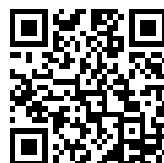
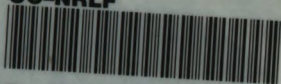

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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.



VOL. V.
SESSION 1860-61.

Nos. I. to V.

EDITED BY FRANCIS GALTON,
HONORARY SECRETARY.

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

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PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1860-61.

First Meeting, Monday, November 12th, 1860.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Dr. Thomas Fox ; Dr. A. D. Whitg ; T. Longridge Gooch ; R. Biddulph Martin ; J. Septimus Roe ; and Thomas Wilson, Esqrs., were presented upon their election.*

ELECTIONS.—*Captain J. Grantham, R.E. ; Robert Lush, Q.C. ; James Alfred Lockwood, and Henry Cartwright, Esqrs., were elected Fellows.*

ACCESSIONS.—The accessions to the Library and Map-rooms since the former meeting were numerous. Among the more important were the following :—United States Reports of Explorations and Surveys ; Geology of Iowa, 2 vols. ; 2nd and 3rd Reports of the Geological Survey of Kentucky, by D. D. Owen ; Marco Polo, edition by W. Marsden ; Leake's 'Numismata Hellenica' and 'Coins of Syracuse,' presented by Mrs. Leake ; Raleigh's 'History of the World ;' Ouseley's 'Travels in the East ;' Thornton's 'British India ;' Erman's 'Siberia ;' Tennent's 'Ceylon ;' Bowring's 'Philippine Islands ;' Brown's 'Sequel to the N. W. Passage ;' Swart's 'Journal van Tasman's Reis,' and map ; Black's, Blackie's, the Dispatch, Keith Johnston's, and Van Carnbée's Atlases ; sheets of the Government Map of Saxony ; of the U.S. Map of Nebraska and Dakota ; Maps of Otago, by J. T. Thomson, &c. &c.

ANNOUNCEMENT.—The Chairman said that a letter would be read from Captain Burton, as it would be a matter of pleasure to all present to know that this excellent, bold traveller was in good health. The following characteristic letter from that distinguished traveller was then read :—

Salt Lake City, Deseret, Utah Territory,
Sept. 7, 1860.

MY DEAR SHAW,—You'll see my whereabouts by the envelope. I reached this place about a week ago, and am living in the odour

of sanctity—a pretty strong one it is, too!—prophets, apostles, *et hoc genus omne*. In about another week I expect to start for Carson Valley and San Francisco. The road is full of Indians and other scoundrels, but I've had my hair cropped so short that my scalp is not worth having. I hope to be in San Francisco in October, and in England somewhere in November next. Can you put my whereabouts in some paper or other, and thus save me the bother of writing to all my friends? Mind, I'm travelling for my health, which has suffered in Africa, enjoying the pure air of the prairies, and expecting to return in a state of renovation, and perfectly ready to leave a card upon Muata yan-vo or any other ruffian. Meanwhile, ever yours,

R. F. BURTON.

EXHIBITIONS.—Colton's Map of North America and General Atlas, with descriptions, published in the United States; and a portrait of Baron Alexander Humboldt, were exhibited.

The Papers read were—

1. *Extracts from a Letter from DR. SHAW, addressed, by direction of the President, to CHICHESTER FORTESCUE, ESQ., M.P., Under-Secretary for the Colonies, Aug. 24, 1860, on a Proposed Exploration in North-Western Australia, under Mr. F. T. GREGORY, F.R.G.S.*

“Aug. 29th, 1860.

“In April, 1859, an application was made by a party of the settlers, through the Colonial Department of Western Australia, for the assistance of a surveying vessel, then in those waters, to aid them in exploring that portion of the country lying between Shark Bay and the north-west coast, about Nicol Bay.

“A compliance with this request not having been at that time found practicable, it is believed that the plan may, with certain modifications, be at present urged on the attention of the Colonial Office. In furtherance of these views, it is necessary to explain that it is by no means intended to confine the desired exploration to the limited extent of country pointed out in the first place by the settlers, but that a favourable time has arrived for endeavouring to complete the chain of exploration and discovery round Australia, by filling up the unknown space of six or seven hundred miles which yet interpose between the late travels of Mr. A. C. Gregory, from the north, on the Victoria, and those of Mr. F. T. Gregory from the west coast. The advantages to this country, of having stations and ports of refuge along this line of coast, are clear; and as it has been ascertained, by the late expedition of Mr. A. C. Gregory, that cotton

grows *naturally* in the valley of the Victoria, it becomes highly probable that large tracts, intervening between that point and the northern settlements of Western Australia, may prove available for the production of this plant. Mr. F. T. Gregory, who has already most successfully made the farthest exploration to the north-east, beyond the settled parts of Western Australia, is at present in London, and is most willing to undertake the task of exploring the region in question, now a 'terra incognita;' and the Council recommend this subject to the favourable consideration of Her Majesty's Government, being well assured, from his antecedents, that Mr. Gregory is worthy of all confidence. Mr. J. S. Roe, the Surveyor-General of Western Australia (under whom Mr. Gregory has so long served), is also in London, and has expressed his willingness to afford every information in his power in aid of this expedition.

"The benefits to the mother country and the colony that may be expected to be derived from this exploration may be briefly described. In the temperate region which lies to the north of the Swan River colony there is good reason to believe that extensive runs for sheep will be found, calculated greatly to extend the production of Western Australia. Farther north, and within and about the tropic, copious rains are known to fall in the north-west monsoon; and it will only be necessary that this fall, which continues for the four months from December to March, inclusive, should be stored for use during the remainder of the year, to make the country irrigated by it eminently well suited to the great staples of cotton and rice, for which the prevailing climate seems perfectly well adapted.

"For the production of one of the two commodities (cotton), European labour is perhaps inapplicable; but European superintendence and capital, to judge by our experience of other cotton-growing countries, are indispensable. The most suitable description of labour may be that of India; and the portion of Australia now referred to may become a suitable colony for taking off the surplus population of India, already excessive, and likely in time to become much more redundant.

"Besides the staples of wool, cotton, and rice, it may be added that men of science have come to the conclusion that this district may be productive in gold and copper, as well as other minerals. Its timber may also become an export of value.

"It would be desirable in the first place to examine the tract of country that lies between the FitzRoy River, in long. 123° 40' E., lat. 17° S., and Nicol Bay in long. 116° 50' E., lat. 21° S.; embracing

thus about 430 geog. miles of coast-line, with such a depth inland as time and the physical character of the interior may permit," &c.

The letter concluded with recommending that either Nicol Bay, Depuch Island, Roebuck Bay, or FitzRoy River, should be selected as the point of landing; that the expedition should consist of seven or eight persons, equipped for about six months, and should arrive off the coast at the end of March. The rough estimate for total expenses was about 4000%.*

The second Paper read was—

2. *Exploration of the Districts near the Burdekin, Suttor, and Belyando Rivers in North-East Australia.* By Mr. G. E. DALRYMPLE.

Governor Sir G. F. Bowen to the Duke of Newcastle.

Government House, Brisbane, Queensland,
12th April, 1860.

MY LORD DUKE,—With reference to my despatch No. 21, of the 16th February ultimo, I have the honour to report that Mr. George Elphinstone Dalrymple has returned in safety from the exploring expedition which he had undertaken to the North-Eastern districts of this colony.

Mr. Dalrymple states that he has considerably extended the knowledge already obtained by the researches of Leichhardt, Gregory, and Kennedy, of the rich and well-watered pastoral districts near the rivers Burdekin, Suttor, and Belyando, between the parallels 19° and 22° of south latitude.

He further informs me that he has discovered that the great river Burdekin flows into the Pacific Ocean, at a point a short distance north of Cleveland Bay, and not near Cape Upstart, as was conjectured by the late Dr. Leichhardt.

Should it be found that the mouth of the Burdekin is accessible to steam navigation, a great facility will be afforded for the rapid occupation of the neighbouring interior. To ascertain this point, it will be necessary that an expedition properly equipped should be sent by sea, at the expense of Government. Mr. Dalrymple offers to take charge of a fresh exploring party, and I feel persuaded that the Queensland Parliament will be disposed, on my recommendation, to vote a sum of money in support of this important

* The Colonial Office has since informed the Council that Parliament will be asked for 2000*l.* towards this Expedition, conditionally upon a similar sum being advanced by the Government of Western Australia.

enterprise.* I have communicated with Governor-General Sir William Denison as to the aid which might be given by Her Majesty's surveying ship *Herald*, now on the Australian station, but am informed that that vessel has been ordered home.

As the pastoral settlements of Queensland already extend within the Tropical circle, as far as the shores of Broad Sound, in about the 22nd degree of South latitude, there is little doubt that the new territory, of which Mr. Dalrymple speaks so favourably, will be stocked with sheep and cattle in the course of a very few years. Much of it is table-land, enjoying a cool and salubrious climate.

The aborigines in that part of the colony are reported as being very numerous and hostile, and as exhibiting more athletic frames and a somewhat higher order of intellect than the native tribes in these parts of Australia, where the climate is less genial, and where fish, game, and edible plants of various kinds are less abundant. Still, the six Englishmen who composed Mr. Dalrymple's party, though often attacked, were able to force their way through all opposition without the loss of a single individual of their number. Consequently there is every reason to expect that a few detachments of the mounted police-force, in aid of the energetic measures of self-defence adopted by the colonists themselves, will, in that quarter as elsewhere, suffice for the protection of any new settlement.

It has been rightly observed that from the circumstance of the aborigines of this island-continent being, apparently, subject to no sort of government except that of the strongest man in each tribe, from the imperfection of their arms, and from their mental incapacity for combination, their collisions with Europeans do not occupy that place in the annals of Australia which is filled by the Maories in the annals of New Zealand, and by the semi-civilised Mexicans and Peruvians, or even by the Red Indians, in the history of America.

I hope and believe that there is another and better cause for the comparative infrequency of serious collisions with the aborigines in Queensland and in the other Australian colonies. I allude to the humane and enlightened treatment which they now receive at the hands of the English Colonial authorities and of the settlers, who, while they energetically repel attacks on their own lives and property, seem always ready to employ, feed, and clothe the peaceful members of the-neighbouring tribes. In fact, on almost all the

* This expedition, under the command of Mr. J. W. Smith, R.N., with Mr. Dalrymple, has since returned after having found that the Burdekin is closed by a bar at its mouth.—ED.

pastoral stations in Queensland, several blacks are maintained as shepherds, stockmen, and grooms; others are enrolled by Government in the Native Mounted Police; while, in the towns, as many as are willing to work can earn their livelihood as porters, messengers, woodcutters, and in other similar capacities. Efforts have also been made at the public expense, at various times and places, for the education of the aborigines, and for their conversion to Christianity; and I expect that these endeavours will be energetically resumed by the Government of Queensland, with the sanction of the Colonial Legislature.

Mr. George Elphinstone Dalrymple to his Excellency Sir George Bowen.

YOUR EXCELLENCY,—I beg to take advantage of your kind permission to address you on the subject of the exploration of the River Burdekin, which I lately had the honour of carrying out.

The country watered by the river and its tributaries, extending from latitude 18° to latitude 22° south, and from the Pacific far to the westward of Mount McConnell, I can confidently state from personal exploration to be undoubtedly capable of becoming one of the finest and largest pastoral and agricultural regions of Australia, and a most valuable adjunct to the colony of Queensland.

Very strong auriferous indications exist over a large area of country.

The rich low country along the coast, and the alluvial flats of the river, particularly in the fine broad valley of its lower course, are admirably adapted for Tropical cultivation, and especially for cotton, sugar, tobacco, &c.

An admirable route exists through this region for the passage of the proposed Anglo-Australian telegraph.

From the Gulf of Carpentaria to the Valley of the Burdekin, in about latitude 18° 48', Mr. A. C. Gregory's intimate acquaintance with the country will doubtless enable him to recommend a practicable route. Thence I can confidently recommend its passage down the Valley of the Burdekin to about latitude 19° 55'; thence by that of the River Fanning on to the lower Burdekin, in about latitude 20°; to follow up the Valleys of the Burdekin and Bowen Rivers to about latitude 20° 50', and thence, traversing the immediate district watered by the Reid and Bonar, to pass over the table-lands N.N.E. of the heads of the Isaacs, run up Collaroy Creek, cross the coast-range on to the Broad Sound Waters of Waverley Creek in about latitude 22° 18', and thence by the Valleys of Herbert Creek and the River FitzRoy to Rockhampton.

Should your Excellency advocate the establishment of this route, and its protection by a chain of police-outposts, I would venture to predict that the security which settlers would derive from the latter would tend to the speedy occupation of the Kennedy, and a large increase to the Queensland revenue.

As your Excellency's Government has decided upon throwing open the Kennedy on the 1st of August current, I would again beg most respectfully to draw your attention to the advisability of deciding upon a seaport for that district, and the establishment of the capabilities of the Burdekin as a navigable river.

I have the honour to state that I discovered the mouth of the Burdekin in the neighbourhood of Cape Cleveland, in about latitude $19^{\circ} 20'$ south, longitude $146^{\circ} 50'$ west; but owing to the smallness of my party, the inclemency of the weather, and the numbers and hostility of the aborigines, I was unable to carry out my intention of testing its depth and length of tideway.

The Bay of Upstart, which I visited, is particularly well situated with reference to the whole district, and possesses in itself great natural capabilities for a seaport.

It is sheltered by its stupendous Cape from the prevailing winds, and there is abundance of fresh water; the soundings of the bay are even at from 6 to 10 fathoms, on a sandy clay bottom; and a large salt-water creek connecting the heads of Upstart and Abbott bays is broad enough for a large vessel to swing, and gave soundings at 3 fathoms.

As the means at my disposal were insufficient to establish as a certainty the navigable capabilities of the Burdekin or the qualifications of its mouth or of Upstart Bay as seaports, I would now most respectfully beg to suggest to your Excellency the advisability of despatching an exploring party by sea, to enter the mouth of the Burdekin, take the soundings of that and of the heads of Upstart and Abbott bays, and to report to your Excellency's Government upon the capabilities of the same, and of the most advantageous positions thereon for the establishment of the future ports of this portion of the colony.

The communication was interesting as indicating a large district which might become hereafter fitted for settlement, and, moreover, a good roadstead discovered, which, as Sir Roderick Murchison observed, was most essential for the protection of our commerce in those parts.

The third Paper read was—

3. *Exploration of Central Australia from Melbourne, viâ Cooper Creek.*

THE Victoria camel expedition to explore the desert of Australia, by way of Cooper Creek, has already left Melbourne, and notes of its first fourteen days' march have been received. The exploratory caravan consists of 26 camels; besides these are horses and waggons to convey twelve months' stores to Cooper Creek, where a depôt will be established. A large item in the stores of provisions is the "expedition-biscuit," which, like the well-known American meat-biscuit, consists of meat dried and pounded, mixed with a proportion of flour, and baked, and forms an exceedingly portable means of subsistence. The camels are supplied with leather shoes shod with iron, and carry waterproof coverings lined with flannel, to protect them in adverse weather. The party is under the leadership of Mr. R. H. Burke; the camels are under the charge of Mr. G. J. Landells; Mr. W. J. Wills, surveyor and astronomical observer, is the third in command; Dr. Hermann Beckler is the medical officer and botanist; and Dr. Ludwig Becker is artist, naturalist, and geologist. Besides these, are ten men, not including three Indian Mohammedans, who have the immediate charge of the camels.

