speke had never asserted that there were two distinct outlets in one direction; he only examined one outlet himself, the other he only heard of from the natives. It rested, therefore, upon no real authority that the two outlets had the same direction.

The first Paper read was—

1. *On an Overland Expedition from Port Denison to Rockingham Bay in Queensland.* By A. J. SCOTT.

Communicated through the COLONIAL OFFICE.

THE Expedition, which was under the leadership of Mr. Dalrymple, was undertaken with the object of ascertaining whether there was the possibility of establishing a dray-road from the Valley of Lagoons to Rockingham Bay, which the writer described as a first-class port, only 75 miles distant from the Lagoons; while Port Denison, the present port of shipment, is upwards of 200 miles. The Paper was accompanied by an official letter on the subject of the expedition,

from his Excellency Sir George Bowen to the Duke of Newcastle, from which the following are extracts:—

"The station occupied by Mr. Scott and his partners, on which they have already placed above 25,000 sheep and cattle, is situated at a distance of more than 1000 miles from Brisbane, in the fine pastoral country surrounding the 'Valley of Lagoons,' on the basaltic table-land first discovered by Dr. Leichhardt. This rich and beautiful *plateau*, though so far within the tropics (the Valley of Lagoons lying between the 18th and 19th degrees of south latitude), enjoys a healthy and delightful climate, owing to its considerable elevation above the level of the sea. In June Mr. Scott found the water of the Lagoon sometimes frozen over in the morning with ice that would bear a pebble thrown on it. The present port of shipment for the Kennedy District is the town of Bowen, at Port Denison, distant above 300 miles; while Rockingham Bay is distant less than 100 miles from the Valley of Lagoons. Foreseeing that it would become an object of vital importance to the settlers in the northern part of the Kennedy District to have a nearer port of shipment, I carefully examined the neighbouring coast in September, 1862, in conjunction with the late Commodore Burnett, on my return in H.M.S. *Pioneer* from my expedition to Cape York. Commodore Burnett was of opinion that there are two good anchorages in Rockingham Bay, at either of which a port might be opened. It remained to discover a gap practicable for bullock-drays in the mountain-range which runs parallel to the coast, and this was the main object of the expedition described in the enclosed Report. A ship will shortly be despatched to meet another overland party at Rockingham Bay, where a new port will probably be opened in the course of the year 1864."

The Paper, after describing the overland course from Port Denison to the Valley of Lagoons, proceeded to narrate the journey in search of a passage through the coast-range. A detachment of the party first marched to Mount Lang, 30 miles distant from the Lakes, with a view to ascertaining from its summit the most practicable route. Mount Lang is a hill composed of basaltic rock and lava, rising abruptly to the height of about 800 feet from the table-land. Mr. Scott supposed it to be the crater of an extinct volcano, and mentioned having three times crossed streams of lava flowing from the northward into the Valley of Lagoons. Deep fissures and chasms occur frequently in these streams, some of which are full of water, green, clear, and of immense depth; the vigour of the vegetation proving that there must be perennial water everywhere beneath. The trees are of great size, and an infinite variety of

flowering shrubs, some of them of great beauty, clothes the sides and the tops of the lava-streams. On reaching the summit of Mount Lang a clear view of the coast-range to the east was obtained, distant about 40 miles, and a low gap was discovered, towards which the whole party then directed their steps. The needle, when placed on the rocks, was found to be deflected four points easterly,—a circumstance which Mr. Scott believes to have led Leichhardt to place Mount Lang several miles too far to the westward. The region between the Lakes and the coast-range is undulating, and consists of open forest country, with long narrow plains, and rich abundant pasture. In traversing it they met with several camps of natives, who resort here to hunt kangaroos, and who are a fine, athletic race, of much lighter colour than the natives of the south. In some of the camps representations of men and women in the attitudes of the "corroboree" were seen, drawn with a sharp stone on the inside of box-bark. About 9 miles from the junction of the Great Antill Creek with the Burdekin they came upon a chain of lagoons, the southernmost of which, about 3 miles in circumference, was named by the party "Lake Lucy." Beyond this the travelling became very difficult, owing to the boggy nature of the soil; and at a point distant only 20 miles from the Pelican Lakes (their first starting-point) the party were compelled to retrace their steps to the Valley of the Burdekin in search of a more practicable route to the north-east. The valley of the river itself seemed to offer the desired opening. It averaged about 2 miles in breadth. Numerous lagoons, covered with water-lilies of various kinds, lay along both sides of the channel, and there was most excellent pasture. The country on the tops of the ridges which bounded the valley was of a very inferior description, the grass being worthless for pasturage and the timber stunted. During two days they were obliged to travel along the valley, but afterwards, finding the ground more firm on the tops of the ridges, they ascended, and thus advanced 25 miles to the north-east. At this point they came upon a branch of the Burdekin flowing from the south-east, and found extreme difficulty in fording it, owing to the boggy nature of its banks. From their encampment on the right bank of this stream they heard the distant roar of waters, which was afterwards ascertained to proceed from a cascade 20 miles away. Continuing their course next day, 15 miles to the north-east, among the hills of the coast-range, they encamped at a point where a view of the sea was obtained, Goold Island being distinctly visible. A deep gorge was then seen stretching to the north-west, between their position and the highest part of the coast-range; the sides were precipitous, and about 1000 feet high.

Through this gorge flows, in its course towards Rockingham Bay, a large river, which Mr. Scott supposed to be the same that formed the large waterfall in escaping from the table-land through the coast-range. The party now descended in a thick fog to a small valley at the foot of the range. On following the stream flowing through this valley for a few miles, they discovered that it must be one of the heads of the Burdekin; so the obvious inference was, that they might have followed the river up to this point without crossing the range at all. The country now opened out, and a succession of lightly-timbered forest-ridges was seen, abundantly grassed and watered by small streams. They continued their journey to the south-east, and at a distance of 15 miles from their previous encampment passed over to the watershed of Rockingham Bay. The land on the coast was flat, and apparently swampy. In the range was an opening formed by the valley of the large river, already mentioned, flowing from the westward. Mount Lang bore a little to the north of west, and Goold Island nearly due east. To the south-west Mr. Scott could trace the valley of the Burdekin the whole way to the Pelican Lakes, by which a road might be obtained without any obstacle. It was impossible, however, to reach the coast, owing to the impenetrable tropical jungle extending on all sides; an attempt was made, but they were obliged to desist, and finally to return to the station in the Valley of Lagoons. The author concluded by declaring the intention of himself and party to undertake another journey for the purpose of opening a road; adducing, in proof of the necessity of the road, the rapid progress of settlements in this extremely rich pastoral district. In three years the stations of the Queensland colonists had been pushed forward 500 miles towards the north, and a territory as large as the British Isles had been during the last two years more or less densely occupied by the flocks and herds of the squatter. In another year the advancing settlements would reach the shores of the Gulf of Carpentaria.

The PRESIDENT said that the Paper was of great value, not only from the character of the gentleman, who is a Fellow of the University of Oxford and a settler in the country, but from the very clear manner in which he had described the products of the country. He had proved himself a good geographer in determining all the positions that he visited, by latitude and longitude. It was a valuable addition to our knowledge of Australia, and showed how inviting a field for colonisation Queensland must be. The author stated that the climate agreed well with Europeans, and that large flocks of sheep are thriving in that very latitude in which some gentlemen thought sheep could not flourish.

SIR CHARLES NICHOLSON suggested that the discussion should be taken after the next Paper had been read.

The second Paper read was—

2. *A Communication from* SIR GEORGE BOWEN *to the* DUKE of NEWCASTLE. Containing Reports upon the Formation of a New Settlement at Cape York, at the Northernmost point of the Australian Continent; and upon the completion of the Survey of the Inside of the Great Barrier Reef, off the North-east Coast, by Commander ROBINSON, R.N.

Communicated through the COLONIAL OFFICE.

THE suggestion of a station near Cape York was made by Sir George Bowen, Governor of Queensland, in a despatch of 4th April, 1860; and the Lords of the Treasury and Admiralty having concurred in the general project, his Excellency and Commodore Burnett (the senior naval officer in Australia) received instructions to visit the district with a view to ascertaining the best site for an establishment. The voyage of inspection was made on board H.M.S. *Pioneer* in August to October, 1862, and the result was communicated in a series of reports, from which the following are extracts.

SIR GEORGE BOWEN relates that having embarked in Moreton Bay on 27th August, and fallen in with the south-east trade-wind, the *Pioneer* made a good passage under canvas, inside the Great Barrier Reef, to Booby Island, in Torres Straits, the farthest limit to the north-west of the jurisdiction of Queensland. From the 10th to the 22nd September the ship was at anchor near Cape York, principally in Evans' Bay and Port Albany, during which time he and Commodore Burnett carefully examined the neighbourhood of the north-eastern point of the Australian continent. They came to the conclusion that the proper site for the projected settlement was Port Albany, which combined almost all the required advantages. Close to the landing-place was found good and safe anchorage, sheltered from all winds, for a limited number of vessels: while whole fleets might ride safely at anchor, at no great distance, in Evans' Bay during the south-east monsoon, or in Newcastle Bay during the north-west monsoon. There is also abundant pasturage, good soil for gardens, and plenty of timber, stone, and lime, both on Albany Island and on the mainland, from which the island is separated by a deep channel only one-third of a mile broad. The temperature was remarkably cool for the tropics and healthy for Europeans, the thermometer marking never above 85° during the expedition. Above all, a plentiful and evidently never-failing supply of fresh water was found, although their visit was at the close of an unusually dry season. Near the north-east point of Albany Island a rill of pure water, fringed with flowering shrubs and grasses, trickles over the cliff into a small natural reservoir, which was

named the "Fountain of Arethusa," from its close resemblance to the Homeric fountain in Ithaca. The place chosen for the proposed settlement was on the bank immediately over the anchorage at Port Albany; but the future town—destined, perhaps, to be one day the Singapore of Australia—would doubtless grow up on both sides of the narrow channel separating Albany Island from the mainland. It would be named Somerset, in acknowledgment of the readiness with which the present First Lord of the Admiralty had lent his aid to an undertaking of such great importance to the interests of the British Empire in Australia. Very friendly relations were established with the small tribe of aborigines frequenting the neighbourhood, and the party were enabled to communicate with them by the help of the excellent vocabulary of their dialect printed in the Appendix to the 'Voyage of H.M.S. Rattlesnake.' Their physical characteristics differed in no essential respect from those of the same race elsewhere; but their arms, canoes, and other implements were of a somewhat better description. The general aspect of the coast along which the *Pioneer* sailed, in the voyage to and from Cape York for nearly 3000 miles, resembled that of Southern Italy and Greece. The mountain-ranges of northern Queensland have much of the picturesque outline and rich colouring of the Apennines in Calabria, and of the hills of Eubœa and of the Peloponnesus; while the group of islands through which they threaded their way often reminded them of the isles of the Ægean and Ionian seas.

COMMODORE BURNETT reports that, having decided to examine first that part of the mainland of the northern extremity of Australia which lies to the westward of Cape York, inside Endeavour Strait, the *Pioneer* proceeded, on the 10th September, from Booby Island to an opening on the said mainland in longitude 142° 12′ 20″, which proved to be too shallow for the light boats to get more than one mile up in salt water, although the *Pioneer* (drawing 12 feet) anchored within two cables' length of its entrance. Hence, on the same day, the ship was taken to and anchored within the channel of Dayman Island, inside of which Simpson's Bay is marked on the Admiralty chart. During the 11th September lines of soundings, taken across Simpson's Bay, showed that it is a worthless anchorage, full of shoals and very irregular soundings, and fit only for very small craft. The whole south coast of Endeavour Strait is very sandy close to the sea, with numerous salt-water creeks, into some of which light boats may get. From the appearance of the mouths of many of them, and from the grass growing near them, he felt satisfied that a great deal of fresh water must find its way by them to the sea at certain seasons. From the 12th to the 15th September the ship was

anchored at Evans' Bay, the country about which was examined, and small supplies of fresh water found in holes (*i. e.* native wells), in the two positions only marked in the Admiralty plan of the bay. Whilst anchored here he visited what has been described in the 'Australian Directory' as "Mew Rivulet," but found the water perfectly salt. Evans' Bay was a moderately good but contracted anchorage, with poor holding-ground, and quite exposed to winds from the north-east and east. The ship then proceeded to Port Albany, and Albany Island was traversed in all directions. He found, in company with Sir George Bowen, numerous springs of excellent water, which appeared to be never-failing, although the dry season was at this time at its height. Albany Pass was a spacious and fair roadstead, with nowhere more than 13 fathoms at low water. Port Albany is convenient for large steamers, and its adjacent bays on Albany Island are good and safe for small craft. The mainland from Bishop Point to Vallack Point was next examined. In Shallow Bay no fresh water was found. In Somerset Bay fresh water seems good and abundant at two places. In Freshwater Bay was found abundance of fresh water breaking through the sand at different parts of the beach, and also small streams apparently coming from swampy ground. The best site for the first establishment of a healthy station would be on Seymour Point, Albany Island. This point is not commanded by any height near it, and has open forest country close inland from it on Albany Island.

MR. WALTER HILL, Director of the Botanic Gardens of Brisbane, who accompanied the expedition as botanist, states that he carefully examined Albany Island during three days, and found it upwards of three miles in length and one mile in its greatest breadth. Its outline is irregular, from the number of bays with small rocky headlands. The land consists of three-fourths open forest, the rest being scrub. Several hundred acres of the open ground have scarcely a tree upon them, and are thickly covered with excellent grasses suitable for grazing purposes. The greater part of the soil consists of red sandy loam, mixed with small ironstone nodules, and varies from 6 to 15 inches in depth. In addition to grazing capabilities, there are several spots where the soil is well adapted for the growth of most useful vegetable productions. The rocks are either a stratum of ironstone in irregular masses, or a very coarse sandstone. The latter is suitable for building purposes. On the eastern side of the island are large beds of coral, of the best description for making lime. During three other days he extended his researches to two or three miles into the interior of the mainland opposite Albany Island. One important result was the finding of two fresh-water

streams, about 8 feet wide, and running in different directions: one emptying itself about one mile from Fly Point, the other nearly opposite Port Albany. The latter waters a fine valley, where trees grow in great luxuriance. Along the valley are some beautiful clear flats, with fine open forest ground. The soil of these flats is of great depth, and consists of black loam. The variety of trees on the mainland is much greater, and they are of a better description for building purposes than those found on Albany Island. Between Mount Bremer and Evans' Bay, close to Cape York, there is a belt of scrub and a tract of forest. The soil here consists of rich black sandy loam, about 24 inches in depth. The soil at Evans' Bay is not adapted for the cultivation of any plants that are used for commercial purposes, on account of its general sterility; but fresh water of excellent quality was found in two native wells in the scrub at the back of the beach.

CAPTAIN ROBINSON, commander of the *Pioneer*, subsequently addressed several communications to Sir George Bowen on the subject of the new settlement, and also on the inner route for vessels inside the Great Barrier Reef. In the first, dated May 10th, 1863, he describes the manner in which he had executed the mission entrusted to him of planting fruit and cotton trees on Albany Island; concluding by saying that this work would, in one or two years, prove of inestimable value to mariners and crews of ships passing from all portions of the world, who, without diverging 5 miles from their course, would then obtain the supplies they most need, and which cannot now be obtained at a less distance than 1500 miles. In the second letter, dated July 2nd, 1863, he describes the advantages which the inner route offers to the colonists of Queensland. He first reverts to the publicly-expressed opinion of Commodore Burnett, that the Great Barrier Reef, hitherto regarded by seamen as a bugbear, was one of Queensland's greatest blessings, being a natural breakwater to the South Pacific Ocean, and making the intervening sea from the Percy Islands to Cape York *one great and secure harbour*. The greater safety of the "inner" over the "outer" route appears to be allowed by everybody; but it was supposed to have a disadvantage in ships being obliged to anchor five or six times, causing a loss of time. But there is in reality no loss of time, and it is better to have the trouble of anchoring five or six times in secure waters than to endure the anxieties of the outer route, where, after all, anchoring has to be resorted to three times, exposed to the ocean-swell, which sets with much violence against the reef. According to the 'Australian Sailing Directory,' twenty-one days is a fair passage from Sydney to Booby Island by the "outer route," and twenty-five to thirty

days a fair passage by the "inner route;" but the shortest passage known was performed by the inner route, namely, by H.M.S. *Rattlesnake* and two merchant-ships, which cleared Booby Island on the twelfth day after leaving Sydney. The advantages and facilities are very great for the establishment by a colonial company of a line of steamers to run fortnightly between Sydney and Singapore, *viâ* the "inner route," and Cape York.

The PRESIDENT said he was happy to find that the views of Sir George Bowen, the enlightened Governor of Queensland, were sustained by such great naval authorities as had been quoted, and particularly by the Hydrographer to the Admiralty, Captain Richards, whose report upon the subject he was sure would be considered of national value.

SIR CHARLES NICHOLSON said the difficulties which were encountered by Mr. Scott in endeavouring to get from the coast-range down to Rockingham Bay were precisely those which might have been predicated by any one at all conversant with the physical geography of Australia. The great coast-range, extending from Cape York on the north, down to Wilson's Promontory on the south, exists with scarcely any interruption, forming an abrupt escarpment towards the sea, and gradually trending off to the plains in the interior. In colonising the country from the coast the great difficulty has always been to get over this great barrier. The first colonists of New South Wales occupied the country in the neighbourhood of Sydney for twenty-five years before they were able to get across the Blue Mountains. It is only on two or three points, where rivers make their way to the coast, that access is afforded into the interior. One of these points is the valley of the Fitzroy River; there is a depression there in the coast-range, and facilities are afforded for getting into the interior plains of the country. It was this difficulty of getting across the dividing range which led to such disastrous results in the expedition undertaken by Mr. Kennedy, who ultimately perished in his exploration farther north. The description given by Mr. Scott and his companion Mr. Dalrymple, who is well known in the history of Australian expeditions, is confirmatory of the statements made by Leichhardt, who first discovered the country, and who gave the names quoted by Mr. Scott, the Lynd, the Mitchell, the Gilbert, and the Burdekin. Leichhardt described this central country as of surpassing beauty, and as consisting of basaltic table-land. He was afraid Mr. Scott rather under-estimated the difficulties of getting from the dividing range down to the coast; probably the only way would be to approach from the coast upwards, following the course of some river which found its way into the sea at that point. It was interesting to observe how rapidly the process of exploration and occupation is going on in this magnificent region. He was afraid almost to speak of its future destinies. He had had opportunities of seeing considerable portions of Australia, and he had never seen any part which impressed him so much with its vast capabilities as the southern part of Queensland. No doubt there would be difficulties with reference to the climate. It was impossible to ignore the fact that it is a tropical region, and if agriculture is to be pursued in that country, he believed it would not be by the Anglo-Saxon population, but by some Asiatic race, probably the Chinese.

The PRESIDENT: But as a pastoral country?

SIR CHARLES NICHOLSON: As a pastoral country, no doubt, it could be occupied by Europeans. Unfortunately, the rivers which fall into the Gulf of Carpentaria have bars at their mouths; therefore, unless more easy access were found into the interior, it was not probable that any towns would be formed there. The most likely place for a settlement on the Gulf of Carpentaria

would be at Investigator Strait. He was glad to find that so much emphasis had been laid upon the utilising of the magnificent route for navigation on the east coast provided by the Barrier Reef, extending a thousand miles in length, and securing tranquil waters and freedom from the annoyances and dangers of a sea-voyage. Government had been somewhat remiss in not establishing more actively a line of steam-communication by this route. Progress, however, is being made. We have now steam all the way round along the south coast, and up as far as Port Denison. The next point would be Rockingham Bay, and then Cape York; and then they would see what a short distance it was from Cape York to Timor, with which the Dutch Government has a fortnightly steam-communication. The Dutch Government had just made a contract with an English Company for a line of steamers to traverse regularly the whole of the islands with which they have connexion in the Eastern Archipelago. As these steamers would come within a short distance of the coast of Australia, it would be an opprobrium and scandal to the English Government if they did not take the opportunity of extending steam-communication up to that point. He also hoped that Government might be induced to take some steps with a view to the exploration of New Guinea.

CAPTAIN RICHARDS said, on his return from America, a short time since, he had permission to come home by way of Australia, on purpose to pass through the inner route, with the view of forming an opinion as to its practicability for navigation, and also respecting the formation of a settlement at Cape York. He passed through the route, and he considered it a very easy route, free from any difficulties in the way of navigation. The action of the Government in sending out an expedition a few months ago on purpose to establish a colony at Cape York, and to maintain communication between it and Moreton Bay, was one of the most important things that had been undertaken for the last fifty years. Until that settlement was established the country to the north could not be opened, for there was no nearer outlet at present for the produce of the country than Moreton Bay and Port Denison. He knew Mr. Scott very well; he was a wealthy and an enterprising man, and a first-rate wool-grower. He met him at Brisbane; and he also saw Sir George Bowen, and he might be allowed to say that too much credit could not be given to him for all that he had done for the colony.

The PRESIDENT asked if Captain Richards was of opinion that the inner route was the preferable one.

CAPTAIN RICHARDS said that he preferred the inner route himself. There was no doubt, as soon as there was a settlement at Cape York, that steam-communication would be established with Moreton Bay. He thought it very probable, however, that mail-packets from Singapore would take the outer route, and that the inner route would be taken for the eastern coast navigation. The attempts made to colonize North Australia during the last twenty-five years had failed because of the want of communication with other parts of the world, but now everything was favourable in that respect, and he thought the present attempt was made in the right place. Ten years ago Brisbane was a village; it had now a population of 50,000 people. Port Denison had been established two or three years, and in five or six years it would perhaps be as populous as Brisbane. There was another point at Endeavour River favourable for a settlement; and he believed in twenty years' time the whole coast would be as thickly populated up to Cape York as it was at points lower down. It was his opinion, and he believed it had been proved, that it was in vain to attempt the colonization of a country until that great precursor of civilization and commerce had been achieved, viz., the nautical survey of its shores. Twenty years ago this inner passage from Cape York to Moreton Bay was the most intricate in the world; now it was as easy to navigate as the English Channel. Silently but steadily this great work had been progressing during these long years, and it was undeniably one of the most gigantic and splendid undertakings ever carried out by

any nation. It had been accomplished by Captains Blackwood, Owen Stanley, and others, whose names in connexion with it would never be forgotten. He was glad to recognise among those present Commander Evans, one of the most able and eminent of those officers who had laboured in Torres Strait with the late lamented Captain Francis Price Blackwood.

The PRESIDENT was sure they had listened with great attention to what had fallen from Captain Richards. He believed with that officer that comparatively few persons were acquainted with the labours of the distinguished men engaged in the nautical survey of this coast. They were not unknown, however, to the true geographer, who would ever cherish the recollection of these bold and scientific seamen, by whose labours these coasts had been rendered navigable to all the nations of the earth. He was particularly grateful to Captain Richards for having called attention to the feats of his predecessors, which had been admirably brought to a completion by Captain Richards himself.

MR. J. CRAWFURD said he believed it to be impossible to colonise tropical regions with the Anglo-Saxon race. They were too hot for Europeans to inhabit and multiply in. Sir Charles Nicholson admitted that it would be necessary to get Chinese to do the labour. It would not be a European colonisation, where the majority of labourers were Chinese. There would be two distinct races; the Chinese would be the helots, and we should be the masters. It was said the thermometer was never higher than 85°, but they had not been told how low it fell.

SIR CHARLES NICHOLSON said it had been stated that the creeks were covered with ice at Table-land.

MR. CRAWFURD said that the Table-land was only 2000 feet high, consequently the fall of the thermometer could never be more than 4° or 5°. With respect to the question of sheep and wool, and cattle, he must confess he was surprised to hear of the vast flocks that were being driven up to the fifteenth degree of latitude. He ventured to say that at the fifteenth degree of latitude, even at 2000 feet above the level of the sea, no great quantity of wool would ever be produced. He admitted that the sheep would thrive there, get fat, and furnish a large carcase; but why should it produce wool, which it did not want? The expectation of forming a second Singapore at Cape York seemed futile, for what produce were the steamers to get there? Cape York would only be of advantage as a port of call to British ships passing through Torres Straits. With reference to establishing steam-communication with the Dutch possessions, why Timor, the nearest island, was 1000 miles distant.

CAPTAIN EVANS said there was one point deserving of interest in connexion with the settlement at Cape York, and that was New Guinea. About 100 miles from Cape York were the mouths of a vast river, which he in vain endeavoured to ascend with his ship owing to the shallowness of the water. The boats went up, and they found a large population, and the country abounding in sago and palm, and magnificent forest-trees. The houses of the natives were 300 feet long. Of this country, so near to Cape York, we knew nothing, except that there was this river, whose mouths extended over 60 or 100 miles of coast-line. The opening up of this country, viewed in connexion with a settlement at Cape York, was a point that ought not to be lost sight of.

MR. SAUNDERS thought the observations of Mr. Crawfurd as to the impracticability of the north coast as a place for settlement by European labourers ought to be taken into consideration. When Governor Bowen proposed to form a settlement at Cape York, were we to understand that he meant such a settlement as we had at Brisbane, where persons could take 40 or 50 acre lots, and work them by their own labour? He imagined that no such course would be practicable along the northern coast. Nobody ought to think of going to the northern coast who had not been well seasoned in the southern part of Australia. He protested against any proposal that would have the effect of sending out the

poorer class of persons, who would have to labour with their own hands, to the northern part of Australia. He saw no objection to sending out capitalists, who had the means, if they did not like the country, to leave it. There was ample room for the investment of capital in stock; for we could not doubt the statement of Leichhardt that his cattle fattened along the road, sustained as it was by the evidence of squatters. He did not think Cape York would ever be a place of trade; a great many ships might pass, but passing ships did not make a trade. We had to look for the development of the trade of Northern Australia in those parts to which ships could penetrate the farthest into the mainland, whence to draw their exports; and it was the bottom of the Gulf of Carpentaria that would be the great seat of the export and import trade of North Australia. He believed the Liverpool River was the place most worthy the attention of capitalists for settlement, to the north and west of the Gulf.

DR. KINKEL said Mr. Crawfurd had maintained that wool had never been grown in a tropical country, or in a country possessing the natural conditions of the north of Queensland. He thought Egypt was a country the temperature of which agreed very much with what we knew of North Queensland. Now, in Egypt not only had wool been grown, but we were able to prove that the oldest woollen stuffs in existence had been manufactured in Egypt. The rugs surrounding the bones of a mummy in the British Museum—the king who built the third pyramid—were of wool. Again, it was almost certain, from the paintings of the ancient Egyptians, that the covers of their horses were woollen rugs. The existence of sheep in Egypt at a time previous to the invention of linen was proved by paintings found by Lepsius in the tombs of the officers of the Fourth Dynasty, at least 2000 B.C.

MR. DUNCAN said the navigation of the inner route of the Great Barrier Reef was of great importance to the mercantile marine. No doubt it was available for steamers and men-of-war. Last year he lost a fine ship in the outer passage, and he had been listening attentively for information respecting the practicability of the inner passage for sailing-vessels. Of course, much would depend upon the prevailing direction of the winds, and he should like to have some information upon this point.

CAPTAIN RICHARDS said the inner passage was perfectly clear and navigable, and the wind was fair for nine months in the year. Charts and sailing-directions had been published, so that no ship-master could be at a loss.

The PRESIDENT, in closing the discussion, said that those who had been in the country really thought that sheep could thrive up to nearly 18° of latitude, approaching to the southern end of the Gulf of Carpentaria. He must do Mr. Saunders the justice to say that on former occasions he had spoken of the southern part of the Gulf of Carpentaria as a good place of settlement for English colonists. Between that point and Cape York there was a great difference of temperature. That difference did not depend entirely upon latitude; for it was a matter of fact that the cooling properties of the vast plateaux of land near the head of the Gulf of Carpentaria did limit the heat to such an extent, that he had no doubt, from what he had heard from colonists who had sheep there, that wool might be grown and that Englishmen might live in those regions; but not at the extreme northern point to which they were now invited to go. Up to about 19° north latitude, he was sure there was room enough for all our extra population for many years to come.

He took that occasion to express the deep regret of the Council and himself at the death of their excellent Treasurer, Mr. Robert Biddulph; and stated that, as it was absolutely necessary for the transaction of the business of the Society that a successor should be immediately appointed, they had, subject to the sanction of the Anniversary Meeting, appointed Mr. Reginald T. Cocks, to fill the vacant post.

The Meeting then adjourned.

Tenth Meeting, April 25, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Henry Jeula, Esq.; Dr. O'Callaghan; Richard A. Long Phillips, Esq.*

ELECTIONS.—*Charles H. Allen, Esq.; Edward L. Betts, Esq.; Lieut. L. M. Carmichael; Major Henry Drew; Hugh Falconer, Esq.*, M.D., F.R.S.; *Sir Richard G. Glyn, Bart.; Robert Carr Glyn, Esq.; Charles Harding, Esq.*, F.R.S.; *Wilson Lloyd, Esq.; David L. Morgan, Esq.; Thomas Ogilvy, Esq.; Le Chevalier Joaquim de Almeida Portugal; F. S. Powell, Esq.*, M.P.; *Thomas R. Quicke, Esq.; Arthur C. Ranyard, Esq.; P. M. Tait, Esq.*

ACCESSIONS to LIBRARY.—A complete set of Castlenau's Works, 15 vols. folio and 8vo.; presented by C. R. Markham, Esq., F.R.G.S. Continuations of Transactions of various Societies, &c.

ACCESSIONS to MAP-ROOM.—New Zealand: Otago; by J. T. Thompson, Esq. (2 copies). Australia: showing Stuart's Route across the Continent; by E. Weller, Esq., F.R.G.S. McLeod's Middle-class Atlas.

EXHIBITIONS.—Seat and Canopy of the King of Dahomey; presented by Commodore A. P. E. Wilmot, C.B., African Station.

The PRESIDENT called attention to the new large map of Africa upon the wall, which had been prepared in the Map-room of the Society, under the superintendence of Capt. C. George, and which denotes all the recent discoveries in that region of the globe. He remarked the improvement on the former map, which is now worn out from constant use.

In connexion with the first Paper to be read, the President stated that at the opening of the present session he had called attention to a very touching and interesting letter from Mrs. Petherick, describing the very great difficulties that herself and her husband had encountered in endeavouring to reach Gondokoro, to establish that communication with Captains Speke and Grant which it was the object of the Society to accomplish. The present communication is the long-expected diary of Mr. Petherick himself. It is accompanied by a registration of the observations, astronomical and otherwise, made by himself and Dr. Murie, his travelling companion, and also by a detailed account of his expenditure, and so forth, in the management of the expedition which was entrusted to him.

MR. SPOTTISWOODE then read the first Paper, which was entitled—

1. *Explorations in the Region of the Upper Nile.*

THE Paper is Mr. Petherick's Report to the Society of the course followed in carrying out the work undertaken by him.* In order to place the matter in a clear light, the Council have thought it

* The geographical details of the land journey, with Mr. Petherick's map, will be published in the 34th volume of the 'Journal.'

advisable to preface the Report by the following extracts from previous numbers of the Society's Proceedings.

8, Cork-street, June 19, 1860.

MY LORD,—In consequence of the refusal of Her Majesty's Government to support the application for pecuniary assistance made on my behalf by the Royal Geographical Society, for the purpose of enabling me to meet Captains Speke and Grant with an armed escort, and to furnish them and their party with provisions and the means of transport down the Nile, and the Council having liberally headed a subscription with 100*l*., to which your Lordship has invited the Fellows of the Society to add their names, a few remarks upon the following two subjects will not be out of place:—

1st. The nature of the assistance I should propose to give Captains Speke and Grant to contribute to their safe return down the Nile, and the expenses thereof.

2nd. The probable expense of an independent Expedition from Khartûm to follow up the course of the Nile to its source, in combination with the aid to Captains Speke and Grant, as stated above.

In order to afford the greatest possible assistance to the Expedition of Captains Speke and Grant, I consider it necessary to place three well-provisioned boats, under an escort of twenty armed men, at the base of the cataracts beyond Gondokoro, in the month of November, 1861.

With forty armed men, natives of Khartûm or the adjoining provinces, I then would undertake personally to penetrate into the interior as far as the Lake Nyanza, with a view to effect a meeting with the Expedition and assist it through the hostile tribes between the Lake and the Nile, and return thence by the boats to Khartûm.

Should I be unsuccessful in meeting with the Expedition, I would then endeavour to establish beyond a doubt whether or no there was any connexion between the Lake and the Nile.

If it should be considered desirable, and my means were sufficient, I would proceed along the western shore of the Lake to the extreme point of Captain Speke's late discovery, so as to connect, by a series of observations, North with South Africa; after which, having met the Expedition or not, I should return to my boats at the cataracts and thence to Khartûm.

I believe that, with the facilities at my command in the shape of boats and arms, the expense of such an expedition would amount to about 2000*l*.

In the event of so large a sum not being available, I would then propose to place two well-provisioned and armed boats, under the superintendence of one of my own men, on whose integrity I could confidently depend, to await the arrival of the Expedition at the above-named cataracts from November, 1861, until June, 1862.

This precaution I consider most important to the success of Captains Speke and Grant, and the expense would be, on a moderate calculation, 1000*l*.

Sixteen years' experience on the Nile, and the brilliant examples of illustrious countrymen, have created in me the desire and ambition, that by placing my experience at the service of the Royal Geographical Society, I may aspire to the proud eminence of adding to British glory by assisting in the discovery of the sources of the Nile.

Single-handed, unfortunately, I have not the means to achieve it, other important interests compelling me to devote my attention to regions which I have had the honour to make known to the Society; but if so far in the enjoyment of the confidence of the Royal Geographical Society and the nation, as to obtain sufficient support, I feel *that* in me, which will command success.

It strikes me forcibly that the most feasible method of accomplishing the object above stated, is to follow the stream.

For this purpose I would supply myself with a boat, either by taking out one in parts from this country, or by constructing one on the spot; the materials for which, with the exception of timber—that being abundant in the locality—I would take with me, as well as also artisans from Khartûm.

The men and materials I would endeavour to place above the cataracts early in 1861, so that in November of the same year, with the setting in of the north wind, I should be in a position to navigate the unknown Upper Nile; and during the same season—I should hope to arrive at its extreme navigable point, where it would be necessary, in order to keep up my communications, to establish a station.

During the rainy season, if the course of the stream continued from the south, the prevailing south wind would prevent farther navigation during the inundation; but if it proceeded from the west or east—which latter I think probable—it might offer no impediment to the sailing of my boat, and I might continue my explorations.

Should the stream continue running from a northerly direction, the heavy rains would, I fear, prevent my following it by land until September or October, 1862; and it would probably require the whole of the ensuing dry season until February, 1863, to secure the object of the Expedition, when, God willing, the flood would bring me down the river to the cataracts of Gondokoro, and thence viâ Khartûm, home to England.

Such an expedition would involve boats on the White Nile from Khartûm to Gondokoro; one or two, probably a larger and a smaller one, on the Upper Nile above the cataracts of Gondokoro; and two establishments—one above the said cataracts, and the other at the extreme navigable point of the stream, in order to keep up my communications for all necessary supplies.

An undertaking to ensure the accomplishment of so glorious an object, if put before the nation under the influential and powerful patronage of the Royal Geographical Society, would, I would fain hope, be eventually carried out; and when it is considered that the proposed expedition might be effected with the double object of independent discovery and of rendering the assistance to Captains Speke and Grant, by supplying them with provisions and transport on their way down the Nile without any increased expense, I believe that in consigning the proposition to the able hands of your Lordship, the mystery that for ages has attached itself to the sources of the Nile is doomed to give way before the powerful influence and unflinching enterprise of Great Britain.

Having placed my opinions before your Lordship, I have the honour to subscribe myself

Your Lordship's most humble and obedient servant,

JOHN PETHERICK, F.R.G.S.

The Right Hon. Lord Ashburton,
President of the Royal Geographical Society, etc.

Agreement between Consul Petherick and the Royal Geographical Society, Feb. 4th, 1861.

1. "Consul Petherick undertakes, in consideration of the receipt of 1000*l.* towards the Expedition up the Nile, to place two well-armed boats, during November, 1861, at Gondokoro, with a sufficient stock of grain to ensure to Captain Speke and his party the means of subsistence upon their arrival at that place."

2. "If Captain Speke shall not arrive in November, 1861, that Consul Petherick shall proceed with an armed party southwards towards Lake Nyanza to meet him."

3. "If Captain Speke shall arrive at Gondokoro before June, 1862, Consul Petherick promises to assist Captain Speke in making any explorations which Captain Speke may deem desirable."

4. "It being farther understood that in the event of Captain Speke not having arrived by that time at Gondokoro, Consul Petherick shall not be bound to remain beyond June, 1862."

Instructions for Consul Petherick's proposed Expedition up the White Nile in Aid of Captains Speke and Grant, Feb. 8th, 1861.

The President and Council of the Royal Geographical Society having ascertained that the amount of subscriptions will not be sufficient to enable you to remain two years to the southward of Gondokoro, and thus to carry out your proposition in full, proceed now to give you instructions whereby the great object of their desire — the rendering assistance to the expedition under Captains Speke and Grant—can be best accomplished with the means at their disposal.

By leaving England in March, you will be enabled to reach Khartûm in time to equip two boats with a supply of provisions sufficient for your own and Captain Speke's party until July, 1862. With these you will proceed to Gondokoro, where it is very desirable you should arrive early in the month of October; that is to say, as soon as possible after the cessation of the rains. You will then, in the event of Captain Speke not having arrived, leave a trustworthy person with a sufficient force in charge of the boats, the maintenance of these until June, 1862, at Gondokoro, being of primary importance.

The next object the President and Council have in view is, that you should proceed in the direction of Lake Nyanza, with a view of succouring Captain Speke, and bringing him and his party in safety to the depôt at Gondokoro.

The President and Council do not attempt to lay down any limit to this exploration, but, fully trusting in your known zeal and energy, feel assured that you will do all in your power to effect the above-mentioned object, without serious risk to the lives of the party under your command.

Should the junction with Captain Speke be effected, which there is every reason to believe it will be, previous to June, 1862, you will consult with him as to the best means of employing the period which will elapse before the change of the monsoon will permit you to descend the Nile, in extending our knowledge of the adjoining region.

In entrusting you with the sum which has been subscribed for this purpose, the President and Council, considering themselves accountable to the subscribers for its proper expenditure, will require an account of its disbursement. If circumstances should prevent your meeting with Captain Speke's expedition, they consider that you are entirely relieved from the responsibility of remaining yourself or detaining the boats longer than June, 1862, at Gondokoro.

The President and Council desire to impress upon you the necessity of obtaining as frequently as possible astronomical observations for the ascertainment of your geographical position, and that you forward, as often as opportunity offers, copies of your journal to the Secretary of this Society.

A list of instruments, together with instructions respecting their use, and notices of such phenomena as it is likely you will have an opportunity of observing, is herewith appended, to which also are added Manuals on Ethnology, Botany, and Zoology; to each of which sciences, as well as Geology, you

will have an opportunity of adding much new information. In addition to the 'Hints for Travellers,' published by this Society, particular instructions relative to the peculiar character of the great river you are about to explore have been prepared, and which, it is to be hoped, will assist you in making observations which will throw much light on the geography of this region.*

The President and Council take this opportunity of expressing their admiration of the spirit of enterprise which has induced you at great personal risk, and possibly considerable pecuniary loss, to undertake the charge of this expedition; and they hope, under God's providence, you may not only succeed in affording succour to the Zanzibar expedition at a period when it will be most in need of it, but that you will succeed in opening a new field to the civilizing influences of commerce.

Extract from Proceedings at Evening Meeting, February 25th, 1861:—

MR CONSUL PETHERICK said the President had so well described the difficulties that lay in the way of Captain Speke's progress from Lake Nyanza to the Nile that it was unnecessary for him to add more. It was only reserved for him to assure the Geographical Society that he would do the utmost in his power to carry out their object of effecting a meeting with Captain Speke. Naturally, any Englishman situated as he would be in those regions, hearing of the coming of a countryman, would do his utmost to see him; therefore he took no merit to himself for promising to do that. The circulars of the Royal Geographical Society in connexion with his expedition pointed out that there was a wish that he should proceed towards the sources of the Nile, provided Captain Speke did not succeed in discovering them. For carrying out such an expedition as that, the sum of 2000*l.* would be required, as has been stated in the circular. However, little more than half of that sum had been subscribed, which would only suffice for carrying out the first part of the project of the Society, namely, that of meeting Captain Speke and supplying him with grain and other necessaries. In case he did not meet with the Captain at Gondokoro, he purposed proceeding into the interior in order to bring about the meeting.

Mr. Petherick's Report is as follows:—

Abu Kuka, or Marnoak, July, 1862.

MY DEAR SIR RODERICK,

My last from Khartûm, informing you of the departure of two boats on the 15th November, 1861, under the direction of one of my agents, Abd-el-Majid, with a statement of his instructions, and a copy of a letter to Speke, in the happy event of a meeting, will, I trust, have been duly received.

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* *List of Instruments, Books, &c., supplied to Consul Petherick by the Society.*

Quintant, by Cary; Sextant, by Casella; Telescope, with tripod stand, by Troughton and Simms; Prismatic Compass, by Troughton and Simms; Artificial Horizon, by Troughton and Simms; Mathematical Instruments, pocket-case, by Cary; Boiling-water apparatus, complete, by Casella; Chronometer, by Barraud and Lund; Parallel Ruler, 12-inch, by Cary; Protractor, ivory, 6-inch, by Cary.

Raper's Navigation; Nautical Almanacs, 1861-2; Blank forms for computing, viz., 3 Field-books; 2 Register 4 Days' work; 3 Latitude by Merid. Alt.; 2 Latitude by Circum. M. Alt.; 2 Time, and 3 Pocket-books; 29 Memoranda, &c.

On my return from England to Khartûm I unfortunately learned that the majority, nay, I may say all of the traders on the White River, regarded the ivory trade a pretence to cover their slave-hunting propensities; and the minority, who still trafficked in ivory with the natives, carried on their business, not as formerly by legitimate barter, but by robbing one tribe of cattle to pay another for tusks of ivory, and their carriage through the country to their boats. The natural result was the necessity of larger armed escorts to proceed with any degree of safety through the country, as Arabs—and I regret to say the white man also—had become devoted enemies to the negro populations. These circumstances I refrained from citing prior to my departure from England, from motives which perhaps, in the minds of some, might have created a suspicion that I was raising difficulties from hearsay; but the more so, from a desire to prevent anxiety in those at home connected with the gallant travellers whom I have undertaken to meet.

You will recollect I had stated a much larger sum would be required for the expedition I have entered on than that which I actually received. Her Majesty's Government, contrary to expectation, having declined its support, 2000*l.* were attempted to be raised by the members of the Royal Geographical Society.

This enterprising spirit of the President, Vice-Presidents, and members of the Society kindled so strong a desire in myself to support their views by all the experience, energy, and means in my power; and the subscriptions falling short of the sum attempted to be raised, I accepted one-half of the sum proposed, well knowing it at the time far from sufficient to meet the expenses necessary for an effective push into the unknown interior.

Owing to the circumstances cited, to realise funds for the provision of the elements necessary for a substantial expedition—one that under the blessing of Providence should command success—became a duty, to acquit myself of which was the cause of my prolonged sojourn at Khartûm. Ready-money was scarce; and to effect important sales of goods in my possession, for cash, traders from the frontiers of Abyssinia, and ivory-merchants from Massáwa and the Hedjas, had to be waited for: thus vexatious delays were occasioned; and it was the end of February before I had realised sufficient to enable me to depart from Khartûm on the 20th of March, in support of the advance-party under Abd-el-Majid.

In addition to the two boats sent forward on November 15, 1861, another large boat was despatched to the Bahr-el-Ghazal, to remove my men there located, to the support of Abd-el-Majid at Gondokoro. Thus, uniting a force of seventy-five men, he would be able

to proceed to a station of mine, some six to eight days' journey south-west of that place; and, in case of necessity, he could still further increase his party from that establishment, in order to proceed southwards in the direction of the Lake Nyanza.

The difficulty of transport appeared to me the greatest obstacle to overcome, as the traders, in lieu of beads, now pay their porters with a plundered cow or bullock each: it was clear beasts of burden became a necessity, and consequently forty donkeys were purchased. To convey them, two boats had to be procured; thus my personal expedition was augmented to four boats.

The *Kathleen*, a new boat, fitted up for the occasion at Cairo, had experienced such delays in surmounting the cataracts of Wadi Halfa and Dongola, that in default of its arrival I was constrained to the use of a favourite old boat, re-named the *Lady of the Nile*, for Mrs. Petherick, myself, and the lad Foxcroft, who had accompanied me from England as insect collector. The next boat was occupied by two medical gentlemen and an elephant-hunter, a young Lombard, from Pisa, Carlo Evangelista, engaged at Khartûm. Dr. Murie left England subsequent to us, as Photographer and Secretary and joined at Korosko. Dr. Brownell, of the United States, volunteered at Khartûm to accompany the expedition as Botanist. In addition, the boat contained merchandise, and on the deck fifteen donkeys. The third boat, independent of the hold full of grain and goods, carried a couple of saddle-horses on the deck; and the fourth contained also large quantities of provisions and twenty-five donkeys.

Thus in the afternoon of the 20th March, 1862, with the good wishes of the Governor, who, instructed by H.H. the Viceroy, had rendered me several services, and an incessant discharge of firearms, intermingled with hearty shouts for a happy return, from a crowd collected on the shore, we sailed down the Blue Nile. At sunset we had turned the point, and made fast, in sight of Khartûm, to wait the arrival of sundry truants.

In the event of the necessity of a boat, to navigate some unknown water, of larger dimensions than any portable gutta-percha punt, I brought a quantity of nails, and the carpenters to build one were supplied by the Egyptian Government. Waiting for these men detained us until March 22nd.

The consorts had preceded; and the *Lady of the Nile*, under three large lateens, followed at a spanking pace. It was late in the season, and, the duration of the north winds being uncertain, the captains had augmented their sails to imprudent dimensions, so that prior to our quitting Egyptian territory all, more or less, came to grief.

The *Lady of the Nile* weathered it best: two boats had their spars shattered and sails torn; but the doctors' boat fared the worst, as, bowling along, we passed them in tow, with mast and rigging over the side. But fortunately a temporary boat-building station beyond Aleis, called Hellet Donagla, was only some 15 miles a-head, and leaving the roughly-handled boats to follow as best they might, the *Lady of the Nile* continued her course before a stiff north-east breeze, in order to prepare for the crippled craft. The arsenal was reached at 9 A.M., March 23rd.

Four days were occupied in mending spars, changing others out of laid-up boats, putting in a new mast, and reconstructing the doctors' cabin, which, smashed by the falling yard, frightened, but happily did not injure, its occupants.

At sunrise, March 28th, the boats again sailed, and everything went on prosperously until March 30th, when, to our great sorrow, the winds began to fail: towing along the banks was now resorted to. On 31st March we reached Hellet Kaka, formerly the principal Shillook settlement, but now deserted. A notorious slave-hunter, Faki Mahomed Hheir, assisted by numerous horsemen of the Bagara tribes, and numbers of armed freebooters, in boats from Khartûm, had spread ruin and devastation far and wide: the heretofore friendly Shillooks that have escaped massacre and slavery are now houseless, driven to the bush for safety.

On the 4th of April the first intelligence from Gondokoro was reported to us by the rais or captain of a trading boat. My agent, Abd-el-Majid, had opened a new country; but there were no tidings of Captains Speke and Grant. On the 8th of April we passed the Sobat, which we found greatly swollen. We passed the Giraffe; and on the 13th I obtained the first interview with the aborigines, who hitherto at the sight of our boats had fled.

April 15th.—Entered the Nouaer district, and on the 17th arrived at the confluence of the Bahr-el-Ghazal. Thus far, although impeded by the great height of vegetation, we had been able to tow along the banks; but now uninterrupted marsh extended on either side to the horizon. Our small boat and a canoe now became invaluable, as, with their aid, lines were sent out to be made fast to the reeds, and round robins towed home. Thus we managed to make good some six or seven miles a day. Mosquitoes became intolerable.

April 28th.—Frequent heavy showers had fallen, and interfered with our progress. A boat from Gondokoro conveyed tidings that our exploring party were still in the interior. They did not know their whereabouts; neither had any tidings been heard of Captains Speke and Grant.

May 2nd.—A heavy storm, accompanied with fearful thunder and lightning, ending in a gale, carried away spars, and more or less crippled each of our boats. Refitted hastily, and in time to profit by the fag-end of the hurricane, now manageable, and made good the equivalent of some half-a-dozen days' towing.