On Aug. 20th the first start was made from Melbourne: thence the expedition has travelled by fourteen easy stages to Swan Hill, in exceedingly wet weather. There was difficulty in persuading the camels across the only creek that interrupted their progress. Some natives, who visited one of the camps, showed terror at the sight of the camels, and would not approach within spear's throw. The Indian attendants work well.

THE PRESIDENT said, there were several interesting particulars in the paper from Melbourne which had been read, including a graphic description of the start of the caravan. The use of the camel was a new feature in the exploration of this country, and he hoped it would be attended with success; for the difficulties in the interior, arising from the want of water, were similar to those found in Africa and other sandy countries. At the starting of the expedition, not only hundreds but thousands of people congregated together to see the party leave, animated by high hopes of the advantages to be derived from success.* As Mr. Gregory was present, he hoped he would say a few words in explanation of the expedition from West Australia upon which he was about to enter, and of the views which had induced him to undertake it.

MR. GREGORY, F.R.G.S., proceeded to describe the physical character of that portion of the country seen by him in former expeditions in Western Aus-

* Although the Members of the Expedition have quarrelled among themselves, the leader left for Cooper Creek on the 19th of October, with 7 whites, 3 coloured men, 16 camels, and 19 horses.—Ed.

tralia. The greater portion was exceedingly level, having an average elevation of from 900 to 1200 feet. It had a sandstone table-land of probably no great extent, and granite cropped out on the western coast with a few broken hills, occasionally rising to an elevation of 1800 feet. Proceeding northwards up towards the Gascoigne River, the country gradually rose, till the head rivers themselves had an elevation of about 1700 feet. The summit of the highest hill which he ascended amounted to 3500 feet. He therefore had reason to think that, although not absolutely a range of mountains, there was a tract of elevated country, forming a watershed, not only to the westerly, but to the eastward and north-eastward. His brother, in 1855 and 1856, traced a creek, which he named Sturt Creek (about 300 miles inland), from the table-land in which the Victoria River took its rise, and which was about 1600 feet above the sea at its greatest elevation; and in tracing it down he descended to a level of more than 900 feet. This fact gave him reason to hope that between that point, going towards Western Australia, and the elevated country in which the Gascoigne took its rise, there must be a depression; and he would venture to suggest, though he knew many geographers were opposed to the hypothesis, that a river was to be found, draining the greater portion of Western Australia, which emptied itself in somewhere about longitude 122° E., in the bottom of a low sandy bight on the north-west coast. Should that prove to be the case, there was every prospect of finding a way into Central Australia; should it be otherwise, he feared the country would turn out to be a low sandstone depression, probably covered with sandy desert, similar to what we had seen in other parts of Australia. The great object of his mission was to try and set that question at rest, and also to see whether lands suitable for colonisation could not be found on the north-west coast.

MR. WM. BURGESS said he had been a settler in Australia more than thirty years, and the expedition which was now proposed had been in some measure taken up in the colony at his instigation. He formed one of the deputation from the Society which waited upon the Colonial Secretary, and he hoped it would be arranged that the expedition should start from Nicol Bay, and explore south to meet the point attained in Mr. Gregory's former expeditions; and after that country had been thoroughly explored, and a port discovered fit for settlement, then the remainder of the six months to be devoted to exploring towards the north up to Roebuck Bay in search of a river. He was sorry to find that this plan might be changed, and that the expedition might start from Roebuck Bay.

SIR RODERICK MURCHISON said the Geographical Society had nothing to do with the details of Mr. Gregory's expedition, which must be settled in the colony of Western Australia. All that the Society had to do was to promote the science to which they were devoted, by appealing to the Government for a grant to enable Mr. Gregory to carry out his plan. The grant had been obtained conditionally, and whatever plan was carried out would, no doubt, bring a considerable addition to their geographical knowledge. He had always wished to see established some port on the north-west coast, both as a naval station and as a harbour of refuge, and it was a discredit to us to remain ignorant of the physical structure, the productions, and capabilities of that portion of the Australian continent.

COLONEL GAWLER, F.R.G.S., stood somewhat in opposition to Sir Roderick Murchison in his opinion that the centre of Australia was an arid desert. That conclusion agreed with Mr. Jukes's theory, but he thought Mr. Jukes was wrong in many points. First, in underrating the character of the Murray, which he spoke of as a stream that could hardly force its way into the sea. Now he had ascended the Murray 180 miles with Captain Pullen, at present of the *Cyclops*, in the Government cutter *Water Witch*, and they never drew less than 13 feet water, and in some places the depth was 40 feet; while at the

North Bend, the highest point to which they reached, the river was 250 yards broad. Again, Mr. Jukes imagined that the great interior was a vast tertiary mass, with very little primary formation in it. Now there was much of the primary formation known. The great base of the Australian Alps and of the Adelaide chain was of primary formation; and on the shores of the Port Lincoln peninsula he distinctly saw gneiss and mica-slate broadly developed and going away to the north-west into the interior. Therefore, with so much primary formation on the coast, there was no reason why it should not reappear in the interior, and all the consequences of drainage from those ranges, and soil formed by their detritus, occur in large extent. He admitted the fact that there was a desert to the eastward of Lake Torrens; but then, when he saw that there was a fine country far away to the north, to the eastward, and to the southward, he could find no reason to suppose that there was no fine country to the westward also. He felt confidence in thus thinking, for since his return from South Australia he had theorized, judging from atmospheric influences, that there was a fertile country to the north-west of Spencer Gulf, and since then there had been discovered a well-watered country half as large as Ireland. He also questioned the accuracy of Mr. Jukes's statement that Mr. Eyre, in his journey from the Port Lincoln peninsula to Western Australia, did not cross the mouth of one large drainage outlet. He passed for several hundred miles along the top of high chalk cliffs, and then came to a deep sandbank 130 miles in length, the cliffs going off north-west into the interior. Having traversed this sandbank, he came to cliffs again running along the shore, but which ward off north-east into the interior. As he came near the sandbank he found atmospheric evidences, in connexion with the flight of water-birds into the interior, which led to the conclusion that there was to the northward of him a great extent of well-watered country. It appeared to him that this sandbank was the bar of a great drainage coming down from the interior, formed by the tremendous rollers of the Southern Ocean. With facts such as these before us, we might reasonably conclude that in the western half of Australia there might be a large extent of good and well-watered country, which might serve to connect the south-eastern provinces with the north-west coast, as a transit for live stock, as well as for railways and telegraphs.

MR. A. ROE, Surveyor-General of Western Australia, said that, as a colonist, he must, to a certain extent, agree with some of the observations which had fallen from Mr. Burgess relative to the proportion which the colony was called upon to contribute to an expedition which, in itself, was only remotely beneficial to Western Australia. Yet, for all that, he hoped the expedition would meet with success, and that, as the object was to advance the general progress of geographical discovery, the colonists would cheerfully come forward and render all the aid in their power. With respect to the various theories which had been broached as to the interior of the country, he thought it was time all these were put aside, and that we went manfully to work in the path of actual discovery. Though Surveyor-General of Western Australia, he must plead total ignorance of the country about to be explored beyond what was known to any individual in the room, except that he had been in a vessel along part of the coast. Of the interior, however, he knew nothing. He thought the Geographical Society had acted wisely in accepting the services of Mr. Gregory. He had a great deal of personal knowledge of that gentleman, from having had him under his own eye in his department as Surveyor-General. He could speak to his fitness for the task, and he had no doubt that the expectations of the Society would in him be fully realized.

The fourth Paper read was—

4. *Abstracts from Letters from the East African Expedition under Captains Speke and Grant to the Secretary.*

THE latest intelligence received from Capt. Speke is dated Bagamoyo, Oct. 1st, 1860. He therein alludes to a previous letter, despatched from Zanzibar, which has not reached the Society. Very shortly after his arrival at Zanzibar, aided by the zealous co-operation of H. B. M. Consul, Colonel Rigby, Capt. Speke succeeded in procuring 56 porters, and in despatching them, in advance of himself, with beads and cloths, to Kazeh. These men had reached Ugo. His next step was to send to the mainland, to collect 100 porters for his own caravan. He also secured an escort of 30 free labourers armed with muskets. Besides all these, the Sultan of Zanzibar presented him with the services of 30 men of his own establishment, under orders to accompany him to Egypt. The Ras Cafila, or head of the native portion of the expedition, is the same Sheikh Said bin Salem with whom Capt. Speke travelled before.

As to his Cape companions, he states:—"The Hottentot guard have shown themselves a very handy, willing set of men after they once settled down to work. They now adapt themselves and wear into the different stages of vicissitude in this vagabond sort of life famously; and if the climate—the great enemy of these regions—only spares them, we shall find them of the greatest service. There is nothing they cannot turn their hands to: they helped to sew the tent, make their own clothes, cobble their shoes, and cook our dinners. They love the gun, and delight in hunting for specimens; but some of them have already had the fever, and I cannot but feel anxious on that score."

The expedition left Zanzibar on the 25th of September, in a corvette belonging to the Sultan. The men were landed, under orders to form a camp four miles from the shore, where Capt. Speke expected to join them on the morrow of writing his letter. All the instruments, given to the expedition by the Indian Department, are described as first-rate in quality and in order.

"The accounts enclosed will show you to what extent I have been obliged to go to reach the point at which I expect to meet Consul Petherick by the time appointed. The expenses have been nearly doubled by this hurry to meet him, as anybody who has travelled in barbarous countries like this, must know that the man who pays best gets most; and I have been obliged to outbid the Arab merchants, to succeed in the short space of time which it has taken me to get so large a caravan together. I shall now certainly

be at my station at the appointed time for descending on Gondokoro, and must then come down the Nile the best way I can. My men are all inflated with the grand idea of reaching Egypt, and will expect a greater remuneration from me than the Government funds admit of; for it must not be conceived that what I have in store now, will be sufficient for the expenses of the way without some reinforcements from Kazeh; and to provide for this, I am carrying letters of credit of the worthy Suddha Damjee. But at the same time that I make this remark, I do not wish the Society to be under any apprehensions that I intend to depart from my engagements with them, or from the last injunction of the Indian branch of Her Majesty's Government, that I should not call upon them for any other assistance. I have made my own arrangements.

"The strength of the caravan is as follows, not including the 56 porters, and 2 men in charge, that have gone forward to Kazeh:—Capt. J. H. Speke, commanding expedition; Capt. J. A. Grant, assistant; Sheikh Said bin Salem, Ras Cafila; 1 corporal and 9 Hottentot soldiers armed with rifles; 3 private servants armed with rifles; 6 slaves of Ras Cafila, all armed with rifles; 30 free labourers, ditto; 34 Sultan's porters; 115 Paganees—total, 192; 11 mules; 5 donkeys. In addition to these, his Highness the Sultan of Zanzibar has ordered a guard of honour, consisting of 25 Belooches, to escort us as far as Kidunda.

"We are now off to Bomani, and will send our next report from Kidunda, in the hands of the escort."

Government House, Cape Town, 14th July, 1860.

SIR,—I have the honour to report, for the information of the President and Council of the Royal Geographical Society, that the Central African Expedition, under my command, arrived here, in H. M. S. *Forte*, on the evening of the 4th ult., all safe and well; that the Admiral of the station has placed H. M. S. *Brisk* at my disposal for proceeding, as soon as the vessel can be got ready, direct to Zanzibar: this probably will take place on Monday, the 16th inst. Further, that his Excellency Sir G. Grey, Governor of the Cape of Good Hope colonies, who, from the first time that I became acquainted with him, and explained the purport of my intended exploration, has ever shown a lively interest towards it, has, since my arrival here, obtained for my purposes an escort of Hottentot soldiers, his own body-guard, and also a grant of money to enable me to purchase twelve mules, as baggage animals for the expedition.

The enclosed letters will explain on what grounds, and through

what immediate channels, the soldiers and mules have been obtained.

I have to acknowledge the receipt of your letter dated the 25th May, 1860, with its enclosures.

As there is and will not be any ordinary means of communicating with Zanzibar by this route, I shall feel obliged by your sending *all* letters or packages *viâ* Aden for the future.

*His Excellency Sir George Grey to His Excellency Lieut.-Gen.
Wynyard, C.B.*

Government House, Cape Town, 9th July, 1860.

SIR,—An expedition has been sent out, under the command of Capt. Speke, of the Bengal Infantry, for the purpose of tracing the river Nile from its sources into Egypt. A great part of this route has been already travelled, and is now well known; but there is an intermediate space of from 300 to 400 miles inhabited by tribes of whose disposition nothing has yet been ascertained. It is, therefore, requisite that the expedition should be accompanied by a few daring and resolute men, if possible, natives of Africa.

Capt. Speke is now at the Cape of Good Hope, on his way to Zanzibar, from which place the expedition starts for the interior of Africa; and I am anxious to afford to the Hottentot soldiers of the Cape Corps an opportunity of sharing in the honour of this adventurous expedition. By showing courage and good conduct on it, they would bring great credit on the corps to which they belong; and it would be for all time a most interesting fact if some of the native inhabitants of South Africa, trained in our service, aid in the discovery of the sources of the Nile, that great problem in North Africa which has for so many centuries baffled all inquiries which civilized man has made regarding it.

I should, therefore, feel much obliged to you if you would allow twelve Hottentots from the Cape Corps to volunteer for this service if they are willing to do so: none but men of good character and of known courage and hardihood should be taken.

The men employed on this service will draw their full pay, and free rations, such as the nature of the country they are in may afford, will always be provided for them. A free grant of 25 acres of land each in Her Majesty's possessions in South Africa will also be given, on their return, to such of these volunteers as may bring with them a certificate from the officer commanding the expedition that their conduct, whilst serving on it, has been such as to entitle them to this indulgence.

I have, &c.,

G. GREY.

Message, No. 28.

G. GREY, Governor.

Government House, 9th July, 1860.

The Governor acquaints the Honourable the House of Assembly that, under the instructions of the Royal Geographical Society of London, an Expedition has been fitted out, jointly by the British Government and the Government of India, with a view of tracing the river Nile from its sources into Egypt, and of thus solving this important problem, which has been for so many centuries a source of such great perplexity and interest to the civilized world.

Captain Speke, the commander of the exploring party, has arrived at Cape Town, together with Captain Grant, of the Bengal Army, for the purpose of organizing the expedition. The Governor, anxious to identify this colony with an enterprise which is deservedly exciting such great interest in Europe, has obtained the sanction of the Commander of the Forces to call for Hot-tentot soldiers from the Cape Corps, as volunteers, to proceed on this service, for which they possess some peculiar qualifications; and the necessary number of men have, with the most creditable alacrity, enrolled themselves as willing to accompany the party.

Since Captain Speke's arrival here it has been thought that the chances of the success of the expedition would be very materially increased if mules could be secured for it, as a means of transport, instead of trusting to being able to hire at Zanzibar men to convey the baggage which must accompany it.

The British Government has contributed 2500*l.* to the expenses of this expedition, and the Indian branch of Her Majesty's Government bears charges connected with it which will amount to a larger sum;* but no funds have been provided for the purchase of the mules which it is now desired to send, and which it is estimated can be provided for about 300*l.*

The Governor, therefore, wishes to know if the Honourable the House of Assembly would think fit to make good this amount of 300*l.* from the revenues of the colony, as the contribution of this Government to the expenses of an enterprise in which the Cape of Good Hope has an interest more direct than might at first be thought, as it now appears tolerably certain that a vast tract of fertile country extends along the high lands of the interior, from the confines of this colony to the Equator, which not only affords a field for the spread of population, but appears already to promise commercial openings from which great advantages may very shortly be derived.

House in Committee.

Mr. Stretch, in the Chair.

The Chairman read the Message from His Excellency the Governor, on the subject of the Expedition for tracing the sources of the River Nile.

The Colonial Secretary moved: That the Committee recommend the House to vote the sum of 300*l.* for the purpose stated in his Excellency the Governor's Message No. 28.

Agreed to.

The Colonial Secretary moved: That the Chairman report this Resolution to the House.

Agreed to.

* Among which were presents to the value of 300*l.* for the Sultan of Zanzibar and others, by command of Sir Charles Wood, of the India Board. By permission of the Admiralty, Captains Speke and Grant were also most kindly allowed passages in H.M.S. *Forster* to the Cape, and thence to Zanzibar in H.M.S. *Brisk*.

H.M.S. Frigate *Forte*, Madeira, 9th May, 1860.

SIR,

Having observed in the last Journal of the Royal Geographical Society an allusion to the course I have given to the Kivira River published in 'Blackwood's Magazine' (1859), which is opposite to what I had described in my original map, made at Kazeh, I have now the honour to send you my reasons for the change, that any doubts which may arise in the minds of such geographers as may have copied my map in 'Blackwood' may be dissipated.

The only man that the expedition met with who had crossed, or even seen, the Kivira River, was a slave belonging to Musa, and he was of the Wanyoro tribe. Further, I was the only person who interrogated the man about the river, and the sort of country through which it flowed.

The slave told me the Kivira River was larger than either the Kitangule or Katonga rivers, but, in opposition to them, was very rapid, and flowed through hilly instead of flat ground. Further, he insisted, contrary to my suggestions, that it flowed to the north or north-west; that is, in a direction contrary to the generally-acknowledged direction of the lake.

I could not, at that time, understand how this could possibly be the case, but thought the river must have originated in the Mountains of the Moon, and that it flowed towards the lake; I therefore altered it accordingly, in the same way as I made the Arabs, in opposition to their first statements, acknowledge the flow of the Kitangule and Katonga to be.

The Arabs first said those two rivers flowed from the lake into the mountains. As I changed one, I changed all.

It may appear arbitrary, changing the directions which natives give to rivers, but it cannot always be helped, for they are often unable to explain themselves. It therefore requires that a person should be possessed of a thorough knowledge of the physical features of the country through which the river runs, to determine if the natives' mode of expression be correct about the course of its flow.

Thus, then, I placed the Kivira River on my map, when at Kazeh, as though it ran into the lake, knowing nothing at that time about the drop of the country to the northward of the lake, and having no books or maps of the Upper Nile to guide me, for the expedition was not provided with any works relative to the results of the Egyptian expeditions on the Nile.

The expedition now left Kazeh for Zanzibar. On the way, at Ugogo, an Arab merchant,* by name Abdullah, coming from the coast, arrived at our camp and sold some cloths to me for the expedition. Whilst doing so I asked him about the northern country and the Kivira River. He replied that he had heard of the river, but only from native report, when he was in the northern countries trading, and his description coincided with that of Musa's slave.

In questioning him about the tribes which inhabit the country beyond the Kivira River, he gave me a long list of names, amongst which was the Bari people. To this word (Bari) I objected, saying, that as all tribes' names began with the prefix "Wa," he ought to have called them Wa Bari. But he said no, this was exceptional; and I therefore entered it on my map at once, as given by him; more, certainly, with a view of keeping it for future reference than for any other purpose, as it was given only on the authority of slaves to him, which fact he was particular in stating. This man, Abdullah, farther told me, on native testimony, a (current) story about navigators, using instruments, approaching the farther end of the Nyanza, which, as before (I heard of these navigators at Kazeh first), I did not believe to be anything more than a traveller's tale.

Now immediately after I arrived in England, when drawing up a sketch of the geography of our journeys to illustrate my map, I consulted Mr.

Findlay about it, and he very obligingly furnished me with the various accounts of the Egyptian Expedition on the Nile, and showed me how nearly my lake came to their position, in $4^{\circ} 44'$ North latitude. Next he detected the word "Bari" written on the map I had sent home, and this in an instant awakened me to the whole truth of the various stories which I had heard.

There were the navigators, there the hilly ground and rapid river, there the Bari people.

The fifth Paper read was—

5. *Notes on South Africa.* By Mr. JAMES CHAPMAN.

Otjimbingue, 30th Jan. 1860.

MY DEAR SIR GEORGE,—Fearing that some vessel may be leaving Walwich Bay before I can reach it, I send this to inform you of the failure of my trip to the south bank of the Zambezi, and my return from Lake Ngami to the Cape, until such time as I shall be able to refit for another expedition.

I think, if my memory serves me, when last I addressed your Excellency our troubles had already commenced. Bad and disaffected servants, a thing almost wholly new to me, made me all along doubt the success of my expedition, and give it up on arrival at the Lake; and one of my principal men dying of fever, and several others having been laid up with the same malady, would, in any case, have prevented my going any farther than the Lake this year, which, as your Excellency is aware, was to have been but our starting-point. Mr. G. Polson, who accompanied me, left for Moselekatze, with the only useful and able white man we had, and I have great expectations of receiving information from him that will be useful to me in my next attempt.

Of this short route, now so much travelled, there is nothing new or interesting to relate more than what has before been mentioned. We have had an uncommonly dry season, and on our way up lost about twenty of our cattle, chiefly from want of water; a few were stolen by poor Damaras, three of whom were shot in a most barbarous manner, to our great annoyance, by a party of Namaquas whom we had sent in search of our cattle and horses, which had been abandoned by our thirsty servants in the middle of the desert.

The want of water has not been confined to one district, but in the whole country up to the Lake the fountains have failed; and if the desiccation continues a few years longer at the rate it has done during the last four years, I fear we shall only be able to reach Ngami during the rainy season. In going up we had to dig at

Koolie, Ghansi, and Gunigga; and other large springs where, a few years ago, hundreds of elephants, rhinoceri, giraffes, and large herds of smaller game drank during the whole dry season, have now dried up so much that scarcely a kettle of water can be got for Kaffirs. At Piet-fontein, formerly a large running-stream, we had to dig for water for our cattle on our return, even after the first rains had fallen. Tunobis, in Damaraland, which was a fine running-stream when I first knew it, has been drying up so fast that now we have to wait in wells twenty feet deep until the water percolates to fill our vatjies—watering the cattle at these is out of the question.

With regard to sporting we have been singularly unsuccessful, but in this we were not disappointed, for we did not expect to see game until we had passed the Lake. I would have accompanied my friend Polson for a few weeks' elephant-shooting down to Botlethe River, but, attacked with a virulent whitlow on a finger, I have been unable to use a gun for more than four months. We have all had a turn at sickness—in fact, we have been a moving hospital the greater part of the way.

The Namaqua Hottentots of Lambert living at Twas have been successful in reaching a family of diminutive elephants, which I have before mentioned by the name of Makolonkoans, in the Kalihari Desert, where they subsist on tubers, and never need water. They were, however, obliged to abandon the tusks (of forty elephants) for a time, and ride hard to get back to the water, from which they were absent four days. Other Hottentots from Amiral Lamberts have made a successful hunt northwards, where they struck Messrs. Green and Anderson's spoor. From them we learnt that Mr. Anderson had reached a tribe called Ova Kaangarra, or Ovalingue, on a fine river (the Okavanga), in about lat. 17° s., and long. 18° e., but was detained there by fever. These reports were verified a few days ago by the arrival of Messrs. Anderson and Green, who bring glorious news for those who wish to distinguish themselves. They report elephants to be just as numerous as Gordon Cumming found them in the Bamangwato country, so that I may yet be in time to make up my number here, if unsuccessful on the eastern side of the continent. Mr. Frederick Green, who went to assist Anderson out, and who is an admirable shot and indefatigable hunter, has, during an absence of a couple of months, shot sixteen very fine elephants, and as many as four large bulls in one night. Small game Mr. Green reports very scarce in those parts.

Of all our little disappointments I regret none more deeply, and

I am sure your Excellency will sympathise with me when I say that I come back without one good photograph. I feel it the more, knowing that no exertion has been spared to render my efforts successful. Many whole days, again and again, have I devoted without any favourable results.

The principal cause of failure in this I attribute to atmospheric influence on the chemicals, or bad water used in washing and developing; of this, of course, I am not certain until I have consulted some one who understands fully the nature of the chemicals, and the theoretical part of the business. I am consoled, however, in this, by having a companion in misfortune. Dr. Holden, a scientific gentleman whom I met, informs me that he has not had one success.

Mr. and Mrs. Thompson, whom we met at the Lake, arrived here a few days ago, and Dr. Holden a few days later.

We heard very little about Dr. Livingstone while at the Lake, as the Makalolo and Batavana have again stopped intercourse. At my repeated solicitation, the chief sent a party to the Mahabee flats to seek some information, and all they brought was, that Dr. Livingstone had induced Sekeletu to remove his town, or part of it, farther eastward on the plains, I should say somewhere on the north bank of the falls. Lechulatile was expecting an attack from the Makalolo about January or February, and was preparing to receive them. We heard that a party of missionaries had penetrated Moselekatze's country, and another party (Rev. Mr. Helmore's) were waiting in the neighbourhood of the Botlethe for rains to cross the Madenisana Desert to Sekeletu's. The Lake has been very full for the last couple of years, and the Botlethe River has filled up the great salt lake (which I discovered in 1854) with fresh water from Ngami. It is very likely that the Natwutwa, if still inundated, may offer an impediment by that the nearest route to the missionaries.

(Signed) JAMES CHAPMAN, JUN.

*His Excellency Sir George Grey, K.C.B., &c., Governor
of the Cape of Good Hope.*

DISTANCES BY TROCHIAMETER.

From	To	Distances.		
		Miles.	Fur.	Yds.
Walwich Bay	Oesip	36	0	166
Oesip	Tingas	31	3	155
Tingas	The Pass	10	1	157
The Pass	Plat Klip	13	0	120
Plat Klip	Witwater	12	1	58
Witwater	Tsonbis	11	6	58
Tsonbis	Otjimbique	21	7	41
Otjimbique	Otjemonjeba	33	7	211
Otjemonjeba	Otjekango	9	0	90
Otjekango	Barmen	5	2	149
Barmen	Otjethebba	15	0	150
Otjethebba	Gons da Gnaus	16	7	107
Gons da Gnaus	Eikanis	12	0	120
Eikanis	Jan Jonker's (Quaiep)	20	7	103
Jan Jonker's	The Turnaway	13	0	0
The Turnaway (from Quaiep)	Nosop	9	4	144
Nosop	Jonker's brother-in-law's place	36	0	85
Last place	Wit Vley	24	6	9
Wit Vley	Kabi Kobis	5	0	94
Kabi Kobis	Elephants' Fountain	25	5	40
Elephants' Fountain (by south-ern road)	Twas	35	0	0
Elephants' Fountain (by north-ern road)	Twas	48	2	132
Twas	{ Pass (in the range at the Damara) village) }	33	0	0
Damara village	Sand Fountain	16	6	32
Sand Fountain	Elephants' Kloof	9	4	144
Elephants' Kloof	Riet Fountain	57	1	117
Riet Fountain	Gnathais	30	6	161
Gnathais	Fort Funk	9	2	57
Fort Funk	Ghanzi	26	6	73
Ghanzi	Thounce	25	3	135
Thounce	Koobè	23	0	99
Koobè	Lake	45	5	54
West end of lake	Chief's town at east end	38	7	90

DISTANCES BY TROCHIAMETER—*continued.*

Place.	Latitude.*			Longitude.*		
	°	'	"	°	'	"
Walwich Bay	22	53	26	..	..	..
Oesip	22	43	57	..	..	..
Otjimbingue	22	20	0	16	5	30
Barmen	22	5	37	16	42	56
Eikanis	22	33	0	17	6	15
Quaiep	22	30	20	..	..	..
Wit Vley	22	24	50	18	26	0
Elephants' Fountain	22	26	15	..	..	..
Twass	22	35	30	19	20	25
Riet Fountain	21	53	0	21	0	30
Gnathais	21	52	45	..	..	..
Fort Funk (Gnuëgga)	21	49	38	..	..	..
Koobè	21	27	53	..	..	..
Lechulatèbe's Town	20	21	34	23	39	58

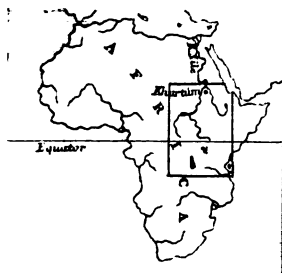
* The nature of the observations by which these results have been obtained is not explained.

HEIGHTS BY BOILING WATER.