May 6th.—Made the Nouaer settlement of Aliâb. Our carpenters were set to repair our broken spars on real *terra firma*, an object we had long lost sight of. The cargoes of both boats were landed to dry; and the destruction of property from constant wet was found to be considerable. The doctors with their consort were astern, and not visible; and we proceeded to caulk our consort.

May 12th.—A young Maltese with two boats arrived from Gondokoro: his establishment he stated to be some ten days' journey south of that place, and east of the Nile; but he could convey no tidings of the Speke expedition. The doctors and their companion boat arrived; and, both requiring caulking and various repairs, I was fortunate in the possession of men equal to the emergency. No end of damaged goods was brought to light from the cargoes; and both doctors were laid up with fevers. From the leaves of the Delaeb palm, a species of Borassus, our boatmen occupied themselves in making towing-lines.

May 16th.—In company with the boat containing our horses we left our moorings, towing against a southerly wind; and on the 19th of May met Abd-el-Majid and his three boats returning from Gondokoro, which place he had left eight days ago. In reply to my expression of surprise at meeting him, he said everything in his power had been done to meet Captain Speke. The expedition from my station, owing to his (Abd-el-Majid's) illness, had been entrusted to Mussaad, the agent in charge, and had made good seventeen marches southwards, to a place called Wanja, in Kakoa. But owing to the troubled state of the country, and deficiency of the most ordinary kind of food, Mussaad and his party, after four days' subsistence on roots and bulbs, were obliged to return No tidings had been gleaned of the Speke expedition; but he had learned the existence of an extensive sheet of water, stretching westwards, distant about four days' march farther south; but whether lake or river he was unable to ascertain.

May 20th.—The canoe sent on from the boats in the rear brought us the painful intelligence of Dr. Brownell's death. In order to ensure to his remains as decent an interment as possible, we continued to a locality, reported by Abd-el-Majid not far distant, where a spot of dry land would answer the purpose. On the 21st poor Brownell was laid in the centre of one of a few prominent dry spots,

formed and deserted by white ants, which being above the level of the marsh promised to retain the deeply-regretted remains of our companion unpolluted and protected from external injury. I read the Service, and a volley of musketry fired over the brave fellow's grave terminated the mournful ceremony. A fearful storm and heavy rain contributed to aggravate our discomfort.

On the 25th of May another most unpleasant circumstance, but of a different nature, transpired in the discovery of eighteen slaves in Abd-el-Majid's boat; and, after having proved the latter as the capturer and owner, I handcuffed him myself, and ordered him to be consigned to the Governor of Khartûm, to whom I addressed the proofs of his guilt. The children and girls, fortunately rescued from slavery, I consigned to another boat, to return with us to Gondokoro and their homes.

May 25th.—Mussaad and twenty-five men were removed from the homeward-bound boats to our own, and, after an exchange of a boat for a larger dahabyeh—one that had performed the service of conducting my men from the Bahr-el-Ghazal to Gondokoro—I consigned it to Dr. Murie, and we followed our various destinations: viz.—the *Lady of the Nile* and three boats up-stream; one boat to Khartûm, with Abd-el-Majid a prisoner; another to the Bahr-el-Ghazal; and the *Bayooda* to my station on the Sobat.

June 4th.—A severe hurricane caused the dragging of our anchors and sent us on the reeds, from which, without damage, we got off and continued towing. The weather cold and showery.

June 11th.—After days of dead towing and frequent heavy showers the collection of lowering clouds astern boded a favourable breeze, and no sooner had the storm burst than our sails were spread. Gallant was the behaviour of each boat, and, blowing harder, onward we raced, when, crash! Surkatti's yard gave way; and, letting go the sheets, the huge sails flapped and roared above the storm. Half-a-dozen of our men were tossing in the small boat to the assistance of our disabled consort, and all hands hauling home our rebellious sheets, we again resumed our course.

June 13th.—A bad leak half-filled the *Lady*, and we all felt the old boat could not much longer resist the rough treatment of heavy gales. On the 14th of June we had another storm, and, carrying on until our sails were rent, we scudded under bare poles.

June 15th.—We had now reached Gaba Shambyl; the right Nile bank entirely inundated, but the left, to which we made fast to repair damages, presented a fine plain, skirted with thick and noble forest. Our small boat we sent down stream to meet and assist the doctor's boat in towing, it being desirable the boats should lay up

together for the night, as the negro tomtoms on shore denoted the aborigines on the alert, and they might perhaps attempt an assault at night. Herds of antelopes were in sight, and I succeeded in stalking and bagging one and severely wounding another, when nightfall put an end to tracking it.

June 16th.—Donkeys and horses were put on shore, and an exhilarating ride proved the latter to have suffered nothing by confinement. We soon found my antelope of the last evening. Quantities of vultures hovered over it, and the greater part of the carcase had been devoured by lions, the tracks of which were evident. Many of our men were ailing, and one of the shipwrights died; the poor fellow was buried under a large tree.

June 17th.—At 5 P.M. we arrived at Mr. Binder's station, formerly De Malzac's. During a long ride in search of material for cordage I shot a large male baboon, and his skin was preserved by the doctor and assistant.

June 19th.—Heavy rains deluged our grain; and we spread it out to dry. But for tarpaulins, another storm at noon would have undone our handiwork.

June 20th.—Repeated showers and storms, and blowing from the south we were windbound until the next day, when, with Surkatti and horses in tow, we struggled onwards; our men, nothing daunted, carolled home the lines with lighter hearts than our drenched position could justify. On June 22nd there was more heavy rain.

June 23rd.—At dawn two canoes from Poncet's station at Abu Kuka came alongside to inquire who we were. They had paddled eight hours down stream,—a distance that it might take us a week to perform. At 9 A.M. they returned to bring us some cordage, as ours was perfectly rotten and breaking hourly.

July 2nd.—Arrived at Abu Kuka, or Lolnun, and the elder Poncet gave us as hearty a welcome as the swamp he inhabited could afford. He had sent us his only towing-line, and the country affording no palm-trees no raw material was procurable. Under these circumstances to quit the boats and proceed by land was the only alternative; and Jickwi, the Kytch chief, promising porters with alacrity, I at once decided to proceed *viâ* the Aliâb to Gondokoro, or my station, as circumstances might dictate.

July 4th.—The doctor's boats and consort joined, and the donkeys were sent on to Adôr, some 12 miles' distance westward, where Poncet possessed a hunting-station. The chief Jickwi had promised porters to conduct us to the Aliâb from Adôr; but, on eliciting particulars, I found the payment was expected to consist of a cow

for each porter. The necessary cattle were to be obtained by a razzia on my part against the Aliâb, with whom the Kytch were at feud. The proposal was declined, and the upshot of a long conversation with Poncet and a palaver with Jickwi was, that I must proceed to the Rohl, some fifteen days' journey due west. At that place I could obtain porters for copper bracelets, and thence any desired number of negroes for the same commodity or beads, to my station, presumed due south. Poncet's principal station was at the Rohl; therefore, his statements seeming reliable, I decided to adopt the route, although a terrible roundabout way to Gondokoro. On the 8th of July a party of negroes were despatched with loads to Adôr.

July 11th.—Got out my gutta-percha punt, and, to the agreeable surprise of our men and some wondering negroes, I rowed Mrs. Petherick across the Nile.

July 17th.—Several heavy storms had considerably damaged our stores, and quantities were thrown overboard.

July 18th.—Bright morning; thunderstorm and drenching rain at noon. At 3 P.M. sent off another lot of forty-five porters.

To Surkatti, under orders for Gondokoro to await us and support Captains Speke and Grant in case of their arrival, was given the dispensable cordage from the standing rigging of three boats, (which were to return down river) to serve for towing-lines to conduct him to the Shyr. At that place raw material was known to exist sufficient for the manufacture of any amount of cordage he might require for his necessities till he reached Gondokoro.

Preparations were completed by July 25th, and his boat laden deep with stores, the liberated children, and a guard of twelve men, Surkatti, with the good wishes of all, spread his sails to a favouring breeze.

July 27th.—Jickwi and the porters became exacting, and, in lieu of a pair of copper ear-rings or a bracelet, a cow for each porter was insisted on. "If I was to rob any one, I would sack his house and village for breach of contract; and I could forego the goods already forwarded to Adôr, if unable to proceed thither in person." The argument was conclusive, and in the afternoon Mussaad, with an escort, accompanied a party of laden porters to Adôr.

Khartûm, Dec. 20, 1863.

The above and my accounts—the latter drawn up by Dr. Murie, kept in a tin box, and placed for greater security in one of the huts, adopted as a storehouse—unfortunately, by mistake, was taken by Mussaad to the Adôr.

The boats were reduced to the smallest possible allowance of

grain for their return voyage to Khartûm, and it was beyond my power to detain them in order to await our arrival at Adôr and the return of the documents. Therefore, owing to prolonged and tedious illness, terminating with Guinea worm in the right foot, I am now only enabled at intervals of short durations of strength, by the exertion of all my efforts and the sacrifice of official and other correspondence, to continue my Report.

To proceed with my Journal. I was occupied on the 29th July with final preparations for the return of the boats and our journey inland. Everything was prepared for leaving by the next day. Means were taken to provide a reinforcement of men and additional stores, with the despatch of the boats from Khartûm to Gondokoro, as early as possible in the approaching season.

July 31*st*.—The negroes having disappointed us, we set out alone at noon with a small party only of our men, who by this time had become familiar with the route. The Doctor and Foxcroft were left to bring up the last loads, for which we hoped to send the required porters from Adôr. The boats also were about to leave their moorings for Khartûm, and with heavy hearts their crews took anxious leave of us.

We proceeded on horseback through slush and marsh, and over water in our punt. We passed the night in a kraal. The greater part of the cattle lay in water, and to all intents and purposes, like their masters, they had become amphibious.

August 1*st*.—A continuation of marsh to the precincts of Adôr, where we found our tents pitched outside the station. Jickwi and our active agent, failing to procure porters at any price short of cattle to be stolen from the Aliâb, had, to lose no time, at quadrupled rate of copper bracelets, hired twenty negroes to proceed with sixteen laden donkeys, supported by an escort of twenty-seven men, under an old hand, to the Rohl, some sixteen days' march due west. From this date our Day-book was regularly kept; and as I forward it for your inspection, I need now but touch upon the principal events of our journey, which therein may not be sufficiently explained.

Aug. 11*th*.—Notwithstanding the endeavours of Deradan, chief of the village, Jickwi's brother, we could not obtain sufficient porters for even the most indispensable of our requirements. Therefore, on the 15th of August, we were constrained to leave 150 loads behind. Left Adôr with forty porters, eighteen laden donkeys, six trained bullocks, and several head of cattle, purchased at 15*s*. a-head for our requirements on the road.

Aug. 19*th*.—At 3 P.M. we arrived at some fishermen's huts, forming

a hamlet, called Jemeed, on the bank of an apparently boundless lagoon, called Faragan, conducting to the river Hangan; supplied by streams from the south, and discharging itself into the Nile at the northern extremity of Gaba Shambyl, in the territory of Fouaer. The lagoon divides the Kytch on the east from the Atwat and Rohl on the west. After the rains the waters subside into two or three channels, and the land affords coarse but abundant pasturage.

Aug. 22*nd.*—The fishermen of the hamlet, who yesterday had contracted for thirty canoes to ferry us across the lagoon, during the night have decamped with bag, baggage, and canoes.

Aug. 25*th.*—At 7·25 P.M. saw a comet, and observed distances—from Benetnasch, in Ursa Major, 10° 3′; Ras Alhague, in Ophiuchi, 30° 53′; and Alpheta, in Coronæ Borealis, 25° 44′.

Aug. 28*th.*—The negroes of the adjoining village of Neot harbouring the fishermen, and refusing to barter grain or food of any description, we were obliged to occupy the village, and, in the event of a protracted refusal to ferry us over, were determined to subsist on their ripening grain until the drying up of the lagoon. The huts, at considerable distances from each other, were being abandoned, and the high corn dividing them was resorted to by the negroes, to all appearance bent on attacking us. Flanking our porters, we marched to about the centre of the village without opposition; and, taking possession of a deserted set of huts in an enclosure for the deposit of our traps, our tent was pitched outside. High stages, used by the negroes as look-outs, were occupied by our sentinels. After a short palaver with a few of the natives, and a repetition of our requirements and intentions, canoes were promised on the following day.

A heavy shower of rain followed; and when about to cease, in lieu of the expected fishermen, we were astonished by flights of arrows, discharged by the negroes in the belief, as we afterwards discovered, that the rain would prevent the discharge of our fire-arms. Several shots from our wary men told a different tale; and hurrying, rifle in hand, to a stage to show them the effect of our arms, and daunt them at the least possible expense of life, at 300 yards I picked off a leader backed by a strong party.

The man was no sooner down than his men relieved him of his bow and arrows, and fled. Our attendant, Ringa, true to Nyam Nyam habits, administered the *coup de grace* in the head. I was sorry for it, and would have preferred having him a prisoner. His wife and son, a boy, fell into our hands. Four or five others had fallen; and, finding their bows and arrows took no effect, the affair terminated.

Aug. 29*th.*—Three negroes presented themselves, and peace was offered and accepted. To ratify it, the next day, a white bullock was slaughtered, and ourselves, but particularly the tent, were elaborately sprinkled with water. Fishermen and canoes were promised to convey us on our way.

Aug. 31*st.*—A heavy storm and abundance of rain; our tent was inundated; negroes did not show themselves.

September 3*rd.*—Seventeen canoes in waiting, we returned to our old quarters at Jemeed. At noon the canoes were laden, and sent on to a deserted kraal farther south, to which we followed in our punt on the next day. We had scarcely time to pitch our tent when a heavy storm inundated our baggage.

Sept. 5*th.*—The canoes, with a guard of ten men, heavily laden with the greatest part of our stores, at 9 A.M. left to cross the lagoon, and return for the remainder.

Sept. 6*th.*—Some firing heard in the direction of Jemeed was inexplicable; and, at 7 A.M., twenty-one of our men, with forty porters, on their way back from the Rohl, came marching gaily up with colours flying. They had successfully crossed the lagoon the day previous; had seen nothing of our party of ten men and baggage; and, ignorant of our presence, had dismissed their canoes. They were on their way back to Adôr to fetch some of the remaining stores.

At 10 A.M. two shots were faintly heard across the lagoon, and we fancied they might proceed from our men, perhaps returning with the canoes. The day passed without intelligence of them, and suspicions were entertained that all was not right.

The return men from the Rohl, on their upward journey, had been deserted by the fishermen after having ferried over their goods only; and the greater part of the men, at the risk of their lives, had to swim and wade alternately during an entire day to cross the water. Their porters, with the sole exception of the chief, Jickwi, took advantage of their opportunity and deserted. Reduced to their donkeys, they were obliged to advance short stages, and return for the remaining loads; thus they accomplished a weary journey to the Rohl, compelled to traverse the same ground twice over.

Sept. 7*th.*—Despatched, at 8 A.M., seven men and an interpreter—Cheir Allah—in the punt across the lagoon to look out for the advance party; proceed with them to Atwat, and endeavour to procure canoes.

At 5 P.M. five canoes were announced; they turned out to be our own men, who had left us with the seventeen canoes laden with

goods on the 5th. They had evidently been roughly handled—vouched for by bruised faces, cut heads, and swollen arms. The negroes had, in fact, betrayed them by upsetting, at a given signal, the canoes. The unfortunate men, struggling in deep water, were mercilessly clubbed on their heads, faces, and arms, held up to protect themselves; and two of the party sank to rise no more. The loss of goods was sad and irreparable, comprising photographic lens and chemicals, arsenical soap, and flaying-instruments; the whole of our stock of beads, four elephant-rifles and muskets, a pair of tusks, trophies of Carlo; the doctor's, Foxcroft's, Carlo's, and the entire of the men's clothing, with other things too numerous to mention.

Fortunately two or three of the men retained their guns, and, notwithstanding the immersion, they did not fail them; and, killing as many negroes, the savages made off, leaving five canoes, bottom up, by means of which they returned to us. To add to our misfortunes, Mrs. Petherick was suffering from fever, myself with lumbago, and our men, of whom many were invalids, were straitened for provisions.

Sept. 8th.—Embarked eight men, with the few stores we had left, in the captured canoes, and, at 5 P.M., after a hard day's work, they returned, having landed the goods in a deserted kraal, and consigned them to Abd-el-Cheir and his party, who had yesterday crossed in the punt.

Sept. 9th.—Sent our porters, under an escort, across the water; and, as Mrs. Petherick was too ill to move, gave orders for them to proceed with the baggage to the Rohl, and to return as soon as possible for us. In the mean time I retained the men and porters thence, who had joined, on their way for more goods from Adôr.

Sept. 10th.—The canoes having returned, sent Mediné, an old servant, with a reinforcement, to join the men on the other side, and proceed with them to the Rohl, fearing lest a small force might come to grief.

Sept. 12th.—Returning from a morning ride, with some guinea-fowl, I was astounded to learn that our trusted agent, Mussaad, had been shot at, and killed instantly, by a youth of Moorish descent, in a quarrel. The lad was sitting some 50 yards off, in the expectation of a similar fate; but I handcuffed him instead.

Sept. 17th.—Mrs. Petherick, feeling herself equal to the task, although very weak, begged to leave the unwholesome spot; and, accordingly, we embarked our remaining baggage in the canoes, and, with astronomical instruments and our firearms, we entered the punt. Crossing the Hangan, we had navigated a narrow channel,

in the reeds, about a mile, and got into a strong current joining the central channel. Their united streams, called Ameen, flowed north, and formed a stream about 30 yards wide and 16 to 18 feet deep. We then passed into shallow water, from 1 to 3 feet deep, amongst high grass and reeds, with occasional open spaces of clear water.

The dense wood seen on the horizon from our camp on the Hangan was now but a short distance from us, and it also was inundated. Ant-hills became conspicuous, and we disembarked on one, whence our effects were carried by the porters to a deserted kraal, called Abael, and the canoes returned for the doctor and the rear. Thus the Lagoon was virtually passed; but although we were now on a spot of dry ground, the entire country as far as the eye could reach was inundated.

Hence through the Atwat territory we waded full three-fourths of the way to the Rohl, and at noon, Sept. 22nd, we reached the long-talked of Poncet station, near the village of Adael. The station consisted of an extensive stockade: the outer one was allotted to the cattle, and in the inner one, containing some seventy huts, we were allotted three thereof for our accommodation.

Sept. 26th to 28th.—The ways and means for further progress having been proposed, and my plans frustrated as much as possible by the agent of the station, to whom I had delivered a letter concerning us from his employer, my presentiments, gleaned *en route* from the men, at length were beyond a doubt confirmed, that without cattle I could not move.

What the intentions of Poncet and his agent at Adôr were, to mislead me by representing the Rohl as a bead-trafficking community, I could not imagine, as even the ordinary articles of consumption, such as moderate quantities of grain, honey, and tobacco, could only be obtained in exchange for a cow or calf. Had I chosen to rob cattle in order to pay the porters, I could have done so at the Adôr, and avoided all the inconveniences and heavy losses that had befallen us by following this impracticable and circuitous route. What was to be done? Indebted to the amount of some sixty head of cattle for the hire of the porters who had accompanied our men, whom we met on the Lagoon, the agent, for an equivalent of goods or money, could or would not supply me with any more cattle. Neither would the negroes of the adjoining village dispose of any of their cattle for any consideration in our power to give them. The men's demands for cattle to purchase their different requirements, put off from day to day, rendered them troublesome and turbulent. They told me we could neither return nor proceed, and they would consent no

longer to privations, whilst in possession of the means to obtain them, and, with or without my consent, they were prepared to join Poncet's men in a razzia.

The storm I had long foreseen brewing now burst, and, as matters would be only aggravated by a refusal, I gave my reluctant consent. Our reflections, as may be supposed, were none of the pleasantest. In lieu of the introduction of more valuable and civilising merchandise, such as cutlery, or cloth for wearing apparel, as articles of barter, of which the negroes are very fond—when the value of glass beads and copper ornaments began to decline and to lose their charm —the traders disgraced themselves by descending to the level of the savages, and imitated them, on a larger scale, in their attempts to enrich themselves by the plunder and destruction of tribe after tribe. From this to slave-stealing, and the pursuit of the traffic, was but a step, which, according to my experience, all the traders have learned, more or less, to indulge in. With the produce they pay their men, and realise such profits, that to many, I believe, the ivory trade is but of secondary consideration.

Oct. 22*nd.*—A commotion in the village. Some cattle have been stolen by the natives from the Atwat, and traced to Adael; several women and children have been seized in the corn-fields, to be retained as hostages for the stolen cattle.

Oct. 30*th.*—Our marauders returned, and after the deduction of one-third for the men, as I was informed was usual, we possessed sufficient cattle for all of our requirements. The only casualty was the loss of one man, in an elephant hunt.

November 13*th.*—At length the arrangements had been completed, and with one hundred porters for ourselves and fifty for a detachment of Poncet's men, we left the station to proceed due south. Poncet's agent and fifty of his men accompanied us to bring back the negroes to their homes, as, if left to themselves, they would risk being exterminated by the tribes.

Nov. 14*th.*—Crossing a sheet of water, we suffered some inconvenience by the desertion of a number of our porters, and the loss of some loads, which, thrown into the high grass or water, could not be recovered.

Passing subsequently through the Djour territory, and entering that of Moro on the 30th November, we made Neangara, the village of a chief of that name, who ruled over a district called Moro Morokodo. The country traversed gained in elevation, and we were now enjoying the prospect of several hills. The Rohl porters, as also Poncet's agent, would proceed no farther; and as the aborigines would not carry loads, we were obliged to wait here until porters

could be obtained from my station, situated at some eight or ten days' journey farther south.

December 2nd.—One-half of our men left for the required porters. Illness prevailed to a great extent amongst us, and, in particular, my dauntless wife and myself were great sufferers. Neangara and the natives were well behaved, and paid us great attention: many of our men were known to them by name, having been here on former trading expeditions from the station.

Dec. 15th.—Our agent Awat arrived from the station with a numerous escort, and brought us upwards of one hundred porters; but I was too ill to think of moving for some time to come.

Dec. 16th.—Awat, having some months previously left merchandise for barter with several Nyam Nyam chiefs, about four days' journey westwards, proceeded with some hunters, thirty men, and all the porters to Makraka, a Nyam Nyam district. Provisions there were abundant, whilst Neangara could with difficulty supply us with a sufficiency.

January 12th, 1863.—Awat and his men, with about 10 cwt. of tusks, opportunely arriving, were gladly welcomed.

Jan. 17th.—Arrangements being complete, and we convalescent, left Neangara, and, travelling through an undulating and prettily-wooded country, occasionally intersected by brooks, we crossed in our punt a considerable and highly picturesque river, called Ayee. Its course was 10° (azimuth compass), and its breadth about 100 yards. The depth varied from knee to waist, and it was reported to contribute its waters to the Hangan, of which lagoon I believe it to be perhaps the principal feeder.

Jan. 25th.—After crossing another pretty stream, the Bibio, we arrived at my station, situated near the junction of the Bibio and the Ayee, formerly known by the name of Neambara, but really situated, not in that district, but near the village of Wayo, in the Moro territory. Our donkeys, originally forty, had now dwindled to fifteen, and I lost my horse.

February 12th.—Having waited for a change of porters, we proceeded easterly, *viâ* the Neambara, through a romantic group of hills, compared by our doctor to the Trosachs, the drainage of which, the river Queeny, flowed north, and emptied its waters also, it was said, into the lagoon of Hangan.

Feb. 16th.—A vast plain, inhabited by the Bari, was reached. Sixty men, a reinforcement from Khartûm, were met, who with four boats had arrived at Gondokoro. The men were bent upon searching for us, and conveyed the unpleasant news of the rumour of our deaths, as also a letter from Mr. Baker, dated Gondokoro.

The various sluggish, and now for the most part dried up, water-courses which traverse the well wooded and fertile plains, take an easterly direction, and finally discharge themselves into the Nile below Gondokoro.

Feb. 20th.—Arrived at Gondokoro, and to our agreeable surprise were greeted by Captains Speke and Grant, as also by Mr. Baker—the former having preceded us by five days. We were glad to find that Captain Speke, on his arrival, had availed himself of our stores for the clothing and support of his men; but an unfortunate misunderstanding, to which I will not here allude, having arisen, with the exception of a daily allowance of grain for his men until the date of his departure, he would, unless for payment, accept of no further stores or provisions.

The *Kathleen*, our dahabyeh, hitherto occupied by Captain Speke, as also four other boats, one of which, Surkatti's, had reached Gondokoro some months previously, were, one and all, forthwith declined. Thus terminated an expedition, as unpleasant as it was arduous, and for the execution of which I had exhausted our means and energy.

In consequence of having performed my official duties in opposition to the slave-trade, and the interests of large bodies of men assembled at Gondokoro, a revolutionary spirit was communicated to my men. Insubordinate during their inebriation, the daily discharge of firearms in near proximity of our boat, when seated on its deck, and abundant whizzing projectiles, gave ample warning of the danger to which we were exposed.

Our intention of proceeding to the cataracts, and thence on the western side of the Nile in search of the lake cited by Captain Speke, and previously reported by our agent Mussaad, was frustrated; for out of the 200 men, exclusive of sailors, who were with me, only 15 declared themselves willing to follow me. Fifty-four of them seized a boat and proceeded to Khartûm direct; whilst others, according to their pleasure, either went to my establishment or consented to visit the Sobat, on their way home. Under these circumstances I proposed joining our residue with a like number of men who also consented to follow Mr. Baker, and jointly to undertake the journey; but no sooner was the proposal made known than the men of the latter stoutly refused to move, if in my company. There was no alternative but to return; consequently on the 28th of March we left Gondokoro in the *Kathleen* with a consort, attended by fifteen men, and proceeding down stream, I was fortunate, during occasional convalescence, in being enabled to measure the volume of water which the Nile and its principal tributaries conveyed per second.

For the particulars of measurements, you will please to refer to the Day-book.*

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* *Volume of Water, White River above Junction with Bahr-el-Ghazal (April 25, 1863).*

Rate of Current above Junction—1 knot per hour = 23½ feet per second.
Width of Stream above Junction—223 feet 6 inches.
Different depths of River from East to West bank at nearly equal distances, viz.—

Fm.	ft.	in.
1	3	0
4	0	0
5	0	0
4	5	0
4	4	0
4	1	0
3	2	0
1	3	0
8)29	4	0
Mean depth in fathoms	3	4	3

223 ft. 6 in. × 22½ ft. × 23½ ft. ÷ 14 seconds = 8288 cubic ft. per sec.

Volume of Water supplied by Bahr-el-Ghazal (April 25, 1863).

Rate of Current below Junction = 1 knot per hour = 23½ feet per second.
Width of Stream below Junction 480 feet 9 inches.
Different depths from East to West bank, viz.:—

Fm.	ft.	in.
1	3	0
1	4	0
3	1	0
2	4	6
3	1	0
3	1	2
3	1	2
3	0	0
2	0	8
1	4	6
9)22	1	10
Mean depth below Junction, in fathoms	2	2	10½

480 ft. 9 in. × 14 ft. 10 in. × 23½ ÷ 14 secs. = 11,330 cub. ft. per sec.
Deduct volume of Water above Junction .. 8,288
Volume of Water supplied by Ghazal .. .. 3,042½ cub. ft. per sec.

Volume of Water supplied by Sobat (June 6th, 1863).

Rate of Current—16 feet 3 inches in 14 seconds.
Width of River—309 feet 3 inches.
Different depths of River at nearly equal distances, viz.:—

Fm.	ft.	in.
1	2	0
2	3	6
4	2	6
5	3	0
6	1	0
5	1	0
4	3	6
3	5	6
2	2	6
9)36	0	6
Mean depth of River, half a mile above Junction	4	0	0

309 ft. 3 in. × 24 ft. × 16 ft. 3 in. ÷ 14 = 8615 cubic ft. per second

The results are as follows, viz.:—

	Feet.
Below junction of Bahr-el-Ghazal	11,330
Above ditto	8,288
Volume of water of Bahr-el-Ghazal	3,042
Volume of water of Sobat	8,615

Of the second Sobat I regret my inability to supply the measurement, never having heard of its existence except in the imagination of Captain Speke.

I had hoped to have been enabled to furnish the volume of water conveyed by the Blue Nile; but serious illness since my return to Khartûm has prevented it, and it is now too late to convey any approximate idea of it in connexion with the above.

The accounts of my expedition, daily journal, sketch-map, and astronomical observations, accompany this my Report, for your inspection. My collections of objects of natural history have been forwarded to the British Museum; and the botanical collection, commenced at Korosko and prosecuted during our entire journey, was consigned to my friend Captain Grant, for presentation to the Kew Gardens.

It remains for me to state, that on our return down the Nile we visted the Bahr-el-Ghazal. The greater part thereof, owing to the shallow state of water, was found overgrown with reeds and "ambadj" (*Ademone mirabilis*), and two days prior to our arrival, at our old moorings, the island of Kyt, the navigation was through a narrow putrid ditch, so encumbered with papyrus plants and ambadj, that the *Kathleen* bears the marks of their inconvenient proximity.

I have the honour to be, Sir,

Your most humble servant,

JOHN PETHERICK.

The astronomical observations alluded to in the foregoing Report, with the Map, will be included, as before stated, in Mr. Petherick's details of his land journey to be published in the 34th volume of the 'Journal.' The following is his statement of account of his expedition:—

1861.		Egypt. Prs.		at	£.	s.	d.
	To subscribed by the Royal Geographical Society	..		..	1000	0	0
Nov. 15	One-half Expenses of Abd-el-Majid, on account of my establishment	..		..	466	17	8
1862.							
May 25	Sundry Goods sent to my station at the Djour Bahr-el-Ghazal	13,943	30				
	Ditto sent to Sobat per Bayooda	6,972	0				
1863.							
March 10	Realised by sale of Punt Gun, and sundry Goods at Gondokoro	25,476	0				
„ 20	Goods sent to Sobat per Ali Diab	3,200	0				
„ 25	Ditto consigned to Mohammed Ali for transport to my station in Makraka ..	89,779	0				
	Hire of Hamad Tamra's Boat and payment of Crew for the requirements of my station	6,175	0				
April 8	Goods consigned to Mohammed Kunna at Shyr	1,295	0				
May 7	Gutta-percha Punt and Sundries to Madame Tinné	11,882	0				
„ 22	Rifles and Sundries	17,940	0				
	Goods consigned to my agent at Djour ..	4,450	0				
June 15	Valuation of Goods returned to Stores at Khartûm, viz.:—						
	Firearms 44,846						
	Beads, 30 crs., at 2*l*. 6,000						
	4 crs. Copper Bolts 4,000						
	2 „ „ Bracelets .. 2,520						
	Sundries 2,500						
		59,866	0				
		240,978	0	97½	2471	11	4
„ 25	Realised by Tusks obtained on Expedition, 10 crs., at 16*l*.	..		..	160	0	0
					4098	9	0
	Balance	..		..	4286	17	4
				£	8385	6	4

1861.		Current Prs.	at	£.	s.	d.
Nov. 15	By Expenditure of Abd-el-Majid	107,383	115	933	15	4
1862.						
March 20	Personal Expenditure	607,096	..	5279	1	10
		Egypt. Prs.				
June to Sept. Nov.	Sundry disbursements, viz.:—					
	Balance of Pay and Boat-hire	31,498				
	Advance to men and sailors to reinforce the Expedition at Gondokoro	35,432				
	Stores, Provisions, per McLulf Allah	88,121				
1863.						
June 15	Balance of Pay and Boat-hire on return of Expedition	56,764				
		211,815	97½	2172	9	2
			£	8385	6	4

Khartûm, Jan. 16th, 1864.

E. E.

JOHN PETHERICK.

The letter of Mrs. Petherick is as follows:—

Khartûm, Soudan, Africa,
July 26, 1863.

SIR,—My husband, Mr. Consul Petherick, is very ill, and in the absence of any one who might render him this service, I beg you to accept a letter from me. I feel sure that you will not deem it out of place, and I also believe that you will extend your warmest sympathy to Mr. Petherick. We have now been at Khartûm six weeks: the day of arrival we were unable to land, so impaired was our health. I am slowly recovering, but Mr. Petherick is much worse; he is completely prostrated, and utterly incapable of attending to business in any shape. I do not feel justified at present to send you the accounts of Consul Petherick's disbursement of the 950*l.* subscribed for his expedition under the auspices of the Royal Geographical Society, though they have been ready many months. There are also the solar and lunar observations, the days' work of travel in the interior, the map of route, and the sketch too of the southwards one, taken by our Agent early in 1862 in search of Captains Speke and Grant. Should my poor husband continue thus seriously ill, I will make my best endeavour to forward you the papers alluded to.

You will soon hear in detail the many trials that we have endured, and all, alas! to be of no avail; we rest alone upon the consciousness of having done our best, using incredible efforts to reach Gondokoro. On the 1st of August, 1862, we were compelled to abandon the boats, in consequence of their leaky condition. The cordage was rotten from constant immersion and three months' towing, so that there remained not a chance of reaching Gondokoro by river. The place of disembarkation, on the commencement of our overland journey, was a wretched swamp, a few patches of ground alone being visible, on which tookuls had been built, and formed a temporary station belonging to the brothers Poncet, from whence the ivory brought from inland was shipped. The station is known to the Arabs as Abu Kuka, but by the negroes it is called Lolnun.

Three boats returned to Khartûm, whilst another proceeded to Gondokoro, laden with the little grain saved from the quantity damaged by leakage and rain. Several invalids went in her, a few soldiers, and a number of slaves, whom Mr. Petherick had rescued from one of his agents, and was now able to send on to their relatives. It was a joy to hear, upon our arrival at Gondokoro, that their freedom had been accomplished, and their friends crowded to the Consul to give thanks. We were to push on by land, and the route that it was at first proposed we should take was through the countries of the Aliâb, Madar, Shyr, and the Bari. This was the direct way south: the negro porters, however, refused to carry our baggage, unless Mr. Petherick fought the Aliâb and seized their cattle, which was to be given to the negroes in lieu of copper as hire. The tribe who thus made proposals was the Kytch; they were infuriated because the Aliâb had stolen enormous herds of their cattle some time previously. Mr. Petherick not consenting to their request, his only alternative was to proceed westwards to Gondokoro by an indirect and untravelled route. The country that we were to traverse, as far as Mr. Poncet by report had knowledge of it, to his third station, the Rohl or Adael, was a bead-trading one, and this Petherick felt to be of great advantage.

The negroes willingly carried, each for a pair of copper earrings, our loads to Poncet's second station, Ador, one day's journey from the river. The *Lady of the Nile* sailed for Khartûm a few hours after our disembarkation, and upon her arrival at that port, went down, damaging goods saved from former misfortunes, also papers, &c. A party of our soldiers went a day in advance of us; they had with them sixty porters, and were accompanied by the Chief Jickwi; they were bound for the Rohl station, a distance to be accomplished

under favourable circumstances within three weeks: the porters were paid in advance with massive copper bracelets. We reached Ador on the 2nd August, starting at noon the day before, the crossing of the lagoon and the heavy rain having prevented us from doing the march in the course of the day. When there every effort was made to leave Ador with another large party as soon as possible, but the negroes believing that to a certain extent we were in their power, as our boats had left, refused to carry unless paid with cattle. Remonstrances were of no avail, and they were even offered four times the amount of copper accepted by their comrades.

A fortnight was wasted in endeavouring to bring them to reason; the chief's wife, after remonstrating in vain with them, said to Mr. Petherick, "If you remain here with all these men we shall not be able to supply you with grain, and without porters you cannot leave. My people are thick-headed and obstinate, and will not listen to my words; you must therefore seize them and force them to carry your loads. I will bring you a few, chiefly women; pay them what you have promised."

No time was lost: the chief's wife directing our men where to search, several able-bodied negroes were secured, and the following day, August 15th, we started, but were compelled to leave a hundred loads behind, and we travelled without even the comfort of tea or sugar; every luxury was dispensed with. A week brought us to the great lagoon; we were here attacked by the negroes, who wanted us to return, and we could get no canoes for a length of time. At last, by persuasion, backed with threats, the canoes were brought, and half our force embarked with the merchandise and a great quantity of powder. Where the current was strongest (the meeting of two rivers) the negroes upset the canoes, and clubbed our men as they rose to the surface; but the men, rendered desperate, fired, though the guns had been immersed. Two went off, killing a negro and wounding another, when these negroes, panic stricken, seeing the effect, and finding their calculation wrong as to the utter uselessness of firearms when wetted, made off, leaving five of the sixteen canoes on the water. Two of our best men were murdered, and the property was lost. Amongst it was the fine photographic apparatus brought out from London.

I have no time to dwell upon the difficulty we now experienced to get on, but the lagoon was crossed; not however without the loss of life; and we reached the Rohl at the end of September, where we found the men who had preceded us. They had been shamefully used: the sixty porters ran away when they reached the lagoon, the chief alone remaining with them; and the men of the canoes left our people in the centre of the lagoon on a very small island; they too had been paid in advance. The soldiers had then to get on as they could: it fortunately happened that they had donkeys, and were thus able to convey the luggage. Dividing their party, one body went a march in advance, depositing the loads and returning for the remainder; their journey was thus doubly tedious, and they had reached the Rohl only a short time before we did.

At that place we were detained two months. The negroes would not listen to any proposition for hire but that of cattle, which Petherick refused to give. During this wearisome stay, the men of the zariba, anxious to go upon a cattle razzia, a system to which they were often compelled to resort, as the negroes refused to barter unless for cattle, induced our men to solicit permission to accompany them. Their request was passionately refused by Petherick, when, to our dismay, the men said that they would go; that Petherick had no right to keep them there to starve, and they refused service. Our position was anything but pleasant; and the men of the station, headed by the agent, insinuated that we could no longer remain there. We were in debt to them sixty head of cattle, which we had borrowed for necessary expenses; cattle invariably was taken for payment; without salt for a considerable time, a small lump was offered for sale—the price, a cow; and again, during a severe attack of

fever, which prostrated me, I had asked for a little honey, and a cow was charged for it. Spirit was distilled at the station, and our men had gone deeply into debt for it; so all these circumstances formed a combination too strong to resist, and, reluctantly, a consent was wrung from Petherick that his men might go with the others on the razzia. They returned with cattle, porters were speedily procured, our debts paid, and we left in November the Rohl, for a place called the Neangara, a settlement south of the Moro tribe; our porters would not accompany us beyond, as the tribes were hostile. Arrived there we were distant but a week's quick journey from Petherick's station of the Neambara, and thither we sent for porters to convey us on. The Consul was here attacked with severe illness, and for a month he was perfectly helpless. His horse died when we were there detained, so that when our journey was continued he had to ride a donkey. There were but ten of those animals left of the forty which we brought from Khartûm.

In January, 1863, we arrived at our own beautifully situated station, the Neambara. We here remained only a fortnight. It was necessary to hire fresh porters, and for this troublesome land it may be considered fortunate that they were in that time forthcoming.

The journey from the Neambara to Gondokoro was truly pleasant. The country was high and fertile—a great change from the marsh lands—our health became re-established, and we arrived at Gondokoro in good spirits, there to meet with Captains Speke and Grant. Mr. Baker with boats and a good force from Khartûm was also there; from him Captain Speke had already accepted the use of his dahabyeh on its return to Khartûm; also stores from him, though our dahabyeh, with three other boats laden with stores, were at Gondokoro, and placed at Captain Speke's disposal, but he rejected any aid from Mr. Consul Petherick.

It had been arranged that Mr. Baker should proceed in the direction of a large lake reported to Captain Speke, but which he had been unable to visit, Captain Speke giving the necessary directions for the guidance of Mr. Baker. And thus it seemed that there was no opening for Mr. Petherick, yet he determined to push on towards the said lake, though in a different direction from that to be pursued by Mr. Baker.

In a few days Captains Speke and Grant sailed for Khartûm, carrying with them our letters, the first we had an opportunity of sending for many weary months. These brave and successful travellers had hardly left Gondokoro when Mr. Baker's men mutinied and refused to proceed inland, a few only remaining faithful. Our men rebelled at the same time, and declined to serve Petherick any longer. Sixty-three of these renegades insisted upon being sent back in the boats to Khartûm, and this request, if denied, they said they would enforce. The feeling against Petherick was very violent, and his life was in hourly danger. All this was owing to his attempt to suppress slave traffic; he acting according to orders received from his Government, and having exposed the system universally adopted, traders and soldiers were vindictive—indeed they had sworn to take away his life. Some fifteen men remained true to us, but these included our personal attendants. Mr. Baker's reduced force numbered about the same, and, placed in this dilemma, it was proposed that the two small bands should become one, and that at once we should start towards the lake reported by Captain Speke. But again a difficulty arose: Mr. Baker's men refused to proceed if accompanied by the Consul. We were isolated. Mr. Baker, with his few soldiers, joined a strong party belonging to a trader who were returning to their station, some five marches eastwards of Gondokoro. For us there was nothing left but to return to Khartûm, with the enormous supply of stores which had been brought up by the boats a few weeks previously.

The greater part of the stores which we brought last year from Khartûm

were destroyed by the rains and leakage. The losses have indeed been serious; and the expenditure which Mr. Petherick lavished upon the Expedition from his private means tends well nigh to ruin him; and there is no longer legitimate trade; its existence, once flourishing, will become a tradition.

We left Gondokoro on March 28th, intending to proceed to the Bahr-el-Ghazal, and, on our return, visit and survey the Sobat: we had hoped that the river-voyage and tranquillity might restore health. Progress down stream was very tedious, going only with the current and sweeps; the wind was generally northerly, and so strong that the dahabyeh was almost daily made fast to the reeds until the storm passed, and then down came the rain. Had those capricious winds but served us at the same season the year before, how much unhappiness might have been spared us!

At the lake we had the pleasure of meeting Madame la Baronne, Madame Tinné, and her daughter; they were about to proceed to the station of a trader, and pass there the rainy season; from thence to go to the Nyam Nyams. But they, like all other travellers in this land of vexatious delays, were constantly retarded, and the rains had already commenced when they set off, and without the protection of the two gentlemen who were of their party, the Baron d'A—— and Herr von Heuglin: the latter was too ill to travel, and the Baron was compelled to await the arrival of porters. The ladies, with a numerous suite, got well over the first day's march, but then rain fell as it only does in the tropics; tents were blown down, and speedily the young lady was attacked by fever, and for many days was too ill to travel. The delay caused the diminution of grain, which was sufficient to have lasted until the station for which they were bound was reached. In consequence of this unforeseen difficulty the porters revolted, the soldiers threw down their arms, and were on the point of abandoning those they had come to protect. Fortunately at this time grain was brought into camp: the trader knowing that the delay would cause the consumption of the supply, thoughtfully sent some, and then peace was restored. The Baron hearing of this disaster, started immediately to render assistance, and subsequently Herr von Heuglin was carried in a litter to the rendezvous. Since our arrival at Khartûm we have heard that the adventurous ladies are well and comfortably settled, and that they have received an invitation from a Sultan of the Nyam Nyams to visit him.

The Bahr-el-Ghazal is now a vast swamp, and it is with the utmost difficulty that a passage can be forced through reeds and the pithy ambadj-tree, which has encroached everywhere. The steamer hired by Madame Tinné had the paddle taken off ere it could be attempted. The place is most unhealthy; and we, attacked by typhus fever, were compelled to make a hurried retreat. Arrived at the Sobat, it was discovered that we were almost without grain, and none could be purchased, so that we went on to Khartûm. Here everything is in disorder, and the report of our death, so universally believed, has caused us great vexation. We are cut off from all knowledge of home news; my last letters bear date October, 1862, and the anxiety for tidings tends to aggravate the fever from which I daily suffer, and you must permit me to offer that weakness as an excuse for the very disorderly written letter which I now send. It has been a trial to complete it, and I have been several days about it, often able only to pen a few lines, and I now feel how imperfect it is. I hasten to conclude, as the post leaves to-day. I wish I could give you a better account of my good husband's health, and, trusting fervently that shortly it may be in his power to write to you, I beg to remain, sincerely yours,

Khartûm, Aug. 3, 1863. KATHERINE PETHERICK.

To SIR RODERICK MURCHISON.

P.S.—I find upon re-reading this letter that I have omitted to tell you that Mr. Baker did not proceed inland with the men and Jakeel of Laliffes, who brought down Captains Speke and Grant, as was arranged. Universally the men protested upon taking *Englishmen* to their locality; and thus it was that Mr. Baker joined a party returning to their station eastwards of Gondokoro, belonging to a Circassian, Kurschid Aga. We heard of his safe arrival at that zariba, and at the same time of the disaster which befell the men of the neighbouring station of a Copt, of the name of Shnooda, who is American Consular Agent of this place: one hundred and twenty of a party of his men, accompanied by a number of Kurschid Aga's force, and two malcontents of Mr. Baker's, who within a few days had levanted, set off on a razzia. The company separated at the foot of a lofty mountain. Shnooda's men reached the summit, capturing the cattle, and seeing no negroes, they made a descent on the opposite side, when, in a gorge, a shower of rocks and stones was hurled upon the Arabs, and one hundred and five lost their lives, fifteen only of the party returning to tell the tale. Since I signed this letter we have received a letter from Madame Tinné, who informs us that it was from Mr. Petherick's agent at the Bahr-el-Ghazal she received the timely supply of grain, and not from the agent of the zariba to which she was going. Herr von Heuglin had not joined them; he was, in consequence of illness, travelling very slowly. K. P.

The PRESIDENT said the paragraph relating to the liberation of slaves had reference to a charge which he believed had been most unjustly brought against Mr. Petherick, that he gave encouragement to the slave-trade. It now appeared that the first operation he undertook in connexion with slavery was to handcuff the captain of the vessel trading in slaves, and to liberate the slaves. He need not remind the meeting that Mrs. Petherick had shared all her husband's difficulties. The touching letter to which he had alluded would be placed in the hands of the Secretary, for there are parts of it which ought to form a portion of the communications published in the *Proceedings of the Royal Geographical Society*. The spirit of enterprise and devotion with which Mrs. Petherick has followed the adventures of her husband are truly remarkable. In reference to the catastrophe, which no doubt originated the report that Mr. Petherick was drowned, the letter described exactly what occurred. The calculations and observations in Mr. Petherick's Paper were in the hands of the officers of the Society. Among the documents is a map of the country to the south of Gondokoro, executed in a rough manner by Abd-el-Majid, the man whom he sent forward and who brought back the information that he could not hear of Speke and Grant. Captain Speke himself intended to have been present, but he was in Paris, having been requested to wait upon the Emperor of the French in reference to explorations in the interior of Africa. He had sent a telegram to inform him that the Emperor of the French is very well disposed to encourage all explorations in the interior of Africa, and will be happy to co-operate with England in any efforts to determine the sources of the great rivers which flow from the interior of Africa.

DR. MURIE, at the invitation of the President, gave some additional details of Mr. Petherick's expedition. Starting from Khartûm, at the junction of the Blue and the White Nile, the party were favoured with tolerably fair winds, and the boats went up merrily to Bahr-el-Ghazal. Here the winds, which had been coming from the north, carrying the boats up against the current, changed and came blowing from the south, so that they had both wind and current against them, and they had considerable difficulty in getting along. The country is marshy, which rendered towing impossible. Accordingly they determined to quit the river and make a détour to the west, to Mr. Petherick's station at Neam-ṗara, which is about 90 miles due west. After a series of

marches they reached the station, and then went round to Gondokoro. In the previous November Mr. Petherick had sent a party up the river to meet Captain Speke, and they reached Gondokoro in January, 1862. Mr. Petherick left Khartûm in March, 1862, and did not reach Gondokoro until February, 1863, the march round occupying as many months as it ought to have done weeks. They encountered many difficulties. Being unable to get porters to carry the baggage, they were obliged to wait at several stations until they could get men. The country on both sides of the Nile at Bahr-el-Ghazal consists of a series of marshes and lakes. On their way to Rohl they came to a winding river with a general course from south to north, almost parallel with the Nile itself. They found great difficulty in crossing, and it was here that many troubles occurred and the misfortune happened which had been mentioned. The boats which were sent forward to Gondokoro Dr. Murie believed had orders to remain there until either Captain Speke or Mr. Petherick should arrive. The chief Arab in command, Abd-el-Majid, went to the station at Neambara to the west, and from this point sent the men under Mussaad to the south. They made a march of sixteen days southwards, and when travelling would go at the rate of 10 or 12 miles a day. The country we passed through, as well as that described to the south, is gently undulating and covered with vast forests; very fruitful and healthy. The chief thing which troubled our men in their march were ulcers in the legs and feet, caused by the sharp grass cutting the skin. Fever is comparatively unknown in that part, and mosquitoes are few. Cotton, tobacco, and many other products, are common. Mussaad reported a piece of water, flowing to the west, but was uncertain whether it was a river or a lake. Dr. Barth, in his Travels, has stated that he had heard from the Arabs that so many days south there was a river flowing to the west. Whether this was the same or not remains to be determined. He would say one word with regard to Mr. Petherick and his expedition. The Geographical Society sent him out to succour Captain Speke. He was to send boats to Gondokoro, which were to remain there a certain time, and if Captain Speke did not come he was at liberty to withdraw. Mr. Petherick himself, Dr. Murie presumed, so understood his instructions, and did send boats to Gondokoro. Abd-el-Majid, however, seemed not to have followed what Dr. Murie understood were his instructions, for he left and was coming down the river when Mr. Petherick met him. With regard to slavery, he might state that the whole of that country of the Nile is in a perfect ferment on the subject. Mr. Petherick met his own men coming down the river with slaves. It is almost out of the power of any man to prevent it. You cannot tell what the Arabs are doing in the boats up the river, and when they come down they conceal the slaves in their boats and land them at a point where they are sent away; some in an easterly direction towards Abyssinia, some to the west, and some down to Egypt.