	Feet.		Feet.
Lechulatèbe's Town	2260	Twass	3950
Ghanzi	3352	Quaiep	4463
Fort Funk	3310	Awass	4643
Riet Fountain	3450	Eikanis	3860
Elephants' Kloof	3752	Barmen	3575

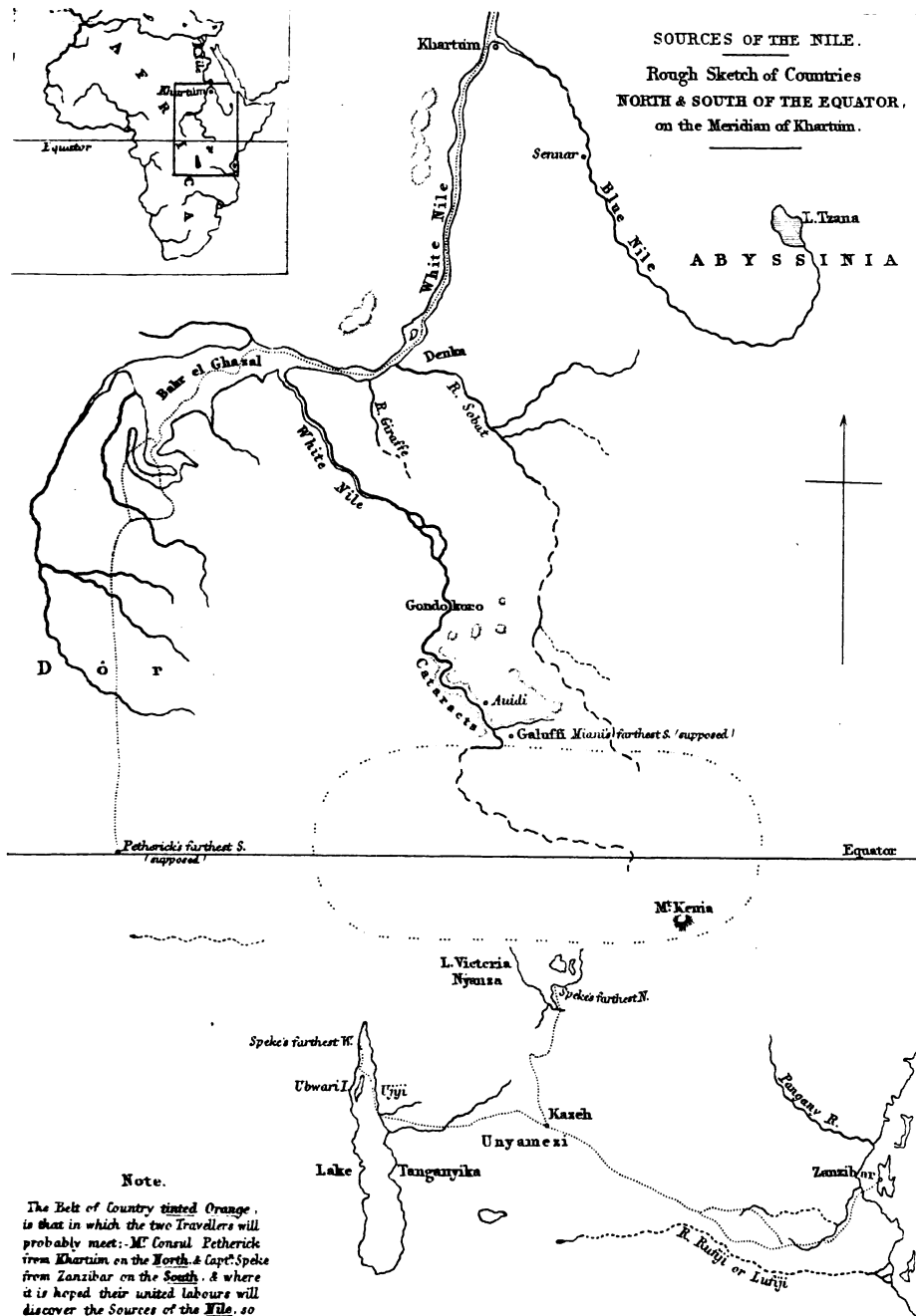
Consul Petherick's Expedition up the White Nile.

MR. CONSUL JOHN PETHERICK, at the request of the President, pointed out the difficulties and dangers which Capt. Speke would encounter in his progress from the hostility of the tribes north of the Equator. He would be unable to obtain porters—the only means of transit at his disposal—to proceed from one tribe to another, and without porters it was impossible he could proceed. His guard would have sufficient work to carry their own ammunition and fire-arms; and as no beasts of burden existed in these countries, he must have negroes to carry his provisions and beads. Should he succeed in reaching Gondokoro, his stock of beads would be exhausted; and from the pastoral character of the natives and their disinclination for work of any kind, particularly agricultural, he would have great difficulty in obtaining grain for the support of himself and people. Moreover, if he does not time his arrival at Gondokoro between December and February, when Arab merchants from Khartúm arrive at that place in boats, he will not obtain the means of transport down the Nile. It was necessary, in order to ensure the suc-



SOURCES OF THE NILE.

Rough Sketch of Countries
NORTH & SOUTH OF THE EQUATOR,
on the Meridian of Khartum.



Note.

The Belt of Country tinted Orange, is that in which the two Travellers will probably meet: Mr Consul Petherick from Khartum on the North, & Capt. Speke from Zanzibar on the South, & where it is hoped their united labours will discover the Sources of the Nile, so long sought by the scientific World.

Scale of Geographical Miles
0 100 200 300 400 500

cessful termination of Captain Speke's mission, that he should be met at Gondokoro with boats, provisions, and men; and if gentlemen would contribute towards the expense of the expedition, he should be most happy to devote his time and services to the object in view.

The PRESIDENT announced that subscriptions would be received at the Royal Geographical Society, 15, Whitehall-Place, in aid of Consul Petherick's Expedition, to co-operate with that under Captains Speke and Grant, *vid* Khartúm and the Upper Nile.

The meeting then adjourned to Monday, November 26th.

Second Meeting, Monday, November 26th, 1860.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*H. Cartwright, Esq.; Consul T. J. Hutchinson; and Captain S. Hyde, were presented upon their election.*

ELECTIONS.—*The Rev. L. J. Bernays; the Earl of Dunmore; Major J. B. Edwards; Lieut. A. Giffard Glascott, R.N.; Colonels W. L. Grant and W. R. Haliday; R. W. Keate, Lieut.-Governor of Trinidad; Lieut.-Colonel W. K. Loyd; Rev. R. Comyn Lumsden; Capt. Sir F. Leopold M'Clintock, R.N.; Capt. R. Playfair; Rev. G. Richards; Lieut.-Colonel L. Shadwell; Consul Don Ramon de Silva Ferro; Colonel Sir Anthony Sterling; Assist. Comm.-General E. Strickland; T. S. Begbie; H. W. Birch; A. Cave; J. Rodney Croskey; T. Devine, Chief of Surveys, Canada; N. Gould; B. Handley; A. Jessopp; F. Perkins, Mayor of Southampton; W. Richardson, M.D.; J. Sheren; J. C. Sim; J. W. Sullivan; and J. Irvine Whitty, D.C.L., Esqrs., were elected Fellows.*

EXHIBITIONS.—A globe, in relief, by Thury and Belnet, published at Dijon; Sonnenstern's map of Central America; Russian map of Northern Asia; and Johnson's deep-sea thermometer, were exhibited at the meeting.

ANNOUNCEMENTS.—The PRESIDENT stated that information had been received from Captains Speke and Grant of the successful starting of their expedition, and he trusted the Fellows of the Royal Geographical Society and the Public would join in promoting its equally successful termination, by contributing to the fund that was being raised to enable Consul Petherick to meet them with provisions and men on their arrival at Gondokoro. The Council of the Society had departed from their rule and allotted out of the funds of the Society 100*l.* for the purpose, and the Foreign Office

had contributed a similar amount. Private individuals had also subscribed something, but still without the assistance of the Public, this would be insufficient. It was intended to send to every Fellow of the Society a circular containing a statement of the difficulties which Captains Speke and Grant would probably have to encounter, and what was proposed to be done to provide for the 'safety of these adventurous men.

The Paper read was—

On the Physical Geography of the Sea, in Connection with the Antarctic Regions.

By Captain M. F. MAURY, U.S. Navy; Corresp. F.R.G.S., etc.

The PRESIDENT next said they were aware that the principal subject of the evening was a paper to be read by a geographer who had done them the honour of coming among them from the United States; a gentleman of world-wide reputation, who by the energy of his character and the power of his arguments had induced civilised nations to concur with him in adopting one great plan for ascertaining the meteorology of the ocean. He had collected the records and observations which had as yet been made upon the subject, and, with the assistance of the maritime nations of the world, was in course of receiving further information.

CAPTAIN MAURY, U.S., after detailing the statistical results of his labours for several years in this previously unexamined field of inquiry, proceeded to dwell specially upon the effects of the winds and currents in the southern hemisphere. He pointed out that, by a knowledge of the set of the winds, sailing vessels had been able to make greater average runs than any steamers had yet been able to accomplish, and this solely by attention to the force of the winds in certain southern latitudes. Before the course of the Gulf-stream was known, ships from Europe to New York in winter used to sail, first to Charleston, South Carolina, then coast it down to the Hudson. The voyage used to occupy them from six to eight months. The Nantucket fishermen were the first to discover the course of the Gulf-stream, and while English captains were taking six months to reach New York, they used to make the run sometimes in one month. Vessels running north of this stream in winter get their sails and rigging frozen, so that it is scarcely possible to make any headway. By running into the stream they thaw it, for the water is always warm, and is known by this and its intense dark-blue colour. It is provided as a reservoir of heat by the Great Governor of Worlds to accomplish his grand purposes. It is the influence of this stream which renders the climate of Britain so genial. Were it diverted to break upon the coasts of Spain only, the island of Britain would soon become a bleak, cold, and inhospitable region, with a climate as cold and a winter as long as Labrador; and Erin would cease to be named the Emerald Isle, for her fields would be covered

with snow during eight months in the year instead of green herbage. Captain Maury, in his observations to the meeting, dwelt also very prominently upon the characteristic difference in temperature, &c., between the Arctic and Antarctic regions. The mean average height of the barometer in low southern latitudes was about $28^{\circ} 2'$, and was never so high as 31° , whilst Captain McClintock had found it above that in 77° north latitude. The range of the barometer was invariably 1° lower at the least in corresponding latitudes in the northern and southern Polar regions. This was attributable, in one respect, to the preponderance of land and ice in the northern circle, and the greater quantity of sea in the south. Hence, as was noted in Keith Johnston's 'Atlas of Physical Geography,' the rain-gauge indicated a fall in Patagonia of 153 inches of rain in 41 days. In South Shetland, in 63° south latitude, a minimum thermometer, which had been left on shore there by some whalers for a long period, never registered a lower degree of cold than -5 ; whereas in 32° latitude in the United States they had a greater degree of cold than this. Another point on which he dwelt with some emphasis was the greater amount of force of the south-eastern trade-winds over the north-eastern, which might be characterised as 13 and 11 lbs. respectively of force to the square foot. He had calculated from the logs the speed of at least 2200 vessels from the Cape of Good Hope to United States ports, and had also had the experimental results of Admiral Chabannes to corroborate his views; and while vessels with the south-east trade-winds abaft made an average of $8\frac{1}{2}$ knots per hour, those going with the north-east trades made scarcely half that speed. After adverting to many other purely practical matters, Captain Maury concluded by urging upon the attention of the Royal Geographical Society the importance of extending the field of research in the Southern Polar regions, of which so little was yet known, while that of the Arctic regions was now pretty thoroughly explored and mapped. It might be asked what good would result from prosecuting this field of research? And perhaps it would be difficult to answer this question properly, so as to satisfy all. That there was, however, an untold mine of wealth there, even in a commercial point of view, he fully believed. The value of the fur seal fishery was something fabulous. He had conversed with an American whaler who had been concerned in the capture of more than 300,000 fur seals, and the value of their skins in one season was about 40 dollars each. But there was, moreover, a great deal of unexplored land there, which it was highly desirable to see defined; and as the climate was so much milder than the northern latitude, who could tell what openings for commerce

might arise there? Here was a field for exploration lying within eight or ten days' steaming of an important British possession (Victoria), and which was yet as little known as the interior of the moon. He trusted the Royal Geographical Society would do something towards removing this stigma on British enterprise. For the last twenty years France, England, Russia, and the United States had done nothing in the way of exploration in this quarter. Sir James Ross had penetrated farther south than any other navigator, but it was still no very arduous matter for some explorer to seek out a winter harbour, and ascertain whether there was not a secure anchorage for one or two vessels, from whence exploring parties might prosecute their researches by land and sea, by boats or over the ice, and tell the world what they had seen, and whether there were any mineral or other industrial resources available in that quarter. The prosecution of this enterprise lay at their own doors. If they made not haste to undertake the duty, it might be that the go-ahead American nation would be yet before them. If the British nation neglected this duty, it would be a reproach to them in after ages that they had neglected so fair an opportunity of adding to their maritime laurels, and to the high reputation they had already attained for ocean discovery and research in high latitudes.

ADMIRAL FITZROY, F.R.G.S., said it was impossible to estimate how immense was the debt which all countries owed to Captain Maury for the system of collecting and classifying observations which he had suggested, and which had been productive of such useful and practical results. Captain Maury came over to this country many years ago and asked for assistance in collecting the information and experience of navigators, but at that time his views were not considered of sufficient importance to induce the active exertions of this country in the cause which he had at heart. Hitherto the experience of the seaman had, as it were, been only available to himself; but by the method of collecting information adopted by Maury, the experience of the whole maritime world was made available for future generations. He should like to mention one fact with reference to the means by which Captain Maury had already effected so much. Through the United States Government he had been enabled during the last five years to disperse among our own countrymen, in our ships, on our waters, and for our special benefit, no less than 700 large quarto volumes of Sailing Directions, which had been eagerly asked for by every captain of a ship that had to make a foreign voyage. In addition to this, more than 12,000 large sheets or charts, each worth not less than 3s., had been distributed gratis, and not only distributed gratis, but sent to the persons who were willing to make use of them, and to collect similar observations for future use. For fifteen years had Maury been at work for the benefit of his fellow men; and if within the next few years, assisted by fellow-labourers in various parts of the world, similar operations were carried on as zealously, there could be no doubt that the most distant regions which could be reached by sea, their various peculiarities and atmospheric phenomena, would become as familiarly known as the Atlantic and the Bay of Biscay.

CAPTAIN JANSEN, of Holland, said, the practical result in his country had been to shorten the passage of ships to Java by a mean average of ten days,

and to Australia by eight, ten, and fourteen days. He had himself made the passage from England to Australia, following Captain Maury's sailing directions, in fifty-nine days, while another captain, who boasted that by making the passage along latitude 38° he would beat Captain Maury's route by at least ten days, was seventy days on the voyage, and upon arriving at Australia was astonished to find that he (Captain Jansen) had been so long in port.

CAPTAIN J. WASHINGTON, Hydrographer R.N., F.R.G.S., said he could not resist stretching out the right hand of fellowship across the Atlantic to the gallant Captain Maury, who had so nobly aided us in the cause of navigation. If our ships and our whalers made good voyages, it was to him that we were indebted; and he cordially agreed with him that no part of the world should be left unsearched that could in any way throw light on the subject of meteorology, and thus enable us to make voyages still more rapidly. Captain Maury, however, concluded his address by saying that it rested with England to explore the Antarctic regions. Now, ought we to accept so great a charge without a little inquiry? England had done her part in promoting voyages of discovery. Cook in 1770 and Ross in the present century, both celebrated circumnavigators, had visited these regions; and the South Shetland Islands were discovered by James Biscoe, in the employ of Mr. Enderby of London. Two celebrated Russians and two celebrated Frenchmen had also explored the Antarctic regions. With these facts before him, he would ask whether it might not rest with the United States to take up the question and to send out an expedition? They would meet, no doubt, with every assistance at Melbourne, or, if that place did not suit them, there were the islands of New Amsterdam in the Southern Ocean, frequented exclusively by American whalers, from which an expedition might be advantageously despatched. England and France had as yet done more to explore these regions than the United States, and, believing that there was at present little probability of our sending out an expedition, he ventured to suggest to Captain Maury that his countrymen should do it, and he could assure him that they would have our best wishes and cordial co-operation.

CAPTAIN SIR F. L. MCCLINTOCK, R.N., F.R.G.S., said as he had just returned from the Arctic regions he might be permitted to say a few words upon the formation of icebergs in support of the theory as to the existence of a large continent at the South Pole. So far as he had been able to see, it was necessary that there should be high land upon which glaciers were formed in the first instance. They were formed by deposits of water and snow, and were forced out by the pressure of the accumulated mass behind, until they were finally launched into the sea. And it was also necessary that there should be a vast quantity of moisture in the atmosphere to cause the rain and snow from which the glaciers were formed. On the shores of South Greenland there was a vast deal of moisture, and on the land a vast deal of glacier stretching continuously from the shore to a short distance inland; but advancing farther into the straits, and leaving the region of moisture behind, the region of the glacier was left behind. The two conditions which Captain Maury mentioned as necessary for the formation of glaciers existed in the north, and where those conditions did not exist, there was no glacier. With high land and abundance of moisture there was abundance of icebergs, while farther north, in the Archipelago of Barrow Straits, with a drier atmosphere, icebergs were not seen.

CAPTAIN SIR EDWARD BELCHER, R.N., F.R.G.S., also spoke of the formation of icebergs in the Arctic regions. From the beginning of September snow fell upon the mountains of Greenland to the southward, and continued to fall till November or December, when the cold became so intense that no more snow could be formed. In the following summer the sun thawed these

accumulations of snow, which flowed from the face of the cliff and formed layer after layer of ice, until at last the attachment of the ice to the parent stock of the mountain was so weak that it fell off into the sea and became an iceberg. Nothing was known of a salt iceberg, and there could be no formation in the sea of an iceberg. All icebergs were pure fresh-water formations. With respect to vapours on the Labrador coast, they would be due to the warm water of the Gulf-stream, which the cold air above would condense and cause to evaporate in the shape of fog, as we knew it did on the banks of Newfoundland. An equatorial current, similar to the Gulf-stream, passed down the coast of South America round Cape Horn, and no doubt caused the vapours which Captain Maury had referred to there. With the intense cold and the want of summer which we found at the Antarctic regions, it was impossible, he thought, for ships to find safe anchorage there, so as to be able to pursue the inquiry which Captain Maury wished to effect. If he were to go, and were to find a suitable harbour, he would let his vessel be frozen in and make the necessary observations during the winter, but he would take good care that some one should come next year to look for him.

DR. JOHN RAE, F.R.G.S., fully concurred with what had been said respecting icebergs. But he had witnessed another mode in which icebergs were formed, and that was by drift-banks over a precipice. When the wind prevailed to the north-west on lands having a south-west exposure, these banks were drifted up in the winter by a succession of snow-drifts. They sloped out to the sea, and he had seen them, in one storm, drift to the height of thirty or forty feet. As soon as the thaw came, the snow thawed at the top, and the water, percolating through the snow, got down to a temperature below freezing point, and froze the whole mass into solid ice. In this way there would be at times as much as thirty or forty feet of solid ice left over to the next season, when a second drift would take place. Thus, in time, a bank of solid ice would be formed, projecting out into the sea, and by the action of water and changes of temperature it broke off and formed an iceberg. He had also enjoyed the opportunity of witnessing the ice-flakes in Greenland, the appearance of which he described.

CAPTAIN MAURY, in reply to Captain Washington's remarks, said the United States also claimed Captain Cook as belonging to them, inasmuch as the Americans were British subjects in the time of Captain Cook. As for what the British Government had done for navigation, the office over which Captain Washington presided was the great centre of the hydrographical information of the world. All that he meant in his remarks was, to give fair warning that if England did not undertake these explorations, the Americans would show the way. He was happy to hear that his remarks about icebergs were confirmed by gentlemen who had had much more experience upon the subject than himself. With regard to the currents to which Sir Edward Belcher had alluded, he had always observed that, where the water was warmer than was due to the latitude, it came from the equatorial regions, and where it was cooler it came from the polar regions.

THE PRESIDENT, in closing the discussion, expressed a hope that Government would undertake the proposed exploration of the Antarctic seas, which, he added, was as much for the general benefit of mankind as it was for the glory of this country.

ADDITIONAL NOTICES.

Memorandum of a Journey from Khartúm by the White Nile, Bahr el Gazal, and in the Interior of Central Africa, during the years 1857 and 1858. By JOHN PETHERICK, Esq., F.R.G.S., H. M. Consul at Khartúm.

PREPARATORY to laying before you an extract of my Journal on an excursion from Khartúm to the Equator during the years 1857 and 1858, permit me to explain that my object in visiting countries and tribes hitherto unknown, was for trade; but at the same time with the determination to break new ground, and, however humble my means, to endeavour to add to our knowledge of the Centre of Africa.

The White Nile had already been navigated by D'Arnaud, Brun-Rollet, Vaudez, and my friends De Malzac and Don Ignatio Knoblecher, beyond Belignan, to a series of cataracts as far as $3^{\circ} 30'$ N. lat. These rapids unfortunately present an impassable barrier to sailing boats; as during the increase of the Nile, when favourable northerly winds prevail, they are too shallow for navigation, while on the other hand, during the inundation, when the draught of water is sufficiently deep to allow a boat to float over the obstacles in the bed of the river, the wind blows invariably from the south, and therefore nothing but a steam-boat could attempt the ascent.

Unfortunately for private enterprise, the introduction of steam-boats, even for so worthy an object as scientific purposes, is strictly prohibited by the Viceroy.

I might here mention that Vaudez, while occupied in endeavouring to form an expedition from the neighbourhood of Belignan eastward into the interior, was, with sixteen of his followers, all Arabs from Khartúm, suddenly attacked by the negroes of the Bari tribe, and all were brutally slaughtered.

The extracts which I have the honour to read to you have been taken from the journal of my expedition in the years 1857 and 1858; but lest they might mislead some into the idea that excursions so far into that terra incognita of Central Africa may be performed with a small sacrifice of time, allow me to state that the greater part of the distance achieved has been the result of five successive journeys, during an equal number of years, some of the principal difficulties and events of which I will, in the course of my narrative, introduce to your notice.

My first expedition, in the year 1853, reached only to the extreme confines of the lake Bahr el Gazal, of which I had been the first navigator; but owing to the rank cowardice of my men, who, on seeing a strong hostile party of negroes prepared to oppose my landing, refused to proceed, I was in consequence obliged to make an immediate return to the White River and Khartúm, under feelings, to say the best, far short of complimentary to Arab boatmen, Arab soldiers, and Arabs of every other denomination, but with a full determination to try it again.

The subsequent year, by having an increased armed force distributed in two boats, I not only effected a landing, but proceeded into the interior of the country, from the extreme navigable point of the lake, and formed an establishment among the Djour tribe, by leaving twenty-five men there.

Each succeeding year, by an increase of men in my employ, and establishing new posts or halting-places, I have succeeded in reaching a country which, according to my rough calculations, I believe to be near the equator, at Mundo in the Runga or Niam-Nam tribe, said by themselves, as also by neighbouring tribes, to be cannibals; of which, however, I have had no ocular proof.

Not having had the advantage of instruments to determine latitudes by observation, I have been confined to the use of a compass, and the rough calculation of the days' journeys performed.

According to the great speed with which the negroes in these parts are accustomed to travel, and reckoning an ordinary day's journey to be eight hours' march at $3\frac{1}{2}$ miles per hour, it will amount to 28 miles per day, and deducting one-third for deviation from a straight line, will reduce a day's journey to 19 miles.

EXTRACT FROM JOURNAL.

Khartúm, Dec. 27th, 1857.—After long preparations at Khartúm, I embarked at 4 P.M. in a large "dahabyeh" with three latine sails, a crew of twenty sailors, forty armed Arabs as a guard, and three dinkas, or liberated slaves, as interpreters; another boat with ten sailors and twenty armed men had preceded me as early as October, which I expected to find at the point of debarkation.

Dec. 28th.—Passed Gotaena, a small village on the east bank, where, by irrigation with the ordinary Egyptian water-wheel, called sakyeh, a little land is cultivated during the winter months only by the Arab population, assisted by slave labour, the produce of which is wheat.

Dec. 29th.—We arrived at Wallad Shellai at about 9 A.M. The country, with the exception of two islands on which wheat is cultivated, is on both sides generally sandy. In some places, stretching up into the interior, the soil is argillaceous, and consequently richer, supporting large herds of cattle, goats, and sheep, belonging to the Hassanyeh, a tribe of nomade Arabs inhabiting both sides of the river. The Hassanyeh, in stature and beauty, particularly the females, are superior to any other Arab tribe with which I have met. Their habits are certainly most peculiar, for they consider the marriage-tie binding but for four days in every week, namely, from Monday to Thursday inclusive, while during the remaining three, both husband and wife are independent of each other, and "sans reproche."

Dec. 30th.—A group of mountains of volcanic origin, Jebel Araschkol, west of the river, and some six miles distant, was in our rear, as also Dabassi, one of the last of a group of cultivated islands appertaining to the Egyptian dependencies. At sunset we were at Eleis, a small village on the eastern bank, and the last of the Egyptian settlements on the White River, being about $13\frac{1}{2}^{\circ}$ N. lat.

Dec. 31st.—The country on both sides uninhabited; the soil gravelly and poor, but the banks well studded with trees of the mimosa tribe.

Jan. 1st, 1858.—Both banks still continue thickly wooded with very fine mimosa, the soil rich. In the afternoon passed between islands also magnificently wooded, all with the same kind of tree as described; among which the common small blue monkey abounded. One of these islands was inhabited by a few Shillúk fishermen.

Jan. 2nd, 3rd, and 4th.—No settled habitations on either side of the river. The Dinka negro tribe inhabit the interior, east of the river, and in summer only, when the water is scarce, approach the river with their herds of cattle and flocks of sheep.

The Selaem Bagara nomade Arab tribes inhabit, during the summer months, the western side of the river, and obtain a livelihood from the proceeds of their large herds of cattle, elephant-hunting, and by pillaging the Dinka negro tribe, carrying off their children into slavery, whom they sell to the neighbouring hill-tribes to the west, and to the Arab tribes bordering on Kordofan.

Jan. 5th.—At 7 A.M. arrived at Kaka, a large village of the Shillúks, about half a mile from the western bank. There is a good market here, well attended by the Selaem Arabs, who bring yarn and a coarse cloth for sale. The negroes offer bullocks, sheep, goats, fowls, excellent capons, maize, millet, cotton, sesame, ground-nuts, &c., in exchange for glass-beads, which the Arab women will also readily accept for milk, butter, eggs, &c. Very neat small coloured mats are likewise manufactured and sold by the negroes, who, while bartering with us, were kept in order by some of the officials of the king, whose residence is at Daenáb, a few miles south of this.

The Shillúks compose one of the largest tribes bordering on the river; their territory extending nearly two degrees southward, and fully as far north, although in the latter direction they have no permanent settlement.

The Dinka tribe, their deadly enemy, occupies the eastern Nile bank, but are exclusively nomadic in their habits. Not so the Shillúks, who inhabit large villages, wherein their well-made conical huts of reeds are crowded close together, and present from the river a picturesque appearance. Their language is a vernacular, common to both of these tribes. The Shillúks are the best governed of any tribe I have seen. Their king exercises a strict authority over them, and inflicts severe punishments for offences. He does not go abroad, and when approached in his hut, it must be on the knees, as no person dares stand erect in his presence. He is addressed through his officials in attendance, and his answers are also conveyed through them.

Both the Shillúk and Dinka tribe extract the lower front teeth from children of both sexes, when at the ages of eight or nine, but circumcision is not practised.

I have never been able to learn that either of the tribes entertained any definite idea upon the subject of religion. The only individual at all resembling a priest is the rain-maker, who is supposed to enjoy supernatural powers. He is only applied to in times of extreme drought, and so little is he respected that, if he fails to produce the desired rain, he is illtreated, beaten, and in danger of his life, which he is fortunate in preserving by concealment in the bush until after a heavy fall of rain.

Having purchased a few sheep, fowls, eggs, &c., at 10 A.M. we were again under sail, and in the evening were passing the large island of Daenáb. The western side of the river is thickly inhabited, village after village appearing in quick succession, and, in many instances, but five minutes' walk apparently between them. Among these villages is that of Gova, under which, at 4 P.M., we made fast, when, long before we approached the shore, the chief, Dood, with a crowd of aborigines, men, women, and children, was waiting to receive me.

I had employed Dood to purchase ivory for me on several occasions during the intervals of my expeditions, and had always found him a good friend and trustworthy. On this occasion he was more than usually glad to see me, and, finding that his labours in my behalf had been crowned with more than ordinary success, I intimated to him, that if he would come down quietly the next morning, with his sons only in attendance upon him, I would make him a suitable present, and add a trifle to each of his sons; but that just then I could not do so, on account of the great number of attendants and idlers in his company, all of whom would expect to participate more or less in the gifts he would receive.

Jan. 7th.—Before sunrise Dood, with a crowd of men and striplings behind him, with their inseparable accompaniments of clubs and lances, were sitting on the bank of the river, at a short distance from the boat, waiting my appearance on deck; upon which a rush was made at me, with cries of "the Benj, the Benj" (the chief, the chief), and salutations too numerous to mention. As soon as the vociferations had subsided, Dood, disembarassing his mouth with

some difficulty of a quid of tobacco, the size of a small orange, seated himself near me on the deck, and motioned me condescendingly to a seat beside him. On inquiry what he meant by bringing with him so many men, most of whom I had never recollected to have before seen, he answered, "True, you have not yet seen the whole of my family; but, owing to your having promised to give each of my sons something on quitting you last evening, I sent to the Kraals; and here before you are all my fighting sons;" and, with the pride of a father, told me that he could depend upon them in any emergency, as his neighbours on the opposite side of the river, the Dinka, could certify. Although knowing something of negro families, I was still not a little surprised to find that his valiant progeny amounted to forty fine grown up young men and hearty striplings. Upon congratulating him, "Yes," he replied, "I did not like to bring the girls and little boys, as it would look as if I wished to impose upon your generosity." "What!" I exclaimed, "more little boys! and how many girls?—what may be the number of your wives and family?" "Well," said he, "I have divorced a good many wives; they get old, you know; I have only now ten and five, making fifteen!" But when he came to count the number of his children, he was obliged to have recourse to a reed, which, breaking up into small pieces, he said, "I never take notice of babies, as they may die in the rearing; women are so foolish about children, and I never care for them until they are able to lay a snare and take care of themselves." Then, as a negro cannot count beyond ten, he began calling over a string of names; and when he arrived at the end of his arithmetic, placed a piece of reed on the deck before him, recommencing another piece of reed, equivalent to a second ten, and so on, until he had counted over and marked the whole of the males; after which he dotted down the female members of his happy family; the sum total of which, leaving out babies and children unable to care for themselves, according to our numerics, amounted to fifty-three boys and twenty girls, which on inquiry I found to be correct. Having been afterwards favoured with an introduction to the ladies, each in a separate batch of huts, I had a farther opportunity of complimenting this still sturdy chief on the beauty of his youthful wives, and also on the graduated scale of the various proofs of their affection towards him. Having spent a very pleasant day with my friend at Gova, I got sail on the dahabyeh before sunset, and passed on through a level country agreeably interspersed with trees. The bifurcated palm and another kind of tall palm, called by the Arabs "*delaeb*," are frequent, as also is the "*heglig*;" the mimosa on the other hand is becoming rare.