The PRESIDENT said he had received a letter from Mr. Colquhoun, the British Consul at Cairo, stating that he had received books and packets of letters from Mr. Petherick, which he would send home by the Southampton boat. He had not heard from Mr. Petherick since Captain Speke left Gondokoro, and he was in ignorance of his movements; but had gathered that his health and that of his wife were much broken. Mr. Colquhoun added that the consulate in the Soudan had been done away with for the present. As the trade with the Soudan became more important, it would be necessary to re-establish the consulate, but on a totally different footing. "It is a wretched country," continues the letter, "and will need, what I fear it will not receive for some time, a thorough re-organisation. The slave-trade demoralises every one apparently who sets foot in it." In reference to this communication the President said he hoped, if through any misrepresentations Mr. Petherick had lost his appointment, that he would be re-instated. This was the first time that we had been enabled to do justice to him, for until now we had never had the real details of his expedition. The documents, on which geographers most rely, are in the hands of

the Secretary, and will be examined; and we shall see how they will enable practical geographers to improve their maps of a portion of Africa where no observations have hitherto been made.

The second Paper was—

2. *On Fossil Bones from the Alluvial Strata of the Zambesi Delta.* By JOHN KIRK, M.D.

THESE bones were collected in the bed of a stream which joins the Zambesi near the head of the Delta, whither they had been transported by the rush of water from a little way inland. In Mammalia, the bones and teeth of large antelopes were most abundant; next, those of the buffalo, hippopotamus, and lion. Among reptiles, fragments of the osseous back of the water-tortoise and bones of crocodile were found. Besides bones there were many fragments of pottery, rounded on the edges, which, on fracture, had the same appearance as the half-baked pottery now in use by the natives; but the surface-markings differed from all kinds of pottery known either to Dr. Livingstone or Dr. Kirk. It seems probable that these fragments were washed from the clay strata, as well as the bones, in company of which they are found. Villages in this region are commonly situated near a lagoon or creek, and it is the superstitious custom of some tribes to cast into the water all bones of animals after the flesh is eaten. The bones have evidently not lain long exposed to the sun and air, otherwise they would not have retained so well their form. All the specimens yet examined belong to species now existing in the Zambesi Delta.

The PRESIDENT said he would read a short communication of his own in relation to the Paper just read. They would excuse him if upon this occasion he commingled a little his peculiar science of geology with physical geography. He had always endeavoured to combine them, because he believed one is the foundation of the other. He deeply regretted that the fossil bones collected by Dr. Livingstone and Dr. Kirk should be a remnant only of the fossil remains and other natural history objects collected by them. The chief collections had been sent by trading-vessels to Mozambique, and not having yet reached this country it was to be feared they have been lost. The geological maps of the late Mr. Richard Thornton, the geologist who went out with the expedition, except one map of the Kilimandjaro Mountains, have in like manner been sent away in ships and have not been heard of.

The PRESIDENT then read the third Paper—

3. *On the Antiquity of the Physical Geography of Inner Africa.* By Sir RODERICK I. MURCHISON, K.C.B.

HE commenced by expressing the regret which every one must feel, that so small a portion of the fossil remains and Natural History objects, collected by Dr. Livingstone and Dr. Kirk, should have

reached England; the greater part having been sent by trading-vessels to Mozambique, and not since been heard of. The great interest which attaches to the bones brought home by Dr. Kirk from the Zambesi is, that, though they have been so long entombed in argillaceous drift as to have lost their gelatine and to have become truly fossil, they are confined to animals still living in South Africa. This supports the theoretical view which Sir Roderick put before the Society in 1852, viz.—that South Africa had, from a remote secondary period, or that of the fossil reptile Dicynodon, maintained, throughout its central regions, undisturbed lacustrine and terrestrial characters up to our own days. This view was also demonstrated by Livingstone as regards the Zambesi, and had been well sustained in Central Equatorial Africa by the researches of Burton, Speke, and Grant. In none of these adventurous journeys have the travellers met with ancient fossiliferous formations which would indicate that this continent had been submerged in former periods, like most other countries. Nowhere have they detected limestones with marine organic remains, though they have been especially urged to direct their inquiries to this point. The only marine shells which have been found occur on or near the coasts, and are either of eocene nummulitic, or of recent age. From the observations of Mr. Richard Thornton and others, it is evident that the nucleus or backbone of the continent is formed of the older or palæozoic rocks of geologists; but there is no evidence of the existence of any secondary or tertiary fossiliferous marine rocks in inner Africa. The opinion of the author of the Paper is, that the superficial deposits which do exist are of purely terrestrial and lacustrine or fluviatile origin. The only striking fossil shell which Speke found, in a ridge at a great distance from the coast, proved to be a large Achatina, similar in form to the *A. perdix*, now living in South Africa. All the evidence which has been obtained sustains the validity of Sir Roderick's hypothesis of 1852, that the same physical conditions have prevailed in Central Africa from those days when that remarkable reptile of the marsh lived, which was discovered by Mr. Bain in the interior of the Cape region, and named Dicynodon by Owen. The author then proceeded to remark that the vast interior of the South African continent exhibits no signs of subaërial volcanoes, and consequently its surface has not been diversified by the outpouring of lava-streams, or broken up by efforts of subterranean heat to escape, or subjected to those great oscillations by which the surfaces of other continents have been in recent geological periods submerged beneath the waters of the ocean, and strewed with erratic blocks. In conclusion, he referred

to Dr. Kirk's opinion regarding the age of the fragments of the pottery, and remarked that if the contemporaneity of these remains of human art with the fossil bones be eventually established, we should have every reason to conclude that the Negro type of mankind inhabiting this ancient continent must be of great antiquity. In view of its antiquity, the very slight advances in civilisation made by this race were very remarkable, especially if we compared the Negroes with the American and Polynesian races; for these have had to struggle against the want of those powerful helps to progress — domesticable animals — which have always abounded amongst the Negroes.

DR. HODGKIN said, he hoped he should not be intruding upon the Society if he offered a few remarks upon the physical geography of North Africa. His observations did not extend much above one hundred miles from the coast; but the appearances which fell under his notice struck him as very remarkable. On landing at Mogador, he found that the sandstone forming the coast and the rocks in the sea were more or less covered with a calcareous coating, very likely of a tufaceous kind. He had then no conception of what it was, or how far it extended. As he proceeded day by day into the interior, he noticed that this calcareous tufa became much thicker, presenting various phenomena, under very interesting modifications, up to Morocco itself. Returning by a different route, thus traversing a triangular space of several miles area, he found the same formation of various depths: sometimes a mere thin coating lying upon limestone in steps, covering it almost like a carpet on stairs; in other places, forming beds of various feet in thickness, and containing embedded in it various masses derived from the rocks of the interior. He always found the *débris* of the covered rocks on one side, and not on the other— a fact which, as respects the place of origin, seemed to indicate the course in which this covering had been derived. In returning from Morocco he crossed the Jeblet chain of hills; and even the sides of these hills were covered with the same formation up to a considerable height. These hills were formed of strata, which in some cases were almost vertical; and even in this position their extremities were covered with a layer of this same calcareous matter. He proceeded to Mazagan, and up to the coast he found the same thing. His friend Captain Armitage, who went from Morocco to the coast at Saffa, also noticed the same phenomena.

ADMIRAL MURRAY said, after papers were read, one of the first things that Sir Roderick Murchison did was to call upon the Society to return their thanks to the author of the paper. His modesty would not allow him to do the same thing with regard to his own paper. Would they therefore allow him, as an humble individual, to ask them to return their thanks by acclamation to Sir Roderick Murchison for the very interesting paper he had read?

The PRESIDENT returned his hearty thanks for the compliment. In reference to what had fallen from Dr. Hodgkin, he begged to say that his own paper had exclusive reference to Africa south of the Equator. He was perfectly well acquainted with the very different structure of North Africa, in which there is a great number of these formations extending a considerable distance into the interior, which are not found in Southern Africa. Dr. Hodgkin accompanied Sir Moses Montefiore in his recent expedition to Morocco, and if he would bring before the Society a special paper on the structure of these rocks, they would be glad to receive it. As Dr. Kirk was present, and they had not seen anybody from the Livingstone Expedition for some time, he hoped that gentleman would favour them with a few observa-

tions. He would ask him to state the circumstances under which he found the bones.

DR. KIRK said they had entered the Zambesi at its most southern mouth, and had reached the head of the Delta, where the river flows from north to south. The creek in which the bones were found comes from the west. It could not come any great distance, as the rocks found washed down by it were chiefly of clay, with a few calcareous nodules in them; whereas the coast-range is composed entirely of calcareous tufa, the representative of the limestone of the Tertiary times of Mozambique. It seemed to him extremely probable that there is a connexion between these bones and the ancient inhabitants of Africa. He came to this conclusion from all the bones being in fragments; it is not at all likely they would have been broken had they been deposited by the death of animals in marshes. All the long bones were broken, while the vertebræ were perfect and not in any way worn. One of the bones of a buffalo is quite sharp on the edges; yet no skull or long bones, such as the natives would break, were found. Hundreds of specimens were picked up for transmission home, which have not arrived. He had also found a few bones in the banks of Lake Nyassa; the spot was in latitude 13° S., near one of those promontories where the river comes in from the mountain range to the west, passing about four miles of flat alluvial plains, very similar to the Zambesi Delta. These plains are composed of clay beds with ferruginous sand, and at the mouth of these the bones were found—not in the least degree fossilized, yet tending that way, but containing a little oil. These seem to have been deposited in the clay when the lake was drying up, for that lake has stood a hundred feet above the present level. He had no doubt that further research in the lakes will lead to the discovery of the remains of animals, and possibly of human inhabitants.

MR. GALTON asked Dr. Kirk how far the loss of gelatine in bones, lying on the shores of the Zambesi, was a sign of their antiquity. In the hot and dry regions of Africa with which he (Mr. Galton) was acquainted, bones lose their gelatine rapidly. He mentioned a case in the Bishari Desert, where he had seen dead camels lying by the roadside, so thoroughly desiccated and so deficient in organic matter, that he was able to lift an entire quarter of an animal, with ease. Again, in the same latitude as the Zambesi, but in the confessedly drier regions of West Africa, he had noticed recent bones wholly robbed of their animal matter. When burnt they gave out no smell. If bones lost their gelatine as rapidly by the side of the Zambesi as in the other places he had named, it is quite conceivable that they should be destitute of gelatine when first embedded. Of the action of the Zambesi climate upon the gelatine of bones he had no knowledge, and therefore requested information from the experience of Dr. Kirk.

DR. KIRK said the bones in that region not only speedily lose their gelatine, but in a year's time are completely destroyed. But it is not in this case the loss of gelatine: the bones are thoroughly fossilised, are much heavier than ordinary bones, on being broken adhere to the tongue, and on being burnt show no trace of organic matter. There is a great distinction between bones which have had their gelatine extracted and bones which have been undergoing a chemical process.

The PRESIDENT said, the bones are as completely fossilised as the bones of the mammoth or any extinct animal that have ever been found in the old diluvial drift.

Before adjourning the Meeting, the PRESIDENT announced that Dr. Livingstone may be expected home very shortly. It is perfectly certain that he had returned to the Zambesi in very good health.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Note on the frequent Omission of Readings of the Barometer and Thermometer in Sextant Observations for the Determination of Latitude and Longitude.* By Edwin Dunkin, Esq.

(Extracted from the 'Monthly Notices of the Royal Astronomical Society,' vol. xxiv. p. 121.)

In offering the following remarks on a subject which has lately given me much trouble, I think it may be useful to call the attention of those members of the Society who are interested in astro-geographical investigations to a most important fact. It appears that, in the determination of latitudes and longitudes by the sextant, while the greatest care has generally been taken by travellers in the astronomical part of the observations of meridian altitudes, local time, or lunar distances, leaving really nothing more to be desired in that direction;—corresponding observations of the variations in the condition of the atmosphere are frequently omitted, notwithstanding that they are such important elements in the deduction of the proper correction for refraction. This omission is to be regretted, even when the traveller keeps a meteorological journal, as the observations in this instance are generally confined to a few readings daily, which differ considerably, especially the temperature, from what would be recorded about the time of the sextant observation.

These few considerations have occurred to me during the discussion of Capt. J. H. Speke's astronomical observations, the reduction of which was performed under my superintendence. So far as Capt. Speke's observations are concerned, I have nothing but the most unqualified commendation, and I have felt personally indebted to him for the general accuracy and order, as exhibited in the whole of his astronomical records from Zanzibar to Gondokoro. The object of these remarks is, therefore, not to complain of, nor even to criticise, what is already performed, but simply to offer a suggestion which might be available for the future.

As a result of the absence of corresponding meteorological observations, I have been informed that it has frequently been the practice in the reduction of lunar distances, &c., to extract the correction for refraction from a table, constructed with a barometer reading of 30 inches and a thermometer reading of 50°, without any regard to the condition of the atmospheric pressure, or of the temperature of the air at the time of observation. For nautical purposes, this rough method may in general be sufficiently accurate; but when the observing station is elevated several thousand feet above the level of the sea, and when the resulting longitude is intended to fix permanently the geographical position of the place, the effect of the decreased atmospheric pressure becomes of the highest importance, and ought on no account to be neglected.

To exhibit the effect of this omission, I have given as examples, though by no means extreme cases, two different results for longitude with the lunar distances corrected and uncorrected for the variations in the readings of the barometer and thermometer. In the reduction of Capt. Speke's astronomical observations, I was obliged to assume these readings, in consequence of no

recorded barometric readings having been placed in my hands; but fortunately, scarcely any ill effect arose from this circumstance, as I found subsequently from an examination of some observations of the temperature of the boiling point of water made during the route, that my assumed readings differed very little from the truth.

From the mean of a series of sextant observations made at Kazé by Capt. Speke, in 1861, February 28, at 20h. 25m. 34s. local time, it was found that the angular distance at that time between the Sun and Moon, when cleared from refraction and parallax, was 123° 10′ 28″ corrected, and 123° 11′ 4″ uncorrected. These values give for longitude:—

	h.	m.	s.		°	′	″	
Corrected	2	12	4	E. =	33	1	0	E.
Uncorrected	2	13	8	=	33	17	0	
Difference	0	1	4	=	0	16	0	

Again, in 1862, December 12, at Faloro, at 20h. 37m. 27s. local time, the angular distance between the Sun and Moon was found to be 103° 39′ 1″ corrected, and 103° 39′ 25″ uncorrected; the resulting values for longitude being:—

	h.	m.	s.		°	′	″	
Corrected	2	7	25	E. =	31	51	15	E.
Uncorrected	2	8	15	=	32	3	45	
Difference	0	0	50	=	0	12	30	

I think these differences are sufficiently important to attract the attention of those who may in future be called upon to make or reduce similar astronomical observations for geographical purposes. They also justify me in laying the subject before the Society. I would, therefore, most strongly recommend that future travellers should be specially instructed to record, not only the readings of the chronometer and sextant, but also the readings of the barometer and thermometer *at least once* during each series of observations. If they will faithfully do this, they will greatly relieve the mind of the computer, and also (which is of more consequence) increase the value of their observations two-fold.

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2. *Gold Fields in Queensland.* Extract from a Despatch from SIR GEORGE BOWEN to the DUKE of NEWCASTLE.

Communicated by the COLONIAL OFFICE.

"Two Gold Fields have been recently 'proclaimed' in this colony. One of them is about 20 miles inland from the town of Gladstone; and the other is on the Peak Downs, about 250 miles north-west of Rockhampton. A large number of persons have already congregated at these two localities, and a considerable quantity of gold has been procured. The discovery of a new Gold Field in Australia no longer causes the general excitement of ten years ago. Gold has also been recently discovered near Dalgai on the Darling Downs, and at some other places. A rich copper-mine is being worked by a Company close to the Gold Field on the Peak Downs. It was from the first foretold that the increase of our population would be sure to lead to the development of our mineral resources."

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3. ERRATA *in* '*Notes on the Language of South Africa*,' by Senhor Command. JORGE C. DE FIGANIÈRE (*vide* 'Proceedings,' vol. viii. p. 105).

Senhor Jorge C. de Figanière has communicated to us the following corrections of his Memoir, published in the last number of the 'Proceedings:'—

Page 106, line 10, instead of "The Nation," *read* "The Native."
Page 106, line 21, instead of "Botetho," *read* "Botelho."
Page 106, line 30, instead of "nations," *read* "natives."
Page 106, line 42, instead of "Sourenço Marques," *read* "Lourenço Marques (Delagoa Bay)."
Page 106, line 43, instead of "of Hottentots," *read* "of the Hottentots."
Page 106, line 57, instead of "which extends to Algoa," *read* "which extends to the lake known by that name (Maravi)."
Page 107, line 1, instead of "Zinganissa," *read* "Chingamira."
Page 107, line 12, instead of "extending to the coast," *read* "extending to the west."
Page 107, line 15, instead of "Sancedo," *read* "Sancule."
Page 107, line 26, instead of "Tungene," *read* "Tungue."
Page 107, line 29, instead of "Angvane," *read* "Anjoanes (Johanna)."
Page 107, line 31—"The inhabitants of our islands of Cabo Delgado speak this dialect with very little difference;" add the following note:—"The reader will find a vocabulary of about 140 words of the dialect of a tribe inhabiting the coast near Delagoa Bay at the close of the last century in the following work:—'Journal of a Voyage performed in the *Lion*, extra Indiaman, from Madras to Columbo and Delagoa Bay, in the year 1798; with some account of the Manners and Customs of the Inhabitants of Delagoa Bay, and a Vocabulary of the Language.' By William White, Esq., Captain in the 73rd Highland Regiment of Foot. London, 1800.

Nearly the whole of this vocabulary has also been incorporated into the 'Vocabulary of the Languages of Mozambique,' edited by Dr. Bleek.*

* 'The Languages of Mozambique: Vocabularies of the Dialects of Lourenzo Marques, Inhambane, Sofala, Tette, Sena, Quillimane, Mozambique, Cape Delgado, Anjoane, the Maravi,' &c. Drawn up from the manuscripts of Dr. William Peters, Member of the Berlin Academy, and from other materials, by Dr. Wm. H. J. Bleek, Member of the German Oriental Society. London, 1856.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

[ISSUED 25TH JULY, 1864.]

SESSION 1863–64.

Eleventh Meeting, May 9, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Sir Richard G. Glyn; Robert Carr Glyn, Esq.; Wilson Lloyd, Esq.; J. Kirke, Esq.; Charles Faulkner, Esq.; E. L. Betts, Esq.*

ELECTIONS.—*Robert Burn, Esq.; Charles Faulkner, Esq.; Lieut.-Col. A. Fremantle; George Goodall, Esq.; Capt. R. C. Holms; Vesey Weston Holt, Esq.; Capt. J. P. Luce; Capt. Roderick M. Murchison; R. W. Roberts, Esq.*, B.A.; *H. Oliver Robinson, Esq.; Admiral Saurin; Frank Simpson, Esq.*, MED. STAFF; *Edward Webster, Esq.; Mark B. Whyte, Esq.*

ACCESSIONS TO THE LIBRARY.—'Handbook of the Panama Railroad,' by F. N. Otis; presented by John Power, Esq., F.R.G.S. 'Le Japon; Histoire et Description, Mœurs, Coutumes, et Religion,' par M. E. Fraissinet; presented by M. V. A. Malte-Brun, H.C.F.R.G.S. 'Expeditions on the Glaciers; including an Ascent of Mont Blanc, Monte Rosa, Col du Géant, and Mont Buét,' by a Private of the Thirty-eighth Artists, and Member of the Alpine Club. Continuations of Transactions, &c.

ACCESSIONS TO MAP-ROOM.—W. M'Leod's Middle-Class Atlas, on 29 Maps.—New Zealand: Waikato River, on 2 sheets, showing the seat of war.—Atlas, by Dr. Hochstetter.—China: Large Diagram, presented by Capt. Sherard Osborn.—World, in Hemispheres; 12 copies; School Series.—Photograph of *Erebus* and *Terror* in a Gale in the Pack, January 20th, 1842; presented by Staff-Commander

Davies.—Continuation of the Admiralty Charts and Ordnance Maps.

EXHIBITIONS.—Stanford's Library Map of South America.—Views of the Victoria Falls of River Zambesi, by Mr. T. Baines.

The PRESIDENT congratulated the Society on the reappearance among them of Sir Woodbine Parish, one of their earliest members, and who, having thrown great light on the geography of South America, was now about to make an additional communication respecting that region, of great novelty and importance.

The Paper was entitled—

1. *A Journey across the Southern Andes of Chile, with the object of opening a New Route across the Continent.* By Don GUILLERMO COX.

Translated and Communicated by Sir WOODBINE PARISH, K.C.H.

THE journey, of which the present Paper gave an account, was undertaken towards the close of 1862, by Don Guillermo Cox, a gentleman born in Chile, but of English parentage. Its object was to discover an easy route between the new Chilian settlements on the Pacific coast, in 40° and 41° s. lat., and the river Negro, which, eighty years ago, had been proved by Villarino, a Spanish explorer, to be navigable from the eastern side of the Andes to the Atlantic. He equipped an expedition at his own cost, at Port Montt, a new German settlement, now containing 15,000 inhabitants, opposite to the Island of Chiloe, and proceeded, in December, 1862, by way of the two lakes, Llanquilhue and Todos Santos, towards the almost unknown inland sea of Nahuel-huapi. He traversed the lakes in boats, and passed over the dividing ridge of the Andes, by the Rozalez Pass, which had been discovered in 1855 by one of Señor Cox's party, Don Vincente Gomez. The height of this Pass was determined at 2760 English feet. Arrived at the far end of Lake Nahuel-huapi, on the banks of which they had built a boat for the remaining part of their journey, Señor Cox was rejoiced to find a broad stream issuing from it in the direction of the rivers which flow into the Atlantic. Nine of the sixteen persons who formed the expedition here returned to Port Montt; the rest embarked in one of the boats, and descended the river, which is called the Limay, and forms one of the affluents of the Rio Negro. The voyage was attended with great risks, owing to the rapids; and the various adventures encountered were narrated in a lively manner by the author. At length, when within five miles of the point to which Villarino had attained in ascending the Rio Negro from the Atlantic, the boat

was upset, and the party escaped drowning only to fall into the hands of a tribe of Pampas Indians encamped near the spot. Señor Cox appeased the anger of the cacique, who threatened to put him to death for having visited his territory without permission, by playing a tune on a flageolet he had fortunately saved from the wreck. The cacique farther promised to assist him in reaching the Rio Negro, on condition that he first went to Valdivia for presents. The recrossing of the Cordillera by the pass of Ranco, at a more northerly point towards Valdivia, was accomplished without much difficulty; but the main object of Señor Cox's journey, namely, the opening of a new passage across the continent, was for the time frustrated by the hostility of the Indian tribes; although Señor Cox, so far from being discouraged, was determined to renew the attempt, and writes to Sir Woodbine Parish that, after accomplishing the passage down the river Negro, he shall never rest till he has made a complete exploration of all Patagonia to the south of it.

The PRESIDENT said their best thanks were due to Sir Woodbine Parish for having translated this interesting communication. He was happy to see present that distinguished naval officer, Admiral FitzRoy, Commander of the *Beagle*, who explored the coasts of the region under consideration during five years. He had fixed the altitude of some of the mountains mentioned in the Paper; and these heights were found to be so accurate, that the author had adopted them. His gallant friend had also thrown much light on the natural history of South America, by taking with him Charles Darwin; and as it was not often they had the pleasure of seeing him at their Meetings, his time being much occupied with meteorological inquiries of national importance, he hoped he would now offer a few observations on the subject of the Paper.

Admiral FITZROY, after complimenting Sir Roderick Murchison upon his unintermitting exertions in the cause of Geographical Science, to which he attributed much of the success of the Society, said the interesting Paper which Sir Woodbine Parish had brought before them related to a country where a man does not go, as it were, with his life in his hand. It is a country suited to the constitution, habits, and pursuits of Englishmen. From lat. 45° s. to 35° s., it embraces, on the western side, some of the finest regions in the world. One proof of its adaptability for colonisation by Europeans is, that, during the last ten or twelve years, no less than 15,000 Germans have settled at Port Montt, a spot where, when he was employed in exploring some twenty-nine or thirty years ago, there was not an individual except the aborigines; while a little farther to the north, where at the time of his visit a few fragments of coal were found lying on the surface, and were not thought worth picking up, there are now from twenty to thirty ships at a time loading coal, with all the necessary contrivances on land for that purpose. The region north of Chiloe and Port Montt, and between that and the south of Chile—between Valparaiso and Conception—is one of the finest he had ever seen. Then, there is the immense range of the Andes running far north and far south, containing an unlimited store of minerals, probably of nearly all kinds. Wherever the mountain-ranges had been examined, from the farthest south, among the broken islands of Tierra del Fuego, up to Central America, they have been found rich in minerals. From the eastern side of these mountains across a

very broad space of flat country, the *Pampas*, there is the easiest possible access. So valuable did the original Spanish explorers consider it, that one of their first objects, after getting a sort of temporary possession of the outskirts of the country, was to push a mission through to the Lake Nahuel-huapi. At the east side of the lake a Jesuit mission was established in 1670, and continued there till about 1715, when it was broken up in consequence of the hostility of the Indians. From that point the whole country to the east was brought within their reach; but the wandering tribes of Indians, having horses which they obtained from the original Spaniards, kept the Spaniards so completely in check, that to this day they have remained in a state of independence. From about lat. 40°, towards the south, the country is open for civilised settlement. The Chilians claim one side, and the people of Buenos Ayres the other; but they have made little or no use of it. Within the last two years he had heard that a colony of Welshmen had gone out to the east of that country, and settled, he believed, near the mouth of the River Chupat, which runs a little to the south of the River Negro. There is also a colony of Chilians in the Straits of Magellan, and there are our own settlements at the Falkland Islands, and perhaps at the mouth of Santa Cruz. So that all sides of that region are beginning to be appropriated by civilised man. The Paper also drew attention to the character of the country. The whole of the west side is well-timbered, most fertile, and very thinly peopled. The readiness with which the Chilians welcome settlers from Europe is shown in some degree by the success of the German colony. He might just refer to the curious fact of there being forests of apple-trees in the neighbourhood of Lake Nahuel-huapi. These apple-trees at the time Villarino went up the river were in full bearing, consisting of several varieties of good edible apples, showing that they must have been grafted. They were either planted and grafted by the missionaries, or they must have been indigenous and improved by the Indians by grafting. This country has also indigenous potatoes. Our potatoes for the last half century have been getting worse, and it has been a matter of surprise to him that no one has taken steps to import the Indian potato from that part of the world. He had eaten three different kinds of potato among the Indians, between Valdivia and Conception, and they were better than any he had ever eaten. He might also advert to the great railway works which Mr. Wheelwright is carrying on in South America, between Rosario on the River Plata and the country across the Cordillera of the Andes, also between Buenos Ayres and a port to the south by another railway; from which, when completed, we might hope for great results.

The PRESIDENT said there was another short communication upon the subject of South America, from Consul Hutchinson, which the Secretary would read. As the name of Mr. Wheelwright had been mentioned, he might state that they had marked on the map exhibited to the Meeting, the projected line of the remarkable railroad which Mr. Wheelwright intended to carry right across the Andes. The subject was brought before the British Association, at Newcastle-upon-Tyne, by Mr. Wheelwright. His proposal was to carry a railroad at a height of 16,500 feet over a pass in the Andes. The project is a gigantic one; but from the success which has attended Mr. Wheelwright's undertakings on the Pacific, and the power he has shown in moving locomotives up very steep inclines, he had no doubt that, if the capital were supplied him, the enterprise would be found perfectly feasible.

Mr. SPOTTISWOODE then read the following communication from Mr. Consul Hutchinson:—

2. *Details of a Journey through parts of the Salado Valley and across some of the Argentine Provinces.* By THOS. J. HUTCHINSON, H. M. Consul, Rosario.

THIS Paper contains an account, in very minute detail, of a journey performed by Mr. Hutchinson through the Argentine provinces, and especially through the valley of the river Salado. It gives the distances from place to place with more exactness perhaps than has been done hitherto, and is accompanied by an excellent map, by Dr. Burmeister, of Buenos Ayres, which, although founded on those drawn by Mr. Arrowsmith for Captain FitzRoy's and Sir Woodbine Parish's works, contains some more recent data and corrections by Mr. Hutchinson himself. The whole country, from the mouth of the Plata to Diamante in Entre Rios, is described as flat; and the aspect of the undulating land of the Entre Rios province is described as very pleasing from the contrast it offers to the level region. The Salado is called the Northern Salado River, to distinguish it from the southern stream of the same name, which flows through the province of Buenos Ayres. Its mouth lies between Diamante and Santa Fé, in s. lat. 31° 38′ 34″; w. long. 60° 39′ 40″. Little or nothing was known of it previous to its exploration by Captain Page, of the U. S. Navy, about ten years ago, who ascended it in a small steamer to a point 340 miles from its mouth. The river has since been more carefully examined by Mr. John Coghlan, civil engineer at Buenos Ayres, who has pronounced on the possibility of its navigability to a distance of nearly 1000 miles above Santa Fé. The line of railroad from Rosario to Cordova, projected by Mr. Wheelwright, is carefully laid down upon the map; and Mr. Hutchinson (who holds the post of H.M. Consul at Rosario, and is therefore a most competent person to form an opinion upon such a subject) bears the strongest testimony to its great and undoubted importance to the future prospects of the whole of that republic. The port of Rosario (he says) is the natural outlet for eleven out of the fourteen provinces into which the Argentine Republic is divided; and the carrying trade, effected by bullock-carts, between the city and the interior, amounts to nearly 18,000 tons per year.

Mr. WHEELWRIGHT said that the communication from Consul Hutchinson reminded him that a new pass had been discovered and examined in the Cordillera of the Andes, which might perhaps be found more practicable than the one he had explored, with reference to an interoceanic communication, in the

latitude of Atacama in 1855. The elevations to be overcome in the new pass appear lower than anything he had obtained in the north. The only obstacle which presented itself to his mind in relation to it was the snow—it being in the latitude of 35° s., whereas the Pass of San Francisco is in 27° s., and for nine consecutive years passengers had passed and repassed without interruption. He came to the conclusion, from this circumstance, that the northern pass might be found practicable for locomotive power, and the surveys he had made induced the conviction that practical gradients could be obtained. Such has been the result; and although a longer route and far to the north, its freedom from blocking snows was a powerful argument in its favour. It would certainly be most desirable that a transandine communication should embrace Santiago, the seat of government in Chile, and the commercial capital Valparaiso, both connected by a railway, which extends to Curico, from 80 to 100 miles south of Santiago, and the apparent starting-point through the Pass of the Andes. Should the statements prove true (and they are doubtless entitled to credit), and no obstacle interpose, this route would obtain a decided preference over that of the north. Should this be the case, the projected railway from Cordova northward to Horqueta, instead of bending westward, as originally proposed, towards the Cordillera, would continue its northerly course through Tucuman, Salta, Jujuy, and finally enter Bolivia, or what was formerly Upper Peru, and restore its foreign commerce and trade to Buenos Ayres; but instead of a journey of three or four months, it would, through railway facilities, be accomplished in as many days. Should the southern pass be found practicable, it would take the Rosario and Cordova line of railway from the valley of the La Plata, and continue it on to the Villa Nueva station, about 160 miles, and at this point diverge and take a western direction through the province of San Luis to Mendoza, from thence seek the Cordillera Pass, and unite on the Great Southern Line, which he (Mr. Wheelwright) projected in 1842, and which has recently reached Curico, the probable junction of this interoceanic communication. The Cordova Railway is already in progress. It has been taken up in England by Mr. Thomas Brassey, who is thoroughly capable of appreciating this great undertaking, which, when carried out, will embrace in trunk-lines 3000 miles of railway.

The PRESIDENT said he wished before adjourning the Meeting to call attention to the beautiful paintings of the Zambesi Falls, by Mr. Baines, the artist who accompanied Dr. Livingstone in his travels. Mr. Baines had sent home a vast number of pictorial illustrations; and he hoped that, under the patronage of the Society, some publisher might be induced to bring out a selection of them in coloured lithography.

Twelfth Meeting (ANNIVERSARY), 1 P.M., *May 23rd*, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

THE SECRETARY read the minutes of the previous Annual Meeting, and also the Regulations for the conduct of the present one; after which Dr. Webster and Mr. Arrowsmith were appointed scrutineers for the ballot by the President.

Captain R. R. Hutchinson; John W. Bone, B.A.; John Cameron; John W. Cannon; F. T. Jeyes, and Edward Warner, M.P., Esqrs.,

were elected as members of the Society: and Captain H. Toynbee; Edw. Bellamy; W. F. Ives; A. Mackinnon, and E. O'Riley, Esqrs., were proposed as candidates for election at the next meeting.

The Report of the Council was read and adopted.

The PRESIDENT then delivered the FOUNDER'S GOLD MEDAL to the Baron C. VON DER DECKEN, and the VICTORIA GOLD MEDAL to Captain JAMES A. GRANT, who each returned thanks.

After the reading of the Anniversary Address, Sir Henry C. Rawlinson proposed, that the regulation which provides that the President be changed every two years should be suspended in the election that was now to take place; stating that Sir Roderick Murchison had already explained, in his Address, the peculiar circumstances under which he was unanimously requested by the Council to allow himself to be put in nomination as President for the ensuing year.

Mr. JOHN CRAWFURD seconded the resolution, which was then put and carried unanimously.

The Scrutineers, after the completion of the ballot, reported that Sir Roderick I. Murchison had been unanimously re-elected President, and that the changes recommended by the Council had been adopted: namely, John Crawfurd, Esq., F.R.S., and Maj.-Gen. Sir H. C. Rawlinson, K.C.B., to be Vice-Presidents in place of Sir G. Everest, retired, and Lord Ashburton, deceased: Laurence Oliphant, Esq., Secretary, to replace W. Spottiswoode, Esq., who has resigned: Vice-Admiral Sir G. Back; T. H. Brooking, Esq.; Rt. Hon. Sir David Dundas, M.P.; the Earl of Donoughmore; Lieut.-Gen. Fox, and H. Danby Seymour, Esq., M.P., to succeed, as Councillors, John Crawfurd, Esq., and Sir H. C. Rawlinson, Rt. Hon. Sir Thomas Fremantle, Admiral Murray, Commodore A. Ryder, E. O. Smith, Esq., and Colonel H. Yule. The appointment of Reginald T. Cocks, Esq., as Treasurer, in place of R. Biddulph, Esq. (deceased), was also confirmed.

Dr. WEBSTER, in announcing the result of the scrutiny, said that he took the opportunity of thanking the President and Council for adopting the suggestion he threw out last year with reference to the balloting papers, to the effect that they should be sent out, as is the custom in other Societies, two or three weeks previous to the Anniversary Meeting, in order that Fellows might have ample opportunity to select the names of those whom they wished to serve on the Council.

The Earl of DONOUGHMORE, in conclusion, proposed a vote of thanks to the President, the Council, and the Scrutineers, coupled with the request that the Address be allowed to be printed; and the PRESIDENT, in acknowledging the compliment, stated that after the expiration of the present year's service he must positively retire.

The Meeting then separated.

PRESENTATION

OF THE

ROYAL AWARDS.

THE Founder's Gold Medal to Baron C. VON DER DECKEN, for his two surveys of the lofty mountain of Kilimandjaro, which he ascertained to be capped with snow, and to have an altitude of 20,065 feet. The Patron's or Victoria Gold Medal to Captain JAMES A. GRANT, for his journey from Zanzibar across Eastern Equatorial Africa to Egypt, in company with Captain Speke, and for his contributions to the work of that Explorer.

The PRESIDENT having called up the Baron C. von der Decken, thus addressed him:—

"BARON CHARLES VON DER DECKEN,

"This Medal is decreed to you for the two remarkable journeys which you have performed from the East coast of Africa to the great Mountain of Kilimandjaro, in each of which, with the assistance of Mr. Richard Thornton in the first and of Dr. Kärsten in the second, you made many astronomical observations, and constructed a contoured map of the region. You also determined numerous altitudes by barometrical measurement, and estimated the highest of the peaks of the mountains to be 20,065 English feet above the sea, and proved it to be covered with snow.

"In these expeditions you further collected rock specimens which have demonstrated that, in a remote period, this snow-capped mountain was an active volcano.

"The accuracy of the observations made in your last journey was proved by a comparison of the chronometers you took with you, which, having been compared on your return to Zanzibar, were found to have varied only 7″ in 120 days.

"I further applaud your unabated zeal and energy in your present desire to explore the interior of Eastern Africa, inasmuch as you have just fitted out at great expense a new expedition, and have constructed a river iron-steamer wherewith you hope to ascend one of the rivers flowing from Mount Kenia, and thence to explore unknown regions, and if possible to follow down one of the main eastern affluents of the Nile. And, as you have named your new vessel the *Guelph*, I trust that this name, cherished by Englishmen who lived in the days when Hanover and England

constituted, as it were, one country, may be a happy omen of the success which we all hope may crown your noble enterprise."

Baron VON DER DECKEN replied :—

"This is but the second time that I have had the honour of being present at a Meeting of the Royal Geographical Society. The first time, besides being kindly welcomed, I was elected an Honorary Member of the Society, and now a still greater honour is awarded me. It is quite impossible for me, as a stranger unfamiliar with the English language, adequately to express my thanks for the distinction. It is true, I always entertained a hope that, after returning from my travels, I might perhaps have the good fortune to receive a Medal, a gift which every Explorer ought to look forward to as the highest testimonial of his work having been well and successfully done. Whether the journey for which I am now preparing will be a success, God only knows! But I have the firmest determination; and, if any accident should arise to myself during the expedition, I have made such disposition that my party (consisting of several able and scientific men) will be able to carry out my plans.

"Happy and proud as I am to-day, there is still some sadness mingled with it. I miss here my poor friend the late Richard Thornton, your countryman and my companion during my first excursion to Kilimandjaro. We did not at that time reach so great an elevation as I did in the second journey, in which, with the aid of Dr. Kärsten, I corrected the mistakes of the first. Thornton was nevertheless the first European besides myself who penetrated farther than the low hills surrounding the great mountain, and settled by his testimony the question of snowy mountains in Equatorial Africa. He was a good companion, and extremely useful during the expedition, by taking observations, working very laboriously with the theodolite, and as a geologist in collecting and describing the rocks. If I ever come back to Europe and publish an account of my travels, I shall not omit to give due credit to my lamented companion.

"In conclusion I feel it my duty to express publicly my best thanks to you, Sir Roderick, our distinguished President, who, from the first time I made your acquaintance, were so kind as to give me in every way assistance and good counsel regarding my new expedition, and who have used your influence to obtain for me the support of Her Majesty's cruisers as well as of the authorities on the African coast."

In presenting the Patron's Medal to Captain Grant, Sir Roderick thus addressed that Officer :—

"CAPTAIN GRANT,

"Eleven months have elapsed since we received your leader, Captain Speke, and yourself within these walls, with the cordial acknowledgment of the great services you had performed in opening

out Eastern Equatorial Africa, and in showing how the White Nile flowed from the very lake previously discovered by your distinguished companion. Captain Speke having, on his arrival at Gondokoro, received the Medal most justly granted to him for the great discovery of Lake Victoria Nyanza, we, in conferring this Medal upon you, wish it to be understood that we once more emphatically mark our deep sense of the value of the first great exploration of those lands around it, made by Captain Speke and yourself.

"When you returned here our Anniversary had passed over, and both our Medals had been adjudicated, or you would, doubtless, before now, have received the highest honour which we have it in our power to bestow. It was, however, a source of true gratification to us to see that the King of Italy was, in the mean time, foremost in recognising your merit, as well as that of your skilful leader, and affixed to each of his Medals the appropriate motto of 'Honor a Nilo!'

"On my own part I can truly say that, on the many occasions in which it has been my lot to present Medals to Explorers of distant regions, I never had greater satisfaction than on the present occasion. For now that I hand to you this Medal, bearing the effigy of Queen Victoria, I feel that we Geographers are not merely recompensing the noble and disinterested companion of Speke, but, as a soldier of the olden time myself, I have a special pride in recognising in you the gallant young Officer, who, in the Indian mutiny, and despite a severe wound, was the means of saving from serious disaster the rear-guard of the illustrious Havelock, as he advanced to the relief of Lucknow.

"Accept, then, this, our gracious Patron's Medal, and consider it as our Victoria Cross."

Captain GRANT then replied:—

"Sir Roderick Murchison and Gentlemen,—It was during a recent sojourn on the Continent that I received the communication from the Council of the Royal Geographical Society, announcing that they had unanimously awarded me one of their Gold Medals of the year. I assure you the receipt of this communication gave me intense pleasure; but it was a surprise to me, for I little thought I had done anything to merit so high and distinguished an honour. And to receive the Medal from your hands, Sir, from whom I have always experienced so much kindness, enhances the value of a gift which I shall cherish to my dying day. I feel so much embarrassed by the distinction you have conferred upon me, that I am quite unprepared to express myself in the language I should wish. I hope, therefore, you will excuse the few words in which I thank you for the honour you have done me."

ADDRESS

TO THE

ROYAL GEOGRAPHICAL SOCIETY.

Delivered at the Anniversary Meeting on the 23rd May, 1864,

BY SIR RODERICK IMPEY MURCHISON, K.C.B.,

PRESIDENT.

GENTLEMEN,

In commencing this Address, which, for the reasons I assigned at the preceding Anniversary, I fully believed would be the last I should have the honour of delivering to you, I feel that, in addition to what has appeared in the Report of the Council, I ought to explain how it has happened that again a list has been prepared in which my name is proposed as your President elect for the ensuing year.

Let me assure you, Gentlemen, that my retirement had been completely arranged. With the advice of some of our leading members, I had, in fact, secured the services of a distinguished geographer and scholar, to be recommended as my successor, when unforeseen circumstances occurred which created disquietude in the minds of many well-wishers of the Society, if coupled with my retirement from office. Our excellent senior Secretary, Mr. Spottiswoode, having found it absolutely necessary, from the pressure of his other avocations, to retire, and our new Assistant-Secretary, Mr. Greenfield, having recently met with a premature death, the Council laid before me their unanimous request, that in this difficulty, and with a new staff to be appointed, I would consent to continue in office. As nothing could induce me to leave the good geographical ship, to which I am so heartily attached, in a moment of distress, so, in the belief that I may be able to steer her for a time, I have consented to remain at the helm for one year, if such should prove

to be the wish of the Society. You therefore, Gentlemen, if you choose me once more, must take upon yourselves the responsibility of re-electing your weather-beaten chief, who on his part can only assure you that, if you do so, he will put forth in your cause whatever energy is left in him.

In the mean time I may say that the losses in our staff have been well made up; for whilst our accomplished Secretary, Mr. Clements Markham, remains, Mr. Laurence Oliphant, the well-known traveller in many countries, takes the place of Mr. Spottiswoode; and the post of Assistant-Secretary is already occupied by a true traveller and good geographer, Mr. H. W. Bates, the author of that popular and instructive work, 'The Naturalist on the River Amazons.' The man who, in pursuit of the beauties and truths of natural history, has spent eleven years of his life in regions known to few Europeans, and who has since published so striking an account of them, will, I anticipate, be found to possess all the qualities of a good Assistant-Secretary and Editor of our publications.

Since our last Anniversary we have made an addition to our members of eighteen distinguished geographers of foreign lands, as mentioned in the Report of our Council; and in this act we have not only honoured ourselves, but have greatly augmented our means of obtaining the best and freshest knowledge of the advances of our science in France, Germany, Switzerland, Russia, South America, the United States, Portugal, and Denmark.*

In former years I have had, as I now have, the satisfaction to announce that the numbers of our ordinary Fellows have increased, and are increasing, and that our losses by death have been small in comparison with the great accession of new Fellows. In fact, the elections made in two of our ordinary days of meeting would replace the whole number we lose by death during the year. If this prosperous, flowing tide should continue, we may really reach that stage of augmentation for which no place of meeting would suffice, and then we may be obliged to limit our numbers, and fill up the annual vacancies only.

OBITUARY.

I naturally commence the record of the losses we have sustained in the deaths of our Associates with a notice, however brief, of that good and well-beloved man, my immediate predecessor, the late Lord

* See Council Report, Appendix F, p. 25.

ASHBURTON. Born in the last year of the last century, William Bingham Baring succeeded to his father, the first peer, the great merchant prince Alexander Baring, whose name is bound up in geographical annals, as having been the chief British Commissioner, assisted by Colonel Mudge, R.E., and my friend W. G. Featherstonhaugh, in settling the boundary between the United States and British America. Receiving part of his education in Geneva, he gained good classical honours at Oxford, where he was a member of Oriel College, and where under Whately, the late Archbishop of Dublin, and Davison of Oriel, he acquired that taste for general knowledge which he ever retained. During the administration of Sir Robert Peel, and when a member of the House of Commons, he occupied the official posts of Secretary of the Board of Control, of Paymaster of the Forces, and of Treasurer of the Navy.

As soon as he became possessed of the title and the great landed estates of his father, Lord Ashburton was enabled to exercise liberally his love of true beneficence; and on numberless occasions he quietly and unostentatiously, but zealously, occupied himself in acts of well-considered encouragement of merit, and in countless works of charity; whilst his exertions to improve the education and condition of the humbler classes were unceasing.

In his capacity of President of this Society, I had perhaps more opportunities of estimating his hearty devotion to our cause than most of my Associates, and I can sincerely declare, that nothing but ill health ever prevented his personal attendance at our meetings; and that even when pressed by illness, his thoughts were anxiously directed to our well-being and advancement. When able to be among us, his elegant and appropriate Addresses, his genuine friendliness, and participation in our proceedings, endeared him to all the Fellows of this Society. It has been incorrectly stated that he resigned his office on account of ill health; for, threatened as he was with the malady which ultimately proved fatal, he strove to do his duty throughout his biennial term of office. As his malady increased, his health underwent so great a change for the worse, that but for the unremitting and soothing attentions of the devoted and accomplished lady who mourns his loss, his life could not have been protracted as it was to the 23rd of March last.

In short, our late President was a man of so guileless and honourable a stamp, that no one could have had much intercourse with him without loving him; and those who knew him best will join with me in asserting that few men of our generation have

passed through life more usefully or blamelessly, or left behind them truer feelings of regard and affection, than William Bingham Lord Ashburton.

Rear-Admiral John WASHINGTON, C.B., F.R.S.—In the year 1858 it was my province, in reviewing the meritorious life of that eminent hydrographer and noble character, Rear-Admiral Sir Francis Beaufort, to solace my Associates with the reflection, that the British Navy and this Society hailed a most worthy successor in our former Secretary, Captain Washington. Alas! he also has now been taken from us. Born in 1800, John Washington entered the Navy in 1812, and saw much active service in the frigate *Juno*, in the waters of the Chesapeake and on the American coasts. Afterwards, in the *Sibyl* frigate (Capt. Forrest) he was occupied in pursuing the American Commodore Rogers up to Spitzbergen. In this voyage he acquired much scientific knowledge under the then master of the vessel, afterwards Sir W. Bain, in making astronomical and magnetical observations. Following up this knowledge in the Royal Naval College at Portsmouth, he there obtained a prize gold medal in 1816; after which he served three years in the *Forth*, both on the North American Station and in the Pacific. While on this last service he nearly lost his life through a sailor's falling upon him from the mast, and throwing him senseless into the sea, from which he was only rescued by extraordinary efforts.