At 7 P.M. passed the mouth of the Sobat, where it is about 100 yards wide, and has been navigated for a distance of perhaps 200 miles, when it is found to divide itself into three branches: the principal one, still navigable, coming from the north-east, is supposed to have its source in the Galla country; the other two branches, the one flowing from the east and the other from the south-east, are only navigable during the inundations, and supposed to have their origin among the Bari, a dark-brown, well-made race, fond of ornament and of something resembling clothing.

At 10 P.M. we passed another branch of the Nile, flowing from the south-east, scarcely half the size of the Sobat, called the Giraffe River. This also navigable stream drains the eastern Nile bank, and in every sense of the word is a branch of the White River, from which it detaches itself in the territory of the Bir tribe, at 5° N. lat. The large island between it and the White River is covered with thick bush, and is a favourite resort for herds of elephants. White antelopes, buffaloes, giraffes, and rhinoceri, afford an occasional diversion from the more exhilarating sport—at least to an ivory-trader—of elephant-shooting; and even at night, when sleep would be a relief, excitement is not wanting to drive off a few disgusting hyænas, or sometimes a lion or lioness

with her over-grown cubs, which, in spite of watch-fires, will not unfrequently intrude upon the precincts of the hunter's privacy, when often a louder roar than one would think necessary, or at least agreeable, will, in spite of themselves, operate instantaneously upon less experienced followers, and, without reflection, bring them with a start to their feet.

Jan. 7th and 8th.—We continued steering west, with a little northing, say from 5° to 10° , until, at 11 A.M., we arrived at a large basin, the White Nile flowing into it from the south, while we steered out of it west by 40° north. We now entered the channel of the lake, called the Bahr el Gazal, by which its surplus waters are discharged into the Nile. The current out of the lake into the White River I estimate at about a quarter of a mile per hour, the width of the channel being about 40 yards, and the depth 15 to 20 feet.

Soon after entering it, a large sheet of water overgrown with reeds, apparently dead water, is visible, stretching to the south and west, divided by a narrow tongue of land running between it and the channel we navigate, along its northern bank, which, as far as the eye can reach, is low, covered with coarse grass, and apparently uninhabited.

Jan. 9th.—At 9 A.M., two villages belonging to a very warlike tribe of negroes, the "Nouaer," on the northern bank, are the only habitations visible. This tribe inhabits also the eastern Nile bank, to a considerable extent into the interior, and carries on warfare among the neighbouring Dinka tribes, taking off their cattle and children, and spreading devastation wherever they penetrate; they are also famous elephant-hunters.

The men of this tribe plait their hair Arab-fashion, and plaster it over with a thick coat of potter's clay, which at a distance gives them the appearance of wearing helmets.

Jan. 10th.—In many places the surface of the water is covered with beautiful white lilies, of large dimensions, and beneath is a plant displaying a fine network resembling moss, the fibres of which are long and delicately interwoven, plainly visible to a considerable depth, owing to the great clearness of the water.

At sunset we were entering on an immense expanse of water, for the most part covered with reeds, about $2\frac{1}{2}$ feet above the surface, and bending with the wind, among which appeared at different points open pieces of water. This lake is the accumulation of numberless rivulets and streams, the largest of which, flowing from the south-west, is in itself a considerable river, and were it not for the density of the high and strong reeds, completely blocking up its connexion with the lake, it would be navigable for a very considerable distance into the interior.

The Bahr el Gazal may truly be called the home of the balinaeae and hippopotami; in such great numbers do the latter occasionally appear with their heads above the water, that one would think a passage through them impossible; and so fierce are they, that on more than one occasion I had literally to fight my way through them; even attempts at boarding were made, which only a liberal distribution of ball, discharged into their open gullets, could effectually prevent. As may be supposed, the sport was great, although the amount bagged was not as much as might be anticipated, owing to a desire of losing as little time as possible; one or two carcasses supplied the crews of my boats with soups, steaks, &c., though perhaps not exactly "à la mode."

Jan. 11th.—Continued navigating a wide open channel in the reeds against the slight current. Some clusters of trees are visible northwards, but whether on an island or on shore we could not distinguish.

Jan. 12th.—At noon view low land westward, and, in the afternoon, we are sailing up a channel a mile across, with low land on either side, where the current is stronger than heretofore.

Jan. 13th.—At 10 A.M., after following the channel above described, and winding about almost from north to south, the water again expands both east and west; but south we are approaching land, and at 11 A.M. make fast our boats at the island of Kyt, which is about two miles long, and half a mile wide, and separated from the shore by a channel of about 60 yards in width. Having now sailed five days and nights since leaving the Nile, I consider to have made good 300 miles, at the average of 60 miles per day; but owing to the tortuous course of the navigation, I should deduct three-eighths for windings, which would place the navigable extremity of this lake about 180 miles from its connexion with the White River. The width I am not prepared to judge so correctly, but am inclined to think it not to exceed one-third of that extent in its widest part.

With the means at my disposal it would be presumptuous to be positive about latitudes, but from the notes of my boat's steering, and a rough guess at distances, taking for granted D'Arnaud's statement that the mouth of the Bahr el Gazal is in $9^{\circ} 11''$ N., I believe the island of Kyt to be about 8° N. latitude.

Jan. 14th.—In company with the boat that I had sent in advance, my dahabyeh being, from former visits, well known to the natives, a large number of them came down from the interior for the purpose of conducting me to my station at the Djour, when I appointed the 17th as the day when I should require them. My sailors, glad to have ended their voyage, cleared the decks and kept up dancing to the sound of the tarbouka, and clapping their hands to the measure, until a late hour; the donation of a few bottles of arrack greatly increased the general conviviality.

Jan. 17th.—Made a start at 8 A.M., with 52 negroes as porters, of the Raik tribe, in whose territory we were, carrying glass beads, provisions in baskets, and my personal baggage on their heads, and 38 of my own men, exclusive of two Dinka interpreters, all well armed with muskets or fowling pieces.

At 11 A.M. halted at the village of Con-Quel-a-Ken (stationary or fixed), near a pool of stagnant water, which, the day being hot, both Arab and negro appeared to enjoy.

Having refreshed ourselves under the shade of some large sycamore trees, we broke up at 3 P.M., and at sunset arrived at Moi Chin (give it me in my hand), in which village we were well received by the inhabitants, who, in exchange for small black and white beads, called *akoitsh*, readily supplied us with maize, fire-wood, water, mats, and straw to sleep upon.

The chief or Benj, and some of the elders, expressed the pleasure they felt at again seeing me, by spitting on the palm of my right hand, and in my face, which compliment, to their great satisfaction, I returned with interest. At an early hour the watch-fires being lit, and guards set, the greater part of my men were soon fast asleep.

Jan. 18th.—Before sunrise we were continuing our journey, and after a march of $4\frac{1}{2}$ hours, halted at the extremity of the straggling village of Agoig (rich, nourishing). The country through which we passed was a dense wood of sycamore, tamarinds, heglig, and tullach, the latter the only tree bearing thorns, which are nearly two inches long; cacti also abound, upon which superior cochineal exist. At 3 P.M. we were again *en route*, and, half-an-hour after sunset, arrived at the village of Affoock, but it being dark, the natives, according to custom, had retired to their huts, and would have nothing to do with us, so that my wearied men had no refreshment.

Jan. 19th.—Having a long march before us we broke up half-an-hour before sunrise, and after six hours' hard walking, which knocked up some of the Khartumers, arrived at the principal village of the Awan tribe, called Faqualit (the place where the man died of thirst). The country well wooded with the same kinds of trees as before, the grass coarse, and standing from two to three feet high. The day was hot, and the men being fatigued, I bought them a

fine bullock, for nine pigeon-egg beads, for their dinner, whilst I dined on a Guinea fowl that my pot-hunter had shot.

Jan. 20th.—Refreshed by our afternoon's halt, we made an early start, and arrived at the very straggling village of Ackweng, belonging to the Ajack tribe, where, reclining under some fine sycamore trees, which afforded good shade near the wells, we were soon, for cowry-shells and glass-beads, supplied with sufficient provision for a hearty meal.

We continued our march at the usual hour, and at sunset were quartered, as was our wont, in the open air, in the last of the Ajack settlements, the village of Ogum.

Jan. 21st.—The sun found us marching through the bush, and four hours later we were entering Auel-chi (the ground covered with milk), belonging to the Neanglau. Here two negroes, Courjouck and Anoin, who had the previous year accompanied me voluntarily to Khartúm, left me to rejoin their friends, who presented me with ground-nuts, and a couple of goats, for my kindness to their relatives.

We remained with these hospitable people until 3 P.M., and at 5 crossed a small stream, about 20 yards wide and 3 feet deep—one of the tributaries of the lake—flowing north.

During the last hour several groups of negroes were hanging about inquisitively, at some distance from our line of march, apparently with a desire to approach, but of which they seemed to doubt the prudence, notwithstanding that I made signs to them and occasionally halted to encourage them to advance.

At length a tall man, wearing a large ivory armlet above his right elbow, whom I well knew, nick-named by my men "Abu-Aag" (the father of the bracelet), as one of the foremost men of the tribe, both in hunt and fight, having come within talking distance, raising high his club, invited us to bivouac near his village, and that before dusk both he and his brother would come and welcome me, provided the Benj (myself) would promise a friendly reception. I then approached him, carrying my rifle as a walking-stick, until he beckoned me to stop, and I promised him, his brother, and the whole tribe if he liked, a safe and cordial interview, but that I had nothing to offer them to "cham cham" (eat); upon which, waving his club as a token of assent, he retired. Continuing our route, a little before sunset we bivouacked near some deserted cattle-kraals within sight of the village of Angoin, the chief of the Neanglau or Bustard tribe.

We soon made ourselves comfortable, with watch-fires lit, and sentinels on duty. My men were bandying jokes about my order to light the cooking-fires, in the face of there being nothing to cook; while, in the full enjoyment of tobacco, on my carpet at a convenient distance, I could not but admire the ready wit of my ever-willing followers, as they returned out of the thick bush with loads of wood.

I was not deceived in my hopes of a supper; some half-grown and unclad sable maidens, ornamented with beads of a variety of colours tastefully strung, and worn round their necks, waists, and ankles, charily seemed to wait for an invitation before approaching too near; I went to meet them, and seeing they had fresh milk and flour, brought them to the bivouac, and consigned them to the caterer, who had, according to custom, invitingly displayed on a dressed antelope-hide, his varieties of the so highly prized beads and cowry-shells.

My pretty guests had no sooner concluded a rather hasty barter than they retired, laughing heartily at having done us out of costly ornaments for such common-place things as milk and flour; when a still larger party of matrons, and their full-grown daughters, the former for love of gain, the latter with greater desire for ornament than dress, of which they exhibited the greatest possible independence, encouraged by the success of their young friends, who

had been sent in advance to reconnoitre, now made their appearance with larger quantities of provender of various descriptions, which my sharpset men greeted with hearty welcome.

This tribe, having raised among their neighbours and themselves fully 6000 men, fought me last year, and as I had no proof of what their intentions might now be towards me, all was not "couleur de rose." One half of my men, apparently thoughtless of treachery, were lying in careless positions with their arms, while the remainder of the Khartúmers were feeding bonfires, hewing wood, and performing the manifold services connected with the culinary department. The Raik, porter-negroes, squatted round the watch-fires, and although an occasional shrill laugh was heard, they unmistakably expected the promised visit of the chief and his renowned brother, but whether it would go off peaceably, or we were to repel an attack, I rather felt than heard asked, and responded to in whispers.

A distant whistle was now heard, which was responded to by the departure of all the women, even of those who had still articles unsold; and in two minutes the loud hum and merry laugh gave way to silence. After a short suspense a strange voice called for Abdullah, an invaluable old negro interpreter of my party, and asked leave to approach, which, on being complied with, the chief and his brother stepped from out of the surrounding darkness into the light of our watch-fires, followed by a score or so of men leading a bullock. I rose and led him to a seat near my couch, which, however, he rather evaded, casting a searching look all round; when reassured, and invited by Abu-Aag's easy manner, they seated themselves in a semi-circle before me, carefully depositing their clubs and lances on the ground beside them, within easy grasp of each man's right hand.

After an exchange of formal greeting, with perhaps a little more of etiquette than candour, Abu-Aag, in a frank manly way, said, "As a shower is succeeded by sunshine, so does peace follow war. The chief of the mighty Neanglau having fought you, now offers this bullock as a token of the peace, which he means to propose to the great White Chief when he arrives at his head-quarters among the Djour." My reply, "*Afwat*" (good), when said with a certain intonation, conveying the meaning of a whole sentence of approbation, charmed both guests and followers, who, in as short a time as it takes to relate it, had the poor bullock struggling under the knife.

Restraint had now been thrown off between my guests and myself, for although they would not join in the meal, the materials for which they had so bountifully supplied, they willingly joined in the general good humour, which a liberal allowance of "*man*" (a thick fluid of uninviting colour, but better taste, which may be translated into beer, although in appearance resembling harm) now began to produce in all parts of the camp; and mixing with the Arabs, several of whom they recognized, partook freely of the muddy beverage, until supper being announced, they withdrew, well pleased with the happy termination to the interview.

Jan. 22nd.—We were up and stirring with the sun, having the prospect of a five hours' march before us to reach my station at the Djour. We struck out lustily, following a winding pathway, which soon brought us into thick bush, and led us now and then across highly picturesque glades, studded with fine trees, the "tout ensemble" of which forcibly reminded me of many a noble park at home. Here we disturbed herds of giraffes and antelopes, the former browsing on the young shoots of a species of acacia, while the latter were attracted by some still green blades of grass, protected by the shade of thick bushes from the withering rays of the sun. Decoyed by the prospect of sport so alluring I succeeded in shooting a giraffe, which my delighted negroes, scorning the operation of skinning, soon reduced into portable pieces for the noonday meal.

The huts of the village still threw their shadows westward as we entered Coetchangia (where the panther was killed), in which was my station, where we were received with a volley from my delighted garrison, and shouts of joy from the aborigines both old and young. Among the first to bespatter me with his endearments was the old chief Akon Dit (Dit, a term of respect, as excellency is prefixed in Europe, and Akon, elephant—the old man having been an intrepid and successful hunter). So many were the welcomes inflicted upon me by my friends, to whom I had become endeared by the profits of trade, sundry gifts, and the recollection of many a carcass of buffalo and elephant, which had fallen to their lot, the proceeds of my rifle, that I felt myself blinded, and my face streaming from the effects of their kindness, which, however flattering to my vanity, I was but too glad to curtail by a more hasty than dignified retreat into my hut.

The style of dress of the young and unmarried of my lady visitors I have already described; the married ones wear hides of antelope and sheep-skins, two of which are worn attached to the waist; one in front, and the other behind, extending to near the ankles; the edges of the front one are neatly bordered with variously-coloured beads, while small iron rings and bells of their own manufacture, form the ornaments of that behind.

The tribes through which I have hitherto conducted you from the lake are strictly pastoral, possessing large herds of cattle, and less numerous flocks of sheep and goats, upon which they mainly depend for support, rather than on agriculture, which, despising as an unmanly occupation, they leave entirely to the females, and is confined to the cultivation of small quantities of maize or millet, cotton of good staple, ground-nuts, gourds, and yams. Their field is a small patch of ground, in the immediate vicinity of their huts, which, unlike the Shillúks, are placed at considerable distances from those of their neighbours, each group of which appertaining to the same family, are defended by strong and high palisades for their protection against wild beasts. Their sheep and goats afford them neither wool nor milk, and dependent entirely upon the produce of their cows and the chase for nourishment, sometimes, from a deficiency of grain, many have died of starvation; and frequently while shooting in the bush have I beheld skeletons of children, in twos and threes, who have dropped and died from want while in search of gums or berries to satisfy their hunger.

We have now entered into a latitude, according to my calculation about 8° N., where the tsetse fly abound, and where consequently cattle can no longer exist; therefore the Djour tribe, as well as those in more southern latitudes, are agricultural in their habits.

Iron ore, a rich red oxide, is found here, which the Djour, who are capital smiths, turn to account by the manufacture of lances and hoes, which they exchange with their pastoral neighbours for fat oxen and beads.

The Djour are a small, powerless, and consequently peaceable tribe, who having tasted the profits of their industry—in the manufacture and sale of iron implements of war and husbandry—entered eagerly into the spirit of the ivory trade, and would collect and purchase tusks wherever they heard of them within their reach, to retail to me at a small advantage.

Although my advance thus far may appear from these extracts to have been smooth sailing, yet from the plundering and cut-throat propensities of my present friends—the Dinkas—it has during preceding years called forth all my energy and nerve, not only to make good my footing, but to insure the lives of myself and followers.

While on my first journey into the interior, in the year 1854, I pursued a more westerly route, with thirty-five Arabs, and ninety negro followers of the Raik tribe, as porters; and after having entered the Wajkoing tribe I was

placed in as awkward a fix as any man with an ordinary love of excitement could desire.

The savages, during my absence shooting in the bush, had, by dint of hard threats, induced my porter-negroes to abscond, and by their refusal to provide me with substitutes, hoped to compel me to abandon my baggage, which offered a prize far exceeding their hopes of gain by legitimate trade or labour. Disappointed in their expectations, collecting by hundreds, they used threats and menaces, calling us frequently to arms during many a weary day and watchful night. After six weeks of patient and trying endurance, a detachment of my men induced the Waj chief Maween, ever after my staunch friend, to bring one hundred men under their escort to my relief, and conducting me through his own territory, eventually left me with the Djour, among whom I succeeded in engaging porters to return to my boats.

In expectation of concluding a peace with the chiefs of the neighbouring tribes, the most formidable of whom was Angoin of the Neanglau, I may as well relate what had led to the rupture between us, as it will serve to throw a light on the slight estimation in which human life is held by these tribes.

My success in the ivory trade had created a jealousy among the mercantile community at Khartûm, and had induced several parties to get up expeditions similar to my own, and, to my great annoyance, follow my footsteps, rather than break new and dangerous ground. One of these parties, on two occasions while on the march, had been fallen upon by the negroes and plundered.

In the first instance, added to the loss of their property, eight out of twenty-four of their men had been murdered by the Ajack tribe, a fate which, no doubt, the entire party would have suffered, had it not been for the providential and unexpected arrival of another Arab company in time to extricate them. A few days after this occurrence, and without any knowledge of it, a second and smaller detachment of nine men, in the service of the same person, were sent from their temporary establishment to their boat on the lake, and were all brutally murdered by the Neanglau, at a distance of about 20 miles from my head quarters.

These facts were for a considerable time kept secret from me, as it was determined, in consequence of the easy prey the last party had proved, to fall upon us, and secure to themselves a more valuable booty. The Djour would not join the neighbouring Dinkas, who comprised the entire negro population, composed of six tribes, between me and the lake, and, in order to take a neutral part, decamped during the night, without any warning, from their huts into the bush.

My first object was to afford protection to the unfortunate Arab merchant, the principal of the murdered men, and his ten ill-armed remaining followers, by taking them into my camp, with whom and my own men—at the time but thirteen in number, and these reduced by illness to only six able men—we set about barricading and strengthening our position, where we stood a six weeks' siege.

At last my men, consisting of two detachments of thirty-five each, although among a far distant tribe, the Dôr, heard of my situation, and, joining, came to my relief. I now no longer feared an attack by day or night, which had often been threatened; but a friendly Djour named Pfling, a valued companion in frequent exploits with elephants, under cover of the night, informed me that Meckwen Dit, the chief of the Neanglau, and leader of the tribes, had determined not to expose himself or men to the effect of our firearms in the open plain round the village, but to occupy in preference the thick bush, through which we should be obliged to pass on the way to regain our boats.

Having secured the safety of a large quantity of ivory and valuables among my southern friends the Dôr tribe, the rainy season being at hand I decided,

at whatever risk, to commence my return. With the certainty of an attack from vastly superior numbers, in a disadvantageous position, I determined to out-manceuvre my enemy; and knowing the tribes to prize cattle above anything on earth, decided on a counter-attack upon their Kraals, which, in expectation of encountering me on my line of march, I conjectured might possibly be ill-defended.

Starting with sixty of the best armed of my Khartúmers, having given Meckwen Dit and his Dinkas in the bush a wide berth during the night, at sunrise on the following morning we were, as I had anticipated, quickly in possession of their Kraals; the few negroes in charge, after a short resistance, abandoned their herds to us. We were yet busy in detaching the cattle from their tethers, with which each was secured by fore and hind legs to pegs in the ground, when the old Neanglau chief, at the head of a large party of negroes, yelling and flying rather than running, assailed us with volleys of clubs and lances.

The first to drop from the fire of my exasperated followers was Meckwen Dit, the author of the preceding murders, and the zealous advocate for our own destruction; around him fell also several of his bravest warriors, and as impetuous as the onslaught had been was their flight precipitate.

Our booty consisted of a herd of cattle and some sheep, several guns and pistols, which had belonged to the unfortunate Arab victims, and sundry prisoners, whose restoration I looked upon as a means of re-establishing peaceable, if not friendly relations between us. In this I was not disappointed. The discomfited Dinkas never having contemplated a reprisal by me so mortifying to them as the loss of their cattle, now feared a repetition of a similar attack on other Kraals, to prevent which they engaged the good services of my old Djour chiefs, Akon Dit and Pfiing, to negotiate a return to our former peaceful alliance, which by their guarantee I was but too willing to embrace, and thus rid myself of the prisoners, who were all given up, my object in visiting the country being a peaceful one—namely, trade.

The cattle went to reward my friend Maween, the Waj chief, for his assistance in helping me out of my fix among the Wajkoing.

While journeying homeward towards the lake, a few days after the above affair, and proceeding through the Ajack tribe, they, hoping to retrieve their fortunes, while acting in concert with the Neanglau, attacked me, and were again defeated.

Jan. 24th.—The tribes now seemed to deplore with myself the melancholy consequences of their barbarous assaults, and I had this day the pleasure of receiving their chiefs—six in number—accompanied by several heads of neutral tribes, among whom was my old friend of the Waj, to unite in assurances of their peaceful intentions for the future. I am happy to say that, under the conviction of the advantages which peaceful traffic would confer on them, and the futility of opposing their crude weapons to firearms, I have ever since enjoyed uninterrupted respect from, and cordiality with, the Dinka tribes.

Jan. 25th.—I broke up, with forty of my own men and fifty Djour negroes, soon after sunrise, and passing into the territories of the Dôr at noon, when we halted an hour in thick bush, through which the most of our route lay, we, after ten hours' march, arrived in the evening at the village of Djau, so called after the chief.

Finding my journal might extend to impracticable dimensions, I shall curtail it, by merely giving the names of the villages at which we passed the nights whilst traversing the Dôr country southwards.

Henceforth the negroes will not proceed more than one day's journey with me, so that I have to get a new set of porters every morning, and lose all connexion between us and our station and boats.

Jan. 26th.—My old friend Djau having prepared our porters, we were early on the road, and during our journey to the frontier of the country, quartered at the following villages, viz.:—Kurkur, Maeha, Mura, Umbura, Modocunga, Miha, Nearhé, Gutu, Mungela, Ombelambé, Lungo, and Umbotea, which, after several halts, we reached on the 19th of February, after sixteen days' march. Between Djau and Maeha six small streams, and near Gutu a large navigable river, are crossed, all flowing from the south-east in a north-westerly direction towards the lake, which they feed.

The country, from the lake up to the Djour, is exceedingly flat, but in the Dôr country it first becomes undulating, where the new red sandstone crops out on the sides of several heights and ravines until near Gutu, Mungela, and Ombelambé, bold red granite mountains, with exceedingly large mica, rise perhaps 2000 feet above the level of the country.

Generally the country is thick bush, but cleared in the neighbourhood of the villages, and in a high state of cultivation.

The Dôr are not so tall as the Dinka tribes generally, but thick-set and strongly made. They speak a totally different language, and their colour is dark-brown. Unlike the Dinka, they do not extract the front lower teeth, nor do they construct their villages similarly. Their huts are larger, made of bamboo, and nearer to each other, without palisades.

As a general rule, the centre of each village consists of a circle of huts, constructed around the largest tree in the neighbourhood, upon which the war-trophies—such as skulls, &c.—are suspended; underneath is a large tom-tom, formed of the hollowed trunk of a tree, and between it and the huts a large circular space forms the dancing-ground.

Their arms consist of bows and arrows, clubs and lances, which both Dôr and Djour, who are excellent smiths, manufacture exceedingly well.

The women perforate the under lip, in which they wear a piece of round wood for ornament. Young girls introduce a piece of wood about the size of a sixpence, whilst full-grown women wear pieces as large as a florin.

Married women, in lieu of aprons, wear bunches of green leaves suspended by a belt to the waist, hung down to the ankles, which latter are ornamented with a solid iron ring, each fully one inch in diameter. Whilst dancing, these rings are struck together, and produce an agreeable sound.

Feb. 23rd.—After a few days' rest, and some trouble in procuring an interpreter, we traversed a hilly and rather dreary country, and, after a forced march of ten hours, we arrived at Baer, also called the Mundo country. This tribe resemble in colour and habits the Djour, from whom perhaps they are descended, as their languages much resemble each other. They are also good smiths.

Occupying a hilly and almost mountainous but narrow strip of country between two powerful tribes, they are hunted by the Niam-Nam, their southern neighbours, and when taken become their slaves.

Their villages are either on the summits of the hills or at the foot of some rock difficult of access, to which they fly when attacked by the Niam-Nam, whom they say are cannibals.

We remained with this tribe three days, having with difficulty found a dozen men to carry on my beads, baggage, &c.

I should have said that I had left the greater part of my merchandise at Lungo among the Dôr, in order to be less encumbered.

Feb. 24th.—At sunrise recommenced our journey, and passing through some fine ravines, gradually came out upon a fine undulating country, in parts beautifully wooded. We halted under the shade of some very large trees, the leaf of which much resembles that of the fig-tree, for an hour at noon, and at 4 p.m. entered the large village called Mundo, in the Runga or Niam-Nam tribe.

It was some time before I could feel comfortable; the sight of my white skin, added to a quantity of cowry-shell and glass-beads in my possession, having excited great curiosity, and a strong desire to become possessed of both our persons and goods, the former, as explained to me through a string of four interpreters, for the purpose of feasting on.

The old chief Dimu with some difficulty managed to persuade the younger men that we might probably be difficult of digestion, being armed with weapons which they had neither seen nor heard; and being told, after having presented the old man with a few beads of different kinds, that they might have beads or cowries in exchange for provisions and elephants' tusks, we were very soon offered every kind of food they possessed, consisting of sweet potatoes, beans of different kinds, ground-nuts, maize, millet, vegetable-butter, dried meats of the antelope and buffalo, and, as a great luxury, the hind-quarters of a dog, unskinned and just killed.

Others ran to the bush in quest of tusks, which for the greater part proved valueless, owing to the length of time they had been exposed to decomposition by fire and rain.

The greater part of the men present, consisting of some hundreds, were slaves, of which the Runga are large proprietors, and entertain them for the purpose of cultivating their lands, hunting, and performing every kind of work; it being considered a sign of poverty for a native Niam-Nam to occupy himself with anything but the chase and war.

The country is well cultivated, and the villages well constructed of bamboo.

The Niam-Nam are of ordinary stature, and a dark-brown colour. Their arms consist of spears, a kind of curved sword, and an iron boomerang, two of which they attach to the handle of a large oblong shield, constructed of interwoven and stained reeds of the palm-leaf. Both men and women wear leather sandals, and a kind of cloth, woven from the fibres of the bark of trees, around the loins. The date-palm tree and the banana grow wild. The indiarubber tree, as also the vegetable-butter tree, exist in abundance.

The rains commence in the month of February, and last until the latter end of October.

The territory of this tribe, I was informed, extended ten days' journey south, where a deep and wide river, flowing west, was said to be its frontier.

Having marched twenty-five days from the shore of the lake, at 19 direct miles per day, will amount to 475 miles, which brings me, I imagine, near the Equator.

What with the purchase of several tusks and our daily provisions, my stock of beads had seriously diminished, and I obtained the promise of a score of negroes to conduct me back to Lungo, in the Dôr country, to my dépôt.

It was not without a sincere promise to return and bring more beads that, at sunrise, I was enabled to leave the hospitable old chief Dimu and my Niam-Nam friends, whose salutations were not so marked as with the Dinkas, but who confined their adieus to an ordinary squeeze of the hand.

Having in due time returned to Lungo, I left twenty-two of my men there well supplied with articles for carrying on trade with the Dôr, Mundo, and Niam-Nam tribes, until my return the following year.

Should they fall short of beads, or from other causes be unable to maintain their position, they were directed to fall back on my principal station at the Djour.