When appointed Lieutenant in 1821, and obtaining leave to come home, he disembarked at Valparaiso, and crossed the Andes to Mendoza, riding over the Pampas to Buenos Ayres. Returned to England, he was transferred to the *Parthian*, and passed two years in the West Indies; and afterwards, obtaining leave, he travelled in France, Spain, and Italy, improving himself in languages. Going to sea again in 1827, he was four years afloat in the Mediterranean, in the *Weasel* and the *Dartmouth*; and during this service he explored the interior of Morocco in company with the English Consul-General Drummond Hay, making astronomical observations in his route, and fixing the true position of places hitherto undetermined. A memoir containing these observations was a communication to our Society in the first year of our existence, and published in the first volume of our Journal.

Constantly occupied in useful studies, he obtained the rank of Commander in 1833, and was ever active in promoting the success of our then young Society, when, in 1836, he succeeded to our first Secretary, Commander Maconochie. Once placed in that office, I

well recollect what vigour he infused into all our proceedings, whether in stimulating important travels and enterprises, or by greatly improving our publications, in the editing of which he laboured assiduously, assisted only by a single clerk. It was he, indeed, who introduced among us the practice of annually reviewing the progress of geography in the past year, a practice which was not adopted by our Presidents until that distinguished scholar the late Mr. William R. Hamilton set the example in 1839. I am reminded by the eloquent and admirable sketch of his life by M. d'Avézac that a very important anonymous suggestion made by Washington, and signed A. Z., which was addressed to the President and Council of the Royal Geographical Society, and suggesting the Antarctic Expedition of James Ross, was never printed, though it was recorded in the Bulletin of the French Society. After five years of invaluable services to this Society, Washington, in 1841, took the command of the *Black Eagle*, in which ship he brought the late King of Prussia to England. My friend, Baron Alexander von Humboldt, being the King's chief adviser, the favourable impressions produced on the mind of the illustrious traveller by the knowledge and acquirements of the ex-Secretary of the Geographical Society were such that, on the recommendation of that Sovereign, Washington obtained the rank of Post-Captain. Up to the year 1847 he was employed as a Nautical Surveyor in the *Blazer*; and on many parts of our own coasts he set that example of scrupulous exactitude of observation which had been duly impressed upon him by his revered chief, Beaufort, to whom in 1855 he succeeded as Hydrographer of the Admiralty. In this new post, following the bright example of Beaufort, he introduced the same spirit of action and order which he had so efficiently applied to the improvement of our Society, and was a thoroughly conscientious, indefatigable, and clear-headed Director of that laborious office. In it, besides compiling for us annually that excellent résumé of all the British Nautical Surveys of each year, which forms so highly valuable a portion of our Journal—which is now continued through the goodwill of his successor, Capt. Richards—Washington lost no opportunity presented to him by his official position, of rendering us essential service in promoting every geographical expedition of importance. Deeply imbued, like many a gallant seaman, with the profoundest sense of the obligations and duties of a Christian, he had all along taken the liveliest interest in every exploration of Africa which might tend to the improvement of the natives and the abolition of the trade in slaves. It

was therefore with especial zest that he backed up Livingstone when the latter had resolved to execute his second journey; and it was chiefly owing to the energy of Washington that the bold traveller was furnished with the steam-vessel by which the ascent of the Zambesi river was to be accomplished, though the expense of fitting out a vessel drawing less water for the ascent of the river Shiré fell entirely upon Livingstone. Nor had Washington been less conspicuously and untiringly active in supporting Lady Franklin through all her efforts in search of her missing husband; and if others had been as true-hearted in that cause as those lamented men, Beaufort and Washington, that heroic lady would not have been left to spend her own fortune in doing that which it was the bounden duty of the country to have accomplished. From repeated conversations on this subject with both of these eminent men, I know how truly they grieved with myself on the loss of national dignity and right feeling which that apathetic conduct involved.

Admiral Washington was one of those men of highly nervous temperaments, and feeling hearts, who inevitably fall victims to their zeal and sensibility, whilst duller men plod on and live. Exhausted by over-exertion in his office, he obtained leave of absence to travel on the Continent, in the hope that his shattered health might be restored; and with this object he repaired to Havre. There he made at first some progress, particularly when reanimated and rejoiced by the arrival of his second son, Henry Halford, from the Chinese station; when suddenly he was struck down by an order that the youth should sail to the Pacific. With natural impatience he hastened, ill as he was, to London, to try to avert his disappointment; but having failed, his despondency and ill-health increased, so he wandered into Switzerland on a forlorn-hope, and only returned to Havre to die in the sixty-third year of his age, happily attended by his affectionate wife and his youngest son, Francis Palmer.

With the sincerest regard for the personal character of Admiral Washington, and the deepest sense of the great services he rendered to this country, and to this Society in particular, it is indeed most gratifying to reflect that ample justice has been done to his memory by our distinguished Foreign Member, M. d'Avézac, in a notice of his life and works, read before the Geographical Society of Paris; whilst the honours which were paid to his remains by all the authorities, as well as by the inhabitants of Havre, on the

occasion of his interment, will never be forgotten by the numerous friends of John Washington. This is indeed one of those kindnesses which will the more link us on in bonds of continued friendship with our powerful allies and worthy rivals, the French. Admiral Washington was a Fellow of the Royal Society, and of many scientific and philanthropic establishments.

PORTLOCK.—By the decease of Major-General Joseph Ellison Portlock, of the Royal Engineers, our Society has lost a truly sound geographer. He was the son of Captain Nathaniel Portlock, R.N., who circumnavigated the globe in the days of Captain Cook, and died one of the Captains of Greenwich Hospital. His son, who was born at Gosport in 1794, was educated there and at Tiverton, and finally at the Royal Military Academy at Woolwich. Young Portlock obtained his first commission in the corps of Royal Engineers in 1813. In 1814 he was sent to Canada, where he served till September 1822, and took an active part in the war with the United States. He was at the siege of Fort Erie, and, when the army retreated, was the engineer who constructed the lines and *tête-de-pont* of Chippewa, at which Sir Gordon Drummond made his successful stand and saved Upper Canada. After his return from foreign service Lieutenant Portlock was appointed in 1824 to the Ordnance Survey, then under the direction of Colonel Colby,* and was one of the assistants of that able officer, in companionship with Lieutenants Drummond and Larcom, in preparing the materials for the measurement for the base of triangulation. Accompanying Colonel Colby to Ireland, he worked with the Trigonometrical Surveyors on Divis Mountain, near Belfast, where the first observations of distant points were made with the heliostat, then recently invented by Lieutenant Drummond, R.E., afterwards Under Secretary for Ireland. Becoming the leader of the trigonometrical branch of the survey in Ireland, Portlock underwent great hardships on the bleak coast of Donegal, in one part of which, though two of his soldiers perished, he perseveringly held on until he brought his observations to a successful issue. Completing the triangulation on various Irish mountains, he remained, in 1827, under canvas at heights of 2000 feet above the sea, till the middle of January. Up to that time he had been accompanied by Lieutenant, now Major-General, Sir Thomas Larcom, K.C.B., at present

* See my sketch of Colonel (afterwards General) Colby's eminent services, in the Address of 1853, when I presided over the Society. Vol. xxiii. p. lxix.

Under Secretary for Ireland, but thenceforward he continued his labours single-handed. In short, he indefatigably pursued his observations with the great theodolite in all the chief mountains of Ireland, until the network of the principal triangles was completed; whilst by observations across the Channel, mainly effected by the employment of heliostats, the Irish triangulation was united with that of England and Wales.

Portlock also undertook the laborious duty of correcting the discrepancies which arose between the established points of the great triangulation and the junctions of the detailed work of the field-surveyors, and, provided with assistants, he so advanced these operations that in one year two millions of acres were completely surveyed. With such ceaseless labour in observation, calculation, and horizontal triangulation, Portlock united an elaborate system of vertical measurements. The altitudes were first deduced from the level of the sea by actual levelling to bases of altitude, and from those bases transferred, by angles of elevation and depression, to the summit of every mountain, hill, and station, at distances averaging a mile asunder, on which the minor levellings of the detail survey depended. This also was at first performed in the separate districts, but ultimately generalised into a system. With this view, Portlock personally carried a line of levelling across Ireland, from the coast of Down to that of Donegal, and caused similar lines of levelling to be observed in other places. The result was, to furnish a more general and homogeneous series of altitudes than had ever before been accomplished. It is true that even the accuracy thus obtained proved insufficient for those increasing wants and that improved knowledge which the scientific works of the day soon afterwards called for, though his contributions went far beyond the original intention and requirements of the survey as contemplated by Parliament. Those wants were also met and supplied in Ireland by an elaborate system of special spirit-levelling, crossing the island in every direction, and terminating at stations on the coast, where tidal observations were simultaneously made. These observations were thoroughly executed by Captain Cameron, who had been trained chiefly under Portlock; and they furnished the material for the admirable paper by the Astronomer-Royal, published in the Transactions of the Royal Society of London.

The triangulation and altitudes of all Ireland being completed, Portlock was employed to carry out the views which Colonel Colby had formed at the commencement of the survey in regard to a

geological survey of Ireland, but which the more pressing wants of the topographical branch had caused to be suspended. For that work, on which Portlock's abilities might have been equally developed, the time was past for making it a part of the survey, and, after a single volume had been published, other public arrangements were made, and the Geological Survey of the British Isles was established under Sir Henry de la Beche. It is, however, my bounden duty, as a geologist, to state that this volume of Portlock on the geology of Londonderry is a perfect model for fidelity of observation and minute attention to phenomena.* To the quickness of his eye, and his resolution to surmount difficulties, we also owe the first detection in Ireland (Tyrone) of those trilobites and other organic remains which enabled him to identify those rocks with the Silurian rocks of England and Wales very shortly after my first classification of these older palæozoic rocks. In short, he not only described the physical and mineralogical features of those tracts, but even so correctly described and named all their imbedded organic remains, that his work will always be considered one of those stock pieces of science to which geologists are largely indebted. On many occasions, as he rose in rank from captain to field-officer, Portlock showed, not only so a great a love for geology, but also so true and solid an acquaintance with the science, that in the years 1857 and 1858 he was elected to occupy the chair of the Geological Society of London; in which he was not only distinguished for his sound judgment and courtesy as a President, but also for the faithful and elaborate research shown in his Anniversary Addresses. He was, in truth, a geologist quite after my own heart; for in him an acquaintance with rocks, minerals, and fossils was united with the full knowledge and feeling of a true physical geographer.

When his duties as a trigonometrical surveyor were completed, Portlock reverted to the active military duties of his corps, and was employed as Commanding Engineer at Corfu in the erection of the fortifications now in process of demolition. Afterwards he commanded the Engineers at Portsmouth and at Cork. In 1853, much to his honour, he wrote a memoir of the life of his old chief in the Ordnance Survey, General Colby, whose modesty had prevented his rendering justice to himself, who had done so much and

* In 1858, Portlock acted as President of the Geological Section of the British Association at Belfast.

said so little of his deeds. Subsequently General Portlock became the Inspector of Studies at the Royal Military Academy at Woolwich; and, lastly, a member of the Council of Military Education. Failing health—the result, doubtless, of his extraordinary labours—bringing on paralysis, and compelling him to resign the last-named office, he returned to a pretty spot near Black Rock, Dublin, called Lota; where, soothed by the attentions of his devoted wife, he died on the 14th February, 1864.

For much that is given in this sketch of my lamented friend I am indebted to his distinguished brother Engineer officer Major-General Sir Thomas Larcom, with whom I cordially agree in thus summing up our estimate of the man:—"The characteristics which shone forth in Portlock during his well-spent life, whether as a soldier, a geographer, or a geologist, were,—undaunted courage in facing difficulties, Spartan endurance and invincible perseverance in overcoming them. Endowed, when in the zenith of his career, with a frame and nerves of iron, he exhibited such a vast power of continuous labour that he achieved every object he had in view; whilst great ability and a pure love of knowledge were in him guided and governed by the highest sense of honour and moral rectitude."

General Albert de La Marmora.—Our list of Foreign Members has in the last year been deprived of the name of one of those brave soldiers of whom Italy has reason to be proud, and who, in the latter part more especially of his distinguished career, has been a most devoted and successful contributor in the advancement of geography. Albert de La Marmora, who died last year at Turin in his 75th year, and was born at the same place in April, 1789, was the second born of eight brothers of an ancient noble family, four of whom became distinguished General Officers. Entering the military service when the North of Italy was united with France under the First Napoleon, his education was completed at the Military School of Fontainebleau, in which he was well instructed in mathematics by the famous Puissant. After some years of local adventure he served in the army which, advancing from Italy, retrieved the defeat of Aspern; and he fought in the great victory gained by the first French Emperor at Wagram. Although a serious malady compelled him to leave the army in 1811, he was called again into activity, and, taking part in the battles of Lutzen and Bautzen, he obtained the Cross of the Legion of Honour. He was also engaged in the disastrous battles of Gross Beeren and Leipzig; and, when the

star of Napoleon set in 1814, La Marmora, returned to his native city, still holding, after eight years of hard service, the rank of Lieutenant only. Our own fine old soldier, Lord Clyde, was, in a similar way, long an unknown brave subaltern.

In the year of peace which followed the short war of 1815, his active spirit led Albert de La Marmora into liberal demonstrations, which caused him to be exiled to the Island of Sardinia. This event, which seemed untoward, proved however to be most beneficial to geographical science. It threw this zealous man upon his own resources, and he began to work out the geography of an island, which, though it gave for a long period a title to a crowned head, had been hitherto quite misrepresented in the scientific maps of European countries. In subsequent years, regaining his freedom and proper position, he advanced to higher rank and occupied public stations of importance; among which was the Directorship of the Royal Naval School at Genoa. An active adherent of the gallant but unfortunate Charles Albert, he received from that King, shortly before his abdication, the rank of Lieutenant-General; and under the present King of Italy was decorated with high honours.

Having thus briefly sketched his public career, it is now my duty to unite, as your representative, with the Geographers of France and Italy, and I trust of every country of the civilized world, in doing honour to the memory of the man who devoted his best energies for many years to the completion of that beautiful map of Sardinia, for the construction of which we placed him in the list of our Foreign Members. This work is not only an example of accurate and skilful workmanship, in the representation of a tract highly diversified in outline, but has been admirably illustrated by the well-filled volumes which he published on the Natural History, Antiquities, and Geology of his favourite island, so that the labours which he commenced in 1819 were not really terminated until 1860. Whilst my eminent contemporary M. d'Avézac, in his Address to the Geological Society of France, speaks with the warmth of a friend and admirer of General Albert de La Marmora for his description of the Antiquities of Sardinia, let me assure you that at a late period I also rejoiced to converse with the deceased General, when I found that he was as zealously intent upon doing all justice to the geological structure of the island. Not content with consulting M. de Verneuil and myself as to the age of the rocks he was describing, he employed competent persons, particularly M. Vecchi, in drawing and describing all the fossil organic remains. In short, he has by

his encyclopædic and praiseworthy labours so united Sardinia with Piedmont, as thereby to constitute the strongest reason, independent even of the rights of regal inheritance, why the race of inhabitants of that fine island should never be severed from the Italian kingdom. It is as a benefactor to humanity in its widest sense that the memory of this true devotee to the cause of science and letters will be preserved to future ages, when the names of many a greater official personage of our time will have passed into oblivion.

The Earl of ELGIN and KINCARDINE.—The late Earl of Elgin was a Fellow of our Society, and it is but a brief time since you heard his voice in this room, unostentatiously describing the results of those great events which have revolutionised the relations between the European world and the most remote and most civilised empires of Asia. The late Earl, born in 1811, was educated at Eton and Oxford, and was the friend and contemporary in years with such statesmen as Lords Dalhousie and Canning, and William Gladstone.

With a slender patrimony, and no other advantage to begin life than an ancient Scot's pedigree, Lord Elgin fought his way to eminence by force of talents, assiduity, and integrity, and was truly the builder of his own fortune and renown. Diplomacy was the branch of administration, including colonial administration, in which he rose; and here, from the magnitude and importance of the transactions in which he happened to be engaged, but still more from the skill with which he conducted them, he is entitled to rank among the first diplomatists of our time. His first responsible office was that of Governor of Jamaica, from which he was transferred to the more important and difficult office of Governor-General of Canada, which he discharged with skill and efficiency, conducting to a successful issue those negotiations with our frontier relatives, which, founded on the solid bases of freedom, justice, and equality, ought to insure peace and contentment to the parties concerned. But by far the most valuable services which Lord Elgin rendered to the State were those which he achieved in China and Japan. The first mission to China began in 1857, and lasted two years; the second began in 1860, and terminated in the same year; so that in all, between China and Japan, he passed three years of most laborious and responsible employment. This successful diplomacy has thrown open to us four new ports in China, and as many in Japan. You can judge to what extent we are already profiting by his Lordship's services, when I state that the value of the exports and imports of Britain and her Colonies with the two empires already reaches the yearly sum of 40,000,000*l.*

Such services as these will assure to Lord Elgin a record in our national history.

The operations which have led to these great results gave the Earl of Elgin an opportunity of displaying that self-reliance, promptitude of action, and political courage, which eminently distinguished his character. The news of the outbreak of the great Indian rebellion having reached him on his route to China, he at once appreciated the extent of the danger, and, on his own responsibility, diverted the whole naval and military expedition from its original destination. By his command, the force which was meant for the Peiho proceeded to the Ganges, and largely contributed to the suppression of the insurrection; for it was in time, not only for the protection of Calcutta, but for the capture of Lucknow. In this last crowning achievement, performed at the distance of 600 miles out of the bounds of their own special element, even the Navy took part; for who can forget the part played in it by the gallant William Peel and his sailors?

Shortly after his return from China, Lord Elgin was promoted to the most lucrative, but also the most difficult and responsible, office under the Crown—the Government of India; and assuredly none of his predecessors brought to it so large and various a practical experience, while in talents he equalled the most distinguished of them. Had his life been spared, his talents, energy, and industry would have been equal to the cultivation of the grand field which was now opened to him. He proceeded to India in 1861, and died at his post in 1863, at the age of 52, much too early for his country and his friends; the malady which proved fatal to him being an organic affection of the heart—without doubt, the effect of long, laborious, and anxious public services on a peculiarly sensitive constitution.

In dying at his post in India, this eminent public servant was spared the misery which befell his predecessor, Lord Canning, in the loss of his wife; for, happily, the accomplished Countess of Elgin, who had devotedly followed her lord to the East, has survived, and will doubtless so bring up her children as to lead them to emulate the great deeds and virtuous life of their noble parent.

The death of the Admiral of the Fleet brings me to notice, however briefly, one of the distinguished seamen of Nelsonian days. Sir W. HALL GAGE, G.C.B., entered the Navy in 1789. He was present as Lieutenant of the *Minerve*, under the command of Lord Nelson, when that vessel captured the Spanish frigate *Sabina*. He next took

part in the cutting-out of the *Mutine* from under the batteries at Teneriffe. When in command of the *Uranie*, the boats of that vessel, in company with those of the *Doris* and *Beaulieu*, cut out the French National ship *La Chevrette*, of 20 guns and 350 men, which was considered one of the most brilliant exploits of the kind ever performed. He served as Commander-in-Chief in the East Indies from 1825 to 1830, and on the Lisbon station from 1834 to 1837; and from 1842 to 1846 he acted as Senior Naval Lord at the Board of Admiralty. Sir William joined the Royal Geographical Society in the year 1845.

Rear-Admiral Octavius VERNON HARCOURT, fourth son of the late Archbishop of York, entered the Navy in 1803, and in the *Calcutta* performed a voyage round the world in 10 months and 3 days, which at that period was thought a very remarkable feat. He served as a Lieutenant in 1809, in the Baltic, with distinction; and in 1813, when in command of the *Challenger*, took part in the siege of San Sebastian, and afterwards commanded the *Blossom* and *Doris* on the South American station. Admiral Harcourt took an active interest in many charities, and at his death bequeathed a large sum of money for their maintenance.

Rear-Admiral FOWLER entered the Navy in 1793, and sailed as Lieutenant with Captain Flinders on a voyage of discovery to New Holland. He was afterwards wrecked on the Cato Reef, when in command of the armed storeship *Porpoise;* but he ultimately succeeded in reaching Canton, where he embarked on board the *Earl Camden*, East Indiaman. In consideration of the assistance that he afforded to Captain Dance in beating off the powerful French squadron under Linois, he was presented by the East India Company with a sum of 300*l.* to purchase a piece of plate, and the Patriotic Society awarded him a sword. He served in Sir R. Calder's action, 1805, and took part in the expedition to Walcheren, 1808.

Captain William ALLEN entered the Navy in the year 1805. He served in the *Standard* at the passage of the Dardanelles, under Sir Thomas Duckworth, and was engaged in the reduction of Java.

Captain Allen served in the *Wilberforce* steamer on her memorable expedition up the Niger, of which he published an interesting account; and in the year 1855 he produced a work in 2 vols. on the 'Dead Sea and the Overland Communication with the East.' In this he advocated the cutting of a canal so as to admit the Mediterranean into the Dead Sea, and entered extensively into a comparison

between this route and that by the proposed Suez Canal. Captain Allen took an active part in the proceedings of the Society, and spoke occasionally at our meetings.

Captain W. A. WILLIS entered the Navy in 1811. He served as Flag-Lieutenant to Sir G. Cockburn, in the West Indies, and afterwards in command of the *Jaseur* and *Frolic;* and in 1845 he was granted a pension for wounds received in the service.

Richard THORNTON.—I have now to speak of a gifted and promising young man, Mr. Richard Thornton, of Bradford, who has lost his life by his zealous exertions to extend our acquaintance with the geography and geology of Eastern Africa. I am proud to say that Richard Thornton received his scientific education in the Royal School of Mines, over which I preside, and that, being desirous of accompanying Livingstone in his last explorations, I confidently recommended him to the good will of the great traveller. When Livingstone last left our shores in March, 1858, young Thornton, then only nineteen * years of age, accompanied him as geologist. Qualifying himself during the voyage and at the Cape of Good Hope in making astronomical calculations, and being also a good sketcher of ground and capable of constructing maps, he was as well adapted to lay down the physical geography of the Zambesi River as to describe the various rocks which occupied its banks.

In looking over his accurately-kept diaries, in which he never failed to register every fact, I find that he made upwards of 7000 observations, to fix relative geographical points and to determine altitudes, on the banks of the Zambesi. In leaving the tertiary rocks of the Delta behind him, and in ascending that river to the rapids, he described numerous rocks of former igneous origin; and, still further inland, various seams of thick and good coal (of which the Portuguese may very largely avail themselves); proving, by the associated fossil remains, that the coal was of the old and best age of that mineral.

His health having failed, he was for a while estranged from the Zambesi expedition, through a partial misunderstanding between his chief and himself. This having been completely done away with, when my young friend returned to work out and complete his labours in the Zambesi region, I should not here allude to it, if not to recount the important services he rendered in the mean time to

* Born 5th April, 1838.

geographical and geological science, by becoming *ad interim* the scientific companion of Baron C. von der Decken, in his first survey of the Kilimandjaro Mountain, from Zanzibar and Mombas.

Having recently examined the diary kept by Mr. Richard Thornton in that journey between Mombas and the highest point the travellers reached, and also on their return to Mombas, or between the last days of June and the 10th of October, I have no hesitation in saying that the labour is so graphically detailed, every movement so accurately recorded, the transactions with the various native tribes so clearly explained, and every hour of the 120 days' expedition so well accounted for, that, with the contoured map of the region which he prepared, together with many sketches of the form of the ground, I can really fancy myself, like his leader and himself, struggling to reach the snowy equatorial summits. The numerous obstacles opposed by the native chiefs, and the manner in which, after so many "showrys" or palavers, all difficulties were overcome; the perfect description of the habits and dresses of the natives—of the metamorphosed structure of the rocks—the vegetation of each zone of altitude—all these are given; whilst every moment of clear weather in that humid region was devoted to star and lunar observations, or to theodolite measurements of altitude, and the fixing of relative geographical points. All this, too, was scrupulously performed by Thornton, notwithstanding occasional attacks of fever, to which the Baron and himself were subjected.

I cannot but hope that these diaries of an accurately minute philosopher, or at least large portions of them, will appear in print; for I have read few writings more instructive and characteristic. In fact, until Baron von der Decken and Thornton carried out this expedition, no other African traveller has ever had presented to him such a vast variety of scenes of nature, within so limited a compass, as those which are seen in ascending from the eastern seaboard to the banana-groves on the skirts of the snow-clad peaks of Kilimandjaro. As the account of this first ascent has been given to Continental Europe in German, so we may rejoice that our Thornton's English version of the same may soon appear; whilst Baron von der Decken, our Medallist of this year, unites with me in the expression of admiration of the undaunted efforts and able assistance of his companion.

In truth, in his letters to myself, besides what is noted down in his diaries, Thornton correctly described (and for the first time) the nature of each rock of that region; by which I clearly learned

that igneous rocks, whether syenites or porphyries, had penetrated micaceous slaty metamorphic strata, and that streams of vesicular lava, which occur on the flanks of the mountains, indicated clearly that the loftiest summits, now capped with snow, had been raised by the extrusion of a great subaërial volcano.*

If his life had been spared, this fine young man intended, as he wrote to me, to endeavour to traverse Africa, and compare its East and West coasts with each other, as well as with its vast lacustrine centre. Anxious, however, to finish off in the mean time those labours in the Zambesi which he had so far advanced, he rejoined his old chief Livingstone, and was on the point of completing the map of a mountainous tract on the north bank of the stream, when, in over-exerting himself, he fell a victim to that fever which has proved so fatal to our missionaries, to the devoted wife of Livingstone, and which, on more than one occasion, has nearly deprived of life that great traveller himself.

One of his companions for a time on the Zambesi, the Rev. Henry Rowley, in writing to me of the never-flagging zeal and unconquerable energy, as well as of the generous nature and high character of Richard Thornton, adds:—"Axe in hand, he would cut himself a path to the top of a thickly-wooded mountain, never leaving it till the setting sun made further observations impossible."

In reviewing the journals and diaries of Richard Thornton, I am lost in admiration of his patient labours of registration, when combined with his vivacity of description. With such a delineator in words as Thornton, and such an artist as Mr. Baines—who has sent home such admirable coloured drawings of South-African scenes, particularly of the falls of the Zambesi—those of us who are destined never to be able to penetrate into the southern part of Africa, may quite realise to our mind's eye the true characters of that grand continent. Through the devotion of the brothers and sisters of the deceased traveller, the whole of his voluminous notes and observations have, I am happy to say, been carefully copied out and transmitted to us; and I am confident that every one who examines them will declare with myself, that Richard Thornton was so gifted and rising an explorer, that, had he lived, his indomitable zeal and his great acquirements would have surely placed him in the front rank of men of science. He died on the 21st April, 1863, at the early age of twenty-five years.

* In the subsequent expedition, when Baron von der Decken reached the greater altitudes, he found in addition trachytes and obsidian.

E. Osborne SMITH.—By the decease of my respected friend, Mr. E. Osborne Smith, the Council has lost a valuable auxiliary, whether in the management of our finances, in preparing the annual Reports, or in every way rendering himself useful. Possessed of sound good sense, and endowed with a most genial disposition, he was truly an important link between the popular and scientific portions of our large body; and on numerous occasions was of real service in calming irritation and in promoting harmony and goodwill among us.

As the Treasurer of the Club of the Society, his cheerfulness and large-heartedness rendered him a general favourite; and all its members have united with me in deploring his loss, whilst they cherish the memory of his good deeds. He had been for many years the Actuary of the Reliance Life Assurance Company, which office gave him full opportunity of displaying his mathematical abilities; and it is believed that the laborious work of computing a long series of important and intricate calculations brought to a crisis the illness that terminated his well-spent and useful life.

Mr. Osborne Smith was a Fellow of the Society of Antiquaries, and also of the Zoological, Statistical, and Ethnological Societies; and was a member of Council in the two last bodies, as well as in that of our own Society. He died on the 25th April, 1864, in the sixty-fifth year of his age, deeply regretted.

Beriah BOTFIELD.—Beriah Botfield, M.P., was a man of cultivated mind, who expended much of his large fortune in the promotion of antiquarian researches, and in the publication of literary works of merit. The chief of these works are—various Tracts upon Bibliography, communicated to the Philobiblion Society; Prefaces to the first editions of the Greek and Roman Classics, and of the Sacred Scriptures; Stemmata Botevilliana; Expenses of England in the 13th and 14th centuries; and Notes on the Cathedral Libraries of England. In addition to these, Mr. Botfield made various communications to the Society of Antiquaries, which have been duly noticed by the President of that body, Earl Stanhope.

William CUBITT.—William Cubitt, M.P., was one of the most marked of that class of good and earnest men who, owing their success in life to their own exertions, rise to posts of distinction. He began life as a seaman; but in due time, following the bent of his genius, he studied architecture, and became a most successful builder. In truth, William Cubitt was the architect of his own fortune. He rose to the loftiest civic dignity of these kingdoms, attaining at the same time a seat in Parliament. Mr. Cubitt was so justly popular, and so much esteemed for his good sense, probity,

and engaging manners, that he was twice chosen Lord Mayor of London, and died infinitely regretted by a large circle of friends and admirers.

John Watkins BRETT.—Though not the scientific originator of submarine telegraphy—an honour which was won by Professor Wheatstone*—Mr. Brett was distinguished by being the first to show, by the actual experiment of laying a gutta-percha wire across the British Channel, in 1850, that the scheme was feasible. He had indeed called the attention of Government to the subject in 1845, with the view of connecting Britain with her colonies. He afterwards (1846-7) endeavoured in vain to carry out his project under the Government of Louis Philippe, though he had obtained a concession. At last, through his energy and ability, he obtained a renewal of the concession from Louis Napoleon; and in 1850 an experimental line was submerged by Mr. Brett between Dover and Cape Griznez, by which the *first* submarine message was sent from one country to another; 'The Times' of the day remarking, "the jest of yesterday has become the fact of to-day." The present cable between Dover and Calais was laid in 1851, and the Dover and Ostend line in 1853; the latter under a concession from the King of the Belgians. The next trial was in the unknown depths of the Mediterranean, under concessions from the French and Sardinian Governments, and resulted, in 1854, in uniting the Island of Sardinia with the Continent of Europe. It would be superfluous to trace further Mr. Brett's connexion with telegraphic enterprise: suffice it to say, that in 1856 he was mainly instrumental in forming the Atlantic Telegraph Company, of which he was one of the directors. It is rare to find a highly cultivated taste for the fine arts combined with an enterprising mind, yet such was eminently the case with Mr. Brett, as proved by his well-known, choice and varied collection of works of art. Mr. Brett died on the 3rd of December last, at the age of 58, bequeathing one-tenth of his large property to charity.

C. G. PULLER.—C. G. Puller, Esq., a respected friend of my own, was one of the representatives of Hertfordshire. He was a conscientious, enlightened, and zealous Member of Parliament. He died most unexpectedly, after a very short illness.

Arthur PAGET.—Mr. Arthur Paget, the heir of a great estate, was

* From the year 1840 onwards Professor Wheatstone familiarized the public with the feasibility of Submarine Telegraphy. I have before me documents which leave no doubt on this subject, and a jury of the International Association at Paris in 1855 unhesitatingly assigned this scientific honour to Wheatstone.

too early cut off: in the spirit of adventure and from love of geographical pursuits, he had visited America, the Pacific Islands, Continental India, Java, with others of the Malayan Islands, and Northern Africa. In China, during our last operations against the Imperial Government, he served as a volunteer, sharing in the perils and privations of his military companions.

The other deceased Fellows, who have not taken a prominent part in our proceedings, or have been noted as authors or public characters, are — Mr. Henry Ancell; Mr. Thomas Blackwell, an able Civil Engineer; Mr. David Barclay, Mr. William Jackson, Mr. George Lee, Mr. Thomas Molson, the Rev. W. Oxenham, Mr. Thomas Parr, the Rev. G. C. Rowden, Mr. John N. Ryder, Mr. W. Richardson, and Dr. Tronson.*

BRITISH GEOGRAPHY.

Admiralty Surveys.†—The Admiralty Surveys at home and abroad have made adequate progress during the past year, although, owing to the completion of some Coasts, and the retirement of officers, certain reductions have taken place.

English Coast.—Staff-Commander Calver, in the *Porcupine*, has resurveyed the estuary of the Thames, a work which, owing to the shifting nature of the sands, was much required. He has sounded over an area of 240 square miles, and will, during the present year, continue to trace the changes to the north-east, along the coasts of Suffolk and Norfolk, till they disappear. The ever-changing character of the sands off these shores, and especially in the vicinity of Yarmouth and Lowestoft, calls for continued activity on the part of our Surveyors; and under the skilful and energetic superintendence of the officer charged with this service it is hoped that all the requirements of navigation, vast as they are, will be fully provided for. Captain George Williams, in the *Bann*, has completely resurveyed and elaborately sounded the Scilly Islands, within a radius of 10 miles: his soundings cover an area of 550 square miles. During the present season he will be employed in completing the deep-sea soundings on the south coast of England, between the Eddystone and Portland. Commander George M. Alldridge, in the *Asp*, has

* I have learnt, too late for notice, that General Monteith is dead. The labours of this experienced geographer must be recorded next year.

† As prepared by the Hydrographer, Capt. Richards, R.N.

surveyed Caermarthen Bay, with the rivers Taff and Towey; thus completing the north shore of the Bristol Channel. This officer, after a long, active service, extending over thirty years, has retired with his promotion, and has been succeeded by Commander David Aird, who during the present season will continue the sounding of the southern shore of the Channel, between Minehead and Hartland Point.

The Survey of the Western Hebrides, under Captain Otter, is satisfactorily completed; and no delay will take place in the publication of this important part of the Scottish seaboard, on a scale commensurate with all the requirements of the seaman. There remains now to complete the entire western coast of Scotland but a small portion of the Island of Tyree, Skerryvore, and its off-lying dangers, with the deep-sea soundings in the same neighbourhood, which, under the direction of Captain J. E. Bedford and Mr. Stanton, will no doubt be brought to a close by the end of this year.

Captain Bedford and his Assistants, during the past season, have surveyed 142 miles of the exposed coasts of Coll and Tyree; and sounded over an area of 137 square miles, besides other details.

Commander Thomas has completed the shores of Benbecula and Harris, and retires with promotion after a long and unbroken period of active service of over thirty years.

The Survey of the Channel Islands, under Staff-Commander John Richards, has made good progress during the past season, and is being continued with that care and minuteness which a coast-line beset with so many hidden dangers necessarily requires.

Mediterranean.—The Surveys in this sea and the Grecian Archipelago, under Captain Spratt, C.B.,* and Commander Mansell, have steadily progressed during the past year. The examination of the different banks in the Malta Channel, the Survey of Tripoli, and the Island and Channel of Corfu, are among the most important works which have been completed. It will be learned with regret by all geographers that Captain Spratt, who has passed the greater part of his professional life in the active duties of the Mediterranean Survey, and for the last twelve years most ably conducted it, has resigned his important command. The records of this Society have year by year feebly recorded the benefits which have been conferred

* No stronger proof of the high estimation in which Capt. Spratt is held by men of science and art can be given, than that he was last year selected as the first out of many candidates in the list of the nine persons who are annually admitted into the Athenæum Club as "*eminently distinguished* in science, letters, and the arts, or public service."

on science and navigation by the energetic labours of this talented officer; but his works themselves will remain an enduring monument of his skill and industry for ages yet to come.

Commander Mansell, the late coadjutor of Captain Spratt, has taken his place; while Lieutenant-Commander Wilkinson has succeeded to that of Commander Mansell.

Newfoundland.—Captain Orlebar, with his Assistants, has surveyed 114 miles of the eastern coast of Newfoundland, between Cape Race and Cape Spear, including plans of several bays and harbours, and has sounded over an area of 1330 square miles: his work is in process of engraving.

Nova Scotia.—The examination of this coast, under Captain Shortland, is rapidly drawing to a close. During the past season 125 miles of sea and harbour shores have been completed, and 177 square miles sounded over.

West Indies.—The West India Survey, under Mr. Parsons, includes during the last year portions of the Islands of St. Vincent, Antigua, and St. Lucia. Mr. Parsons has now commenced the examination of Grenada.

Bermuda.—In consequence of the increased draught of our modern ships, and in order to ascertain whether any alteration has taken place in the depth, consequent on the growth of the coral, it has been considered necessary to make a re-examination of some of the narrow and intricate channels leading to this important depôt; and Captain Pullen is now employed on this duty.

Vancouver Island.—It was announced in our last Annual Report that the Survey of this important island, with the adjacent coast of British Columbia, had been completed. The *Hecate*, lately engaged on this duty, has arrived in England, and the work has been deposited at the Admiralty, by whom it will be published for the benefit of navigation without delay. The fruits of this Survey are already apparent in the rapid development of the resources of this region as a coal and timber producing country, and also of its fisheries. A company is incorporated for the establishment of a graving-dock in the harbour of Esquimalt, which will have the effect of drawing to the shores of this rising colony the ships of all nations from one end of the Pacific to the other. The Survey of the northern shores of British Columbia is being continued by Mr. Pender, late Chief-Assistant in the *Hecate*, who, with an able staff, has already made good progress with the work.

Australia.—Under the combined efforts of the four officers in

charge of the different Surveys, considerable progress has been made in the delineation of the shores of this great country; the expenses being borne equally by the Colonies and the Home Government.

Commander Hutchisson, in South Australia, has completed the upper portion of Spencer Gulf, including 167 miles of coast, and has sounded over 964 square miles. He was, in his little vessel of 100 tons, to leave South Australia, and, passing round the eastern coast, by Torres Strait, take up the examination of the northern shore about Cambridge Gulf, that coast having lately been added to the territory of South Australia.

Commander Cox, in Victoria, has completed the Survey of Port Phillip and its approaches, but has been considerably retarded in his little vessel, of 65 tons, by the furious gales with which this part of Australia was visited during November and December, 1863. On the coast of New South Wales, the Survey under Commander Sidney is proceeding as rapidly as the means at his disposal will allow; but in consequence of the wreck of H.M.S. *Orpheus* at the entrance of Manukau Harbour, in New Zealand, he was directed to proceed to that colony and make a re-survey of the dangerous bar of that harbour. This duty Commander Sidney has effected, and returned to his survey in Australia. The new Survey of the Manukau Bar is in course of publication.

Mr. Jeffery, in Queensland, has surveyed part of Hervey Bay and the entrance of Mary River; and, now that he has been provided with a suitable vessel, no doubt the examination of the sea-coast of this thriving colony will advance rapidly. But by far the most important event which has occurred in the annals of Queensland is the establishment of the new settlement at Cape York, in Torres Strait. The Government have lately dispatched a small detachment of Royal Marines to commence this work; and H.M.S. *Salamander* has been also sent from England to aid in the enterprise.

Under these favourable circumstances, coupled with the daily increasing prosperity of Brisbane, and the rapid extension of the white population towards the north, we cannot doubt but that the whole eastern coast of Australia will ere long be opened up to navigation and commerce. In truth, we are now beginning to reap the fruits of those long years of toil and industry—the rewards of that skill, patience, and perseverance which produced to the world the magnificent survey of 800 miles of channels within the reefs of this coast; a survey which, when commenced, must have appeared

almost a hopeless undertaking, but which has led to the opening of a safe highway, soon to become the beaten track between India and Australia. In connection therewith, let not the names of King and Blackwood, and Owen Stanley, be forgotten: well may the companions of these gifted men, who still remain, feel proud to have participated in a work which will ever remain a monument of their perseverance and their skill, and among Nautical Surveys will stand unrivalled.

China and Japan.—The opening of new ports and the rapid extension of the world's commerce with these countries have taxed to the full the energies of our Surveyors during the past year.

The *Rifleman*, under Mr. Reed, has been employed in defining the limits of the great central reefs which encumber the China Sea, and in clearing the two highways from Singapore to the north, viz. the N.E. and Palawan routes. This is a most important work, not only involving much time, but the greatest care and vigilance: real dangers have been correctly placed, and many imaginary ones, hitherto a source of constant anxiety to the seaman, have been expunged from our charts. Still much remains to be done in both these great thoroughfares before they can be pronounced free from danger. It is with regret we learn that Mr. Reed has been compelled through ill health to resign the command of this portion of the China Survey, which he has conducted with so much energy and ability. He has been superseded by Commander Ward, the officer who formerly commanded the *Actæon*, engaged on a similar duty.

The *Swallow*, under Mr. Wilds, has been employed in the northern portion of the Chinese waters. Its commander has made new chronometric measurements between Hong Kong, Shanghai, Nagasaki, Yokuhama, and the Korea, and surveyed 700 miles of coast-line, including part of the Korean Archipelago; Chin Chu Bay, on the south coast of Shan-tung; also the harbour of Amoy, a good plan of which was much required.

The re-survey of the estuary of the Yangtsze Kiang is now in course of progress, great alterations having taken place in its shoals since the Survey of Captain Collinson in 1842.

During the year 1863 twenty new Charts have been published by the Hydrographic Office of the Admiralty, besides numerous additions and corrections to others. The number of Charts printed during the same time has amounted to 150,517. Tide Tables have likewise been prepared by Staff-Commander Burdwood for 3000

places. Sailing Directions have been prepared by various officers: for the South and East Coasts of Africa, by Captain de Horsey, R.N.; for the Persian Gulf, by Captain Constable and Lieutenant Stiffe, of the late Indian Navy; and for the Gulf of Aden and East Coast of Arabia, by Commander Ward, late Indian Navy. A fourth edition of the 'China Pilot' has also been issued. This work has been thoroughly revised, and much additional information introduced from our late Surveys of the Coasts of the Yellow Sea, the Gulfs of Pe-chili and Lian-tung, the Sea and Islands of Japan, by Staff-Commander King. The 'South American Pilot,' Part 1, is just complete, and contains directions for the Eastern Coast of America, from Cape St. Roque to French Guayana, by Staff-Commander Penn.

Various other books of Sailing Directions are being revised or brought out anew, with all the dispatch which the means at the disposal of the department will permit, and the interests of navigation so urgently call for. Lighthouse Lists for every coast have also been published under the direction of Commander Dunsterville, R.N.; together with Hydrographic Notices of newly-discovered Rocks, Shoals, &c., with other information useful to navigation in general.

ORDNANCE SURVEY OF THE UNITED KINGDOM.*—The Plans of the six Northern Counties of England having been drawn on the large scales of 25 and 6 inches to the mile, have been reduced to and engraved on the scale of 1 inch to a mile; and although the engraving of the hill features upon a few sheets is not yet finished, the Map of England and Wales, for all practical purposes, may be said to be finished and published. The 1-inch map of Ireland, in outline, reduced from the 6-inch plans, has also been engraved and published; together with many of the sheets with the hill features represented.

In Scotland the survey of Buteshire, Forfarshire, and Kincardineshire, on the large scale, was finished during the last year, and considerable portions of Aberdeenshire and Argyleshire have also been surveyed. All the southern portion of Scotland, including Perthshire and Forfarshire, has been engraved and published on the 1-inch scale. The principal cultivated district of Scotland remaining to be surveyed extends from Peterhead to Inverness; and for the purpose of expediting the work in this quarter, officers are stationed

* Prepared by Colonel Sir H. James, R.E.

at Aberdeen and Inverness, and another will shortly be sent to Banff. The importance of proceeding also as rapidly as possible with the survey of the Highlands, is now fully recognised; and rooms have been prepared at Fort Augustus to receive another officers' party.

The publication of the Reports of the Royal Commission, and of several Select Committees of the House of Commons, has had the effect of fully enlightening the public as to the importance of having a complete cadastral or large survey of the United Kingdom. Last year Her Majesty's Government gave directions for the whole of England and Wales, south of Yorkshire and Lancashire, to be re-surveyed, and the plans drawn on the scales of 25 and 6 inches to a mile, like those of Scotland; and the first vote for proceeding with this great work was passed by the House of Commons this year without opposition; but with an objection, on the part of some Members, to the insufficiency of the amount voted for prosecuting the survey with the rapidity which is desired.

The principal triangulation, and the initial levelling of the United Kingdom, have been published; and the Survey Department is therefore in a position to proceed with the detailed survey in any part of England and Wales. During the last year the survey of Middlesex was finished, with the exception of the detail-plans of the city of London, which has already been published in outline, and large portions of the counties of Surrey, Kent, Essex, Devonshire, Cornwall, and Hants have also been finished. The estimated cost of completing the Cadastral Survey of England and Wales is 1,400,000*l.*; but with a grant amounting only to 75,000*l.* for England, Ireland, and Scotland, or about 25,000*l.* for England and Wales, it is obvious that the means is very disproportioned to the magnitude and cost of the work.

The extension of the Triangulation of the United Kingdom into France and Belgium was published in 1862. This was undertaken for the purpose of connecting our triangulation with that of Europe, so that we now have a connected triangulation extending from the West of Ireland to the Ural Mountains, and the data for completing an arc of parallel in the latitude of 52° N., extending over about 72° of longitude. Operations are now in progress for determining the difference of longitude between selected stations along the course of the arc; and as, on account of the "personal equation" of every observer, it is necessary that the same individual should be employed at every station, the Russian officers, Colonel Forsch and

Captain Jilinski, of the Imperial Staff, who commenced their observations at the eastern extremity of the arc, are now working their way westward, and are expected to arrive in this country to observe at Greenwich, Milford, and Valentia in July next.

The publication of the facsimile of Domesday Book by the Photozincographic process was finished last year. The original MSS. are contained in two volumes, designated 'Great Domesday Book' and 'Little Domesday Book,' containing 760 and 900 pages respectively. The facsimile has, with one or two exceptions, been published by counties, in 32 volumes, and 10,280 volumes have already been printed. This copy of the Great Survey of the Conqueror has been received with great satisfaction by the public; and the production of a series of County Maps, showing the position of the several manors or properties mentioned in it, is now contemplated.

GEOLOGICAL SURVEY OF THE UNITED KINGDOM.—Besides an enumeration of the new geological maps which have been published in the last year, of the Southern and Central Counties of England, and large portions of Ireland and the South of Scotland, I have explained in my Report to Parliament, that in the coming years a sufficient number of surveyors will at once be employed in working out the structure of the North of England. Whilst it is an obvious duty of the Geological Survey to develope the great mineral resources which exist in the northernmost English counties, the public must recollect that the Ordnance Maps of that region, on which alone our work can be carried out, have only recently been brought towards completion. Until this was effected, I deemed it to be highly desirable to finish off the geology of the districts around the metropolis, particularly with a view to the greater supply of water for a vast population from subterranean sources. Now, however, that these southern districts have been geologically surveyed, no time will be lost in applying vigorously to the North the same processes as those by which the structure of Wales and the southern and central counties of England has been eliminated. In a few years, therefore, I hope to see maps and sections published which will fully illustrate the older rocks of the lake regions of Cumberland and Westmorland, as well as of the rich coal-fields of Yorkshire, Durham, and Northumberland.

NEW PUBLICATIONS.—In respect to the publication of works on geographical subjects within the last two years, I cannot pretend to have a due acquaintance with many of them. The most remark-

able maps which have come into our possession have been mentioned in the Report of the Council; and a certain number of those which have been published abroad will be further alluded to in what I have to say on various foreign countries. In addition to these, some of the maps and original articles in Petermann's 'Mittheilungen' may be passed in review in this place. I would more especially mention the articles by the accomplished editor, on the physical and statistical survey of the Austrian Empire, illustrated by nine coloured maps: Sartorius von Waltershausen's survey of Etna, with a topographical map printed on the same sheet with a map of Kilimandjaro, as surveyed by Baron C. von der Decken; the two being given on the same scale to facilitate comparison between the two mountains; the articles by Petermann on the sea-bottom of the British seas and the cartography of the Mediterranean, as delineated in the excellent maps of these regions in Stieler's Atlas; and, lastly, the maps in illustration of the geographical and other results of the Swedish expedition to Spitzbergen. With regard to British publications, there remain a few which seem to me to deserve a passing commendation in this Address.

The Index Geographicus of Keith Johnston; or an Alphabetical List of the principal places on the Globe, with the latitudes and longitudes, is a most useful addition to every good library.*

Phillip's New Imperial Library Atlas, edited by Messrs. Bartholomew and Hughes, Fellows of our Society, is a clearly-defined and attractive work. The chromo-lithographic colouring of the maps is effective, and the divisions are not obscured by the insertion of too many names. The accompanying Index Geographicus at once enables the reader to find any place on the map.

A work about to appear has just been put into my hands, entitled 'A System of Universal Geography,' by Dr. Muir of Glasgow, one of our youngest and most industrious Associates. It forms a large volume, and conveys in a compendious style some of the latest information on the various countries of the earth. From its plan of arrangement the work appears to combine the advantages of a gazetteer and those of a text-book for schools and families.

Mr. Murray has just published two volumes of the Travels of M. Mouhot, by his widow, a descendant of Mungo Park. The travels are in Siam, Lao, and Cambodia, and have near 100 beautiful illustrations: they describe the most remarkable ruins of temples and palaces which have ever been discovered, comparable only for

* Blackwood and Sons.

magnitude to the Pyramids and temples of Egypt. The book is dedicated to the Royal Geographical Society.

Mr. William Simpson, one of our Fellows, who has spent much time in delineating the natural features of Upper India, the Himalayas, Tibet, and Cashmere, has brought home a series of coloured paintings of great beauty, which, I hear, are about to be published. The sources of the Ganges and the Jumna, the fine scenery of Rajpootana, and the Falls of Gairaoppa, in Mysore, are as strikingly represented as numberless buildings are elaborately and artistically worked out.

Among the elementary publications, I may direct attention to an useful little work, by the Rev. Alexander Mackay, entitled 'Elements of Modern Geography.'* In a former Address I ventured to commend the 'Manual of Geography,' by the same author; and the present production is an improved and careful epitome of that work, which can be recommended as a text book to be used in the educational establishments of the country. Considering that the author is—as I know myself—actively employed as a minister of religion in the heart of Aberdeenshire, remote from access to libraries and the great marts of knowledge, I cannot but admire the assiduity and research displayed in the preparation of this elementary treatise.

Foreign Cartography.—On the detailed progress of Cartography in foreign countries I must delay the attempt to give a *précis*, except with respect to Russia; and on the great strides made by the geographers of that empire I will presently dilate. It is, however, my duty to notice, that though engaged in a gallant and strenuous defence of their country, the Government of the ancient kingdom of Denmark did not omit to comply with our request, to transmit to our Society all the sheets of their Topographical Survey up to the time of their presentation.

Of these maps, which when completed will number seventy sheets, about one-fourth are already finished and in our possession, and I can truly say that I never saw more beautiful specimens of cartography. They embrace many details, more, indeed, than those of our own Ordnance Survey on the small scale, and are usefully combined with hydrographical charts on the same scale, exhibiting the soundings and sand-banks; an agreeable effect being produced by slightly tinting the water. Even on the scale of $\frac{1}{80000}$, or one inch to a mile

* Blackwood and Sons.

and a quarter, all the elevations are delineated by contour lines, their height in feet being given. Not only are the houses and farmsteads marked, but also the minor enclosures and wooded and marshy tracts; so that this map may be favourably compared with any work published by other and larger nations. Several excellent geological maps accompany this valuable donation to our Map Office.

It also gratifies me to place on record a kind act of the Government of Copenhagen in acceding to a request I recently made through his Excellency the Danish Minister, M. Bille, when the Elbe was blockaded, to grant a passport to the ship in which the river steamer of our Medallist, the Hanoverian Baron C. von der Decken, is to be translated from Hamburgh to the East Coast of Africa. The passport was at once sent, for happily scientific explorations were considered as sacred by the Danes as they were by the French when the Austrian frigate *Novara* was circumnavigating the globe during the Crimean war.

We have to thank the Prussian Government for transmitting to us the detailed map of the course of the Weser, from its sources to its mouth. This map is on twenty-one sheets, on the scale of $\frac{1}{100000}$, or three miles to an inch.

Lastly, from Switzerland our excellent correspondent, M. Ziegler, has transmitted for the Society a copy of the maps recently published by the Federal Post-office department; representing the railways, postal routes, and telegraph stations of the Confederation. The maps are accompanied by a table of distances between the towns, and are remarkably clear and well executed. The important question of the determination of heights in Switzerland has much occupied the attention of Swiss geographers, and a committee has been appointed by the Federal Government to reconsider the subject, in consequence of the levelling of railroad lines having shown a difference of 2 to 3 mètres from the determination as given in the official maps of General Dufour.

RECENT PROGRESS OF GEOGRAPHY IN RUSSIA.—Judging from the grandeur and importance of its operations, the Geographical Society of St. Petersburg may well be styled "Imperial." He who will peruse the Compte-rendu of the proceedings of that body, as ably perpared by the Secretary, M. Besobrasoff,* cannot fail to admire the wide and laborious surveys which have been effected, the number of valuable maps which have been prepared, and the various sciences

* Translated into French from the Russian.

affiliated to geography which have been enriched by researches amid regions hitherto for the most part unexplored by any traveller, and most imperfectly known to geographers. Founded on the model of our own Society so recently as the year 1846, the Imperial Society of St. Petersburg has now, indeed, become a most important body under the presidency of the Grand Duke Constantine, assisted by that enlightened nautical surveyor and circumnavigator Admiral Lütke.*

Whilst the practice in England, and our habits, have led us to separate ethnology and statistics from geography,—the parent Royal Society, the Linnæan and Zoological Societies, and the younger body the Ethnographical Society, gathering papers on the various subjects closely allied to geography,—the Geographical Society of St. Petersburg embraces all these cognate branches, and combines them with physical geography and travels; separate sections for each subject being organized with separate presidents, irrespective of the officers and council of the general body.

As I had the honour, when this Imperial Society was founded, of being named, in association with Humboldt and Ritter, one of the three first elected Foreign Honorary Members, simply because I had assisted in working out the structure of portions of that vast empire, I naturally take sincere pleasure in pointing out to my Associates the successful strides which this body has made, and particularly in the last few years, in extending our acquaintance with large portions of Northern Asia, as well as in the construction of accurate maps, and the diffusion of sound knowledge in statistics, natural history, and ethnology.

Independently of the justly famous measurement of an arc of the meridian from the North Cape to the Black Sea, carried out by the astronomers and surveyors led by Struve and Tenner, on which I have dilated on previous occasions, the geographical explorations of Eastern Siberia and the borders of the Chinese Empire have been so conducted as to throw quite a new light on the physical geography and natural history of those vast regions. These surveys were organized in so judicious a manner that they were almost certain to produce good fruits. Thus, while to M. Schwartz, of Dorpat, and his assistants, was entrusted the preparation of the topographical maps, to MM. Schmidt and Glehn were allotted all geological and mineralogical inquiries; whilst M. Radde, assisted

* Admiral Lütke has recently been advanced to the dignity of President of the Imperial Academy of Sciences.

by other able men, was responsible for the zoological and botanical departments.

With such sound pre-arrangements we need not therefore be surprised, that these explorers should have made observations which call for great changes in all pre-existing maps, and at the same time greatly enriched the domain of natural history. Among the most important of the new features which characterize these researches, and which are perspicuously pointed out by M. Besobrasoff, the following may be mentioned. The physical section of the East Siberian expedition has ascertained that many of the existing notions of the configuration of the vast basin watered by the great river Amur and its affluents are not only very inexact, but are often diametrically opposed to the truth. The connection, for example, of the lofty mountains proceeding from the eastern side of the lake Baikal, and called Yablonoy, with those termed Stanovoy on the north-east, has no existence. On the contrary, it has been ascertained that in this region, as in the interior of other continents (a phenomenon to which Humboldt first directed attention), the true parting of the waters often proceeds from comparatively low plateaux situated among much loftier mountains, through which the rivers escape in deep chasms. In this way the watershed of Eastern Siberia is found to proceed from the north of the lake Baikal, a little to the north of 56° N. lat., and to throw off the affluents of the Lena to the north, and those of the Amur to the south. We also learn that in a more eastern or lower portion of the great Amur, the chain of Bureia has a different outline from that which has been assigned to it. The sudden southward deflection of the mighty Amur from the Cossack station of Pashkoff is determined by a lofty mountain-ridge striking from east to west, and not from north to south, as formerly represented on maps. This stream has, in fact, found an issue by a profound fissure, with precipitous cliffs on either side, of which gorge it takes advantage. If we turn to the western portion of this region of Siberia, we find that there also researches have produced a great change in our previous knowledge. The form of the Saians Mountains, which range eastward from the Altai, has undergone considerable modification, as determined by the observations of Schwartz and Kryjine.

Practical cartographers will consult with much profit the maps, almost completed, of these hitherto ill-defined tracts, and geologists are awaiting the description of the rocks and their contents, whilst ethnologists are looking for accounts of those curious tribes of

Mongolian and Russo-Chinese Tartars, of which the late Mr. Atkinson and his relict have given us such lively sketches. In the mean time we may be quite sure that the splendid and abundant collections of animals and plants brought to St. Petersburg will be found to illustrate the direct dependence of the animal and vegetable products on the physical geography and climatology of the region. It is by such a well-devised and richly-endowed expedition as that of the Survey of Eastern Siberia that geography attains its highest distinctions; and I am sure that all those whom I address will rejoice with me, that a Society founded on our model should in so few years have attained a distinction which entitles it to the grateful thanks and approval of all geographers.

Whilst the Russian Geographical Society has thus carried scientific explorations, and applied its science to newly-acquired, wild tracts in Northern Asia, and to important outlets for the commerce of the empire, its members have not been less actively employed in enriching their country with valuable data, in cartography, ethnology, and statistics.

When I travelled in Russia, upwards of twenty years ago, the greatest of all desiderata, and which, as a geological explorer, I felt most, was the want of a good general map of the country. That work, which was commenced by the Imperial Geographical Society in 1857, has been completed, and the map was issued for sale last year. This most important work, embracing the Caucasus, has been followed by another still more scientific,—a Geographical and Statistical Dictionary of the Empire, of which some parts have already been published. Thanks to the very numerous journeys and surveys which have been made, this Dictionary will be a striking record of the substantial advances which Russia has achieved in the last quarter of a century.

In an Address like this, in which it is my duty to refer to geographical progress in many countries, I cannot do justice to the Imperial Society as regards numerous other subjects which this body has, in the most exemplary manner, combined with the extension of the higher branches of physical science. Inquiries of real utility to the nation, such as in times gone by were executed in England by the Society for the Diffusion of Useful Knowledge, have been made in various branches of statistics, showing how zealously the Russian Government is labouring to dispel ignorance, and thus, by extending true knowledge, to enable all classes the better to appreciate and value the vast improvement,

amounting to a social and peaceful revolution in the condition of the people, which the present Emperor has so liberally and beneficially introduced. Some of these good measures were, indeed, on the point of being carried out in the western Governments bordering on the kingdom of Poland, when the outburst of the insurrection in the latter seriously interfered with the development of the material prosperity and improvement of the country.

In reference to the establishment of telegraphic communication with China across Siberia, in which, as I announced to you last year, our associate Mr. Grant was busily employed, it is satisfactory to know that the Russian portion of the enterprise is so far completed, that the telegraph station at Irkutsk, distant 5700 miles from St. Petersburg, was opened five months ago (2nd December, 1863), and thus messages will be, as it were, instantaneously conveyed, which formerly required 23 days. To no country, indeed, is telegraphic communication of more vital consequence than to Russia, in which a Government messenger, carrying the most important despatch, would have occupied a month in conveying that which is now the affair of hours, if not of minutes.*

Further results of the expedition of Eastern Siberia and the borders of China, including all the river-system of the Amur, have recently appeared in the publication of a large map in 7 sheets, on the scale of 40 versts to an inch. This work, executed by M. Schwartz, is accompanied by a general detailed *aperçu*. The same author has also prepared a cheaper map on a smaller scale and embracing a much larger region of Siberia. M. Schebunin has executed a detailed map, on the scale of 5 versts to an inch, of Sakhalin, which shows great changes in the form which has been given to this large island in all preceding maps; he also contemplates de-

* In the lately-acquired territory of Eastern Siberia a new colony has been founded, to the south of the Amur, on the Usuri River which waters the richest country of that region.

The general reader as well as the geographer will be highly gratified by a perusal of the work of Le Comte Henri Russell-Killough, entitled 'Seize mille Lieues à travers l'Asie et l'Océanie' (Paris, Libraire Hachette, 1864), which the author has transmitted to me since the Anniversary. The author's journey across Siberia and the Desert of Gobi, in the depth of winter, is in fine contrast to his descent in the summer of the great river Amur to its mouth, amid the most luxuriant and magnificent vegetation. I cite this work, when speaking of the geographical researches of the Russians, as giving so attractive a description of the scenery as to render many a traveller anxious to visit that magnificent gigantic stream, the Amur, during those months when it is open to navigation. In short, whether as respects Eastern Siberia, China, Japan, our Australian Colonies, or our Indian Empire, I gladly commend the work of Comte Henri Russell as a graphic sketch by a quick observer and a lively and agreeable writer.

tailed maps of other tracts, including the course of the rivers Amgun and Bureia.

From the researches of M. Schmidt the geologist, aided by the botanist Glehn and the topographer Schebunin, we learn that the region beyond the Sea of Baikal is distinguished by a great variety of geological formations. Crystalline rocks, however, abound, and the unaltered sedimentary fossiliferous formations are much less extended. Among the latter, the Devonian and Jurassic deposits have been best recognised. The latter has the petrographical characters of the Jurassic rocks of the Caucasus, and contains certain beds of coal, which in one spot is said to pass into graphite. Further eastward, and along the Saigon or chief mountains, and on the Amur below the junction of the Zeia, there are spread out great fresh-water formations of tertiary age, whilst in the great island of Sakhalin very recent marine tertiaries repose on true chalk and cretaceous deposits. Having discovered what he believes to be many transitions between crystalline rocks and unaltered sediments with fossils, M. Schmidt is of opinion that all such changes have been brought about in an aqueous manner, and not by any plutonic or igneous action. The ingenious author is obliged, however, to admit the existence of obsidian in one place, and has not yet developed his proofs in favour of his novel system, in which, if I have not been misinformed, he seems to carry the chemical and Neptunic ideas of Bischoff to what I cannot but consider an extravagant length.

From such theoretic speculations it is indeed comforting to myself, as a practical geologist, to turn to the more recent labours of my distinguished friend M. Abich in the peninsula Apcheron and the adjacent parts of the Caspian Sea. There, the apparition of new islands in the sea, and the eruption of the mud volcanoes on land, show, according to him, the close connection which exists, in a natural history point of view, between the ancient igneous phenomena so apparent throughout the Caucasus and the analogous but much more puny eruptions of the present day, as exhibited in the north-eastern flank of that great chain, where one of the islands (Kouman) was thrown up in 1861.

After five years of active labour and assiduous researches in Eastern Siberia and in regions rarely visited before, and some where no naturalist had preceded him, M. Radde has, as it were, completed our acquaintance with the zoology of these vast regions, parts of which only had been visited by Pallas, Middendorff, and Voznessensky, and recently by Maack and Schrenk. The last of these tra-

vellers gave indeed an excellent idea of the natural history of the region of the Amur; but M. Radde has done more, in gathering together a complete fauna of Eastern Siberia. He has prepared zoo-geographical maps of all the regions he traversed, in which he has shown, by means of colours, the limits of the range of each group of animals. His comprehensive geographical researches, which led him to divide Northern Asia into three zoological and botanical zones, are of a high order of merit. These regions are Siberia proper, to the southern limit of which the reindeer ranges, and in which the Siberian cedar grows; the region of the Mongolian Steppe; and the region of Northern Manchuria.

Confirmed as these grand zoological deductions are by the determination of the collateral plants of each, I am led to believe that, since the earlier days of Humboldt, there is no work on natural history which has more tended to complete the general views of the true physical geographer. This grand publication of M. Radde has directly resulted from the direction of the Imperial Geographical Society and the support of the Government; and we hope soon to be able to admire the illustrations of numerous natural types hitherto wholly unknown to men of science.

Another contribution to the physical knowledge of these countries is a pamphlet on the climate, by my valued friend M. Middendorff, the justly-celebrated traveller in Northern Siberia. The work entitled 'La Contrée de l'Amour,' by M. Maximowicz, is also a most important addition to the literature of the Geography and Natural History of Siberia.

Irrespective of natural history as a branch of geography, one phenomenon has been brought out in strong relief by the physical section of the expedition to Eastern Siberia, viz., that in the basin of the Amur, as in the island of Sakhalin, the right bank of the river is steep and precipitous, and the left bank low and flat. I pointed out the same phenomenon twenty years ago in regard to the great rivers Volga, Oka, &c., in European Russia.* The probable explanation of this striking phenomenon is that the flat regions on the left bank of each river were formerly broad riverine sheets, and by the elevation of land, the destruction of forests, and other causes, have been so desiccated that the waters have at length found their natural boundary in the escarpment of rocks which rise successively from the low regions of the north to the loftier ranges of the south.

* See 'Russia in Europe and the Ural Mountains,' vol. i. pp. 21, 650.

An expedition under M. Anosoff in search of a gold region on the Chinese frontier, reported as such by fugitives, has returned without success. They found that this tract had been extensively washed for gold, and, from the remains of buildings, &c., it is supposed this district of country had been occupied by a powerful people, but the gold seems to have been nearly exhausted.

In further developing the geography of the Kirghis countries between the Russian and Chinese boundaries, the Imperial Geographical Society have been so fortunate as to secure the services of M. C. Struve, who, assisted by M. Potamine, an accomplished Cossack, has been for some time exploring the water system of the Black Irtysh, and who, when last heard of, had passed the mountains, containing graphite, which separate the basins of Baikal and Tszai-San. The great lake of Tszai-San with its fisheries had already been occupied by Russia; it receives no streams from the north; the basin of the Black Irtysh is entirely distinct from that of the Ulangur. The explorers found the mountains of the South Altai to be much nearer to the Lake Marka than is represented on maps; this highly picturesque sheet of water being embosomed in lofty mountains. In these Asiatic explorations the Transilian, or country of the seven rivers (Semivetchurt), must not be forgotten as having been examined by Colonel Golubeff and Colonel Babkoff at the east end of the Lake of Tszai-San.

Coal has been found in the mountains of Karatau by Colonel Tcherniaieff, which, though of poor quality, may prove of importance to Russia in feeding her new flotilla on the Sea of Aral, with fuel by transit along the great river Syr Darie. The present supply of coal for the Aral region comes from the coal-field of the Donetz in South Russia, a distance of about 1200 miles over the Caspian Sea and Desert of Ust Urt.

Among the important expeditions recently undertaken and directed by the Imperial Geographical Society is that which, under the guidance of the eminent naturalist M. Baer, aided by M. Radde, has examined the Sea of Azof. All the results of this inquiry are not yet fully known; but whilst we ascertain that the amount of sediment and detritus poured out by the Don and other streams into this inland sea necessarily diminishes the depth of its waters, yet, this operation not being so rapid as some persons have supposed, a long period will elapse before navigation will be materially impeded.

The conclusion of the Russian report had not reached me when this Address was read; but in the part transmitted I am glad to find that the eulogies which I passed, at the last Anniversary, on the labours of M. Khanykoff and the Russian Expedition in Persia quite accord with the well-digested analysis of M. Besobrasoff.

Arabia.—We have been much gratified within the last few months by the lively and exciting narrative of his journey across Arabia, given to us by Mr. Gifford Palgrave. This enterprising traveller, who took high honours at Oxford, and has since been a wanderer over many regions of Asia, travelled in the character of a physician across the northern and central parts of this great, but little known, peninsula; and, with the exception of Major Sadleir, who is described as having travelled with the silence of a bale of goods *in transitu*, he is the only one of modern explorers, who, crossing the very heart of the country, emerged on the Persian Gulf.

Although Mr. Palgrave has fixed no latitudes nor longitudes, he yet travelled far beyond the adventurous Wallin of Finland, who only reached Haîl. His sketch of the people of the inland kingdom of the Wahabites, and their capital Riadh, and the clear distinction he draws between the wandering Bedouins and the regularly governed, civilised, and strict Wahabite Mahomedans who live in the central towns, are so very instructive, that the Council have warmly approved his labours by conferring on him a testimonial. I trust that Mr. Palgrave will elaborate the eloquent communication he made to us, and which is given *verbatim* in Vol. viii. p. 67, of our Proceedings, by producing a work worthy of his abilities and research. I can truly say that on no occasion have I seen the Fellows of the Geographical Society more gratified and excited, than when Mr. Palgrave narrated his adventures in crossing Arabia; and surely, as respected the deep interest created, I was fully borne out when I termed his narrative the Thousand and Second Arabian Night's Tale!

Little as we know of the interior of Southern Arabia, I am reminded by my friend the Rev. C. Forster, that there are evidences tending to sustain the accuracy of Ptolemy, when he speaks of four rivers in that region. In the parts of Arabia traversed by Mr. Palgrave, a river, after fertilising whole valleys, disappears under the sands, and re-appears no more. So is it in the south. For, even on that very coast, so well surveyed by the ship *Palinurus*, and where no rivers were discovered, a river, the mouth of which is lost under sands, was discovered by the late Rev. Thomas Broockman, who

examined that coast in an Arab *dhow*, proceeding from Aden to Shehr, and landing continually in spots where no large ship (like the *Palinurus*) could approach. This river is considered by Mr. Forster to be the Caûa Canim of Ptolemy; and a lithographic sketch of it is given in his 'Sinai Photographed,' and is described at pp. 349, 352 of that work. Mr. Forster further believes, from the accounts given to Mr. Broockman, that another of Ptolemy's four rivers, the Prion, runs parallel to the coast-ridge, and is lost in interior sands. Not pretending to give any opinion upon the question of whether these rivers be really two of those mentioned by Ptolemy, it is gratifying to find that, as in Africa, so in Arabia, modern discoveries go to sustain the accuracy of that great ancient geographer.

Hindostan.—The Report of the operations of the Trigonometrical Survey of India during 1862-63, is full of interesting professional details. This great Survey, which was commenced upwards of fifty years ago, and which has since been so ably conducted by our distinguished Associates, Sir George Everest and Sir Andrew Waugh, is one of the most important results of our rule in India; and the present Report by Major J. T. Walker, R.E., as one of a series containing the history of the Survey, is of great value. In addition to the general review of the proceedings for the year, it contains two Reports, which are complete in themselves and of special interest, namely, an account by Mr. C. Lane of a portion of Independent Tipperah, and a reconnaissance, by Captain J. P. Basevi, R.E., F.R.G.S., of a portion of Jyepore, in Gondwana. These are parts of India hitherto unknown, and which have never before been visited or mapped.

The important observations of Captain Godwin-Austen on the region of the Western Himalayas will be commented on under the head of Glaciers (p. 221).

Major Showers, of the Indian Army, has recently published some interesting letters upon two practical questions connected with the geography of India: the one refers to the terminus of the Madras Railway on the Malabar coast—the other to the proposed port at Sedashegur. Major Showers gives good reason for preferring Narakal—6 miles north of Corhin, as the ocean terminus of the railway—to Beypoor, which is 80 miles farther to the northward, the latter being an open roadstead exposed to the full force of the south-west monsoon; whilst at the former place, the sea within the area of a square league, forming the anchorage, is in all weathers perfectly calm. If the account which Major Showers gives of this locality be correct—and he appears to write

from personal observation as well as on the authority of the resident Marine Officers—the calmness of the sea along the Narakal shore is one of the most remarkable phenomena of physical geography in the world, and well merits further investigation. With respect to Sedashegur, which is regarded with so much interest at present, as the proposed outlet for all the cotton-produce of the Southern Mahrattan country, Major Showers's opinion is decidedly unfavourable. He shows, in the first place, that the construction of a breakwater in the open sea, without which the port would be inaccessible during the monsoons, would be attended with the utmost difficulty, owing, on the one hand, to a sea-bottom of soft yielding mud, and, on the other, to the working season being limited to an interval of seven or eight months' duration; and he shows, in the second place, that if the port were formed, it would be almost impossible to maintain a regular communication with the interior, owing to the natural obstacles—especially from floods—as well as the extreme unhealthiness of the surrounding tract of country.

Formosa.—Mr. Swinhoe, who had well prepared himself for such a task by a long residence in China, has given us a very clear account of the geography, ethnology, and natural history of this island. The value of this communication from H.M. Vice-Consul at Formosa was pointed out at length to the Society by Admiral Collinson, who formerly surveyed its shores, and by Sir Harry Parkes, who gave to the meeting an instructive sketch of the history of European, Chinese, and Japanese relations with the islanders. The prospects of increased trade with this large and fertile island, now that it is opened under Lord Elgin's treaty to Europeans, were discussed, and the statements of Mr. Swinhoe confirmed regarding the superiority, as ports, of Tam-Suy and Ta-Kow to the port Taiwan, which was the one originally selected.*

The Malay Archipelago.—At the meeting of the 8th June, 1863, we were gratified by the reading of a Memoir from the pen of that eminent naturalist, Mr. A. R. Wallace, on the Malayan or Indo-Australian Archipelago.† After eight years, passed in that highly-interesting region of islands of all dimensions, from the vast and still little known Borneo, and the still less known New Guinea, to the remote and semi-barbarous Timor, Mr. Wallace came before us with a well-established natural boundary-line between one large

* See 'Proceedings Royal Geog. Soc.,' vol. viii. p. 23; also 'Proceedings of British Association for Advancement of Science,' Newcastle Meeting, 1863.

† See Proc., vol. vii. p. 206.

region of the islands of the Archipelago and another; the one being Asiatic by its animal and vegetable life, the other having an Austro-Malayan type.

Indicating how the Asiatic Islands were probably once connected as *terra firma*, and pointing to the various oscillations of the surface, in these lands so replete with volcanoes, Mr. Wallace happily shows how, by simply traversing one gut or channel occupied by a deep sea, only 15 miles wide (between Bali and Lombok), the traveller is at once transported from the Asiatic to the Australian kingdom of natural history. This physical separation he considers to be one of great antiquity, whilst the separation of the mass of Asiatic lands to the west of it into innumerable smaller parts (yet all being a community of Asiatic type), is viewed as being of posterior date.

Whilst this philosophic Memoir naturally gave great satisfaction to my learned and sagacious friend, Mr. John Crawfurd,* who has passed many years in the Indian Archipelago, I must also be allowed to say that it gave equal satisfaction to myself, from the skilful manner in which the author brought to bear all his lore in the various branches of natural history, to sustain his grand geological inductions as to the enormous changes which have successively occurred in the physical geography of those diversified regions.

It is, indeed, to be remembered with pride (particularly by us, who cheered on Mr. Wallace when he left these shores ten years ago on his adventurous travels), that no such results as these could have been laid before geographers when the sciences of Zoology, Botany, and Geology were in their infancy. The work of Mr. Wallace is, therefore, a true index of the advance which has been made in geography, in the correlation of the most arduous and extensive researches and observations of the traveller and statist with every branch of natural history science.

Australasia.—The great and important discoveries made in hitherto unexplored tracts of Australia having been largely dwelt upon in last year's Address, I will confine myself now to mentioning several collateral subjects, which have recently been brought forward in respect to that vast portion of the terrestrial surface of the globe.

The intention, to which I alluded at the last Anniversary, of colonising portions of North Australia by South Australian settlers, to proceed thither by sea, is about to be carried into effect. A North

* *See* Mr. Crawfurd's most valuable work, 'A Descriptive Dictionary of the Indian Islands and adjacent Countries' (Bradbury and Evans, 1856), with a map of the Asiatic Archipelago.

Australian Settlement Company has, indeed, been formed, the chairman of which is Sir Richard Graves M'Donnell, the late Governor of South Australia, and under whose administration M'Douall Stuart made that remarkable journey from Adelaide to the Indian Ocean,* which has led his brother colonists to make this great venture. If success should attend the bold enterprise, whether brought about by a settlement in Van Diemen's Gulf, or in the Queen's Channel of Cambridge Gulf—the latter of which I should think much preferable (see my last Address)—then it is almost certain that a separate North Australian Colony must be established, inasmuch as it will be impossible that the Government of Adelaide should rule a population separated from them by a distance of 1300 miles, much of the intervening space consisting of tracts of almost impassable sands and forests.

If such a colony should be established, and it be afterwards found impracticable for Englishmen to labour in the open air in so warm a latitude, I trust that Hindoos, Malays, or Chinese may be used for that purpose; for, by whatever means effected, I shall rejoice in seeing the realisation of a project, which I have advocated at meetings of this Society for many years. I am fully persuaded that, with the rich products of that region, the fine bays of the sea on the south shore of the great Indian Ocean must, sooner or later, be occupied by a great maritime nation like our own, which already possesses the other three sides of this vast continent.

Already, indeed, we know that, under the auspices of the Governor of Queensland, Sir George Bowen, and for the purposes of trade and commerce, a new settlement has been made at Cape York, the northernmost point of this continent. From the same authority we learn the results of the important naval survey of the inside of the Great Barrier Reef, as completed by Commander Robinson. On this point I must refer you to the full explanatory comments of Sir Charles Nicholson and the Hydrographer, Captain Richards, as given in the report of the meeting on the 11th April last, which is to be seen in our Proceedings.

We now know, from the high authority of Captain Richards himself, that, although twenty years ago the inner route from Cape York to Moreton Bay was the most intricate passage in the world, it is

* Whilst these sheets are passing through the press I have received copies of the 'Journals of J. M'Douall Stuart,' which have just been published in a handsome volume, by Messrs. Saunders and Otley; edited by Mr. Hardman, and illustrated by Mr. Angas, with an excellent map by Weller. The work ought to be in the hands of all who are interested in Australian exploration.

now rendered as navigable as the English Channel, thanks to the labours of our naval surveyors. It was, indeed, most gratifying to find Captain Richards characterising that survey as one of the most gigantic and splendid undertakings ever carried out by any nation; and I repeat, what I have said before, that every true geographer will gratefully cherish the recollection of those bold and skilful seamen, Captain F. Price Blackwood, Captain Owen Stanley, and their successors, through whom the east coast of Australia has been opened out to the navigation of the world.

The mooted question of the extent to which the successful propagation of flocks of sheep can be carried in advancing towards the Equator from our old settlements in Australia, which was vigorously discussed last year, particularly when the journeys of Landsborough and M'Kinlay were under our notice, has been revived, and will no doubt continue under discussion until the perseverance of our countrymen shall have decidedly settled that limit by experience. As far as ascertained data go, it had been found that in Australia sheep have thriven up to 19° south latitude, which alone gives us an enormous range for the flocks of new settlers.

Amid the few regions of which we have acquired little or no additional knowledge in the last quarter of a century, we may certainly place New Guinea. Hence it gave me much pleasure when the attention of the Council was directed to a proposal of Sir Charles Nicholson to endeavour to explore the southern coasts, bays, and rivers of that great mass of land, from the new settlement of Cape York. I trust that the Admiralty (looking only to the narrow channel which separates New Guinea from Cape York) will lend a helping hand in such a survey, as soon as circumstances will permit.

New Zealand.—From Australia and tracts lying to the north of it, let us turn to the southern portion of Australasia, New Zealand; where, despite the war which has unfortunately prevailed in the northern island of the group, great advances have been made in delineating the physical geography and geological structure of the provinces of Canterbury and Otago, in the middle island.

Three Papers of great interest have been communicated to the Society, which throw additional light upon the physical geography of the hitherto unsurveyed districts of the great middle island of New Zealand, and contain new facts illustrative of glacial action. I consider it, indeed, to be a fortunate circumstance for our science, that these regions should have been

visited by such men as Dr. Hector, Mr. M'Kerrow, and Dr. Haast. We may now compare their observations with those of Professor James Forbes and others in the Alpine regions, and those of Dr. Thomson and Dr. Hooker in the Himalaya Mountains, of which I shall have occasion to speak at some length in explanation of my own views as a geologist upon this interesting topic of glacial action.

The first of these papers to which I call your attention is that which relates to the successful journey across the province of Otago, by my friend Dr. Hector, so distinguished already by his explorations in North America and British Columbia. Leaving the town of Oamaru, his party proceeded by the right bank of the Waitaki River, and then, following the course of the tributary Ahuriri, crossed Robinson's Saddle. At the Wanaka Lake the party left the outposts of the settlers, and proceeded into the *terra incognita* by way of the Matukituki River, which empties itself into the lake upon its western shore. Forming a central camp here, Dr. Hector with two men proceeded up the valley, and after exploring in a northerly direction, without success, for an available route, advanced on foot, and reached the glaciers which form the source of the river. Ascending a saddle-shaped mountain by a steep climb, partly over the glacier, they found its elevation to be 5500 feet above the sea. The view obtained of the mountains was extensive and grand; Mount Aspiring, enveloped in ice, 10,000 feet high, on the right; and Mount Richards, with its enormous glacier which forms the source of the Jackson, on the left. It was here that the track of gigantic birds, supposed to be the Dinornis, which was first taken for a native pathway, was observed. After a vain endeavour to follow the course of the Jackson River to the sea, owing to the density of the woods, they were compelled to return, having reached a point 8 miles from the west coast.

Another Paper on New Zealand is a Reconnaissance Survey of the Lake districts of the Otago province, by Mr. M'Kerrow, who states that 4883 square miles have been surveyed and classified into Pasture, Forest, Lake, Barren, and Swamp. The bearings of the survey from the true meridian and a datum line for altitudes are given. In his remarks upon the configuration of the country, Mr. M'Kerrow calls attention to the great and sudden differences of elevation that diversify its surface. The mountains rise from 4000 to 9000 feet, and the line of perpetual congelation in that latitude has been determined to be 8000 feet. The mountain-ridges lying

in a N.N.E. and S.S.W. direction, are directly athwart the track of the prevailing wind from the Pacific Ocean; and it was noticed that the snow-line on the north-west side (the side exposed to the wind) of the mountain-ridges was higher than upon the south-east or the sheltered side; thus showing that the wind has a very decided influence in producing this effect. The flood-marks show a rise and fall of water almost incredible, and the deltas at the mouths of the rivers are invariably and rapidly advancing into the lakes. The value of the latter as reservoirs, restraining the floods, is particularly expatiated upon, and the greater extent of the lakes at a former period is pointed out; while attention is called to the varied influences at work which produce a condition of "unstable equilibrium" in the atmosphere, producing storms of great violence.

The third Paper is a most important account of the highly interesting journeys of the provincial geologist, Dr. Haast, of whose deeds I was led to augur most favourably, in consequence of the high character which he brought with him from Vienna, as testified to me in a letter from my eminent friend, M. von Haidinger. In the year 1861, the rivers Ashburton and Rangitata were traced by Dr. Haast to their sources in Mounts Arrowsmith and Tyndall. In 1862, the course of the River Tengawai was followed, and the mountain-range crossed to Lake Tekapo, the affluents of which were traced to the Godley Glacier and Mount Darwin. Lake Pukaki was visited, and its sources in the declivities of Mount Cook ascertained; and the Naumann Range, from whence the Dobson and Hawkins take their rise and flow into Lake Ohau, was explored.

In 1863, Dr. Haast proceeded from the Orihi River along the coast to the Waitaki River, which he ascended, and followed the course of its first tributary on the left bank (the Ahuriri) to its source, visiting also the western shore of the Ohau Lake. The Hawea Lake was crossed from south to north, and the River Hunter explored to its source in Mount Ward. Lastly, the Wanaka Lake was traversed; the River Makarora traced to its origin, from whence he crossed over a pass, 1012 feet above the sea, and descending a river (which has since very properly been called the Haast), he reached the western shore of the island near Open Bay.

As a general commentary upon these remarkable journeys, Dr. Haast observes, like Mr. M'Kerrow, that a longitudinal mountain-chain of great magnitude, forming the watershed of the island, runs from north-east to south-west. The continuity of this chain is broken through only in a very few places, otherwise it presents

high and abrupt walls of great altitude throughout its whole length in the Canterbury province, wherein it reaches an estimated height of 10,000 feet. Dr. Haast describes the different passes through this chain, and in particular that pass which he considers to be unique in physical geography, and through which he penetrated to the western shore of the island, over a ridge not more than 1012 feet high.

In the course of these explorations he has availed himself of the opportunity of remarking and commenting upon the features of glacial action, which he has thoroughly described in all its different phases, and illustrated by a series of very beautiful, coloured sketches upon a large scale. The sketches are now deposited in the archives of our Society, and, together with the admirable description which accompanies them, will enable the physical geographer to compare the results of Dr. Haast's observations with those which have been made amid the glaciers of the Alps and of the Himalaya Mountains.

In one of his interesting communications, Dr. Haast describes the zealous efforts made by Mr. Whitcombe, after traversing these Alps, to reach the mouth of the Taramakau River; and I must refer you to our 'Proceedings,' vol. viii. No. 3, p. 58, for a very touching account of the manner in which that excellent scientific observer lost his life.*

It appears that Mr. Albert Walker, with his brother and Mr. M'Farlane, passed through a country on the west coast which had hitherto proved inaccessible, *i. e.* from the mouth of the Taramakau river to that of the Wanganui. Mr. Walker sent his account of this arduous journey to our late Assistant-Secretary, Mr. Greenfield; but through the confusion incident to the illness and death of that gentleman, this document has not yet been read or noticed.

As your attention was directed at the last Anniversary to the rapidly increasing produce of gold in the western parts of the province of Otago, it is unnecessary that I should recur to that important feature in the structure of New Zealand.

AMERICA.

British Columbia and Vancouver Island.—Though unable to comprise within the limits of a short memoir any detailed description of British Columbia, Lieutenant Palmer, R.E., who has served in that

* I earnestly hope that chromo-lithographic copies of those very remarkable coloured sketches of the New Zealand Glaciers will be soon published. Glacialists and Alpine travellers should possess them.

colony four years and a half, has given us a very clear and sensible sketch of the geography and chief capabilities of that vast, and, as yet, very imperfectly explored region. Subtended on the west by the densely-wooded coast or Cascade range, with its long and deep bays, and on the east by the flanks of the much loftier Rocky Mountains, a band of plateau-like and undulating country, of about 100 miles in breadth, watered by the Fraser and its tributary streams, is the tract which may eventually be best rendered capable of yielding produce for the support of the mining population. The chief gold mines, which lie in the mountainous tract of Cariboo, to the east of the plateau land watered by the Fraser, are well described, and we learn how the earlier proprietors traced up the precious metal, from the banks of the Fraser and Thompson Rivers, till they reached those western watersheds of the Rocky Mountains, in which, doubtless, vast amounts of mineral wealth lie hidden. The picture of the difficulties which the miners have to encounter is thoroughly well drawn, whether as to the want of provisions, or the excessive cold, and all the disadvantages of a new settlement in a wild and sterile land. In fact, gold mining is only beginning in British Columbia, and the few creeks in which diggings have been so successful will be followed up by discoveries of gold in the quartz veins of the slaty rocks. In British Columbia, as in California and Australia, those quartz reefs, be they veins or altered beds, range from north to south, or rather from north and east to south and east. Now, when we correlate this fact with similar data, as obtained from the auriferous regions of Australia and Russia, in all of which, as well as throughout the great chain of the Andes, the same prevailing north and south strike of the quartz bands is dominant, science has still to search for an explanation of this most striking physical phenomenon, to which I have directed attention in several publications upon the distribution of gold.*

The memoir of Lieutenant Palmer is concluded in the following words, which are, I think, entirely borne out by the facts he has adduced :—"From its geographical position, its mineral wealth, the great salubrity of its climate, and its valuable natural products, British Columbia, with good management and by a process

* See 'Russia and the Ural Mountains,' vol. i. p. 472 *et seq.*; 'Siberia,' 2nd edit. pp. 479 *et seq.*; Addresses to the British Association, Royal Institution Royal Geographical Society, *passim*; and several other works, from 1846 to 1850, including the article in the 'Quarterly Review' of 1850, entitled 'Siberia and California.'

of gradual development, is likely to take rank as not the least important of the Colonies of the Crown."

This opinion has been ably sustained by Colonel Moody, under whom Lieutenant Palmer served, and who, from having been a Crown Commissioner for some time, is a most competent and reliable authority.*

Thanks to the admirable Nautical Surveys, chiefly conducted by that able hydrographer, Captain Richards, who now directs the construction of all the charts of the Admiralty, the singularly diversified coasts of the noble island of Vancouver have been accurately delineated. Fortunately for our science, Captain Richards had a medical officer on board his ship, Dr. C. Forbes, R.N., who has brought out, in a most efficient manner, all the data relating to its resources and capabilities as a colony. In introducing his subject, the author well says, that "the romance and mystery which hang over the scenes first visited by Cook and Vancouver, have now given way to a hopeful reality, and the emigrant sees before him a land full of promise and of hope."

After an excellent descriptive sketch of the whole region, Dr. Forbes dilates on its physical geography, geology, hydrography, and meteorology, and then treats of the political geography and statistics of the rising colony; so that I can safely refer any one who wishes to obtain a true acquaintance with this great flanking buttress of British Columbia—this key to the influence which a British fleet must ever exercise in the Pacific—to the valuable Memoir of Dr. Forbes, which will soon be printed in our volume, and also to a valuable Prize Essay by him, published by the Colonial Government. The author expresses his sense of the impossibility of doing justice to all the resources and capabilities of Vancouver Island: but in pointing to it as a commercial emporium between two great wealth-producing countries, to the certain rewards attending steady industry, the prospect of good settlements, and the excellent system of education established for the youthful part of the colony, all these, he justly says, are "sound attractions, to draw thither the capitalist, merchant, working farmer, miner, and skilled mechanic, and even the honest labourer." †

South America.—In South America, steam navigation and railroads are fast adding to our knowledge of rivers and lands hitherto very imperfectly described.

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* See 'Proceedings,' vol. viii. No. 3, p. 91. † See 'Proceedings,' vol. viii. No. 3.

The Survey across the Upper Provinces of the Argentine Republic, for Mr. Wheelwright's gigantic scheme of a railroad over the Andes to unite the shores of the Pacific with those of the Rio de la Plata, has led to the collection of fresh information regarding those provinces. Mr. Hutchinson, H.M. Consul at Rosario, on the Parana, from whence the railroad is to run to Cordova, has lately made a journey through them, of which he has transmitted the details to this Society through the Foreign Office, with an excellent map by Dr. Burmeister (now Director of the Museum of Natural History at Buenos Ayres), containing corrections made by himself and by Mr. Coghlan, one of our Fellows who is engaged in engineering works of considerable importance for improving the navigation of the great river Salado, which runs through them—information which will be very useful to geographers. (See Stanford's New Map of South America.)

With reference to Mr. Wheelwright's project, recent advices from Chile allude to the Survey of a Pass by the Planchon over the Andes, in about lat. 35°, to the south of the province of Mendoza, communicating with Curico in Chile, through the valley of the river Teno—which seems to offer on many accounts a better line for the projected extension of his railroad from Cordova than that originally projected by La Rioja to Copiapo; the elevation of the Pass in question not exceeding 6000 feet instead of 16,500, the height to be surmounted according to the first plan described in Mr. Wheelwright's Paper in the 31st volume of our Journal, and which was reconsidered at the last meeting of the British Association.

This Pass, now called a new discovery, appears to be the same as that called De las Damas, or The Ladies' Pass, which was carefully examined sixty years ago by a Spanish officer, Zamudio, who reported to the Viceroy of Buenos Ayres that it might be made practicable for wheel carriages at a very small expense. His account of it is given in De Angelis' Collection of Records of the Rio de la Plata, a copy of which is in our Library.

One of the most interesting Papers read this year to the Society is the narrative, translated from the Spanish, and communicated by Sir Woodbine Parish, of Don Guillermo Cox's journey by a Pass over the Andes to the south of Valdivia, not 3000 feet high, to the great lake of Nahuel-Huapi, on the eastern side of the Cordillera, and of his descent for the first time of the river Limay, which falls into the Negro, and which, from its junction with the Limay, was ascertained to be navigable throughout its whole course across Patagonia to the Atlantic, eighty years ago by Don Basilio Villarino, whose

Diary, also communicated to us by Sir Woodbine Parish, is given in the 5th volume of our Journal.

Señor Cox, though prevented by an accident to his boat from completing his object of passing down the Negro to the Buenos Ayrean settlement of Carmen at its mouth, has had the satisfaction of uniting his work with Villarino's Survey, and of proving that from the lake of Nahuel-Huapi, on the eastern side of the Andes, there is a continuous water-communication to the Atlantic, the future importance of which it is difficult to estimate.

The observations which, on the reading of this memoir, fell from our medallist Admiral FitzRoy, who so distinguished himself in the survey of all the coasts of the southern extremity of America, including a visit to a portion of the region explored by Señor Cox, will be read with deep interest.*

Sir Woodbine Parish, who perhaps has studied the geography of that part of South America more than any other living individual, and who spoke so effectively on the same occasion, is of opinion that Señor Cox's exploration, made under great difficulties and entirely at his own cost, deserves the highest commendation. A detailed account of his travels and adventures amongst the Indians who inhabit the eastern sides of the Andes has been published in Chile, in a volume replete with information regarding the habits and customs of those tribes, as well as on the topography, botany, and geology of that part of the Andes. A copy of the work has been transmitted to me, and it is to be hoped that some one will undertake to publish a translation of it, for the benefit and instruction of all who are interested in the present and future of those countries.

I may add, in relation to this portion of the continent, that, in the Bulletin of the French Geographical Society for March and April, 1864, there is a memoir by Mons. B. Poucel on the province of Catamarca, one of the remotest and least known of the districts of the Argentine Republic. The memoir contains much information on the climate, productions,† and trade of the country, as well as many corrections of errors existing on all the maps of the region published

* See 'Proceedings,' Royal Geog. Soc., May 9th, 1864.

† Some interesting facts relative to the climate, pasturage, and productions of the Falkland Islands are given by Admiral Sullivan in a letter to the 'Times,' dated Dec. 31, 1863. He resided there during three winters and two summers, and made large experiments on the capabilities of the colony for grazing purposes, having had 1400 head of wild cattle tamed, and leased 40,000 acres of land. Speaking highly of the climate and pasturage, he strongly recommends that the eastern island be made a penal settlement.

in Europe. Mons. Poucel has spent thirty years of his life in these countries.

We are indebted to Mr. Hinchliff, one of the Fellows of this Society, and well known as an adventurous member of the Alpine Club, for a very graphic account of a tour made by him last year in Southern Brazil and the Eastern Provinces of the Rio de la Plata, under the title of '*South American Sketches*,' in which his vivid descriptions of the excitement of life amongst the Gauchos are such as, I doubt not, will lead other equally enterprising spirits to follow his good example, and bring us fresh stores of information from those new countries, especially when they learn from Mr. Hinchliff's book how easily they may be reached; "for," as he says, "the limits of a barrister's long vacation are sufficient to allow of his passing five weeks in the cool season amidst the glorious vegetation and unrivalled scenery of Brazil."

The peopling of the fertile plains of the River Plata is now progressing with great rapidity; and as exact information on the nature of the new population which is pouring into these southern parts of America is not easy to procure, a memoir,* recently sent to this Society by our Corresponding Member, Signor Cristoforo Negri, is worthy of mention, as supplying data showing the large Italian element that these growing new countries will contain. The result of Signor Negri's inquiries is that, at least, 8000 Italians annually leave the ports of Italy for this region; and that 100,000 emigrants have departed within the last 25 years, the number still increasing from year to year. This drain is from the most industrious classes of the population, and the advantages to the Spanish republics are correspondingly great; for, according to Signor Negri, all but an insignificant fraction naturalize themselves in their new home.

While on the subject of South America, I have pleasure in announcing that the indefatigable explorer, Mr. Richard Spruce, who has for fifteen years been unceasingly employed in scientific labours in the valley of the river Amazons, and in the Andes of Ecuador, is on his way to England. Of his great services to botany it is not for me to speak, but his geographical work is fully entitled to special notice at my hands. Mr. Spruce left England in the year 1849, and landed at Pará, whence he proceeded up the river Amazons, and explored several of its least-known affluents. In 1849 he ascended and made a map of the river Trombetas, an

* See the 'Corriere Mercantile,' Genoa, 29th September, 1863.

important tributary of the Amazons which was hitherto unsurveyed. In 1853 and 1854 he ascended the Rio Negro, Cassiquiari, and Orinoco, exploring and mapping the river Cunucunúma, a tributary of the Orinoco, and the river Pacimoni, which flows into the Cassiquiari. The maps of these three rivers were made by means of cross bearings and astronomical observations, and will form an important addition to geographical knowledge. During the years 1855 and 1856 Mr. Spruce ascended the river Huallaga, and in 1857 he successfully surmounted all the difficulties of the navigation of the rivers Pastaza and Bombonaza, and reached the Andes of Quito. He has since been engaged in exploring the southern part of the republic of Ecuador; and during 1860 he was employed by the Secretary of State for India, in co-operation with our Secretary, Mr. Clements Markham, in collecting *chinchona* plants and seeds in the forests at the foot of the mountain of Chimborazo.

After fifteen years of such incessant toil in the cause of science, exposed to innumerable dangers and privations, the health of Mr. Spruce has been much impaired; but I trust that the renovating air of his native land will restore it, and that geographers, as well as botanists, will be put in possession of the fruits of his valuable researches.

I conclude my notices of South American explorations, by observing that travellers or emigrants intending to proceed to Brazil, or to any part of the River Amazons, will find a very convenient hand-book for their guidance in a small volume published by Mr. Belmar, a French gentleman, entitled, '*Voyage aux Provinces Braziliennes de l'Amazonie, en* 1862; *précédé d'un rapide coup d'œil sur le Littoral du Brazil.*'

GLACIERS.

Glaciers of the Himalaya Mountains and New Zealand compared with those of Europe.—On the Powers of Glaciers in modifying the Surface of the Earth, and on the Agency of Floating Icebergs.—In the last Anniversary Address* I directed your attention to the state of Greenland as it is, in order to impress upon the minds of our Fellows who have not attended to the connection between existing geography and the ancient conditions of the globe, that Scotland and large

* See 'Proceedings,' vol. vii., No. 4, and 'Journal,' vol. xxxiii.

portions of Northern Europe must, at a period anterior to the creation of man, have been in the same condition as that in which Greenland and its adjacent seas are now. In other words, that, in the glacial epoch of geologists, certain elevated tracts were permanently occupied by fields of snow, with glaciers descending from them to the bays and cliffs of the sea, and that the erratic blocks which we now find spread over central England and the plains of Germany are simply the relics of icebergs which floated over wide tracts then submerged, and which, on melting, dropped them on the then sea bottom.

In the last session the vivid descriptions of the glaciers of Western Tibet, by Captain Godwin Austen, and of the glaciers of the middle island of New Zealand, by Drs. Haast * and Hector,† have specially attracted the attention of the Society; and I am therefore led to dwell on these grand terrestrial phenomena by giving a general view of the results of glacial action, both terrestrial and subaqueous.

When the first of those Memoirs was read, Dr. Hugh Falconer, who had passed several years in that same region of the Tibetan Himalayas, enlarged upon the scenes which had been so graphically delineated on maps by Captain Godwin Austen. He then referred us to the works of those who preceded and followed him in examining that region, and reminded us of the names of Moorcroft, Trebeck, Jacquemont, Vigne, Strachey,‡ and Thomson.

In considering the subject of glaciers, I am bound specially to call

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* Dr. Haast (as before-mentioned) has sent to our Society a series of coloured sketches of the Glaciers of the Western Coast of the Province of Canterbury, which for striking effect seem to me never to have been surpassed by any delineator of icy regions. The juxtaposition of these glaciers to a splendid forest vegetation, and amidst mountains which are close to the sea, and yet rise to 10,000 feet above it, the depth of the gorges, and the height of waterfalls issuing from the ice, are all very remarkable.

† By a letter just received from Dr. Hector, dated 20th January, 1864, I learn that not only has he ably explored the region occupied by glaciers in the province of Otago, but has also visited, in a steamer, the wonderful fiords on the western side of the island. He is now preparing a work on the geological structure of the colony, in which he will show that the lakes on the eastern slopes of the country are true rock basins, which were once occupied by glaciers, and the bottom of one of which sounded by him has a depth of 1250 feet, or considerably below the sea. Although Dr. Hector does not go so far as to express his belief that these rock-basins have been scooped out by ice, he suggests that they have been filled and shaped by glaciers. He avows, however, that he has to read up much on this subject, and I only regret that this portion of my Address cannot probably be in the hands of my distinguished friend before his final conclusions may be published.

‡ In 1847 Lieut. R. Strachey visited and described the glaciers of the Pindur and Kuphinee Rivers, and applied to them the excellent Alpine classification of Professor James Forbes.

your attention to the last-mentioned of these explorers, Dr. Thomson, who first well defined the characters and extent of the glaciers of Western Tibet. In addition to a masterly description * of the physical geography of the regions he traversed, the work of Dr. Thomson is also so rich in botanical, climatological, and geological researches as to be a model for geographical explorers. Thus, his original observations on the enormous lacustrine deposits, replete with the remains of fresh-water shells, accumulated formerly at vast heights above the sea, are to my mind the grandest and clearest proofs of how the feeders of the Indus in bygone periods were dammed up by rock barriers, which later acts of upheavement may have disrupted, or by gigantic transverse or terminal glaciers and their moraines. In truth, therefore, the parallel roads of Lochaber in our Highlands, to which I adverted last year, have their grander analogue in the vast horizontal terraces of the mountains of Tibet. Again, among the remarkable data set before us in that work, is the striking fact that in the trans-Sutlej region of the Himalayas, the glaciers which descend from the southern flank of a range of mountains are longer than those which occur on the northern flank of the same. This is accounted for by the author on the grounds of the great amount of moisture proceeding from the ocean being arrested and condensed into snow by the first great range of heights which it encounters. The same phenomenon was, indeed, met with in Sikhim by Dr. Joseph Hooker, in the eastern portion of this great chain. Unlike his precursors, Thomson, when he wrote, was already conversant with the true laws of glacier movements, as well as the most remarkable of their effects, as pointed out in various works by Agassiz and other writers upon the Alps, and he specially refers to Professor James Forbes; for, though many an ardent traveller had preceded him, Thomson was the first who clearly distinguished the glaciers of the Himalayan Mountains from the snows whence they issued, and who at the same time pointed out the lateral and terminal moraines which they evolved. That which Thomson did for the western or Tibetan portion of this lofty chain of mountains was, in like manner, admirably done by Dr. Joseph Hooker for the eastern mountains of Sikhim, in his most attractive work.†

All these observers, whether in India or in New Zealand, have taught us that the glacial phenomena, though on a much grander scale in the Himalayas, are precisely analogous to those in Europe.

* 'Travels in the Western Himalayas and Tibet.' 1852.
† See 'Himalayan Journals.' 1854.

The application, however, of accurate topographical surveying, and the ascertainment of the precise length and breadth of those grand rivers of ice, were wanting. Captain Godwin Austen has effected this, as regards those vast glaciers proceeding from the Mooztagh, which lie to the west of those descending from the Karakorum Pass, described by Thomson. Having measured the length and breadth of these masses, he has enabled us to know that one of them, which feeds the powerful affluent of the Indus called Shiggar, has a length of 36 miles, and is therefore upwards of three times the length of any existing glacier of the Alps; though it will presently be shown that some of the old Alpine glaciers were considerably longer. Well, indeed, may we account for these grandiose dimensions now existing in the Himalayas, when we recollect that the passes by which travellers proceed to Yarkand have a height of 18,000 feet, and that the great Karakorum Peak rises to 28,200 feet, above the sea. Captain Godwin Austen is, I understand, about to explore the great *terra incognita* which the Burhampooter is supposed to traverse in the upper part of its course, and we may confidently hope that, at no distant day, this energetic young officer will ultimately obtain the highest honours of this Society.

In the discussion which followed the reading of the memoir of Captain Godwin Austen, Dr. Falconer grappled most ably with the novel theory that the lakes of the Alps owe their origin to the erosive action of ice, which, descending from former great glaciers, has excavated or scooped out the cavities now filled with water. Being one of the few men who have personally examined the glaciers both of the Himalayas and the Alps, his reasoning from observed facts is most valuable. Believing, with the vast majority of practical geologists, that the irregularities of the surface of the Alps have been primarily caused by dislocations and denudations, he gave it as his opinion that the Alpine cavities, having been filled with ice during the glacial period, were thereby protected from the influx of the vast masses of the detritus hurled down in the moraines of gigantic glaciers that passed over these countries on solid ice, which, on melting, left the depressions in the condition of lakes. On the southern flank of the Himalayan mountains, on the contrary, where ice has not acted as a conservative agent, the valleys have been choked up with débris, but no great lakes exist. Dr. Falconer expressed the same views at an evening meeting of the Geological Society, on the 5th March, 1862, but it is not the practice of that body to record the opinions of speakers.

In alluding to this original view of Dr. Falconer, and to the able illustration of the whole subject, as detailed in our Proceedings,* I am bound, as a geologist, not to shrink from stating that I agree with him. I beg also to take this opportunity of recording my own opinion of the effects which glaciers have produced in those tracts where they formerly existed, or where they now prevail, as founded on the observations of many good observers, as well as on my own researches. Until lately most geologists seemed to be agreed that the numerous deep openings and depressions which exist in all lofty mountains were primarily due to cracks, rents, and denudations, which took place during the various movements which each chain had undergone at various periods. These apertures, it was supposed, were necessarily enlarged by long diurnal atmospheric agency and the action of torrents carrying down boulders and detritus; such action being most intense in those mountains where snows and glaciers prevailed, the melting of which necessarily produced great débâcles. In the place of this *modus operandi*, another theory has been applied to all those mountains, which, like the Alps, have been for long periods the seat of glaciers.

Before I enter on the consideration of the new theory of the power of moving ice, let us take a review of the progress recently made in pointing out the extent to which ancient glaciers and their moraines have ranged within or on the flanks of the Alps. In the northern portions of the chain these phenomena long ago attracted the attention of some admirable observers. Originating with Venetz and Charpentier, the true active powers of glaciers were defined by Rendu, Agassiz, and Forbes, and subsequently by the other explorers. In short, no doubt any longer obtains, that such was the powerful agency of the grand ancient glaciers, that blocks of crystalline rock were transported by them from the central Alps of Mont Blanc to the slopes of the Jura Mountains. When, however, we begin to seek for satisfactory explanations of the method of transport of these huge erratics, geologists (who are only geographers of another order) entertained different opinions. For my own part, I have had strong doubts as to whether the great blocks derived from Mont Blanc, and which lie on the slopes of the Jura, were ever borne thither by a vast solid glacier which advanced from the Lake of Geneva over the Cantons of Vaud and Neufchatel. Whilst fully believing in the great power of glaciers and their

* 'Proceedings of Royal Geographical Society,' vol. viii. p. 38.

agency, my opinion was that these blocks were rather transported to their present habitats on the Jura on ice-rafts, which were floated away in water to the N.N.W., when the great glaciers melted, and the low countries were flooded. I founded this opinion on the fact, that in examining the Canton de Vaud, and particularly the tracts near Lausanne and the north side of the Lake of Geneva, I never could detect the trace of true moraines. In that detritus I saw merely accumulations of loose materials, which had all the aspect of having been accumulated under running waters. But, even granting to the land-glacialists their full demand, and supposing that a gigantic glacier was formerly spread out in fan shape, as laid down by several geologists and recently in the little map of Sir Charles Lyell, in his work on the Antiquity of Man, and that it became eventually of such enormous thickness as to have carried up the great blocks on its surface, to lodge them on the Jura Mountains; there is still in it nothing which supports the opinion, as indeed Sir Charles has himself observed,* that the deep cavity in which the lake lies was *excavated* by ice.

The geologists who first embraced the view of the transport of the huge blocks on the Jura by a solid glacier, were of opinion, that the great depressions and irregularities of the surface which we now see between the Alps and the Jura, including the Lakes of Geneva and Neufchatel, were so filled up with snow and ice, that the advancing glaciers travelled on them as bridges of ice, the foundations of which occupied the cavities.

Let us now turn to the south side of the Alps, where a long incline accounts for the enormous extension of glaciers into the plains of Italy. Thus, in examining the remains of the old glaciers which once advanced into the valley of the Po, MM. Martins and Gastaldi show us, that one of those bodies extended from Mount Tabor to Rivoli, a length of 50 miles; and, therefore, was longer than any existing glacier described on the flanks of the Himalayas;† whilst those to the south of the Lago di Garda are shown to have had a much greater length. Demonstrating, along with many other authors, how these old glaciers had striated and polished the hard rocks through or on which they had advanced, these authors also clearly pointed out how the course of the glaciers had been deflected, so as to take a new direction, when they met with the obstruction of any promontory of hard rock. Further, M. Martins, being well

* See 'Antiquity of Man,' p. 312. † Bull. Soc. Géol. de France. 1850.

acquainted with Norway, indicated that, just as in that country, the face of each rock in a valley was rounded off, polished, and striated where it had been opposed to the advancing mass of ice, and that its opposite or downward face, over which the ice had cascaded or tumbled, was left in a rough state; thus exhibiting the worn or "stoss-seite," and lee, or protected side, of the Scandinavian geologists. The subsequent works of M. Gastaldi on the geology of Piedmont, in 1853 and in 1861, bring within well-defined limits the phenomena of old moraines and ancient drift, and prove that the débris carried over each gorge and valley has been derived from the rocks which specially encase such depressions. He also clearly demonstrated that in many of these cases the gigantic boulders, which are piled together and present the character of a cataclysmal origin, can all be accounted for simply by the power of advancing ancient glaciers. In these works M. Gastaldi very properly distinguishes between the erratic blocks which were evidently parts of old terrestrial moraines, and those which, associated with tertiary strata, are found in deposits with marine shells —the larger erratics in the latter, as in the Superga, having been transported in masses of ice which floated on the then sea.

Various other Italian authors have occupied themselves with glacial phenomena (particularly Omboni, Villa, Stoppani, Cornalia, Paglia, Parolini, &c.): the conclusion at which they have all arrived is, that there existed an enormous extension of the moraines sent forth by the ancient Alpine glaciers into the great valley of the Po. Geographers who have not studied the phenomena may well indeed be surprised when they learn, that the hills to the south of the Lago di Garda, and extending by Pozzolengo and Solferino to Cavriano,* or the very ground where the great battles of the year 1859 were fought (the hill of Solferino being 657 English feet above the sea), are simply great moraines of blocks and gravel, produced by the advance of former glaciers which issued from the southern slopes of the Alps.

Combining these observations with others of his own on the lake of Annecy, M. Mortillet suggested in 1862 a new theory, in attributing to the descent of the glaciers a great excavating power. Believing, with all those who have been named, as well as the most eminent of the Swiss and French geologists, that the last great upheavals and denudations of the Alps had produced the irregularities

* See Paglia—'Sulle Colline del Terreno Erratico all' estremità meridionale del Lago di Garda' (with map).

of their surface, he inferred that before the glacial period began, the débris derived from the wear and tear of the mountains by watery action had, to a great extent, choked up the valleys and filled the rock-basins. He further believed that, in the cold period which followed, great glaciers, descending with enormous power, forced all such débris out of the original rock-basins, and left them to be occupied by the present lakes. It is proper here to state that M. Gastaldi was right, as well as M. Mortillet, who followed him, in presuming that great deposits of old water-worn alluvium or loose drift were accumulated before the formation of glaciers, inasmuch as the oldest moraines are seen to repose in many places on the former. It will presently be shown that this fact contains within it the proof that the glaciers were not and are not in themselves excavating bodies.

Preceding M. Mortillet, however, in reasoning upon the excavating power of former glaciers, my eminent associate Professor Ramsay had broached a much bolder theory. In his essay entitled 'The Old Glaciers of Switzerland and North Wales,' published in 1859, and re-published with additions in 1860, he expressed the opinion that the excavation of deep hollows in solid rocks was due to a weight of superincumbent ice pressing and grinding *downwards and outwards*, over high, flat, and sometimes broad watersheds and table-lands, during that period of intense cold which produced the old glaciers.* In 1862 he went still further; and whilst M. Mortillet was communicating his views on the Continent, Ramsay, wholly unconscious of what M. Mortillet was doing, read a memoir to the Geological Society of London, showing that all the cavities occupied by lakes in Switzerland and the North of Italy had been excavated originally by the action of glacier ice. Whatever, therefore, be the fate of this ingenious view, Professor Ramsay has our thanks for having excited much useful inquiry, and for having compelled old geologists like myself to reconsider our conclusions.

If the view of M. Mortillet has been met with objections, still more is the theory of Ramsay opposed, and particularly in foreign lands. In this country it has indeed met with the most vigorous opposition on the part of Dr. Falconer, as recorded in our Proceedings; and even Sir Charles Lyell, the great advocate of the power of existing causes, has stoutly opposed this

* See 'Peaks, Passes,' &c. (Alpine Journal, 1859), and 'The Old Glaciers of Switzerland and North Wales,' London, 1860, p. 110.

bold extension of a most powerful *vera causa*.* Having explored the Alps, at various intervals, for upwards of forty years, I long ago came to the conclusion that their chief cavities, vertical precipices, and subtending, deep, narrow gorges, have been *originally* determined by movements and openings of the crust, whether arranged in anticlinal or synclinal lines, or not less frequently modified by great transversal or lateral breaks, at right angles to the longitudinal or main folds of elevation and depression. Explorations of other mountainous regions, in various parts of Europe, have strengthened this conviction. I rejoice, therefore, to find that those geologists of Switzerland, who justly stand at the head of their profession, Professor Studer and M. Escher von der Linth, have sustained, by numerous appeals to nature, the views I hold in common with the great majority of geologists. Those Swiss explorers, who have laboured for many years in their native Alps, and have constructed admirable geological maps of them, must surely be well acquainted with the ruptures of the various rocks, the outlines of which they have sedulously followed. Now, they attribute most of those deep cavities in which the rivers and lakes occur either to dislocations producing abrupt fissures, or to great foldings of the strata leaving openings upwards where the tension has been the greatest—openings which were enlarged by powerful denudations. Numerous geologists have recently expressed their concurrence in the generally-adopted view, that the Alpine lakes occupy such orographic depressions; and, by close researches, my accomplished friend Mr. John Ball† has ably sustained this view, and has further shown how slight is the erosive power of a glacier even when issuing from its main source. No one of them, in short, any more than Professor Studer and myself, doubts that the origin of these lakes is primarily due to other causes. Nor am I aware that any geologists of France and Germany, much as many of them have examined the Alps, have deviated from the opinion that the main diversity of outline in that chain was due to ruptures and denudations that occurred during the upheavals of the chain.

On the other hand, I am bound to state that, although the new theory has met with little or no favour on the continent of Europe, it is supported by our able geologists, Jukes and Geikie. Again, whilst Ramsay extended his view to the great lakes of the Alps, the eminent physicist Tyndall speculated even upon all the Alpine

* See 'Antiquity of Man,' pp. 316 *et seq.*

† See 'Phil. Mag.' 1863.

valleys having been formed by the long processes of the melting of snows and the erosion of ice.* With every respect for the reasoning of my distinguished countrymen, I rely upon my long acquaintance with the structure of the Alpine chain; and now that I see sound practical geologists, who have passed their lives in examining every recess of those mountains, rejecting this new theory, and pointing out, in place of it, the proofs of ruptures and denudations in the chain, I adhere firmly to the view I have long entertained.†

Those who wish to analyse this matter, must consult the admirable essay of Professor Studer on the origin of the Swiss lakes.‡ They will find numerous proofs of the views sustained by the leader of Alpine geologists. He shows you, indeed, how many of the rivers now flow in fissures or deep chasms in very hard rocks of different composition; chasms which water alone could never have opened out, particularly in those cases where the river has left a softer rock, and, with very slight obstacles to its straight course, has availed itself of one of these deep transverse natural gorges, which have evidently been produced by a great former rent. My personal observations in the Alps, Carpathians, and Ural mountains enable me to confirm this view. As regards the continent of Europe, I should transport you to the Rhine, the Danube, and other great streams, which, flowing through flat countries, with little declivity, never could have eroded those deep, abrupt gorges through which they here and there flow, and which are manifestly due to original ruptures of the rocks.§

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* See Tyndall on the Conformation of the Alps, 'Phil. Mag.' vol. xiv., 1862, p. 169, and also Ramsay on the Excavations of the Alps, xvi. p. 377.

† Some remarkable facts have been mentioned to me in a letter by M. Escher von der Linth, as proving the inapplicability of the ice erosion theory to the Swiss lakes. 1st. That the glacier of Rosenlaui, which descends from a great altitude, does not enter a low deep narrow gorge of the valley, but forms a bridge over it; and so it is to be inferred, that, as the ancient glacier did not excavate this gorge, still less did it excavate the great valley in which the present glacier is embosomed. Again, he points out that, as the bottoms of many of the Swiss lakes are below the level of the sea, the glacier which is supposed to have excavated the hollow would have to ascend considerable heights to emerge from the depression which it had excavated—an impossible movement, and contradicted by the existing operations of all glaciers.

‡ 'Origine des Lacs Suisses,' Biblio. Univ. et Revue Suisse (Arch. des Sci. Phys. et Nat.) t. xix. liv. de Février, 1864; also Phil. Mag. vol. xxvii. p. 481.

§ The recent Russian exploration of Eastern Siberia has shown how the grand river Amur deflects suddenly at nearly right angles from its course in a comparatively low country, to take advantage of a deep natural rent in the mountains through which it escapes to the seaboard (see p. 201 of the Address).

In holding these opinions as to the small power of watery or glacial action, when not acting on an adequate incline, I do not doubt that glaciers have been, and still are, most important agents in modifying the outlines of mountains. Their summits are, we know, continually degraded by rains and melted snows; and torrents flowing down from them and carrying much detritus, are, doubtless, deepening their channels wherever sufficient slopes occur. But to whatever extent this agency has been and is at work, and to however great a degree a descending glacier may scratch and round off the rocky bottom on which it advances, I coincide with Professor Studer, and many other observers, that the amount of erosion produced by these icy masses, particularly when they have advanced into valleys where there is only a slight inclination, must be exceedingly small. In valleys with a very slight descent it will presently be shown that, even in the Alps, no erosion whatever takes place, particularly as the bottom of the glacier is usually separated from the subjacent rock or vegetable soil by water arising from the melting of the ice. Again, in all the steeper valleys down which ancient glaciers have formerly descended, we do not find that either the sides or bottoms of the upper gorges afford any proof of wide erosion, but only exhibit the peculiar fashioning of the flanking surfaces of the rocks, or that rounding off and polishing, called *moutonné*, accompanied with striations. On the contrary, in gorges whence the largest glaciers have advanced for ages, we meet with islands of solid rock and little bosses still standing out, even in the midst of valleys down which the icy stream has swept.

With such proofs before us of what the frozen rivers called glaciers have done and are doing in the high valleys, how can we imagine, as Dr. Falconer has forcibly put it, that the glacier which is supposed to have occupied the Lago Maggiore, for example, and had advanced its moraines into the plains of the Po, should have had the power to plough its way down to a depth of 2000 feet below the Mediterranean, and then to rise up along an incline at the rate of 180 feet per mile? Nor can I admit the possible application of this ice-excavating theory wherever I see that a depression in which a lake occurs is at right angles to the discharge of an old main glacier. This is remarkably to be noticed in the case of the Lake of Geneva, which trends from E. to W., whilst the detritus and blocks sent forth by the old glacier of the Rhone have all proceeded to the N. and N.N.W.; or in direct continuation of the line of march of the glacier which issued from the narrow gorge of the Rhone. By what

momentum, then, was the glacier to be so deflected to the west that it could channel or scoop out, on flat ground, the great hollow now occupied by the Lake of Geneva? And, after effecting this wonderful operation, how was it to be propelled upwards from this cavity on the ascent, to great heights on the slopes of the Jura mountains?

Still stronger objections exist to the application of the excavation theory to the Lake of Constance. There I have never been able to see on the northern flank of the Hohe Sentis, which presents its abrupt, precipitous, and highly dislocated and contorted jurassic and cretaceous rocks to the lake, with terraces of miocene deposits, at various heights,—there I have been unable, when with my indefatigable friend and companion M. Escher von der Linth, who knows every inch of the ground, to trace the signs of the action of a great glacier, which could, in its descent, have so plunged into the flat region on the east and north, as to have scooped out the cavity in which the Lake of Constance lies. In this case, indeed, there are no traces whatever of those great old moraines from the relics of which we infer that glaciers have formerly advanced; the level country to the north of the lake being entirely free from them.

Great orographic depressions and deep cavities, sometimes dry, sometimes filled with water, occur in numberless countries where no glaciers ever existed. Thus, in Spain, as my colleague M. de Verneuil assures me, the large depressions on either side of the granite mountains of the Guadarramma present exactly the appearance which a theorist might attribute to excavation by ice, and yet, however these cavities were formed, it is certain that no glacier has ever existed there. Nor, again, has ice ever acted on the sides of the steep mountains of Murcia, where deep excavations and denudations are seen upon the grandest Alpine scale.

If we transport ourselves from those southern climes to the northern latitudes of the Ural mountains, where doubtless ice and snow formerly prevailed to a greater extent than now, we do not there find any proof whatever of the action of glaciers; for the hills are much too low to have given propulsion to such masses. On the contrary, we know that great blocks of hard rocks have been transported to the foot of these hills from Lapland and Scandinavia, when, during the glacial period, a vast Arctic Sea watered the flanks of the Ural mountains, and when most parts of that low chain could then have been only slightly elevated above

the waters. And yet on the sides of this chain, where no glaciers have ever so acted as to have produced erosion, we meet with both longitudinal and transverse deep fissures in some of which lakes, and in others rivers, occur. Thus, all along the eastern flank of the Ural mountains we find a succession of depressions filled with water without a trace, on the sides of the bare and hard rocks which subtend these lakes, of any former action of glaciers. Then, as to deep valleys in which rivers flow, let us take two out of the examples along the western flank of this chain, on which my companions De Verneuil, Keyserling, and myself have specially dwelt in our work on Russia. The Serebrianka river, as it issues from a network of metamorphic schists, quartz rocks, and marbles of Silurian age, exhibits on its rugged banks the extrusion of much igneous matter. This agency has split up the stratified deposits; and the necessarily accompanying movements have caused great openings, including the cavity in which the river flows. Or, when the geological traveller passes from the valley of the Serebrianka to that of its recipient, the Tchussovaya, still more is he struck with wonderment at the unquestionable evidences, amidst intensely dislocated rocks, of the ruptures by which the deep narrow chasm has been formed in hard crystalline rocks, in which a lazy stream flows, which, not descending from any altitude, has had no excavating power whatever, and, like our own meandering Wye, has flowed on through clefts in limestone during the whole historic and prehistoric period, without deepening its bed.*

But if rivers which are not torrential, and do not descend from heights, cannot possibly have produced, nor even have deepened, the natural hollows or chasms in which they flow, still it might be contended, that, what water has not effected, may have been done by a river, when, in the compacter form of ice, it descended and advanced across the lower country. Unluckily for the supporters of the ice-excavating theory, the data which existing nature presents to us, as before said, are decisively opposed to their view. The examination of those tracts over which glaciers have advanced, and from which they have retreated, shows, in the most convincing manner, that ice has so much plasticity that it has always moulded itself upon the inequalities of hard rocks over which it passed, and, merely pushing on the

* For a full description of the abrupt gorge of the Tchussovaya, see 'Russia and the Ural Mountains,' vol. i. p. 352 *et seq.*

loose detritus which it meets with, or carries along with it from the sides of the upper mountains, has never excavated the lateral valleys, nor even cleared out their old alluvia. This fact was well noticed by the Swiss naturalists, as evidenced by present operations, at their last meeting in the Upper Engadine, and has been well recorded by that experienced and sagacious observer of glacial phenomena, M. Martins.*

Since that time the able French geologist, M. Collomb, who was associated with Agassiz in his earliest researches on glaciers, and has been the companion, in Spain, of my colleague M. de Verneuil, has recently put into my hands the results of his own observation upon the present and former agency of the glaciers of the Alps, which decisively show that ice, *per se*, neither has nor has had any excavating power.† None of the glaciers of the Alps cited by M. Collomb, viz. those of the Rhone, the Aar, the Valley of Chamounix, the Allée Blanche, and the Valley of Zermatt, produce any excavation in the lower grounds over which they pass. That of Görner, which, among others, is advancing, affects very slightly the surface of the meadows on which it proceeds, and does not penetrate into the soil. Again, where the glacier of the lower Aar pushes, on its front, upon accumulations of the débris of old moraines and gravel, it scarcely deranges these materials, but slides over them, leaving them covered with mud and sand, but not excavating them. Also, the glacier of the Rhone, the principal part of which can be so conveniently studied, advances on a gravelly substratum, in which it does not form a channel. Such being the facts as regards glaciers now advancing, M. Collomb cites equally strong, if not still stronger, cases, in support of his view, as derived from the observation of retiring or shrinking glaciers in the valleys of the Alps. Examining last year with M. Daubrée the glaciers of the Valley of Chamounix, he was attracted to that named Bossons, which he had not seen for five years. During that time the glacier had shrunk very considerably, both in altitude and length, and yet upon the surface of the ground from which it had retired there was not the smallest sign of excavation.

Viewing a glacier as a plastic body, we know that it is pressed onwards by gravitation from the increasing and descending masses

* See 'Revue des Deux Mondes,' Mars, 1864. The former observations of M. Martins on Norway and on the Alps are of the highest importance.

† I may add that M. de Collomb expresses that which I believe to be the opinion of Elie de Beaumont, d'Archiac, de Verneuil, Daubrée, and all the leading French geologists.

of snow and ice behind it in the loftier mountains, and being forced to descend through narrow gorges, it naturally acts with the greater energy on the precipitous rocky flanks of these openings; striating and polishing them with the sand, blocks, and pebbles which it holds in its grasp. But, as before touched upon, the narrowness of many of those channels through which glaciers have been thrust for countless ages, is in itself a demonstration that the ice can have done very little in widening the gorge through which it has been forced, and where, of necessity, it exerted by far its greatest power. In other words, the flanking rocks of each gorge have proved infinitely more stubborn than the ice and its embedded stones, which have merely served as gravers and polishers of the granites, quartz rocks, porphyries, slates, marbles, or other hard rocks, among which the frozen river has descended. And, if such has been the amount of influence of advancing glaciers in the higher region, where the body descends with the greatest power, how are we to believe that when this creeping mass of ice arrived in low countries (as for instance in the depressions occupied by the Lakes of Geneva and Constance) it could have exerted a power infinitely greater than that which it possessed in the higher regions?

When we turn from modern glaciers to the remains of those of ancient date, the proofs are equally decisive, that, whatever might be their extent, those gigantic bodies exercised no excavating power. I am reminded by M. Collomb, as well as by M. Escher von der Linth, that in many parts of the Alps, vast old moraines repose directly on incoherent and loose materials of quaternary age; the old drift of the Alps, containing *Elephas primigenius* and *Rhinoceros tichorhinus*. Well may we then ask, how is it that the ancient and larger glaciers, which were supposed to have had such enormous excavating power as to have scooped out deep valleys in hard rocks, should not have entirely destroyed the loose accumulation of gravel over which they have been spread? Or, if glaciers excavated the Lago di Garda and Lago Maggiore, why did they not produce any such effect at Ivrea, in the Valley of Aosta, down which we know that enormous masses of ice travelled; or at Rivoli, in their march from Mount Cenis towards Turin?

Leaving it to physical philosophers, such as Forbes, Faraday, Hopkins, and Tyndall, to show what is the real measure of the abrading power of masses of moving ice, I simply form my opinion from what glaciers are accomplishing, or have accomplished. Judging from positive data, I infer that if, as agents, they have been wholly

incapable of removing even the old and loose alluvial drift which encumbered the valleys, infinitely less had they the power of excavating hard rocks. At the same time I know that, in every mountain tract which I have examined, there have been quite a sufficient number of rents and denudations to account for all inequalities. These openings have doubtless been greatly increased by the atmospheric agencies of ages, and particularly in all those situations where water has acted with great power, during the melting of glaciers.

I have made these observations (which I could largely extend) to show the intimate connection which exists between the science of geology, to which I have been so long devoted, and physical geography. Let me explain, however, that I do not doubt that glaciers have, in certain regions, caused the formation of lakes, though by a very different agency from that of the excavation of rocks. The great glaciers of former times have unquestionably sent forth and discharged still larger accumulations of débris than those of our day, which, in the form of high terminal moraines, barred up water-channels, and the result in some mountainous tracts has inevitably been the production of lakes. Among examples of such in Europe, M. Collomb directs my attention to the Gérard-meer, on the western flanks of the Vosges mountains. This lake has been formed by an ancient moraine, which, descending from the Vosges mountains, has been accumulated on old drifted loose materials, which it has not excavated, whilst it has served as a permanent dam to sustain the waters at a height of 1400 feet above the plain of the Rhine, to the east of the Vosges, and nearly 2000 English feet above the level of the sea.

In the grand and loftier cases, however, of Western Tibet, before alluded to, it is scarcely conceivable that icy barriers or moraines in the valleys could have risen to sufficient height to pond back the waters to many thousands of feet above the low country on the south. The bursting of those old vast and lofty mountain lakes was probably, as suggested by Dr. Falconer, determined by the last great upheaval of the Himalayas, which, judging from the very modern character of the organic remains in the upheaved deposits, must have taken place during one of the most recent of geological epochs.

In referring you to my observations of last year on the marvellous effects of those aqueous currents which have transported erratic blocks of stone during the former glacial period, I must attract your notice to a remarkable and faithfully executed new map of Finland by

Professor Nils Nördenskiold, of Helsingfors, which illustrates an able memoir by that author on the scratched and polished surfaces of the rocks of his native country.* Carefully taking the direction of every one of the innumerable sets of parallel scratches over a region larger than Great Britain, he shows, that everywhere the direction of these groovings and scratches is from north-west to south-east, with slight local deviations only. Again, the worn sides (stoss-seiten) of each hard rock which has been scratched, worn down, and polished, are presented to the north-west, the point from which the force proceeded; and every *lee*, or protected and rough side, lies to the south-east. On the coast of Finland these groovings are even observed to extend in one place from many feet under the surface of the sea. Seeing that the force which produced these groovings and scratches came from beyond the Gulf of Bothnia and the low country of Sweden, and has operated with such uniformity over a vast region, parts of which rose to about 1000 feet above the Bothnian Gulf, he necessarily refers the phenomena to powerful marine currents. These took place when Finland, as well as all Northern Russia and Germany, lay under the sea, and when the chief groovings were made by stones and blocks, which were held fast in the bottom of floating icebergs, when they were arrested on submarine banks or points of rock. He also indicates how the erratic blocks dropped by these icebergs are found to be more and more rounded as they have receded from the source of their origin, or how, in drifting to the south-east, they have consequently been more exposed to wear and tear. The quantities of sea-sand which abound, and the accompanying small and waterworn pebbles and gravel, have, of course, assisted in the polishing of the rocks. The sand-ridges and pebble-beds which abound in Finland are, in fact, nothing different from the Ösar of the Swedish geologists; and thus the drift phenomena on either side of the Gulf of Bothnia are shown to be identical sub-aqueous deposits.

Here, then, we have a vast region of Europe in which it is manifest that no land-ice or glacier could ever have acted, inasmuch as the area from whence the force was directed was manifestly far to the north-west of the Gulf of Bothnia, and the low countries of Sweden, which, equally with Finland, are covered with erratic blocks and aqueously transported drift. Neither in the south of Sweden nor in Finland are there any moraines, all the detritus

* 'Beitrag zur Kentniss der Schrammen in Finland.' Von N. Nördenskiold. Helsingfors, 1863.

around the great erratics being water-worn; and yet the scratched and polished surfaces, the worn and abrupt sides of the hillocks, in both these countries, resemble precisely the *roches moutonnées* seen in the march of every existing glacier. Agreeing, as I do entirely, with Professor Nördenskiold (for in my published works I have maintained the same view as regards the southern parts of Sweden, and all Northern Russia, Prussia, and Germany),* I also agree with him in the conclusion that the depressions in the surface of Finland, which are now occupied by innumerable lakes, are those which existed when the country was a sea-bottom, and that the present lakes simply occupy the hollows which existed when Finland was raised from beneath the waters. In a table giving the lithological structure of each rock *in situ* which has been grooved, it is shown that the depth of the scratches bears an exact relation to the hardness and resisting nature of the rock. The map—on which every lake and the numerous scratched surfaces are marked, as well as all the altitudes —is a work which must elicit the admiration of every geographer and geologist, and does such honour to Professor Nördenskiold, that our Council has justly placed him in the list of our Honorary Members.

The lines of striation, so carefully laid down by Nördenskiold in Finland, I have myself found extending in the adjacent low regions of Russia, and notably upon the hard quartzose rocks forming the sides of the lake Onega, at a distance of 500 miles from the Bothnian Gulf. There, also, they are seen to be continuous from the shore under the water of the lake, being visible at some feet below the surface. In this flat or slightly undulating country we have all the same proofs as in Finland, that these scratches, groovings, and polishings could only have been produced by stones carried in icebergs; and there, as in Finland, the great erratics, referable to the north-western parts of Norway, have been dropped at numerous intervals, some of them from Lapland, extending to the western flank of the Ural mountains. In the work and map of "Russia and the Ural Mountains," published by myself and companions De Verneuil and Keyserling, the enormous area over which these erratics were transported during the period when the glacial sea covered Russia in Europe and Northern Germany was defined. It was then for the first time made manifest that the currents which transported these blocks had eccentric directions. Thus, whilst the blocks in Finland

* See 'Russia in Europe and the Ural Mountains,' vol. i. chapters 20 and 21. Also, 'Quart. Jour. Geol. Soc.,' vol. ii. p. 349.

and Northern Russia had proceeded from N.W. to S.E. (having been derived from the old north Norwegian ice-fields), the blocks which covered the plains of Prussia, and extended over Poland up the great valleys, on to the foot of the Carpathians, being also of Scandinavian origin, must have been brought from north to south when all those lands were under the sea. On the east of England the great Scandinavian erratics came from the west coast of Norway, whilst in Lapland, M. Böhtlingk had shown that the blocks were diverted northwards into the icy sea.

These facts of the divergence of the distribution of the erratics, as due to divergent currents, are quite in harmony with what would be found at the present day, if the bottom of the sea could be so laid bare as to enable us to refer to the various north or south polar glaciers, or to those of Greenland, the devious lines of deposit of the blocks derived from each of these regions, as determined by different prevailing currents.

If we refer to what glaciers have effected upon land, and to those phenomena which could only have been produced when the rocks so affected were submarine, we must admit that two distinct modifications of the same great agency have produced similar results. The great mass of low country in North America, the surface of which has been striated in like manner from north to south, seemed to me long ago to fall into the category of subaqueous striation by floating icebergs, which were here and there arrested in their progress by sunken rocks. When presiding over the Geological Society of London, in 1842, I gave all credit to Mr. Peter Dobson, a citizen of the United States, for the adoption of that view in reference to his native land,—a previous acquaintance with whose writings, I then said, might have saved volumes of disputation on both sides of the Atlantic.* And now, after a lapse of 22 years, I hold to the same belief.

In the admirable work of Sir W. Logan on the 'Geology of Canada,' my eminent friend expresses the opinion, "that the grooves on the surfaces of the rocks which descend under the water appear to point to glacial action as one of the great causes which have produced these depressions."† Not having visited the region myself, I should have no right to oppose my opinion to that of such weighty authority,

* See 'Anniversary Address, Proc. Geol. Soc.,' vol. iii. pp. 686 *et ante*.

† 'Report of Geological Survey of Canada, 1863,' p. 889 and note *ib.* Montreal.

were it not that the grounds assigned for believing in the excavating power of glaciers in North America are the same striations on the sides of the lakes, and beneath the water, as those which I have cited from the shores of the Bothnian Gulf and the lake of Onega in Northern Russia. Now, as regards the latter countries, I have shown that land glaciers could never have passed over them; for surely no terrestrial glacier in advancing to Finland and Northern Russia can have scooped out the Bothnian Gulf by the way! Instead of such striation on the sides of rock-basins, now filled with water, being proofs of the grinding and excavating action of former glaciers, particularly in the cases of Finland and North America, where no lofty mountains, as in the Alps, are at hand to give great power to descending masses of ice, I conceive that such phenomena can only be explained by appealing to the grating action of the bottom of former floating icebergs. My belief is, that the great North American lakes were cavities originally due to a combination of ruptures and denudations of the rocks, and that the whole surface of the lower country thus prepared, was under the sea when icebergs coming from Arctic glaciers floated over it.

We can thus well imagine how countless icebergs were here and there arrested on those submarine rocks which now form the sides of the lakes, and how each icy mass, forced on by a powerful current, after producing the well-known striation on the points of stoppage, would necessarily, when set free, float rapidly across the deep sea cavity, until the base of the iceberg was again arrested by the prominences on the opposite side of the depression, there again to make striations with the stones held fast in its bottom. In this way we can just as easily account for the transport of the numerous great erratics which are spread over North America up to 38° N. latitude, as we have explained the transport of the Scandinavian blocks up to the foot of the Carpathian Mountains.

Whilst, therefore, I fully recognise the stupendous spread and influence of former land-glaciers over extensive regions, I at the same time affirm, that as regards the striation and polishing, the worn side and the abrupt side of the rocks affected, floating icebergs, when impeded by submarine obstacles, have also produced those results. The true and independent test of the action of terrestrial glaciers is the existence of moraines. Now, there is no

trace of these peculiar accumulations in the South of Sweden and Finland, all the detritus of those regions, as well as of the North of Russia and Germany, being waterworn; and I have yet to learn that there are any evidences of true moraines in the low countries of Canada and the United States.*

[Whilst I was reading this Address to the Geographers in London, that sound practical geologist, Principal Dawson, was performing a similar duty at the Annual Meeting of the Natural History Society of Montreal. Having received a copy of his Address in time for insertion of a Postscript here, I rejoice to have the opportunity of stating that he also is a vigorous opponent of the theory which refers the striation of the North American rocks, and the excavation of the great lake basins of that country, to the action of terrestrial glaciers. He shows indeed that the great striation of a large portion of the continent from N. E. to S. W. was from the ocean to the interior, against the slope of the St. Lawrence valley, thus disposing at once of the glacier theory; for it is impossible to imagine that a glacier travelled from the Atlantic up into the interior. Admitting that in limited tracts of Eastern America there may have been local glaciers, Mr. Dawson believes, as I do, that the chief countries in question were striated when the land lay beneath the sea.]

AFRICA.

North-western Africa.—Senegal and its Dependencies.—Looking to the well-digested and clear accounts of the progress of geographical research in Northern or North-western Africa, which have been embodied in the Reports of the Geographical Society of France, by M. Malte Brun, I have only to refer you to those works, and not detain you on this subject by any observations of my own. I am, however, impelled to call your notice to a work of this year 1864, the 'Annuaire de Sénégal,'† as followed by a *résumé* of the explo-

* For a full explanation of my views respecting the manner in which former floating icebergs transported blocks, and spread out submarine detritus, I must refer the reader to the 21st and 22nd chapters of the work 'Russia and the Ural Mountains,' pp. 507 to 556. Since that time (1845) I have indeed seen reason to admit a much greater extension of former land-glaciers than my colleagues and myself then believed in, and this I explained in my last Address to the Royal Geographical Society.

† Printed at St. Louis, Senegal, 1864. Paris, chez Challamel aîné, Rue des Boulangers, 30.

rations of the interior, made by order of the Government, in the years 1859, 1860, and 1861, and which has just fallen into my hands. Whenever our allies the French describe any one of their possessions, it is invariably done with method, order, and a lucid condensation of details; and such qualities are particularly observable in this little volume. Discovered in 1460 by some bold navigators of Dieppe, Senegal was soon after colonised by the same Normans. In succeeding centuries the Portuguese and Dutch warred for the occupation of these tracts, until 1758, when the English took the country, including Goree, but ceded it again to France by treaty. Again, in 1800, Goree fell into our hands, and in 1809 we added to it St. Louis; but, at the conclusion of the last great war in 1814, the whole territory was rightly given back to France, its original occupant. Holding possession of this territory for the last fifty years, the French have striven energetically to improve it, by a vast enlargement of boundary, the construction of forts, strict military tenure, and by carrying on a commerce with the adjoining native tribes; so that they reckon upon having 200,000 subjects, and, after several years of war, they are now in relation with about a million of natives.

In the long list of annexations of native districts, it is gratifying to read, as a sequence of the last treaty of peace, that a telegraphic communication is now established between St. Louis and Goree, and that in 1863 the new port of Dakar was formed. Recently the quiet state of the political horizon has enabled the Governor, Colonel Faidherbe, who has been the mainspring of French progress in Senegal, and who has recently been named one of our Honorary Foreign Members, to send various exploratory parties along the north coast and into the interior of the country. These have added much important information to the sketches of tracts formerly visited by the Père Labat, Mungo Park, Caillé, Mollien, and Panet. The French colonists, since their occupation of Algeria, have sagaciously sought for original knowledge in the native recitals of Arabs, and the inhabitants of Soudan and Berber. With these data, and in acquiring the language of the natives, several travellers,—such as Captain Vincent; MM. Bournel and Mage, young Naval officers; Pascal and Lambert, Infantry officers; with Alioun Sal and Bough-el-Moghdad, intelligent Native officers in the French service,—have, in the years 1859, 1860, and 1864, made most successful journeys. Thus, the portion of Soudan adjacent to Senegal is now nearly as well known as the more central

regions, which have been already developed by British explorations, including those of Denham, Clapperton, and W. Lander,* and the works of our honoured Associate Barth. One of these parties, Alioun Sal, reached Timbuctoo; and the death of this young and intelligent Mohammedan, who unfortunately fell a prey to the fever of the country, has been deeply lamented by the authorities of Senegal.

Before quitting the subject of North-western Africa, I am unwilling to pass unnoticed the services of the enterprising young German traveller Gerhard Rohlfs, who, having made a successful journey through Southern Morocco by Tafilet to Gerysville in Algeria, is now on his route to Timbuctu under the auspices of the Royal Geographical Society.

Northern Abyssinia.—The efforts of our German contemporaries to complete our acquaintance with Northern Abyssinia and the adjacent countries (of which mention was made in a note to my last year's Address), have been most successful; and every geographer must have heartily commended the researches of Von Heuglin, Kinzelbach, Munzinger, and Steudner. Whilst these travellers have prepared an excellent detailed map of the districts of Bogos, Manesa, and Murea, with the surrounding tracts, a more extended map, ranging from the Red Sea on the east to 34° 45′ E. longitude, which has resulted from their surveys, is a work of great and general interest. For, in it, we find the routes laid down of all the travellers of various countries during the last quarter of a century, who have examined the regions between Massáwa and the coast of the Red Sea on the east, and the river Atbara, that great affluent of the Nile, on the west. This sheet, as published in the 'Mittheilungen' of Petermann, is an excellent example of the amount of knowledge which can be conveyed on a map alone; the successive journeys of the different travellers being laid down in different colours with border profiles showing the relative heights of the different countries traversed.

* I have just had the gratification to learn that, with a due appreciation of the devoted and zealous researches in Central Africa of that accomplished young traveller Edward Vogel, who was barbarously beheaded by the King of Wadai, Earl Russell has granted the sum of 500*l.* to Miss Julia Vogel, the sister of the deceased. In thanking me warmly for supporting her cause, this lady assures me that, by this generous act, all her prospects in life are brightened, and that her heart's desire will now be fulfilled in being enabled to do honour to the memory of her lamented brother, as well as, she says, "to assist a younger brother in those studies which may enable him to serve a country to which she will ever cling with the deepest gratitude."—24 June, R. I. M.

The Niger.—The last accounts I have seen of the labours of Dr. Baikie are contained in a private letter to a relative, dated at Lukoja, on the 9th October, 1863. This persevering and praiseworthy envoy of our Government, who has been seven years in Africa and in whose appointment I took much interest, had, it appears, made up his mind to come home last year, when he received instructions to remain at his post till further orders.* In braving the dangers of the climate, Dr. Baikie has shown how a British settlement can be made a centre of civilization. Alone, and almost without means, he has contracted friendships with all the leading chiefs of Soudan, and has awed tribes merely by the exercise of moral influence, whilst his messengers can now travel securely from his station to Bonny.

It is by such an example and such persevering conduct that Africa can be best civilized; and we must earnestly hope that whoever may succeed Dr. Baikie, will follow the same kind, judicious, and forbearing conduct which has endeared him to the natives, and has enabled him to make his little station, so far up the Niger, a centre of commerce and friendly intercourse with them.

The Gaboon Country.—Although the progress of the recent expedition of M. du Chaillu to the scene of his former explorations has been unluckily checked by the loss of his scientific instruments, I trust that when he receives the fresh supply sent out to him by us, he will make a successful examination of the interior in those latitudes. He has, indeed, already sent home instruments, including the native harp with strings of vegetable fibre, which prove the truthfulness of some of his descriptions which had been unjustly discredited. As regards his previous accounts of the geography of the Gaboon country, M. du Chaillu's accuracy, in the main, has been amply confirmed by Lieuts. Serval and and Du Bellay, who have since made surveys in the interior.†

South Africa.—Explorations of the Baron C. von der Decken.—The unchanged terrestrial condition of the ancient Surface of the Interior of South Africa.—Project of rendering the White Nile the highway of intercourse between Central Africa and Europe.—Petherick's Journal.—Whilst our last Session closed with the striking results of the journey of Speke and Grant, and our warm welcome of the undaunted travellers, who, for

* As this Address is printing, Mr. Layard informs me that the *Investigator* steamer has been ordered to bring Dr. Baikie down the Niger, and that he may be expected home this year.

† Vide Petermann's 'Mittheilungen,' December, 1863. Messrs. Serval and Du Bellay have discovered a new and broad river, the Ogowai, flowing from the interior, about 20 leagues to the south of the Gaboon.

the first time in history, had crossed Equatorial Africa and had also descended along the course of the great White Nile from its water-basin to its mouth, the opening of this Session was marked by the interesting and detailed description of the snow-clad mountain Kilimandjaro, the issue of two expeditions conducted entirely at his own cost by Baron C. von der Decken.

In the first of these, he was accompanied by my clever and lamented young friend, the late Mr. Richard Thornton, who drew the first contoured map of that wild and lofty country, took many observations of latitude and longitude, and kept an accurate diary. Copies of all his writings, as well as his original map, have now been sent by his family to the Royal Geographical Society.* In the second expedition, Baron von der Decken had for his scientific companion a German astronomer, Dr. Kārsten.

I have already adverted at some length to the importance of this enterprise, as recorded in our 'Proceedings,' and also in the award of the Medal. I have informed you that, in reference to the prosecution of other enterprises by the same distinguished person, the First Lord of the Admiralty had given directions that Her Majesty's vessels on the coast of Africa should assist the Baron in passing his own steamer into one of the rivers of Formosa Bay; and I have now to state that Her Majesty's Secretary for Foreign Affairs has strongly recommended this enterprising traveller to the good-will of the Sultan of Zanzibar, through the British Consul at that place. Seeing that Baron von der Decken, who has already done so much, is organising at considerable expense another expedition, in which, providing himself with an iron river-steamer, he will be attended by competent observers, we naturally wish him all the success which his zeal and devotion to our cause merit.

If, after ascending one of the rivers which fall into the Bay of Formosa, he should reach Mount Kenia or any part of that mountainous region of Eastern Africa, north of the Kilimandjaro, probably a great watershed, and should thence descend by any eastern affluent of the White Nile, or should reach Egypt by the Blue Nile, in either case he will have performed a most essential service to geography. In the mean time, both for the great and good duties he has already performed, and for the extensive and vigorous preparations he is now making to enlarge our acquaintance with the geography of Africa, the Council has in my opinion wisely adjudicated a Gold Medal to Baron C. von der Decken.

* See my observations on the late Richard Thornton in the Obituary, p. 184.

Our Victoria Medal has, with great propriety, been awarded to the gallant Captain Grant,* the companion of Speke, to mark, as I have said, emphatically and once more, our sense of the vast importance of their journey across Equatorial Eastern Africa, and the region of the head waters of the Nile. By their researches the watershed between North and South Africa was first established in respect to the Eastern Equatorial region. The results which ought to follow from these discoveries will be further considered in the sequel.

In former Addresses I suggested that the interior mass and central portions of Africa constituting a great plateau occupied by lakes and marshes, from which the waters escaped by cracks or depressions in the subtending older rocks, had been in that condition during an enormously long period. I have recently been enabled, through the apposite discovery of Dr. Kirk, the companion of Livingstone, not only to fortify my conjecture of 1852, but greatly to extend the inferences concerning the long period of time during which the central parts of Africa have remained in their present condition, save their degradation by ordinary atmospheric agencies. My view, as given to this Society in 1852, was mainly founded on the original and admirable geological researches of Mr. Bain in the colony of the Cape of Good Hope. It was, that, inasmuch as in the secondary or mesozoic age of geologists, the northern interior of that country was occupied by great lakes and marshes, as proved by the fossil reptile discovered by Bain, and named Dicynodon by Owen, such it has remained for countless ages, even up to the present day. The succeeding journeys into the interior, of Livingstone, Thornton, and Kirk, Burton and Speke, and Speke and Grant, have all tended to strengthen me in the belief that Southern Africa has not undergone any of those great submarine depressions which have so largely affected Europe, Asia, and America, during the secondary, tertiary, and *quasi* modern periods.

The discovery of Dr. Kirk has confirmed my conclusion. On the banks of an affluent of the Zambesi, that gentleman collected certain bones, apparently carried down in watery drifts from inland positions, which remains have been so fossilized as to have all the appearance of antiquity which fossils of a tertiary or older age usually present. One of these is a portion of the vertebral column and sacrum of a buffalo, undistinguishable from that of the Cape buffalo; another is a fragment of a crocodile, and another of a

* See 'Presentation of Royal Awards,' *ante*.

water-tortoise, both undistinguishable from the forms of those animals now living. Together with these, Dr. Kirk found numerous bones of antelopes and other animals, which, though in a fossil condition, all belonged, as he assured me, to species now living in South Africa.

On the other hand, none of our explorers, including M. Bain, who has diligently worked as a geologist, have detected in the interior any limestones containing marine fossil remains, which would have proved that South Africa had, like other regions, been depressed into oceanic conditions, and re-elevated. On the contrary, in addition to old granitic and other igneous rocks, all explorers find only either innumerable undulations of sandstones, schistose, and quartzose rocks, or such tufaceous and ferruginous deposits as would naturally occur in countries long occupied by lakes and exuberant jungles, separated from each other by sandy hills,—scarcely any other calcareous rocks being found except tufas formed by the deposition of land-springs. It is true that there are marine tertiary formations on the coasts (around the Cape Colony, near the mouth of the Zambesi opposite Mozambique, and again on the coasts of Mombas opposite Zanzibar), and that these have been raised up into low-coast ranges, followed by rocks of igneous origin. But in penetrating into the true interior, the traveller takes a final leave of all such formations; and in advancing to the heart of the continent, he traverses a vast region which, to all appearance, has ever been under terrestrial and lacustrine conditions only. Judging, indeed, from all the evidences as yet collected, the interior of South Africa has remained in that condition since the period of the secondary rocks of geologists! Yet, whilst none of our countrymen found any evidences of old marine remains, Captain Speke brought from one of the ridges which lay between the coast and the lake Victoria Nyanza a fossil shell, which, though larger in size, is undistinguishable from the *Achatina perdix* now flourishing in South Africa. Again, whilst Bain found fossil plants in his reptiliferous strata north of the Cape, and Livingstone and Thornton discovered coal in sandstone, with fossil plants, like those of our old coal of Europe and America,—yet both these mesozoic and palæozoic remains are terrestrial, and are not associated with marine limestones, indicative of those oscillations of the land which are so common in other countries.

It is further to be observed that the surface of this vast interior is entirely exempt from the coarse superficial drift that encumbers

so many countries, as derived from lofty mountain-chains from which either glaciers or great torrential streams have descended. In this respect it is also equally unlike those plains of Germany, Poland, and Northern Russia, which were sea-bottoms when floating icebergs melted and dropped the loads of stone which they were transporting from Scandinavia and Lapland.

In truth, therefore, the inner portion of Southern Africa is, in this respect, as far as I know, geologically unique in the long conservation of ancient terrestrial conditions. This inference is further supported by the concomitant absence, throughout the larger portion of all this vast area, *i.e.* south of the Equator, of any of those volcanic rocks which are so often associated with oscillations of the *terra firma*.*

With the exception of the true volcanic hills of the Cameroons recently described by Burton, on the west coast, a little to the north of the Equator, and which possibly may advance southwards towards the Gaboon country, nothing is known of the presence of any similar foci of sub-aërial eruption all round the coasts of Africa south of the Equator. If the elements for the production of them had existed, the coast-line is precisely that on which we should expect to find such volcanic vents, if we judge by the analogy of all volcanic regions where the habitual igneous eruptions are not distant from the sea or from great internal masses of water. The absence, then, both on the coasts and in the interior, of any eruptive rocks which can have been thrown up under the atmosphere since the period when the tertiary rocks began to be accumulated, is in concurrence with all the physical data as yet got together. These demonstrate that, although the geologist finds here none of those characters of lithological structure and curiously diversified organic remains, which enable him to fix the epochs of succession in the crust of the earth in other quarters of the globe, the interior of South Africa is unquestionably a grand type of a region which has preserved its ancient terrestrial conditions during a very long period, unaffected by any changes except those which are dependent on atmospheric and meteoric influences.

If, then, the lower animals and plants of this vast country have gone on unchanged for a very long period, may we infer that its human inhabitants are of like antiquity? If so, the Negro may claim as old a lineage as the Caucasian or Mongolian races. In the absence of any decisive fact, I forbear at present to speculate on

* Although Kilimandjaro is to a great extent igneous and volcanic, there is nothing to prove that it has been in activity during the historic era.

this point; but as, amid the fossil specimens procured by Livingstone and Kirk, there are fragments of pottery made by human hands, we must wait until some zealous explorer of Southern Africa shall distinctly bring forward proofs that the manufactured articles are of the same age as the fossil bones. In other words, we still require from Africa the same proofs of the existence of links which bind together the sciences of Geology and Archæology which have recently been developed in Europe. Now, if the unquestioned works of man should be found to be coeval with the remains of fossilized existing animals in Southern Africa, the travelled geographer, who has convinced himself of the ancient condition of its surface, must admit, however unwillingly, that although the black man is of such very remote antiquity, he has been very stationary in civilization and in attaining the arts of life, if he be compared with the Caucasian, the Mongolian, the Red Indian of America, or even with the aborigines of Polynesia.*

The discovery of that vast water-basin, the Victoria Nyanza, in the heart of Equatorial Africa, and the proof that a great stream flowed out from its northern extremity, which Speke and Grant followed, and showed almost conclusively to be the White Nile, was truly, as I said last year, a grand feat, of which all our countrymen had reason to be proud. But, in warmly praising and honouring the men who accomplished it, we are not yet satisfied, as geographers, with this their single line of march, and the valuable data which they fixed. We look naturally to other efforts which must be made to dispel scepticism regarding the upper waters of the Nile, including that raised by the claim of the Venetian traveller Miani, as to his having continuously ascended a river to 2½° to the s.s.w. of Gondokoro, the rocky banks of which he has laid upon a sketch-map, and which he contends does not flow from the Victoria Nyanza. But irrespective of such a claim, the Council of our Society have, on general grounds, come to the conclusion that the physical geography of all the region, together with the shores of the Victoria Nyanza (a lake laid down by Speke as larger than Scotland), should be further explored, and the nature and extent of the various affluents of that vast body of water determined. They further wish to see examined the region lying between the great lake Luta-Nzige, north of the Equator, and the lake Tanganyika, south of it, in order to deter-

* The most remarkable proof of the inferiority of the negro, when compared with the Asiatic, is, that whilst the latter has domesticated the elephant for ages and rendered it highly useful to man, the negro has only slaughtered the animal to obtain food or ivory.

mine if there be not there (as some geographers think possible) other sources of supply for the White Nile, coming from the region to the west of the Victoria Nyanza; and finally, that, if possible, the Upper White Nile of Speke and Grant should be traced continuously from the lake to that point, where, according to their map, it is made to join the end of the lake Luta-Nzige.

Having considered this subject, the Council has adopted my proposal, to assist in fitting out an expedition to clear away all such obscurities, by ascending the White Nile, and not, as previously, by any efforts from Zanzibar and the eastern coast of Africa. The difficulties encountered by Speke and Grant in passing through that tract, and the apparent impossibility of establishing any regular traffic between the east coast and the central kingdoms, have induced us to prefer to any other line of research an effort to render the Great White Nile a channel of intercourse and commerce between the prolific interior and the traders of the Mediterranean Sea. One serious difficulty only exists in bringing about this desirable consummation. Between Khartûm, the present southern boundary of Egypt, and Gondokoro no obstacle on the river-navigation exists, as recently proved, indeed, by the voyage of the enterprising and intelligent Dutch ladies, though the natives in the interior have, it appears, been to a great extent demoralised by the conduct of the traders in ivory, who, arming one set of villagers against another, are said to plunder tribes, and carry away the women and children as slaves. Now, these horrible practices having been still more ruthlessly carried into effect above or south of Gondokoro, as we learn from the testimony of Speke and Grant, a belt of country, from 100 to 200 miles in breadth, inhabited by the Bari, has been rendered so lawless and savage, that it was with the utmost difficulty our medallists traversed it in their way northwards from the fertile kingdoms of Karagwe, Uganda, and Unyoro.

On the part of the Society, therefore, the Council have drawn up a memorandum, in which, after enumerating the desiderata, commercial, philanthropical, and geographical, involved in our project, we express the hope, that, as we are ready to embark 1000*l.* in such an expedition, some means may be found to put a stop to this demoralising trade in slaves, which, as our Consul-General in Cairo, Mr. Colquhoun, writes to me, is accompanied by horrors of which no one can form an idea. We believe that this can best be accomplished by the exertions of the Pasha of Egypt, and by the extension of his influence southwards from Khartûm to Gondokoro. The in-

termediate country is a sort of No-man's-land, in which numerous warring small tribes are kept in an excited and barbarous state by an extensive importation of firearms. Now, if the miserable natives were rescued from disorders occasioned by such enormities, legitimate commerce would eventually arise between the Equatorial kings and the merchants of Cairo and the Mediterranean; and the Great Nile, which for thousands of years has alone served to enrich the soil of Lower Egypt, would eventually become a highway of intercourse with Europe, which might largely tend to the civilisation of Central Africa. To have made the first proposal in a matter of such permanent interest will, I trust, be always counted a proof of the lofty as well as useful efforts of this Society, to bring about a state of things which will prove the real importance of the discovery recently made in Inner Africa by British geographers, and may render the White Nile, for the first time in history, of real use to commerce and civilisation.

The practical geographer will, I trust, find in the observations made by Mr. Petherick and his associate, Dr. Murie, which have at length reached the Society, some materials for the construction of improved maps of the large region on that portion of the west bank of the White Nile which is watered by the Bahr-el-Ghazal. We are also indebted to Mr. Petherick for a measurement of the comparative volume of water discharged by the Nile and its affluents, the Bahr el Ghazal and the Sobat. When measurements such as these shall have been repeated at different periods of the year, we shall be in a far better position to estimate the relative importance of the tributaries and parent stream of the Nile.

In the commencement of this Session I adverted to a feeling letter written to me by Mrs. Petherick, the wife of the traveller, and explaining how he had been cast down by misfortunes and severe illness, and was unable then to send home the accounts of his expedition. These documents having arrived, will soon be printed and circulated among the Fellows, who, seeing the amount of work accomplished by Mr. Petherick, will be able to estimate to what extent the disasters he encountered prevented his fulfilling the engagements he had entered into with the view of succouring Speke and Grant.

We now wait with deep anxiety for accounts of the ultimate issue of the journey made by the adventurous Dutch ladies and their scientific companion Baron von Heuglin, and their exploration

of the great western affluents of the White Nile.* We are also equally anxious to have some account of the travels of that undaunted, generous, and self-sacrificing explorer, Mr. Samuel Baker, of whom we have heard no tidings for a year.

Conclusion.—In terminating these observations on the results of geographical explorations in various countries, I must, on the grand subject of African geography, as on the previous occasion, decline to enter upon an analysis of the respective writings, of great value in critical geography, which have in past years been contributed by our own countrymen, by continental writers, as well as by the Portuguese authorities who preceded them. An analytical sketch, which would do justice to the scholars who have from time to time set forth the results of their researches, is much wanted. In this way, for example, we might trace the amount and increase of information published by Cooley, first anonymously, in articles of the 'Edinburgh Review,' commencing in 1835, and followed up by him in the construction of a map delineating his view of a line of lakes and rivers proceeding from N.N.W. to S.S.E. through Southern Africa.

In like manner I have not, in anything I said last year, done the justice I wished to our Abyssinian Medallist, Dr. Beke, for his ingenious suggestion as to the region wherein the head-waters of the Nile would be found, and his bold hypothesis, of 1848, respecting the mountain-chains of Africa, which opened out an original view of the physical geography of Africa north of the Equator. The analyses of such subjects as these, and of all the labours of Macqueen, Arrowsmith, Petermann,† and other practical geographers, require much more time and power of research than I possess. Unable to cope with them myself, I hoped that, in taking leave of you at this Anniversary, I might be succeeded by one whose scholarship and powers as a comparative geographer would enable him to describe the

* Since this Address was read, I learn with deep sorrow that Madame Tinné and two of her European attendants have died. Her enterprising daughter, Baron von Heuglin, and Baron D'Ablaing, had, however, reached Khartûm. As Baron von Heuglin is in regular correspondence with M. Petermann, we may look to the 'Mittheilungen' of our correspondent for much interesting matter respecting the exploration of the region of the Bahr-el-Ghazal. In a letter to Capt. Speke, which I have read, Baron von Heuglin speaks of the ivory and slave dealing merchants, and, in addition to much important knowledge respecting the fauna and flora of the Bahr-el-Ghazal, informs us that he has prepared a map of that region, as also of the country of Nyam Nyam.

† The various researches of late years in Africa are admirably illustrated by the series of maps and accompanying descriptions in the 'Mittheilungen' of Petermann, of which I gave an account in my last year's Address, and which have since been completed.

successive steps made by all contributors to our science, and, by a comparison of their labours with those of their predecessors, to trace down throughout the long current of ages the additions which have been made, in Asiatic as well as African geography, by various men, to that vast emporium of geographical knowledge which we now enjoy.

As on this head, doubtless, there have been many omissions on my part, I beseech my friends to be assured that such omissions have not been caused by any want of good will, but simply from an inability to do justice to the theme amidst the many other avocations which occupy my time.*

One task, however, I will try to accomplish, to the best of my ability, if my tenure of life be prolonged, and that you should place me for the current year in this Chair. I will endeavour at our next Anniversary to draw a parallel between the general state of geography when this Society was founded, in 1830, and the condition which it has reached in the present day; and, in doing this, I hope to demonstrate that my countrymen have borne no small share in this progress, and that the Royal Geographical Society has taken the lead in efficiently promoting this great work of advancement,—not merely by the publication of the volumes of our Journal and our Proceedings, but by zealously encouraging explorations, and by rewarding those persons, to whatever nation they belonged, who have thrown light on the geography of the world.

P.S.—Whilst this Address is going through the press, letters from Dr. Livingstone have reached me, giving an account of his journey into the interior, on the west bank of the Shiré, and for nearly 700 English miles to the N.N.W. of that river. Owing to his being obliged to return to settle the affairs of his Consulate and to convey H.M. *Pioneer* steamer down the Zambesi, he was unable personally to determine the question whether any waters flow into the head of the great Lake Nyassa (coming, as had been suggested, from Lake Tanganyika).† The natives, however, one and all, denied that any waters entered the lake from the north, and Livingstone seems

* Some of the discussions which have been going on between Mr. Cooley and Capt. Burton, and others, can only be correctly understood by etymologists who have studied the African languages and dialects.

† As far as it was examined and laid down on a map by Dr. Kirk, the Lake Nyassa trends due South and North.

to think that the lateral affluents which he saw are sufficient to account for the infilling of the lake and the supply of the Shiré.

The one point on which Livingstone and all African travellers are agreed is, that where no traders in slaves and ivory are met with, there no difficulty occurs in passing through the country; the inhabitants willingly serving as porters. In a recent letter to Captain Speke, which I have already mentioned, Baron von Heuglin, after affirming that the ivory dealers in the Bahr-el-Ghazal are barbarising all that fine region, and have rendered it impassable, exclaims that it is a disgrace to civilised governments not to endeavour to put an end to these horrors. Let us hope that the aspirations of our Council, in unison with the prayers of all travellers, may have a due influence on the governments of Europe and Egypt, and thus eventually render the White Nile useful as a highway of commerce.

June 10*th*, 1864.

PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY.

[ISSUED 1ST OCTOBER, 1864.]

SESSION 1863–4.

Thirteenth Meeting, June 13th, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Edward Webster, Esq.; Charles H. Allen, Esq.; Thomas Ogilvy, Esq.; Edward Warner, Esq.*, M.P.; *Lord Belmore; E. C. Lowndes, Esq.; F. F. Joyes, Esq.; G. Gladstone, Esq.*

ELECTIONS.—*Edward Bellamy, Esq.; William Field Ives, Esq.; Alexander Mackinnon, Jun., Esq.; Edward O'Riley, Esq.*, F.R.S.; *Captain Henry Toynbee.*

ACCESSIONS TO LIBRARY.—'Explorations in Australia,' by J. McDouall Stuart; edited by William Hardman, M.A.; 3 copies presented by Messrs. Saunders and Otley. 'Bulletin de la Société d'Encouragement pour l'Industrie Nationale,' Mars, 1864. Continuations of Transactions of various Societies, &c.

ACCESSIONS TO MAP-ROOM.—Photograph of the North Atlantic Telegraph Expedition, 1860.—Vale of Brallilid, South Greenland.—Government Maps of the Kingdom of Denmark; 55-inch; complete up to date of presentation.—Seat of War in America, near Richmond (2nd edition), from the Topographical Depôt.—Continuation of the Ordnance Maps and Admiralty Charts.

The first Paper read was—

1. *On the Travels of Portuguese and others in Inner Africa.*
By W. D. COOLEY.

THE object of the Paper was to propound the views of the author, formed on a careful examination and comparison of the reports of various travellers, on the position of the rivers, lakes, and places

in Inner Southern Africa. The accounts of several Portuguese travellers were passed in review; and the author contended that their itineraries were so full and their various accounts so accordant, that, notwithstanding the paucity of their astronomical observations, the geographical information they imparted was quite reliable, and ought not to be set aside, as had been done in the construction of modern maps. The subject was argued with much learning, and a large map was exhibited to illustrate the views of the author. Some of the more striking points of difference between this map and the recent ones of Livingstone were the total separation of the rivers Liambeji and Zambesi (the upper and lower courses of the Zambesi) and the release of their affluents from the system of inosculation which, in recent maps, bind all those rivers together; and the north-west direction of Lake Nyassa, which was made continuous with Tanganyika, forming an elongated lake, called Ñanja mucúro.

The PRESIDENT said, Mr. Cooley was a distinguished critical geographer, who had spent his life in elaborating from many sources, particularly from those Portuguese travellers who have preceded our own, a vast variety of information. The present paper had been so recently communicated that he had not had time to read it through; but, finding that the observations were of a critical nature, and that they bore to a great extent upon the accuracy of Dr. Livingstone's observations, he thought it right that the criticisms should be read first, and that Dr. Livingstone's simple account of his last exploration along Lake Nyassa, which he had undertaken of his own accord, should come afterwards; and then, that gentlemen who were more or less acquainted with the country should discuss the papers afterwards. He wished the subject to be fairly discussed, and that all deference should be shown to Mr. Cooley's powers as a critical geographer, for he was sure the Society desired to do justice to every man, whatever his labours might be, whether in critical geography or in actual observation.

Mr. MARKHAM then read the following :—

2. *Letters from the Zambesi to Sir R. I. Murchison, and (the late) Admiral Washington.* By DAVID LIVINGSTONE, M.D., LL.D.

THESE letters comprised a narrative of Dr. Livingstone's last journey into the interior. The despatch containing instructions for the withdrawal of his expedition did not reach him until the 2nd of July, 1863, when the waters of the Zambesi had fallen too low for the *Pioneer* to be taken down to the sea. To improve the time, therefore, until the flood of December, Dr. Livingstone set forth, accompanied by the steward of the vessel, to finish the exploration of Lake Nyassa, and more particularly to decide whether a large river entered its northern extremity. The wreck of his boat in the rapids of the Shiré forced him to abandon the attempt to sail round

the lake; he therefore started to go to the northern end by land, pursuing for many days a north-westerly course so as to avoid a colony of Zulus, who were at war with the negroes on the western shores of Nyassa. In this direction he came upon a range of mountains, 6000 feet high, running north and south, and forming the edge of the table-land on which the Maravi dwell. Beyond this he turned to the north-east, and struck the shores of the lake at Kota-kota Bay in lat. 12° 55′ s. He here found two Arab traders engaged in building a dhow, to replace one which had been wrecked in crossing the lake. This is the point at which nearly all the traders in slaves and ivory cross on the highway between the eastern seaports and the Cazembe country of the interior. The Arabs had 1500 persons in the village, and were busily employed transporting slaves to the coast. One fathom of calico (value 1*s.*) is the price paid for a boy, and two for a good-looking girl. But, nevertheless, it is the joint ivory and slave trade that alone makes slave-trading a paying business; for the cost of feeding the negroes would be too great an expense were it not for the value of their services in carrying the ivory; a trader with twenty slaves must daily pay the price of one slave for their sustenance. All the difficulties which Dr. Livingstone had experienced in travelling in the interior were due to the obstacles thrown in his way by the Portuguese, who judged truly that in buying up the ivory he was undermining the slave-trade. He only hoped that this same course would be pursued by other travellers who might succeed him, as this did more to destroy the slave-trade than the English cruisers on the coast. Leaving Kota-kota Bay, Dr. Livingstone again turned due west, and in three days reached the ascent of the plateau. The long slope, adorned with hill and dale and running streams, fringed with evergreen trees, was most beautiful. The heights had a delicious, but peculiarly piercing air, which was very exhilarating. At this point, distant 80 or 90 miles from Nyassa, the watershed was crossed, and two rivers met with, both named Loangwa: one was found flowing eastward, into the lake; the other westward, towards the Zambesi. Another river was here seen, called the Moitawa, which flows into a small lake, called Bemba; from this river issues, according to native and Arab report, the River Luapula, which, flowing west, forms the Lake Mofue, and then, passing the town of Cazembe, turns to the north, and is lost in Tanganyika. Dr. Livingstone had a strong desire to follow the stream, but the time for the rising of the Zambesi and for floating the *Pioneer* out to sea having arrived, he was obliged to return. With regard to the existence of a large river flowing into the northern end of Nyassa from Tanganyika, Dr.

Livingstone was assured by all the natives of whom he inquired that there was no such stream, but that two small rivers alone enter the lake from the north. The numerous streams met with on this journey flowing from the west into Nyassa seemed to warrant the conclusion that no flow of water from Tanganyika was necessary to account for the great depth of the lake and the perennial flow of the Shiré. In this journey Dr. Livingstone and his companion walked 660 miles in 55 travelling days. On arriving at the Zambesi he found the river had not yet risen, the rains being much later than usual, and was mortified in the reflection that had he dared to speculate on a late rise he would have had ample time to examine the water-system of Lake Bemba.

The PRESIDENT was sure they would all agree with him that Dr. Livingstone had made the best possible use of his time as a geographer in this exploration to the north-west of Lake Nyassa, of which he had previously explored the western banks in company with Dr. Kirk. The observations of Mr. Cooley seemed to have no special reference to this communication respecting the outlines of Lake Nyassa and the mountains to the west and north-west of it. The map constructed by Dr. Kirk shows Lake Nyassa stretching directly north and south, a distance computed at 200 miles; but on Mr. Cooley's map the lake is made to trend to the north-west. There was, therefore, this great discrepancy between the observations of the Portuguese who visited that country many years ago, and the *de facto* recent observations of Dr. Livingstone and Dr. Kirk.

Captain SPEKE said he had a few remarks to make upon both papers. In the first place, Mr. Cooley, taking the Portuguese accounts, made a continuous lake of the Nyassa and Tanganyika. He himself was inclined to believe that at one period there really was such a union; and he thought there was still a connection between them, though not as a broad lake. When he was at Kazé he heard from the Arabs, and also from many of the natives, that the Babiza tribe, which inhabit the western shore of the Nyassa lake, cross a deep river by canoes, and find their ivory mart at a place called Luwemba, not far distant from the south-east corner of the Tanganyika. To this place the Arabs from Kazé, and their slaves, go for ivory. Thus whilst the Arabs draw their ivory up to Kazé, the Babiza take theirs down the western coast of Nyassa to Kotakota, where they sell it to Arabs, and from that point it is transported to Zanzibar by Kilua. All these trading people at Kazé told him that there is no mountain-range dividing the Nyassa lake from the Tanganyika lake; but they all talked of a river running as it were from one lake into the other, from which he inferred that the Tanganyika was drained by a river into the Nyassa. Dr. Kirk had assured him that no large river entered the Nyassa at its northern end. He should like to know from Dr. Kirk whether he derived his information from Arabs or from his own personal inspection. The river system of Africa is chiefly determined by the rainy system of that continent. Within the Tropics everything goes on in an exact ratio throughout the year, the rains following the path of the sun. The greatest rains are confined to the Equatorial line—the part to which the sun is nearest, on an average, the whole year round. Were it not for that rainy zone, the sources of the Nile would certainly not be on the Equator. The Tanganyika would not be in existence; nor, as he believed, the Nyassa either. Whilst the sun is in the north, the Nyassa lake, were it not supplied by the rains which are constantly falling on the Equator, would dry up, in the same manner that Lake Tchad dries up; that is to say, to a certain extent.

Again, with regard to Lake Dembea, in Abyssinia, we know what an enormous river this lake pours out when the sun is to the northward, and how it shrinks when the sun is to the southward. The size of that river is so prodigious in the rainy season that it overcomes the White Nile. But in the dry season, if it were not for the White Nile, the waters of that river would never reach Egypt, and there would be no Nile at all. The greatest possible importance must, therefore, be given to this system of rains, and he firmly believed that the existence of the Nyassa lake is due to the rains of the Equatorial regions. Upon reference to the map, they would see that the majority of the streams which flow from the mountain-range overhanging the west of Nyassa, turn off to the westward, and, as Dr. Livingstone imagines, drain into the upper course of the Zambesi river. So that but little water could possibly find its way into Lake Nyassa in that direction. On the eastern side of Nyassa we have the Ruvuma river draining all the countries to the east of it, in that latitude; and to the northward of that we have the Uranga branch of the Lufiji river. Then, there is that great chain of mountains which extends right down the coast of Africa from Abyssinia to the Cape of Good Hope, hemming the lake in on its eastern side. So that really the rains that can fall within the basin of the Nyassa are so confined that there would never be a lake of such enormous depth as that of which we have just heard, were it not supplied from much greater sources than these puny streams of which Dr. Livingstone tells us; for such they must really be, having their sources at so short a distance from the shores of the lake. Notwithstanding all that had just been said, he thought Mr. Cooley to a certain extent right in the view he had taken, that there is a long channel extending from the Tanganyika to the Nyassa, though instead of its being a continuous lake as of old the waters have dried up to midway, leaving the two lakes simply connected by a river. There was another thing which may appear extraordinary. They had heard from Dr. Livingstone that there were Zulu Caffres on the western shore of the Nyassa. Dr. Kirk also saw these men and spoke with them, and recognised them. From their dress and other circumstances he was certain that these very men, who have absconded from that region, have now gone up the eastern side of the Tanganyika, and have arrived at the southern border of the Usui, where they are known by the name of Watuta; for he heard of them on both journeys, when on the grand trading-line from Zanzibar to Tanganyika, and also when going from Kazé to Karagué. On this latter journey they were fighting on his line of march, had struck terror into the hearts of his followers, and had thereby delayed his progress a considerable time. He believed the Caffres generally migrated in the first instance from Abyssinia; that they gradually found their way down to the Cape, and there remained for a certain time until they were driven away; that then, this Zulu branch of the Caffres made their way to the western shore of Nyassa. They are a pastoral and predatory race, and live by seizing their neighbours' cattle, and harassing their country. They have harassed the whole of this country to the north-west of Nyassa; they have harassed the country half way up the Tanganyika; and they have gone up to Utambara. They are now the terror of the Usui; and before long they will probably arrive at the southern shores of the Victoria Nyanza. There was another point he should like to mention. On his former journey, when he was at Zanzibar, he met a very intelligent and energetic young German, Dr. Rosher, who had been very little heard of in this country. He believed Dr. Rosher was the first European who arrived upon the eastern shores of the Nyassa. After arriving at the lake he was, unfortunately for himself, induced, accompanied by two or three natives, to visit the northern branch of the Ruvuma river. One night, having put up at a village, he was suddenly surprised and deliberately shot with bows and arrows. The King of the country sent the murderers to Zanzibar, where, at the solicitation of our consul, Colonel Rigby,

they were beheaded by the orders of the Sultan of Zanzibar, in the presence of Captain Grant. Dr. Rosher sent home no observations of what he had done; but nevertheless, like Sir John Franklin in another direction, he had done a good work, and must not be forgotten. But further inquiry, and even Dr. Livingstone's own accounts, showed that the first promoters of the explorations into that region of Africa were right; he meant the missionaries, Mr. Rebmann and Mr. Erhardt. They gave the spring to the whole opening of this question; and the map which they made, which was certainly an extraordinary one, and which probably excited laughter at the time, had such an effect upon the Geographical Society that they determined to open up this region; and bit by bit they had done so. We have found out that the missionaries, generally speaking, were most accurate in all their accounts, so far, at least, as they understood their informants. Their distance from Kilua to the Nyassa is perfectly accurate, and their route from Zanzibar direct to Ujiji was almost the same that he himself made with astronomical observations. Therefore he thought geographers were greatly indebted to these two worthy missionaries.

Mr. GALTON did not agree with Captain Speke as to the equatorial regions of Africa alone having a sufficient rainfall to enable them to maintain rivers of first-class size. The Senegal, which rises on the verge of the Sahara, is a first-class river, as constant in volume throughout the year as the White Nile. The Gambia is no insignificant stream; and, further south, there is the mighty Niger. None of these is supplied from the equatorial zone. Independently of its Tchadda affluent, the Niger, which may be said to flow in part through the Sahara, is a stream superior, in the volume of water it carries, to the Upper White Nile, which comes from equatorial regions. South of the equatorial zone there is the great Zambesi. With respect to lakes, the Lake Tchad never dries up. It occupies an exceedingly shallow basin; and by losing a few feet of water in height its area materially diminishes; still at the driest time of the year there is an immense deal of water in Lake Tchad. Therefore he saw no difficulty for the maintenance of Lake Tanganyika and Lake Nyassa by tropical, and not equatorial rains. The outflow of Lake Nyassa through the river Shiré was, however, remarkably constant, and that constancy created a hygrometrical difficulty, which requires further explanation.

The PRESIDENT said he would now call upon the only person in the room who had sailed upon Lake Nyassa, and had been near its northernmost extremity, about which there had been so much discussion as to whether or no rivers flowed into it from the north. As that was the great point in dispute, and as Dr. Kirk had constructed the map of the lake now exhibited, the meeting would doubtless be pleased to hear any observations he might offer.

Dr. KIRK said he should limit his remarks to the hydrographic basin of the Nyassa, and afterwards say a few words about the Zambesi. Tracing Lake Nyassa from its southern end, in latitude 14° 25′, where they entered it by taking the boat up the Shiré, in 1861, they passed along its western shore for 200 miles, nearly south and north. The water was as blue as the tropical ocean, and in some places 115 fathoms deep. In sailing along its western coast they found seven rivers entering, seen from the boat. But in recent letters from Dr. Livingstone many other rivers were mentioned as coming in, and he expressly said that the amount of water thus brought in would be quite enough to account for the perennial flow of the Shiré. During the rains there must be a great excess in the water flowing into the lake over what flowed out of it. When they considered the extent of the lake, 200 miles in length, and its breadth from 15 to 60 miles, and knew that there was a rise of three feet during the rains, this would amply account for the surplus water then poured in. Considerable importance appeared to be attached to the north end. That part of the lake had not been seen by any of their party. The furthest point north

Royal Geographical Society,

15, Whitehall Place,

October 8th, 1864.

SPEKE MEMORIAL FUND.

Subscriptions to the Fund destined for the erection of a Monument to the memory of the late Captain Speke are received by Messrs. Coutts, Strand; Messrs. Cocks, Biddulph, & Co., Charing Cross; Messrs. Grindlay & Co., 55, Parliament Street, and Colvin's Ghaut, Calcutta (and their Agents, Messrs. Arbuthnot & Co., Madras, and Messrs. Remington & Co., Bombay); and at the Office of the Royal Geographical Society, 15, Whitehall Place.

SUBSCRIPTIONS ALREADY RECEIVED FROM FELLOWS OF THE ROYAL GEOGRAPHICAL SOCIETY.

	£	*s.*	*d.*
SIR RODERICK I. MURCHISON, K.C.B.	20	0	0
CAPTAIN J. A. GRANT	10	0	0
ADMIRAL W. H. HALL	1	1	0
ARTHUR G. PULLER, ESQ.	10	10	0
PETER SHARP, ESQ.	1	1	0
SIR JUSTIN SHEIL, K.C.B.	2	0	0
COLONEL G. BALFOUR, R.A., C.B.	1	0	0
R. JASPER MORE, ESQ.	1	1	0
W. SPOTTISWOODE, ESQ., F.R.S.	1	1	0
ADMIRAL R. COLLINSON, C.B.	1	1	0
C. R. MARKHAM, ESQ.	1	1	0
JOHN CRAWFURD, ESQ. F.R.S.	5	0	0
FRANCIS GALTON, ESQ., F.R.S.	2	0	0
SIR ANDREW A. WAUGH, F.R.S.	1	0	0
M. J. M. ZIEGLER, Hon. Cor. Mem. (Switzerland)	2	2	0
REGINALD T. COCKS, ESQ.	2	2	0
SIR GEORGE BACK, D.C.L., F.R.S.	5	0	0

reached by the boat in 1861 was latitude 11° 20". They could then see mountains ranging along on the western side as far as latitude 10° 55'; they could also see the bearings of a mountain on the eastern side, named Kumara, a name which, in the native language, means "the ending." He did not, however, attach much importance to native names; they are established often on very frivolous bases. However, it was clear that the lake was narrowing, from 60 miles, which was its breadth a little way south, to 15 miles. The natives told them that in five days' sail (and they named the stations and the intermediate places on the north end of the lake) they would double it, and would reach a point on the eastern shore opposite to where they then were. This information seemed very definite, and all the party placed reliance upon it. As to a river coming in from the north, the only ones they heard of were two small ones, one named in a generic way the Rovu, which means simply "river," and the other which they described as a small river coming in from a marsh. Whether this has any connection with the Tanganyika, he was not prepared to say; but it would seem to have very little to do with the supply for the Nyassa. It cannot be of any great size, for the Zulus, passing up the east side of the Shiré, and taking off the cattle from the east side of the lake, doubled its north end; and the Livingstone party saw them, still with their cattle, on the north-west side. Now, the Zulus are a race who never cross water if they can possibly avoid it; and he did not see how they could have crossed a lake with the considerable quantity of cattle which they took with them. The amount of rain which falls in the region of the Nyassa is very much larger than is generally supposed. Even on the Zambesi, as far south as Tete, the rainfall varies from thirty to forty inches in the year. Along the coast-range of hills the precipitation is very much greater. There is a narrow and lofty band of mountains which separates the Nyassa from the sea; and the inland side of that range is the one on which the greatest precipitation takes place. In the diagram prepared by Mr. Cooley they would observe that the course given to the lake is very different from that which he and Dr. Livingstone found, and that no river was marked as issuing from its southern end. Now, they found the Shiré coming out there. They took the boat up first through the Zambesi; branching off from that at the junction with the Shiré, they passed 100 miles up that tributary. Then, taking advantage of the smooth reaches, they travelled 40 miles by land, taking the boat along with them, but never for a moment losing sight of the Shiré; launching the boat again, they sailed 60 miles into the lake which the Shiré enters without obstruction. They found the lake lying due north and south, both by compass bearings and by absolute observations of longitude.

There was a discrepancy in another part of Mr. Cooley's map, at a point where he had the opportunity of making personal observations, namely, the portion between the upper and lower course of the Zambesi, which is marked unknown in the map, and the lower course is treated as a quite distinct river. Now, he had, by his own observations, almost connected the lower with the upper Zambesi. In marching from Tete their party followed the river on foot as far as a village called Mpanda. From that point they struck up into the mountains, and crossed to Sesheke. But in coming back from where the Makololo chief was then living, they descended from the Victoria Falls eight miles down the Zambesi by land; then, to avoid rough mountains, and save themselves a great deal of climbing, they determined to keep out about 10 miles from the river, thus leaving in all only about 30 miles of the Zambesi unexplored. At Sinamane, which is 40 miles from the Victoria Falls, taking a canoe, they navigated the whole course of the Zambesi, passing its affluents, the Kafue and the Loangwa, at Zumbo; but finding the rapids of Kebrabassa insuperable, they again went on land, and followed the Zambesi down to Tete. He therefore thought that, so far, the continuity of the Zambesi was pretty well

determined. Again, on the south bank the course of the river appears equally well traced. In a letter to Sir William Hooker, Mr. Thomas Baines mentions having started from Victoria Falls, and passing a little out from the river, in order to avoid rough country, again having struck the river about 10 miles further down. So that the unknown part of the river and country is limited to a radius of 20 miles at the utmost.

In conclusion, with regard to Lake Nyassa, he would state that the native information was tolerably definite concerning rivers entering the lake on the north-west. Their party met Arabs, the same as those mentioned in Dr. Livingstone's letter as building the dhow. They had travelled along that country from Katanga and Cazembe, the two great marts of the interior. They spoke of the Loapula, running to the northward into a small lake; but on being examiued, it appeared to have no connection with the Tanganyika; and when asked about the small rivers coming in at the north end, they assured Dr. Livingstone that they were of no great size. The more recent information which Dr. Livingstone had gathered seemed entirely to confirm what was obtained in 1861.

Dr. BEKE wished to say a few words with reference to the supposed connexion between the two lakes, which he had questioned since 1849, though he had not cared to argue the point with Mr. Cooley.* According to Captains Burton and Speke, Lake Tanganyika lies 1844 feet above the ocean. Dr. Livingstone estimated Lake Shirwa at 2000 feet. He has not yet given the altitude of the Nyassa; but several years ago he reported that its waters had been described as being separated from those of the Shirwa by a mere spit of land: whence it was concluded that a communication of some sort must exist between these two lakes.† Assuming this to be the case, and the fact being also that, between Nyassa and Tanganyika, Dr. Livingstone has recently come upon a range of mountains, 6000 feet high, running north and south, and forming the edge of the tableland—being, apparently, a continuation of the Mountains of the Moon—it follows that a connexion between Nyassa and Tanganyika is physically impossible. Captain Speke had described the flow of water from the Lake of Dembea (Tsana) as being so immense that it exceeded that of the White River. But this lake could not furnish to the Nile more water than falls within the area of its basin, which forms but a small portion of that of the Blue River. All the water which issues from Lake Tsana passes under a single-arch bridge built by the Portuguese; and, as is stated in the Society's 'Journal' (vol. xiv. p. 48), when describing Dr. Beke's visit to the spot, on March 4th, 1843, "the river runs here with great violence through a deep fissure in the rock, so narrow that just above the bridge it may be leaped over. I should say it cannot be more than 2 yards in width." Father Jerome Lobo relates that in his time, before the bridge was erected, the whole army of the Emperor of Abyssinia passed over the chasm containing the river by means of beams of wood laid across it.

Mr. MACQUEEN said that on Mr. Cooley's map the places, according to Portuguese observations, especially the capital of Cazembe, were placed wrong. As for the lake which Dr. Kirk has laid down, it is quite correct; it has been known for more than two hundred years to lie in the very direction in which he has put it. There can be no connexion between the Nyassa and the Tanganyika—it is impossible; the country between Tete and Cazembe has been

[* See the 'Athenæum' of May 19th, 1849, p. 516, and July 12th, 1856, p. 867. —DR. B.]

[† See Earl De Grey's Anniversary Address, 1860, in the Society's 'Journal,' vol. xxx. p. clxi. I have since been informed by Dr. Kirk that he makes the elevation of Lake Nyassa to be only 1520 feet above the sea; but this does not affect my conclusion.—July 5th, 1864.—DR. B.]

traversed many times of late years, and nobody ever heard of a connexion between them. In the old Portuguese maps (see 'Annaes Maritimas,' No. 7, of 1844) the Lake Nyassa is laid down very nearly correct, both in latitude and longitude. He had worked at African subjects for sixty years, and he had been in possession of the Portuguese documents for nearly twenty years. There was a very valuable Arabic map that Admiral Washington showed to him twenty-five years ago, which he would ask the Society to make some inquiry about. It was one of the best maps he ever met with, well executed by a man who perfectly well knew what he was about, giving an account of the sources of the Congo, and all those rivers which run westward from Darfur. It was a very valuable map, and he had never seen it since.

The PRESIDENT said Mr. Macqueen's observations were very important. For sixty years he had laboured upon this subject. He has been a great collator of Portuguese authorities, and he must say that he had great confidence in Mr. Macqueen as a critical geographer. Now, Mr. Macqueen stated that the Portuguese had laid down their map of Lake Nyassa just as Dr. Livingstone and Dr. Kirk have laid it down.

Mr. MACQUEEN: Exactly so. In 1623 you find the southern or small lake laid down in the very latitude and longitude where Dr. Livingstone has laid it down. Thus, Father Godinho, in 1823, obtained from a countryman of his clear accounts of this part of Africa. The small lake he called Zachaf extended from 15° south latitude to 15° 50′ south latitude. Again Monteiro and Gamitto (see their Journal, 1832, Muata and Cazembe, p. 48), say the south end of the great lake was 6 days' journey north from the small one, and was of "extraordinary breadth," 45 geographical miles, and very deep. Dr. Livingstone says it is about 50 miles broad at its south end. Monteiro calls it Nhianja or Nhianza (so does Lacerda in 1798), and that it runs a great distance due north. And so we find it.

The PRESIDENT was afraid this knotty question would never be completely decided until they had induced Captain Speke or some other traveller to go and do as Dr. Livingstone and Dr. Kirk had done with Lake Nyassa. When gentlemen go into such countries, risking their lives to search out the truth and making astronomical observations which fix latitudes and longitudes, it is obvious that all preceding accounts, derived from Portuguese and Arab travellers who did not make such observations, must give way to facts. Therefore, let us return our thanks to Dr. Livingstone and Dr. Kirk for their practical observations, and also to Mr. Cooley for his paper, which has given rise to so animated a discussion.

Portions of letters were then read from Dr. Baikie, Baron Theodor von Heuglin, and M. du Chaillu.

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3. *Letter from Dr. Baikie.* Dated Lukoja, on the Niger, October, 1863.

EXTRACTS read from this letter showed how successful Dr. Baikie has been in establishing satisfactory intercourse with all the native chiefs around the settlement which he has formed on the Niger. He expresses feelingly his desire to return home, to see his aged father, from whom he has been absent seven years; but nevertheless remains at his post.

The PRESIDENT eulogised the conduct of Dr. Baikie, and expressed a hope that, as the officer serving under him had proved himself competent to

carry on the same successful system, Her Majesty's Foreign Secretary would take the case into his favourable consideration.*

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4. *Letter from the Baron von Heuglin to Captain Speke.* Dated Bongo (between the Rivers Djour and Kosanga), October, 1863.

After recording the death of Madame Tinné and her maids, and the return of the party, Herr von Heuglin states that he is resolved, after visiting Khartûm, to try to advance further towards the south-west; but he doubts whether he shall be enabled to penetrate so far as the Rivers Sena and Makoua, which it had been his wish to do. There are many obstacles, not proceeding however from the natives, but from the merchants and slave-dealers of Khartûm, who are jealous lest travellers should learn too much of the secrets of their trade, and so prohibit the poor negroes from rendering them service or selling them provisions. The warehouses of the traders are filled with grain and other stores extorted from the natives, whilst the latter are suffering from famine. In the course of his researches on the banks of the Kosanga, he had discovered many isolated mountains, and one rather considerable range lying to the west and north-west in the country of the Quola. These elevations, he believed, were formed (contrary to his earlier opinion) of primary rocks, for he had found fragments of granite in the beds of the torrents with which the clayey soil was furrowed. The flora and the fauna differ much from those of the White Nile, and approximate those of Guinea. The negro type ceases with the Djour tribe; the Fertits, Kredjs, Quolas, and Nyam-nyams being robust, well-made people; their hair is not curly, and their shape and physiognomy are similar to those of the Baquára tribes and the inhabitants of Senaar. The same affinities are observable in the languages. If it were possible to reach the Nyam-nyam country, travelling would be more easy, as the chiefs are well-disposed towards Europeans, and would facilitate their progress if presented with arms, powder, cloth, and so forth. He adds that he has traced a tolerably correct map of the Bahr-el-Ghazal, and determined a few points by astronomical observation. In conclusion, he hopes that the English Government will take some measures towards suppressing the slave-trade, which is now in full vigour on the

* Mr. Layard has since written to Sir Roderick Murchison as follows:—

"June 26, 1864.

"Dr. Baikie has been relieved. The *Investigator* steamer will be sent to bring him down the Niger, and he may be expected home this year. I hope that satisfactory arrangements will be made to render the work he has done permanently useful."

White Nile, nearly all the vessels and trading-stations taking part in it.

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5. *Letter from M. Du Chaillu.* (Fernand-Vaz River, April 7, 1864.)

M. DU CHAILLU now announces that all will be ready for his projected journey into the interior, as soon as the new set of scientific instruments reaches him, sent for to replace that lost by the upsetting of his boat. He is in good health, and intends to send by the next ship to England all the collections he has made up to the present time.

Fourteenth Meeting, 27th June, 1864.

SIR RODERICK I. MURCHISON, K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—*Gavin Hardie, Esq.; Captain Toynbee; W. F. Ives, Esq.; D. G. Bruce-Gardyne, Esq.; J. S. Phene, Esq.*

ELECTIONS.—*Commander A. L. Mansell*, R.N.; *H. N. Nissen, Esq.; W. F. Quicke, Esq.; Charles M. T. Western, Esq.; George Woolcott, Esq.*

ACCESSIONS TO THE LIBRARY.—Pamphlet on the Hooghly and the Mutla; by James A. Longridge, M.I.C.E. Continuations of Transactions of various Societies, &c.

ACCESSIONS TO MAP-ROOM.—Railways in China: a sketch-map to accompany Report on introducing Railway communication into the Empire of China; by Sir Macdonald Stephenson, 1864. Admiralty Charts and Ordnance Maps. Originalkarte von Hamasen, Saraë, Adiabo, &c., in Nord Abessinien; von Th. von Heuglin, Werner Munzinger und d'Abbadie; entworfen von A. Petermann. Originalkarte der Nord Abessinischen Grenzlande; Bogos, Mensa, Marea, &c.; von Heuglin, Kinzelbach, &c.; entworfen von A. Petermann.

The first Paper, read by Mr. Markham, was entitled—

1. *A Visit to the Port of Lingah, the Island of Kishm, and the Port of Bunder Abbass.* By Lieut.-Colonel LEWIS PELLY, Acting Political Resident in the Persian Gulf.

[Communicated by the Secretary to the Government of Bombay.]

COLONEL PELLY left Bushire in December, 1863, and touched first at the port of Lingah, on the mainland, which he describes as an

open roadstead, sheltered from the north-west, but exposed to the prevailing south-east and south-west winds. There is, however, a breakwater of solid masonry which affords protection to small craft. The town is the chief place of a district which touches the sheikdom of Moghoo on the north-west, and reaches almost to the region farmed, under Bunder Abbass, by the Sultan of Muskat. It is unwalled, and consists of clusters of houses overhung by date-palms, its population being from 8000 to 10,000 souls. The sheikh of Lingah is an Arab of ancient descent, and the place enjoys considerable prosperity owing to there being neither import nor export duties. The bulk of the trade is with the maritime Arab ports, to which goods from Bombay and Kurrachee are conveyed in small coasting-craft; specie, pearls, and a little salt-fish forming the return cargoes. Arrived at Bassidore, in the island of Kishm, Colonel Pelly crossed to the southern side to visit some salt-caves and naphtha-springs. The road was, partly, over a plain sprinkled with date-trees and villages a few miles apart. The prevailing formation of the island is like that of the mainland hence to Kurrachee—a coarse sandstone grit and conglomerate, overlying blue lias marl. The south side is parched and barren, like the Persian coast in general. Wordsworth, according to Colonel Pelly, had he visited this region, would never have applied the epithet of "everlasting" to the southern hills of Persia. They are all hollow and tumble-down, as the towns are. Passed at night, the gloom of their gorges and the precipitous height of their flanks, lend them a bold and solemn appearance; but with daylight the illusion vanishes. The range of hills in which the salt-caves lie varies from 300 to 600 feet in height; the rock is of a dark-red aspect alternating with slate-colour. One of the caves is of truly noble proportions, being a vault of from 200 to 300 feet in height and length, with a span of 60 or 70 feet. The entire arch of the cave is beautifully streaked like marble, while large crystalline salites hang from the roof in festoons white as snow. The blocks of salt are conveyed on the backs of donkeys and camels to the sea-shore, where they are embarked in small native craft, and carried to Muskat for ultimate exportation to Calcutta and the east coast of Africa. Returning to Bassidore, Colonel Pelly again embarked, and passed down the Clarence Strait, which separates the island of Kishm from the mainland, through a narrow channel, about 100 yards wide, which winds for a distance of 21 miles between low bushy islands. Within this channel lies the village of Luft, which is sub-let by the Sultan of Muskat, who farms the whole island of Kishm, to a sheikh for about 1500 rupees per annum. The trade of the inha-

bitants is the gathering of wood for exportation, Clarence Strait supplying the whole circuit of the Persian Gulf with firewood. Colonel Pelly next visited the island and city of Ormuz, whose bygone splendour is vaunted by old writers, but whose ruins did not show signs of any former greatness. Crossing hence again to the mainland, a distance of 12 miles, he examined the neighbourhood of Bunder Abbass, a walled township built along an open beach, with lofty and desolate mountains in the background. The port has only from 2 to 3 fathoms of water at a distance of 2 miles from land, and during the frequent southerly winds becomes a lee shore lashed by a heavy surf. Bunder Abbass has about 8000 or 9000 inhabitants, and is the seat of a considerable trade, the nature of which is discussed in detail by the author of the paper.

SIR H. RAWLINSON said the island of Kishm was of some interest from having been supposed to be the site of the ancient kingdom of King Erythrus, who gave his name to the Erythræan Sea. The chief modern interest attaching to the island arose from its being in the line of the Overland Telegraph. The cable had been laid, and was in working order from the Indian Telegraph-system at Kurrachee, along the Persian coast to the entrance of the Gulf, then round the island of Kishm up to Bushire, and thence across to Bussorah. Two years ago he had explained to the Society the difficulties in the way of the line which it was then determined to follow, between Bussorah and Bagdad, and had suggested a method of avoiding the obstacle by taking the more circuitous route to the east through Persia. Those anticipated difficulties had been realised at the very spot he had pointed out. That part of the line between Bussorah and Bagdad would always, under the most favourable circumstances, be precarious; whereas the alternative line which he had suggested, and which was now being carried out, would always be safe, because the country through which it passed was under a fixed Government, who would guarantee the protection of the line. He thought in the course of September or October, we might expect to be able to communicate daily with our friends in India.

The PRESIDENT in requesting the Secretary to read the next Paper, explained that its author, M. Vámbéry (who would afterwards address the Meeting) was a Hungarian gentleman, who had lately penetrated into the heart of Asia in the disguise of a Dervish. He had travelled in a region which had scarcely been traversed by a European since the days of Marco Polo. M. Vámbéry intended shortly to undertake a further journey, starting from Samarcand, and would endeavour to reach China, following a route different from that of Marco Polo.

Mr. OLIPHANT then read—

2. *Sketch of a Journey through Central Asia to Khiva, Bokhara, and Samarcand.* By M. VÁMBÉRY.

AFTER several years of preparation in a Mohammedan college, M. Vámbéry joined, at Teheran, in March, 1863, a company of poor pilgrims, who were returning to Tartary from Mecca; giving out that he was a pious Mussulman travelling to Central Asia with a religious object. They crossed the south-east corner of the

Caspian Sea on board a Turcoman corsair, and landed at Geumush-tepe (the *Silver Hill*), a camp of about 2000 tents of the Tamut tribe. From this place he visited the ruins of the wall built by Alexander the Great, which begins on the shores of the sea near this place, and stretches about 100 miles inland in the form of an embankment, dotted with turrets and fortifications. Continuing, with the party, in a northerly direction, eastward of the Caspian, he passed the river Attrek; and after crossing the Hyrcanian Desert, a horrible journey of 22 days, reached Khiva at the beginning of June. The present condition of the country, of which Khiva is the capital, he described as most wretched. The reigning prince, Seid Mohammed, a sick tyrant with very frightful features, does little else but slaughter hundreds of his subjects for mere trifles, which he calls transgressions of the holy religion of Mohammed. M. Vámbéry made excursions as far as Koongrad, and was astonished at the great fertility of the country, which he thought superior to anything he had hitherto seen in Asia. The next place he visited was Bokhara, distant 10 or 12 days' journey on camels from Khiva. On the road, his party, to avoid a band of Turcoman robbers, were obliged to seek refuge in the desert of Djan-batiran (the *Life-destroyer*), where for six days they suffered horribly from thirst, and lost two of their number. The city of Bokhara occupies more ground than Teheran, but it is not so populous. Some of the palaces and mosques are built of stone, but the large, clumsy turrets produce a disagreeable impression. The whole khanat of Bokhara he estimated to comprise two million souls, including Persian slaves. The reigning prince is is Moozaffar-ed-din, son of the Khan who murdered Conolly and Stoddart. He is a man of a good disposition, but is forced, for political reasons, to commit many tyrannical and barbarous acts. After spending a month in Bokhara, M. Vámbéry proceeded, full of anticipation, to the renowned city of Samarcand. He travelled for six days through a thickly-peopled and well-cultivated country, and was greatly surprised at the quick succession of towns and villages on the road. But in Samarcand he was much disappointed. He found the capital of Timour in a state of decay; and although he saw a few remains of its ancient glory, was convinced that the ancient reputation of the place was greatly exaggerated. The most remarkable of the ancient edifices were the medresses or colleges, one of which, erected by the wife of Timour, a Chinese princess, was a most splendid building; but the magnificent portico, 100 feet high, inlaid with mosaic in the form of roses, is now all that remains of it. The palace of Timour he described as very interesting, especially his tomb, and a huge block of green-

stone, the base of his throne, which must have been derived from some distant country, although how it was conveyed to the place is now difficult to surmise. M. Vámbéry terminated his narrative with his arrival at Herat in October; the country to the north of which place he found in great disorder, owing to the revolt against the Affghan Yoke consequent on the death of Dost Mohammed.

M. VÁMBÉRY said the motive which led him to undertake this journey into Central Asia was to study the affinity between his native tongue and the languages of Tartary. He accordingly went, in the first instance, to Constantinople, and remained there four years, finishing his studies in the Turkish, Arabic, and Persian languages. After a short preliminary excursion, returning to Teheran, he met with 24 dervishes or holy pilgrims who were on their way from Mecca to their own country, Yarcand in Chinese Tartary. He presented himself to them as a dervish who had a strong desire to travel into Central Asia, in order to see the tomb of a very holy man. His dress and the colour of his skin excited their incredulity; but having overcome that by his representations, and by quoting verses from the Koran, he cast off his European clothing, assumed the ragged garb of a barefooted dervish, and furnished himself with the pilgrim's staff and with a copy of the Koran. He travelled with these people across the desert to Khiva, thence to Bokhara and to Samarcand. They first arrived among the Turcomans, on the eastern shores of the Caspian Sea. These people were great robbers, and in no part of the world was slavery so rampant as among them. He was obliged to have recourse to falsehood, in order to parry their suspicions that he must be either a Russian or an English spy; and when he had convinced them that he was really a dervish, the people came and asked him for his blessing. M. Vámbéry described the character of the Turcomans as a compound of great liberality and hospitality on the one hand, and of great tyranny and cruelty on the other; and he related some amusing instances of plundering which occurred while he was in the country. He stopped among the Turcomans a month, and then hired a camel and started for Khiva. They found the journey a most difficult one, for they were 22 days without fresh water, and the heat was intense. In addition to this, he had to undergo the misery of performing a great part of the journey on foot, rather than encounter the abominable smell of a buffalo-calf, which was slung on the other side of his camel. Khiva had been visited before he went there by Captain Abbott and Mr. Thompson, who was sent on a special mission by the English ambassador at Teheran. It is a very small town, about half the size of Bokhara. When he went into the streets his features excited the greatest suspicion; he was regarded as either an English, a Russian, or a Persian spy, and they tried to arrest him. To prevent this, he went to the first Minister of the Khan, who had been a long time at Constantinople, and induced him to give out that M. Vámbéry was a true Mollah, of great repute, from Constantinople. The Khan being assured of this, sent and importuned him for his blessing, and, when he had received it, wept for joy, declaring that he had had a dream that a holy man from Constantinople would come and bless him. From Khiva they went to Bokhara, taking the left shore of the Oxus. They were told that the Turcomans were coming to plunder them, and that they had better make their escape into the desert. They went into the desert; but they had not sufficient time to take water with them, and some of the days he passed there were the most frightful he had ever spent in his life. It was the first time he had seen a man die of thirst; the poor man's tongue and face became black as ink. The second day he saw in a looking-glass little black stains on his own tongue, and he was naturally very much alarmed; but happily, his life and the lives of the rest of the party were spared, and they entered Bokhara with

a caravan of 16 camels. Their arrival was welcomed by the people, and they were introduced into the convent where holy men tarry. His appearance again excited much suspicion, and he was threatened with death by the vizier of the Khan, if he did not confess that he was a dervish in disguise. By a display of assurance and tact, claiming to be a renowned dervish, and holding out threats of punishment in this world and in the next, he succeeded in inspiring the vizier with a dread of him. After staying a month at Bokhara, they went to Samarcand, the route abounding in villages and towns. In some places, particularly after having passed the little desert named Malek, villages occurred every quarter of an hour of the journey, either on the line of march or a short distance from it. Much had been said of the renown of Samarcand as the capital of Timour; but the ruins he met with did not seem to justify its former reputed magnificence. There are, however, remains of ancient colleges which are very interesting. During the reign of Timour there was one built at great expense in the Persian style, with a portico, still remaining, about 80 ft. or 100 ft. high, consisting of elaborate mosaic work inlaid in the form of thousands of coloured roses and other objects of beauty. At Samarcand stands the second observatory that was ever built in Asia, erected by a grandson of Timour; and also the summer-palace of Timour, in which is an immense green stone supporting the throne, transported from Broussah, but by what means it is impossible to tell. The tomb of the King is also very interesting. In the upper part there is the tomb of Tamerlane, the great conqueror; next to him lies his first teacher, and around him are his children. There is a lower part which is an exact imitation of the upper part; there is no figure, no stone, no rose in the upper part which is not repeated in the lower part. In the lower part is contained the Koran, said to have been written by the hand of the second Caliph on the skin of a gazelle, and brought by Timour from Broussah to Samarcand. He remained 10 days at Samarcand, and looked everywhere, but could discover no traces of the great Library which was spoken of in the work of a French writer. From Samarcand he returned to Karshi, and thence to Herat. At Herat he thought himself safe, because in the streets he saw red-coated soldiers being drilled in the English manner, and he began to speak a little more freely. Being in want of money to continue his way to Mushed, he went to the palace, where he found the son of the King attended by his Vizier. He told him he was a poor dervish and gave him his blessing, and expressed a wish to sit down at his side; but, as the Prince made no place for him, he pulled the Vizier away, and took his seat next to him. The Prince looked at him and exclaimed, "By Heaven, I swear you are an Englishman!" He denied that he was, and he recited some verses from the Koran; at length, the Prince believed him and gave him some money. He stopped at Herat, and then started for Mushed, which is on the frontier of Persia; from which place he wrote a letter to the Prince, telling him that he was not an Englishman but very nearly an Englishman, and cautioning him not to molest people passing through his country.

At the invitation of the President, M. Vámbéry explained that there are different kinds of blessings practised by the dervishes; one called the "blessing on foot," another "the blessing on horseback." The blessing consists of verses of the Koran. The man who blesses stands upright, with his hands held high; and after having blessed he strokes his beard with his hands, and those who receive the blessing do the same, in token that it has been accepted.

Sir H. RAWLINSON said M. Vámbéry had conferred a very great benefit upon geographical science; for all these adventures of his, which he had so amusingly described, were but a means to an end. Like many Hungarian scholars before him, he was greatly interested in the origin and history of his race, one of the most interesting questions relating to the ethnology of Europe; and with the view to ascertain these, he had gone through years of toilsome

hardship and probation, in order to qualify himself for travelling in the East and prosecuting his researches. It was a remarkable thing that a European gentleman should be able to pass through a Mohammedan college, and become so competent an Arabic scholar that clever men of the Mohammedan religion should not be able to detect that he was not one of themselves. As far as Teheran, hundreds of people had passed over the same ground; but from Teheran M. Vámbéry went into a comparatively *terra incognita*. The country through which he had been travelling was interesting in a twofold point of view. In the first place, it was interesting as a newly-explored region; and in the next place, it possessed great political interest from being the debateable land between the two great Asiatic empires, the Russian empire on the north and the Anglo-Indian empire on the south. Many gentlemen present would remember that twenty-five years ago great alarm prevailed in this country at the extension of Russian influence towards our Indian frontiers, and fears were entertained that Russia had designs upon India. That feeling, which brought about the Affghan war, had passed away, and had been succeeded by a feeling in the contrary direction, and we were as supine now as we were alarmed then. It seemed to be very little known that during these twenty-five years, while we had been imagining that all was quiescent, a gradual approximation of the two frontiers had been going on to the extent of nearly a thousand miles. Twenty-five years ago the Russian frontier was marked by a line of forts erected along the northern skirts of the Kirghis deserts, and the English frontier was the Sutlej. At the present day the Russian frontier comes down to the Aral Lake, the Jaxartes River, and the Oxus; while the English frontier embraces the whole of Scinde, the whole of the Punjab, and crosses the Indus to Peshawur; so that at present there is only five or six hundred miles between the two frontiers. In speaking of the extension of Russian territory, he attributed no hostility against England, or anything reprehensible on the part of the Russian Government. It is a sort of law of nature, stated to be such by the late Sir Robert Peel, that when civilisation impinges on barbarism, the latter must give way. The subject, however, ought to be interesting to the English public; and in this point of view M. Vámbéry was deserving of our commendation for having made us acquainted with these regions, pregnant with so much political importance to us. With respect to M. Vámbéry's journey, he believed no European had ever passed from the Caspian at Astrabad to Khiva. Arthur Conolly endeavoured to pass by that line, but he only advanced three days' journey from Astrabad, and was obliged to turn back; and since that time he had never heard of any one attempting the whole route. Khiva itself has been visited by many travellers—by Captain Abbott, Captain Shakespeare, and also by Mr. Thompson; and very recently by Colonel Ignatief, son of the Governor of St. Petersburg, who conducted a mission to Bokhara and stopped a considerable time at Khiva: but M. Vámbéry had followed an entirely new route. His visit to Samarcand is also new. There is a tradition that an Englishman of the name of Gardiner visited Samarcand about twenty-five years ago, and left some extraordinary journals and memoranda, which were in the hands of Burnes when he was killed, and which were afterwards published in the Journal of the Asiatic Society of Bengal. But the portion relating to Samarcand is entirely lost; so that M. Vámbéry may fairly claim the honour of having been the first European who had lived in Samarcand and described it since the days of Clavijo, who visited it in 1404. Andekoï, which he visited on his return journey, is a place of interest to Englishmen, because it was there that Moorcroft, the pioneer of English travellers, was taken ill, and died. Then the route from Andekoï to Herat is through a difficult tract of country. Many of our travellers have passed to Herat by Mushed. Conolly, in his last journey, passed from Cabul direct to Merv, and left a very good account of the route. Sir Henry Rawlinson added that he felt some personal interest in the circum-

stance, because it so happened that he was appointed joint envoy with Colonel Conolly, and it was only by mere accident that he did not accompany him on the journey, which ended, as they were aware, fatally to that officer. He would only say, in conclusion, that with all his experience of the East, he considered that M. Vámbéry had achieved something exceedingly remarkable. He doubted whether there was one European in a thousand who would successfully pass three years of probation among bigoted Mohammedans. At Bokhara M. Vámbéry lived with his life in his hands, for at any moment he was liable to have his head cut off. The fate of Stoddart and Conolly proved that. M. Vámbéry seemed to be doubtful about the fate of those Italian merchants who had gone to Bokhara to obtain the eggs of the silkworm; but, according to the last accounts which he had received from a member of the Russian embassy in London, they have been killed. The Ameer appealed to the Russian Government to know if they were Russians, and the Russian Government replied they were not. They were then asked if they were English, and they said they were not. The Ameer said they must be Englishmen, because there were no other Europeans but Russians and Englishmen, and upon that they were executed. He had been informed, however, that the Sardinian Government had sent a mission to Bokhara to search for them; and a gentleman had just mentioned to him that one of our naval officers returning from China travelled with this mission, quite recently, nearly up to the Bokharian frontier. He mentioned these circumstances to show what danger there is to an Englishman living in Bokhara. M. Vámbéry went through all the difficulties and dangers from a real love of science; and although he was not able to take astronomical observations, yet he had brought back a considerable amount of information with regard to the geography, the statistics, the languages, the antiquities, the commerce, and the social condition of these countries, which that prince of publishers, Mr. Murray, is at present occupied in putting together for publication.

Dr. WORTHINGTON said his friend Dr. Wolff, whose papers were in his possession, passed over a large portion of the ground which had been traversed by Mr. Vámbéry. He went from Teheran to Mushed and Khiva, and his adventures were precisely similar to those which this Hungarian gentleman had related. He spoke of the Turcomans in the same terms—of their barbarism and rudeness, and of slavery existing among them. In his time there were 40,000 slaves in that country. Another point that would be interesting to M. Vámbéry, in connection with the affinity between the Hungarian and Polish and Tartar races, was, that there is a town, Shamay in Chinese Tartary, which, in Dr. Wolff's time, contained 300 Polish families. The country in question is full of interest, as the birthplace of the great conquerors of the human race; for Timour and Genghis Khan both proceeded from the country of the Turcoman.

Lord STRANGFORD observed that Dr. Wolff was never in Khiva in his life. The route he took is a comparatively well-known one, across the desert from Mushed to Bokhara, and he returned from Bokhara by precisely the same way. M. Vámbéry took an entirely different route, by way of Astrabad. Conolly went that way, but he had to return, and he had the greatest difficulty in escaping with his life. M. Vámbéry went to Khiva over perfectly new ground; from Khiva to Bokhara again over perfectly new ground; and from Bokhara to Samarcand, a city that had not been visited by a European for several centuries. He did so with his life in his hand; and he only maintained his life by his extraordinary acquirements and accomplishments and his indefatigable enthusiasm.

Dr. WORTHINGTON understood, by Dr. Wolff's having described Khiva in the account of his second visit, that he had been there.

Mr. DRACH stated that he believed there was a copy of the Koran, similar to that described by M. Vámbéry, in the Library of the India House.

Sir H. RAWLINSON said he himself obtained that copy of the Koran from a pilgrim from Samarcand, who was in great distress; and he sent it to the Library of the India House. He believed it was a fellow-copy to that which M. Vámbéry saw at Samarcand, and that neither of them was really older than the second or third century of the Hegira.

Mr. MARKHAM said that an interesting point in M. Vámbéry's journey was the fact that, previous to his visit, Samarcand had never been described for 450 years, when Ruy Gonzales de Clavijo, the Spanish Ambassador, visited it. The account he gave of the Turcomans corresponds exactly with that given by M. Vámbéry. But there was a great difference in the way in which the two travellers performed the journey from Persia to Samarcand. M. Vámbéry performed it on foot, suffering from thirst, and in great danger of his life. The Spaniards were in no danger of life, but they suffered from the frightful haste in which they had to travel. Timour was excessively anxious that they should arrive at Samarcand in time for a festival in honour of his eldest son. When they reached Teheran, orders were issued for them to travel on horseback day and night to Samarcand. One of the party died on the road, and Ruy Gonzales reached Samarcand quite worn out. He was then made to eat and drink to such excess that he was nearly killed. It appeared that all classes, from Timour downwards, drank in the most frightful way, and were drunk every night. He was asked to dine with the queen, who was horribly drunk, and, as Ruy Gonzales never touched wine, he was in the greatest possible distress all the time he was there. Samarcand then had a very different appearance from what it now presents. There were beautiful gardens, very fine buildings, and elephants engaged in carrying stone. It had not, however, attained the height of its prosperity, and the observatory built by the grandson of Timour had not then been commenced. Samarcand is now in ruins, and the interval of 450 years which has elapsed since the visit of Clavijo, during which no European traveller has seen the place, alone gives great importance to M. Vámbéry's journey.

The PRESIDENT understood there was a gentleman in the room, Mr. Michell, who could contradict the report respecting the death of the Italians.

Mr. MICHELL said that when he was in St. Petersburg, ten days ago, he heard on very good authority that a second firman from the Sultan of Turkey had arrived at Bokhara, the first having been stolen on the Russian frontier, and that the Italian gentlemen were on their way back to Persia. There was another point on which he wished to make an observation, and that was the commercial aspect of the question. Bokhara is a great cotton-producing country; and an immense quantity of Bokharan and Khiva cotton has found its way to England, being exported from St. Petersburg. It has been used in some of the mills. The Russians are doing what they can with proper machinery towards teaching the natives to prepare the cotton in a better way than they do at present, and in a year or two it will be quite available for common use; it does very well mixed with American cotton.

Mr. CRAWFURD thought we should never get any cotton from Bokhara worth speaking of. The price of cotton is threefold what it formerly was; therefore he was not surprised that cotton should arrive from Bokhara, India, and other places. He was glad to hear Sir Henry Rawlinson express the opinion that there is not the least danger to India from the advances of Russia. He never thought there was the slightest danger, and he was sure that neither country could do the least harm to the other. Five-and-twenty years ago he protested against the Affghan war; and he might mention that, at the very time we were engaged in that war, the Russians made an attempt to punish the Khan of Khiva, and they lost 30,000 men in the operation. Now, if they could not advance 300 miles into the interior without incurring such a loss,

how would it be possible for them to send an army 4000 miles to India? It will always be far easier for us to send an army from the banks of the Thames to the banks of the Indus than for the Russians to send an army from their frontier to Peshawur.

Sir H. RAWLINSON said this cotton question is really one of some consequence with regard to the Russian supply. There is no doubt that Russia draws the greater portion of her supply from Central Asia. M. Vámbéry had not touched upon the commercial part of the question; but it should be remembered that the real rivalry between us and Russia in Central Asia is in commerce, and not politics. At present, he gathered both from our own Trade Returns and from Mr. Lumley's Report on 'The Trade of Russia with Central Asia,' that we are entirely driven out of the market. M. Vámbéry would tell them that in Khiva, Bokhara, and Samarcand, he saw nothing but Russian goods. It is a peaceful and an honest rivalry, and as long as it is confined to that, we have no right to complain of Russia.

M. VÁMBÉRY confirmed this statement of Sir Henry Rawlinson, and added that he was informed that 8000 camels annually enter the different towns laden with Russian goods.

The PRESIDENT congratulated the Meeting upon the discussion, and expressed his concurrence in the opinion of Sir Henry Rawlinson that the advance of the Russians could not be in any way detrimental to our great Indian empire. He might remind his friends that long before we had any empire in the East, the Russians had intercourse with Bokhara. Surely, then, we could not be jealous of Russia trading with a nation that she had traded with for hundreds of years. So far as the subject had been touched upon, he thought it would do a great deal of good; as showing that both nations, by advancing their frontier and approximating to each other, only tended to civilise barbarous regions, and to bring savage nations under a regular system of government.*

3. *On the Comoro Islands.* By Captain ALGERNON DE HORSEY, R.N.

THIS paper contains a description of the little-known group of islands called Comoro, lying between the northern end of Madagascar and the African coast. The largest of the group is only 35 miles in length by about 12 miles in breadth. It is remarkable as possessing a lofty isolated mountain, 8526 feet in height. Many interesting details, both of the physical geography and ethnology of the group, are given by Captain de Horsey, which it is unnecessary to repeat here, as his paper will be published entire in the 'Journal.'

* M. Khanikoff has sent the following note, vindicating his claim to have visited and described Samarcand long before M. Vámbéry's journey:—

"I arrived at Samarcand the 2nd (14th) of September, 1841, and remained there up to the 20th of the month. My travelling companion, the late naturalist Lehmann, arrived two days after me, and remained there for three weeks. We have both published very full descriptions of the capital of Tamerlane, and I also caused an exact plan of the place to be drawn up by the topographer Yakowlef, who accompanied me. This plan, on the scale of 1 verst (3500 English feet) to an inch, is annexed to my description of the Khanat of Bokhara, translated into English by M. de Bode. The English editor, it is true, would not go to the expense of reproducing the plans and maps; but the Russian edition, in which they appear, is to be found in the British Museum library. The description of Samarcand, drawn up by M. Lehmann, was published in German, by Messrs. v. Baer and v. Helmersen, after the death of the author, in the 'Beiträge zur Kenntniss des Russischen Reiches,' Vol. 17."

ADDITIONAL NOTICES.

(Printed by order of Council.)

1.—*Extracts from a Memorandum on the Country of Azerbaijan.* By KEITH E. ABBOTT, ESQ., H.M. Consul-General in Persia.

[Communicated by the FOREIGN OFFICE.]

THE country known to the Persians as Azerbaijan is divided between them and Russia, the latter Power possessing about five-eighths of the whole, which may be roughly stated to cover an area of about 80,000 square miles, or about the size of Great Britain; 50,000 square miles are therefore about the extent of the division belonging to Russia, and 30,000 of that which remains to Persia. The Russian division is bounded on the north and north-east by the mountains of Caucasus, extending to the vicinity of Bâkou on the Caspian. On the west it has the provinces of Imeritia, Mingrelia, Gooriel, and Ahkhiska (now belonging to Russia); on the east it has the Caspian Sea, and on the south the boundary is marked by the course of the River Arrass (Araxes) to near the 46th parallel of longitude, thence by a conventional line across the plains of Moghan to the district of Tâlish, and by the small stream of Astura which flows to the Caspian through the latter country. In this area are contained the following territorial divisions:—Georgia or Goorjistan, comprising Kakhetty, Kartaliny, Somekhetty, Kasakh; the Mohammedan countries of Eriwan, Nakhshewan, Karabâgh, Ghenja, Shirwan, Shekky, Shamachy, Bâkou, Koobeh, Salian and a portion of Tâlish.

Georgia is traversed by the River Koor (Cyrus), a stream of no commercial importance, since it is not navigable except by boats. After being joined from the north and south by many small tributaries, it unites its waters to those of the Arrass, a few miles above Salian, and flows to the Caspian. The Arrass which forms the principal line of boundary between the Persian and Russian possessions is likewise of no importance commercially, and its waters become very low in autumn.

A fresh-water lake (slighly brackish) of considerable extent, and surrounded by lofty and bleak mountains, is situated in the country of Eriwan. It is known as Lake Ghôkcheh, and abounds with trout of a large size. A small island situated near the western shore possesses an ancient Armenian monastery known as that of Sevēnn. The climate of this lake is cold and variable. Winter sets in early, and the road lying along the western shore and carried by the edge of deep precipices is one of great danger to travellers at that season. On the same shore is found a colony of Mallekkans, Russian sectarians who have been persecuted by their Government and are kept here in permanent banishment. I believe that they may be regarded as reformers; they are dissenters from the Russo-Greek church, and one of their principles is the rejection of picture-worship. There is also a colony of Jews there.

Some miles beyond the Lake of Ghôkcheh, on the north, commences the great descent by the Pass of Dilijan through a broad strip of wooded mountain country. Here the sides of the descent are clothed with fir, oak, beech, elm, and other trees. The Pass extends through about 36 miles of descent, at first very abrupt; the road, though not good, affording very charming pictures of greenwood scenery.

Tiflis is the capital of all the Russian possessions south of the Caucasus. The old town is said to date from 469 A.D., and possessed a fort on the heights. The modern or Russian town is already a handsome place and yearly increasing in size; but it possesses no object of especial interest. There are hot springs used for public baths. The summit of the Kazbeg, the second highest peak of the Caucasus, is seen from the streets, and the Koor flows through the place in a deep channel and rapid stream of width varying, probably according to the season, from 100 to 200 yards. The population of Tiflis is credibly estimated at 70,000 or 80,000 souls, a mixed race of Georgian Christians, Russians, Armenians, and Mohammedans. Its climate is oppressively warm in summer, and fevers of a malignant kind are prevalent at that season and in early autumn. In winter it is variable, with cold searching winds. The city has now apparently great chance of rising into importance. An electric telegraph has been established between it and Poti on the Black Sea, and the line is being carried on to the Persian frontier of Azerbaijan. A fine macadamized road, leading for a great distance over very mountainous and difficult country, has been established between the Black Sea and Tiflis, and the scheme of a railway for the same line is under consideration; and English engineers employed for the survey regard it as practicable, though at a great cost. The productions of Georgia Proper appear to be of limited importance, serving only for local consumption; and such indeed is the general poverty of the Russian Trans-Caucasian districts, that they do not produce sufficient for their thinly-scattered population augmented by the presence of the Russian troops. The latter are therefore supplied with food from Astracan.

Dense forest commences at some miles north of Tiflis, and extends to the mountains of Dâghestan, and the country west of the city is more or less wooded to the confines of Imeritia, which, with its sister provinces of Mingrelia and Gooriel, is occupied to a great extent with deep jungle.

The population of Russian Azerbaijan consists of mixed races, Mohammedan and Christian, amounting probably to 700,000 or 800,000 souls. Georgia Proper is chiefly occupied by Christians of the Greek Church, but Armenians are scattered among them and over all the Russian possessions south of the Caucasus, being numerous in Nakhshewan, Karâbagh, and Ahkhiska. This estimate of numbers does not include the inhabitants of the mountains of the eastern and western Caucasus, on which subject little is known. The Mohammedans are principally of the Shieh sect, are much divided, as in Persia, into tribes, and have been with some difficulty kept in subjection by the Russians, though there is now little chance of their ever emancipating themselves from the yoke of their present rulers.

Persian Azerbaijan extends southwards to the range of mountains known as the Kâflan Kooh. On the west side it has the Ararat or Byazeed frontier, the pashalik of Van, and the lofty mountains of Koordistan; whilst on the east are Russian and Persian Tâlish, and a range of mountains commencing at about the 39th degree of north latitude, and extending southwards past the 36th degree, where, sweeping to the east, it stretches across Arâk and Khorassan in nearly an unbroken chain, blending with the loftier range of the Hindoo Koosh of Afghanistan, and may thus be said to be continuous with the Himalaya. It will be seen that this range, starting from the point above mentioned, shuts in the low wooded countries of Tâlish, Ghoelan, Mazenderan, and Asterabad, lying on the Caspian, from the upland or elevated country of northern and central Persia.

The country included in these boundaries, and perhaps a large part, if not all, of Russian Azerbaijan, is generally recognised as the Media Atropatena of ancient geography. The principal districts of Persian Azerbaijan are as follows:—Tabreez, Khoee, Oroumieh, Marâgha, Soorek Bonlâgh (to which belong Serdusht and Sayn Kaleh), Ardebul and Mishkeen, Khalkhâl.

The country of Persian Azerbaijan consists of an elevated tract of mountain and plain, the latter being situated at heights varying from 4000 to 5000 English feet above the level of the sea. From this elevated base spring the mountain-ranges, the loftiest point of which attains an elevation of 15,400 feet above the sea.

The city of Tabreez is situated at about 4330 feet above the sea, and some of the mountain-ranges, &c., are as follows:—

	Feet.
Serhund (highest point)	11,200
Passage across it to Marâgha	9,950
Hot springs of Leewan	8,370
Mount Savalan near Ardebul	15,400
Limit of grain-cultivation on that mountain ..	8,200
Hot springs at its foot (31·7 Réaumur)	5,530
Lake of Oroumieh	4,200*

The Lake of Oroumieh is the only extensive sheet of water in Persian Azerbaijan. It is about 80 miles in length, and has been computed to be about 300 miles in circumference, though this is probably an exaggerated estimate. The intense saltness of its waters is its most remarkable feature, and so great is its specific gravity, consequent thereupon, that the human body is quite buoyant in it. Its waters are supposed to contain no living creature excepting a kind of polype. Fishes which are carried into it by the rivers perish, yet it is the resort of great flocks of the beautiful flamingo, which, at certain seasons, cover its shores and may be seen wading far into the water, for the lake is very shallow at a distance from land.

Numerous islands and rocks are found in the lake, but none of them are inhabited by man. The most interesting, and one of the largest, situated opposite to Shishawan, is the abode of large flocks of the moufflon, or wild sheep, the descendants of a colony placed there, some years ago, by a Persian prince. There are also wild asses and oxen, from tame breeds, and an abundance of partridges. A great deal of rather low wood is found in the island, consisting of the benneh, or wild pistachio, and the sakkiz. A peninsula runs into the lake on its eastern side, in the shape of a huge mountain, known as Shâhee. It forms a Mahâl, or district of the province, and contains six villages. The only vessels found on this lake are three or four large, rudely and singularly-constructed boats, wedge-shaped, and with square sterns and flat bottoms, one mast, and a heavy cumbersome sail.

Tabreez, the capital of the province, and in every respect the most important city of the empire, is, in extent, probably now superior to Ispahan, and it is considerably larger than Teheran. No statistics exist of the population, which, at a rough estimate may be put down at 150,000. It consists of a walled city, in circuit about 3½ miles, with very extensive suburbs. Its situation is at the south-eastern corner of a vast plain extending about 100 miles east and west, and is picturesque owing to the outline and formation of the mountains in its vicinity and the density of the foliage of groves and gardens; but the town in itself has nothing to boast of. Its bazaars, though extensive and well supplied, are in general narrow and meanly-constructed; its streets, as in all Persian towns, confined, irregular, and abounding in holes and inequalities. Filth of every kind is thrown into them, and those leading immediately along the ramparts present a spectacle at once of ruin and neglect, such as I suppose is not surpassed in any other eastern town. The city is surrounded by a dry ditch, a glacis, and a low wall, and a second or inner wall,

* I am indebted for most of the above observations of heights to the kindness of M. Khanikoff, a Russian gentleman of high scientific attainments.

and towers at about 50 paces back. The city has been frequently injured by earthquakes. I have known nine shocks to occur in one night.

Tabreez has now become the principal seat of commerce in all Persia, and is the mart from which nearly all the northern and midland countries are supplied with the produce and manufactures of Europe, conveyed to it chiefly by land-transport from the Black Sea. These have been estimated at as high a value as 1,750,000*l.* in the year, brought in about 87,000 packages or half mule-loads, the value of the portion from England being probably full three-fourths of the whole. Since the war in America has arisen, however, there has been a great falling off in the trade; English cotton manufactures being so much more difficult to procure and so much more expensive than before. The place contains about 3100 shops of all descriptions, 30 caravanseries occupied by merchants and traders, and about 40 others devoted to the accommodation of muleteers and their cattle. It is divided into 15 mahullehs, or principal wards, besides subdivisions, and possesses 9 city-gates. The population, as in other Persian towns, is for the most part Mohammedan, but about 330 families of Armenians are found there. The place is resorted to by a few Europeans having commercial or other interests there, and the governments of England and Russia have consuls-general established in it. It is also the seat of an Armenian bishopric depending on Etch Miazin.

Within the enclosure called the Ark rises a vast mass of very beautiful brickwork, erected by Aly-Shah, one of the viziers of the Cazan Shah (9th in descent from Chenghis), who flourished about the year 700 A.H., or 1300 A.D. The building was originally a mosque, and had a dome, which has long since fallen in, the consequence of earthquakes, which have sorely tried the strength of this fine structure and rent it in two places. Almost the only remaining object of interest in the place, in the shape of a building, consists in the ruins of a beautiful structure known as the Blue Mosque, situated in one of the suburbs. The founder was Jehan Shah, chief of the tribe of the Black Sheep, and the 3rd sovereign of a small Tartar dynasty which reigned in the North of Persia for a period of 63 years. The building is said by one traveller, M. Tancoigne, to have been destroyed by earthquake in 1559. The ruin consists of the principal arched entrance, of fine proportions, and ornamented in the richest manner with the blue-glazed tile, famous in Persia, which is wrought in devices of white, black, and other colours, in excellent taste, and with Arabic inscriptions in large characters beautifully adjusted. Behind this building are to be seen some of the finest specimens of the Tabreez marble, or alabaster, in enormous slabs.

The vineyards in Azerbaijan consist of vast walled enclosures as large as English fields; the area within is cut up into deep trenches with corresponding banks, facing north and south, three or four feet in height. On the northern side of these banks the vines are planted, and when sufficiently grown are trained over to the southern side, where the fruit becomes more fully exposed to the sun whilst the roots are kept cool in the shade. About five years are required before any return is reckoned on from a newly-planted vineyard. The vine seems to thrive even in the poorest and sandiest soils; the great requisite being a sufficient supply of water. Long and straight lines of walk, cutting each other at right angles, divide the vineyards into so many quarters or sections, and fruit-trees and vines as standards are planted along them. Beyond the rich clustering of the grapes of many beautiful kinds and the profuse bearing of the fruit-trees, however, there is not much that is attractive in a Persian vineyard. This kind of cultivation is yearly extending itself, and the quantity of fruit produced in the orchards, vineyards, and fields is sufficient to provide the poorest of the population with a delicious adjunct to their meals, such as is unknown in most parts of Europe, and some of the fruits are preserved through the greater part of the winter. A great deal of

wine, of a very good quality when properly prepared, is made at Tabreez by the Christians and drunk by them and the Mohammedans. It is exceedingly cheap, costing about 4*d.* or 5*d.* a bottle. At some of the villages great quantities of dried fruits are prepared for Russia and other parts.

Undoubtedly the city of Tabreez has greatly increased in extent and population during the past thirty years, but it is thought that this has been very much at the expense of the surrounding districts, the population of which has to some degree been attracted to the city merely by the greater freedom from oppression enjoyed where a large community of men is found. In its commerce Tabreez has made great advances since 1830, a traffic having sprung up with Europe which had attained in 1860 to an amount eight times greater than in the former year, and though, in my opinion, it probably then reached the highest figure it is capable of, I think that in some other respects the prospects of the province are more encouraging than ever. In 1859 an electric telegraph was established between Tabreez and Teheran, which as a speculation has answered exceedingly well, and is understood to have repayed the outlay within the first year; though from its having been very carelessly constructed it is frequently rendered unserviceable. I have already alluded to the telegraph carried from the Black Sea to Tiflis and thence towards the Persian frontier of Azerbaijan, which is probably ere this completed, and the Persian Government has undertaken to connect the two lines by extending the former through the short distance which now separates them, so that, when completed, direct intelligence may be transmitted from Europe, *viâ* St. Petersburg, to Tabreez and Teheran by one uninterrupted line of electric communication. This must tell favourably on the commerce of the country, by giving increased rapidity and activity to affairs, and the various improvements which are going forward in the communications through the Russian Trans-Caucasian possessions must also act advantageously on the condition and prospects of Northern Persia. The country possesses every requisite for prosperity, excepting good government; a fine, healthy, and, during part of the year, bracing climate; varied agricultural productions, raised with comparatively little labour or expense in a genial and fertilizing temperature; mountains rich in metallic productions and coal, which have hitherto been little attended to, but which a more direct communication with Europe will some day bring into notice; and, finally, a hardy and intelligent race for its inhabitants, capable of being turned to any good account.

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2. *The Western Shore of the Dead Sea, from Jebel Usdum to Ain Jidy.*

[Extracts from a Paper by Rev. GEORGE CLOWES, B.A., F.R.G.S., announced to be read at the Evening Meeting, 22nd February, 1864.]

THIS journey was performed early in the month of April, 1863, in company with four friends, under the guidance of Abu Dahûk, Sheikh of the Jehâlîn tribe of Arabs. The party reached the shores of the Dead Sea through the Wady ez-Zuweirah. A broad plain here stretches towards the water, across which they rode; Jebel Usdum, a narrow, saddle-backed ridge, lying in front, separated from the hills on the west. Whilst crossing the plain they observed dead trees standing in the water at some distance from the shore. With regard to these Mr. Clowes remarks, "I find from Mr. Grove's valuable article on the Dead Sea, in Dr. Smith's 'Dictionary of the Bible,' that Mr. Poole, in October, 1855, remarked the same thing. As this was at the time of the year when the water was at its lowest, it seems more than probable that a permanent rise in the level of the sea has taken place of late years." Arriving at the north-east angle of Jebel Usdum, the party reached the point where the mountain approaches within

30 yards of the sea. At this spot there is a heap of stones, a ruin called Um-Mzoghal, which is supposed by M. de Saulcy to be a portion of the remains of Sodom. Mr. Clowes here adds, "Although I feel great diffidence in expressing any decided opinion on such a subject, I must say that it is difficult to understand how M. de Saulcy arrived at this conclusion. The form of the ruin certainly does not tell the tale of its origin, for it is, as I have said, a mere heap of stones. I would venture to suggest that its position—at the very narrowest part of the shore between the Wady ez-Zuweirah and the south of the sea—seems rather to imply that it was simply a fortress erected for the purpose of obstructing the passage towards the north." About half a mile beyond Um-Mzoghal the party turned somewhat more to the south, their path lying along the base of the range of Jebel Usdum, which presents a rugged, water-worn surface, with huge masses of rock-salt projecting here and there beyond the coating of limestone. Mr. Clowes corroborates Dr. Robinson's statement as to the length of the mountain—5 miles. Returning again northwards, Mr. Clowes and his companions, after passing the Wady ez-Zuweirah, noted the rugged and worn appearance of the hills, the masses of rolled débris, and the rounded shape of the stones which are scattered over the shore; all which were to them so many signs that aqueous action, and not volcanic, has produced the peculiar formation of these western hills and valleys.

To the north of the Wady ez-Zuweirah the party noticed the existence of three distinct parallel beaches, the highest lying at least 50 feet above the level of the sea. It was impossible to trace them for any great distance in a continuous line, on account of the constant interruptions caused by the débris from the heights above and by numerous watercourses: sufficient, however, was at times visible between this place and Ain Jidy to remove all doubt that the Dead Sea was once much higher than at the present time, and therefore that the old idea of the Cities of the Plain being submerged is untenable. The principal object of interest for some distance south of Sebbeh is the peninsula adjoining the opposite shore. It presents the appearance of an ordinary mud-bank, the western extremity of which is elevated only a few feet above the level of the water. "It is an ascertained fact," says Mr. Clowes, "that the principal part of this peninsula is composed of the same material as the beach opposite, beneath Sebbeh. That the channel which runs between the two is gradually becoming silted up by the soft deposit which the winter torrents carry down into it, seems beyond a doubt. The jagged edge of the peninsula, the increasing width of the bank between its high ground and the sea, and the shallowness of the channel, all point to such a conclusion. It must be remembered that the water was now at its highest, the line of drift-wood being a very short distance from it, so that later in the year the channel must be much narrower, and the bank of mud or sand much wider." Specimens of earth from the opposite shore (the same earth as that of the peninsula), brought home by Mr. Clowes, were analyzed by Dr. Price for Mr. Grove, and found to contain 6·88 per cent. of salts, soluble in water, viz.:—

Chlor. Sodium	4·559
„ Calcium	2·08
„ Magnesium	0·241

Bromine was distinctly found.

Opposite the northern portion of this strange tongue of land is the rock of Sebbeh. The party halted on the southern side of the hill, close to the remains of a Roman camp. A narrow ridge joins the rock on the west to the other mountains, and by this alone is it accessible. Towards the top of Sebbeh there are evident signs of the rocks having been cut away, for the purpose, no doubt, of rendering the approach more difficult. The ruins of the Roman camps appear almost perfect. There is one on the east, and another on the north-

west. In many places the walls, which are built of loose stones, are still standing to the height of 4 or 5 feet. The view from Sebbeh was extremely fine. Far away to the north lay the dark line of the Jordan, bounded on either side by plains of sand. On the south was the Ghor. Between these were spread out the calm waters of the Dead Sea, reflecting as perfectly as a mirror the rugged outline of the Moab Mountains. With the exception of the north-west corner, the whole extent of the sea was visible from this point. A slight haze floated over the eastern mountains. The day was fine, and the desolation and scarcity of life, animal and vegetable, were forgotten. On wet days the prospect is very different, for it is impossible to describe the awful gloom which then hangs over the sea, justly called the Dead.

At a place half a mile south of Ain Jidy, Mr. Clowes, whilst bathing and trying the buoyancy of the water, found that he was being carried by a strong current in a northerly direction. He suggests that this may either have been an eddy caused by the influx of the Jordan, or a movement produced by a spring in the bed of the lake. The analysis of a bottle of water collected at this point countenances the latter idea; for he had fortunately the means of comparing it with that of a portion collected two days previously, from the north of the lake.

	Collected April 9th ½ mile S. of Ain Jidy.	Collected April 7th from North Shore.
Specific gravity	1·1674 ..	.. 1·1812
Percentage of salts ..	.. 20·54 ..	.. 21·585
Boiling point	.. 106° 5 cent.	.. 108° cent.

"These analyses" concludes Mr. Clowes, "show that the water collected by me was less dense, and contained a smaller percentage of salt, than that obtained two days previously at the north. The temperature of the water was 75° Fahr., that of the air certainly less; but I neglected to take it. These facts strike me as most interesting in connection with the question whether the supply of water from the known sources is sufficient to counterbalance the enormous evaporation constantly going on."

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LONDON: PRINTED BY WILLIAM CLOWES AND SONS, STAMFORD STREET, AND CHARING CROSS.