On my way up, having occasionally purchased tusks, and invariably, to save expense of carriage, left them in charge of the chiefs, I necessarily returned through the same villages, and in due course of time arrived, on the 15th of May, at Khartúm.

*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 Khartúm 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 dépôt 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.

* *List of Instruments, Books, &c., supplied to Consul Petherick by the Society.*

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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.

CONSUL PETHERICK'S *Expedition from KHARTÚM on the NILE, to co-operate with that under CAPTAINS SPEKE and GRANT from Zanzibar on the East Coast.*

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PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1860-61.

Third Meeting, Monday, December 10th, 1860.

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

PRESENTATIONS.—*Thomas Begbie ; J. Rodney Croskey ; and J. Irwine Whitty, D.C.L., Esqrs., were presented upon their election.*

ELECTIONS.—*Dr. J. Cornwell, PH. DR. ; Lieut.-Colonel Lothian Sheffield Dickson ; Sir Jamsetjee Jejeebhoy, Bart., of Bombay ; Dr. E. J. Pearce, PH. DR. ; and A. M. à Beckett ; W. R. Looker ; J. A. Mann ; G. Philip ; and W. Spencer Stanhope, Esqrs., were elected Fellows.*

ACCESSIONS.—The following were among the more important accessions to the Library and Map Rooms since the last meeting:—Maury's 'Physical Geography of the Sea;' 'Den sidste Franklin-Expedition med Fox, ved Carl Petersen;' Hope's 'Canadian Settler's Guide,' &c., &c.

EXHIBITIONS.—Views of Rangoon, photographs of various parts of Burma, by Dr. M'Cosh, M.D. ; and tracings of the Irawaddi, Salween, and other rivers, by Captain R. Sprye, were exhibited.

ANNOUNCEMENT.—The CHAIRMAN read a letter from Dr. Baikie, F.R.G.S. (of the Niger Expedition), dated Bida, Nùpe, 24th April last, announcing his arrival at the above place, hitherto unvisited by Europeans, and stating that he has been everywhere well received; also that he had found the country exceedingly mountainous, there being a range from 10 to 12 miles long, and 1200 to 1300 feet high, and well cultivated, the products consisting chiefly of the oil palm-tree and cotton: the latter Dr. Baikie states to be excellent.

The Papers read were:—

1. *Communication with the South-West Provinces of China from Rangoon in British Pegu.* By Captain R. SPRYE, and R. H. F. SPRYE, Esq.

THIS paper is substantially a description of Yu-nan and Se-chuen, the two provinces of China that lie nearest to Pegu. Captain and Mr. Sprye have submitted it to the Society, previous to a promised

description of their proposed telegraphic and commercial route from Pegu to China via Esmok. They desire to specify the commercial products of that moiety of China to which their road would in the first instance lead, and upon whose amount and value its importance would principally depend.

The information they have collected is deduced from numerous and scattered sources. They begin with Marco Polo, and proceed with Du Halde and Le Comte. They then give copious extracts from most of the modern travellers, writers, and compilers of works relating to China. The Abbé Huc is, however, the only one of these later authorities who ever visited the provinces in question. Even he did not traverse Yu-nan; it was at Se-chuen where, leaving behind him the dreary uplands of Tibet, he descended into the fertile plains and the high civilization of China.

Lastly, an important contribution to our knowledge of the neighbourhood of Esmok is extracted from the unpublished reports of Dr. Richardson and, the now, Colonel McLeod who were despatched by the Government of India, between the first and second Burmese wars, on unsuccessful missions to open a line of commerce from Moelmyen across the lofty Tanon-Tong-Ghee range, which runs north and south between the Tenasserim provinces and the Siamese Shan States of Labong, Lagong, and Zimmai. Yet the impracticability of that long and difficult route does not compromise the prospects of the present project, for considerable changes have occurred since the date of their missions: England by the acquisition of Pegu and Martaban having pushed her frontier one half nearer Esmok and within reach of the Chinese caravans proceeding from that place. Both Captain and Mr. Sprye are personally well acquainted with our Pegu, Martaban, and Tenasserim provinces; and have, for years, collected all procurable information of the countries between them and China.

The numerous authorities above alluded to, are mutually corroborative of the facts that there is a general resemblance between Yu-nan and Se-chuen; that Yu-nan is the richest in mineral wealth of all the provinces of China, exporting gold, copper, zinc, and various stone and marbles of high value. Also that being in part mountainous, it is intersected by lakes, large rivers, and highly fertile valleys, where nature is prolific under a tropical sun, yielding silk, sugar, &c.; and more especially that it is a tea-growing district of some celebrity, partly as the source of export of ordinary teas to Tibet, and partly as producing an exceedingly rare and precious description, at a place called Purrh, near Esmok. This latter is the most highly-priced of any that exists in China.

Esmok, the frontier city, is written Sz'mau in the Jesuits' map, and Es-man in other maps. It is described from hearsay, in McLeod's report, as a walled town, garrisoned with from 300 to 1000 Chinese soldiers, and traversed by merchants' caravans, composed of mules, ponies, and donkeys, carrying on traffic between China, the Laos states, and the Shan States of Siam and Burma, for which last their caravans, passing through Kiang-Hung and Kiang-Tunk, cross the Salween river so far as Moni, &c. McLeod's farthest point was Kiang-Hung, about 40 miles from Esmok. It is on the right bank of the Mai-Kong or Cambodia river, which even here, at the driest time of the year—that also of McLeod's visit—was 500 feet wide, upwards of 15 feet deep, and navigated by laden vessels of various sizes.* The caravans from China cross it in ferry-boats, at fixed charges.

The paper concludes by stating that Esmok is now within 250 miles of our north-east Pegu frontier, and that the two intermediate Burmese Shan princes, the Tswabwua of Kiang-Tung (who was twice visited for several days by Colonel McLeod) and the Tsenwibwua of Kiang-Hung (where the Colonel spent seventeen days), are most desirous of the establishment of a route between British territory and China across their states and through their capitals.

The second Paper read was—

2. *On the various Lines of Overland Communication between India and China.* By DR. M'COSH, late of the Bengal Medical Staff.

FEW nations bordering upon the British dominions are less known than those inhabiting the north-east frontier of Bengal. There our territory of Assam lies in almost immediate contact with China and Ava, separated from each by a narrow belt of mountainous country, possessed by barbarous tribes of independent savages; and yet from this small, savage, and unknown country many navigable branches of the great rivers of Nankin, Cambodia, Martaban, Ava, and Assam derive their origin, offering natural highways of commerce to the great nations of Ultra-Gangetic Asia.

This belt of country, though covered with impenetrable jungle, possesses a cool climate and other conditions congenial to the con-

* At Kiang-Hung the river Mai-Kong or Cambodia is, during the rains, 1600 feet wide. Kiang-Hung is distant from the (now French) fortified city of Saigon at its mouths about 880 miles in a direct line. By the capture of that city and the recent formal annexation of the Cochin Chinese province of Saigon to the French Empire, France has secured command of all the mouths of this very important Asiatic river.

stitution of Europeans. It appears capable of being converted into one continuous garden, that should extend over hundreds of square miles, and produce cotton, silk, coffee, and sugar.

The province of Assam, which leads to it, lies between the Himalaya and some of its mountainous offshoots. It is drained and devastated by the mighty Brahmaputra, which rising thirty or forty feet in the rainy season, inundates the land and renders ordinary earthworks, such as railway embankments, impossible, while itself is little suited to navigation. For days together during a voyage upon its stream neither boat nor human habitation is to be seen; the horizon is bounded by gigantic reeds; and porpoises, turtle, and crocodiles are the chief tenants of its waters. Judging by the rate of premium exacted by the insurance offices on residents in this district, Assam is reckoned to be the most unhealthy province in British India.

Near Suddya, the old frontier station, the Brahmaputra is formed by numerous confluent, of which the Dihong and the Lohet are the principal. They issue through the wall-like range of snowy mountains that here put a limit to the valley of Assam. No less than five roads lead from this district into Tibet or China proper. They will be described in order, premising that our information is drawn from very limited sources—so much so, that no Englishman now living has ever traversed any one of them.

I. *The Pass of the Dihong*.—This river is the main tributary of the Brahmaputra, and is usually considered to be the termination of the great river of Tibet, the Tsan-pu. In this opinion Dr. McCosh does not himself coincide, on the ground of its inferior size; but the arguments he quotes, and the popular belief in favour of the identity of the rivers, are strong. Pilgrims passing by this route reach Mah-loo, the frontier town of Tibet, in sixteen days. Four days farther is a populous city, with a regular Chinese government, called Rhoshee-mah. The Dihong pass is always difficult, and impracticable except in summer. No less than five British officers have penetrated to the capital of the tribe (Abors) who live on the first part of this route. Beyond them are the Bors Abors, regular Tartars, who have never been visited by the British.

II. *The Mishmee route* is very practicable, but little commerce is likely to flow along it. It leads for a couple of days up the Lohet, to where the river ceases to be navigable, and thence by a footpath ten days farther along its banks, to a place very sacred in Hindu mythology, called Brahmakund. Great numbers of Hindu pilgrims go there for absolution. Captain Wilcox reached it with ease, though the surliness of the people beyond, caused him to return. Captain

Rowlatt made a difficult ten days' journey to Toopang, on the river Doo, during which he succeeded in traversing no greater distance than sixty miles. He met a large party of Lama people, who had crossed from Tibet, but could not get back to their homes, owing to an unexpectedly early fall of snow in the mountain-passes. They were about to spend the winter with the Mishmees, who are the go-betweens to them and Assam. The Mishmees were very friendly to Captain Rowlatt.

III. *The Phungan Pass to Manchee and China.*—This leads over the Wang-leo-bum mountain-range at an altitude of 8400 feet, through a dense jungle of oak, pine, rhododendron, and juniper. No footpath was to be seen; but the travellers Wilcox and Burlton were led by guides, who followed notches in trees, they had made in a previous journey. Venomous flies and swarms of land-leeches infested the forest. There were elephants, buffaloes, and tigers; but these gave no trouble. When they reached the Irawaddi, the travellers were surprised at the smallness of its stream, only eighty yards wide, and fordable. They could hear of no trade whatever between Manchee and China; while, to the north of them, rose a wall of lofty snow mountains, that wholly cut off communication with Tibet. However, in this district the great rivers of Nankin, Cambodia, and Martaban are in close approximation, and are probably navigable onwards to the sea. The native tribes are numerous; all are tributary to, and in dread of, Ava, and all are habitually at war with one another.

IV. *Pathkoy Pass to Bhamo on the Irawaddi, and thence to China.*—This was the route followed by the invading Burmese army, and is by far the most practicable line from Assam to China. At Bhamo it meets a great stream of Chinese commerce between that country and Burma. Caravans of thirty and forty mules or bullocks constantly arrive. About five hundred Chinese are said to come every year to Bhamo and transact business to an amount of 700,000*l*. This road was travelled in part, by Lieutenant Burnet, on his way to the north face of the Pathkoy range, where he was stopped in his attempt to penetrate to Ava, and in part by Lieutenant Hannah, who endeavoured to reach Assam from Ava, and was stopped at the south face of the Pathkoy. In both cases the natives were the obstacles. They are a wild, daring race, and once the terror of the Assamese. Although we have no British account of the Pathkoy range, it is clear that little difficulties can exist there, since the entire Burmese army succeeded in traversing it. The Chinese exports that pass Bhamo are gold and silver ingots, brass and copper vessels, mercury, arsenic, vermilion, carpets, fans, silk fabrics, spices,

rhubarb, musk, dried fruits, &c. The return cargo is cotton wool, ivory, edible birds' nests, and British woollens and calico.

V. *Route by Manipur to the Irawaddi*.—Granting the feasibility and advantage of the Bhamo and China line, it remains a question how best to reach Bhamo. The Irawaddi has all, and more than all, the disadvantages above ascribed to the Brahmaputra, and may not be thought of. However, an excellent opening exists through the mountain valley of Manipur. This was once a populous kingdom, since devastated, like Assam, by the Burmese: it was from here that the Burmese threatened a descent upon Calcutta, and originated the first Burmese war. The treaty that followed the conclusion of that war restored the Rajah of Manipur to his throne, and he is now a well-affected neighbour of British India. The climate of the land is well adapted for Europeans, being cool and healthy; the soil is admirably fitted for the tea plant. The route proposed by Dr. McCosh passes by Dacca and the line of the Barrak River to Bans-kundee; thence by land to Manipur and Monfu, on the river Ning-tee or Kyan-dwen; thence across country to Bhamo, and lastly up the Pinlang river into Yunan. A railroad is now being constructed from Calcutta to Dacca; it might be extended to Bans-kundee. There is already much intercourse between Manipur and Ava down the Ningtee. Captain Pemberton remarked, in a forcible report, on the natural advantages of Manipur as an entrepot to Bengal and Burma: he dwelt on its position, the navigable rivers that passing near it flow in many directions, the healthiness of the climate, and the favourable disposition of its ruler.

Dr. McCosh concludes by dilating on the importance of facilitating an overland commerce between India and China by opening a practicable road between them; he urges that an expedition should be despatched in order to make a thorough survey of these five passes, especially the fifth and the latter half of the fourth; and he begs the Royal Geographical Society to exert their influence with Government in furtherance of his proposal, the details of which he traces out in full in his paper.

The CHAIRMAN tendered the thanks of the Society to the authors of the papers just read, and observed that of late years the Government of this country appeared to have been too much occupied with the political concerns of India and China to pay sufficient attention to a point of such national importance as the opening of a western route between the two countries.

MR. JOHN CRAWFORD, F.R.G.S., said he had served with Captain Sprye thirty-five years ago in Ava, and had a high respect for him, but felt himself bound, nevertheless, to differ widely from him with respect to his proposed western route. He was not responsible for the sentiments attributed to him in the quotations which had been so freely used by Captain Sprye. The book from which they had been taken was not written by him, as it professed to be, but

by a clerk of his, one Mr. Peter Gordon, who had published it as a production, for which he (Mr. Crawford) was jointly responsible. Yunan was at once the largest and the poorest province in China. It might be called a "great big beast." It was mountainous and barren. The province of Canton was also a poor one. Captain Sprye had said little or nothing respecting the staple trades of China, tea and silk. Yunan produced very little tea—about half the quantity consumed annually in London—and what it did grow was execrably bad. It produced no silk at all. The Chinese themselves would not live there if they could help it, though they would emigrate in large numbers to Australia and California. With regard to Esmok, he doubted the existence of such a place. First of all, it was a word of two syllables, and every one knew the Chinese could not put two syllables together. Moreover, every one in that room knew that Chinese words ended invariably either with a vowel, a nasal, or an aspirate; whereas the two syllables in Esmok ended, the one in the sibilant "s," and the other in the guttural "k." Supposing, however, that such a place existed, the district lying between it and the Rangoon territory was mountainous and most difficult of transit—muddy and malarious also in parts—and from the middle of May to the middle of October it was altogether impassable. Heavy bales of cotton would have to be divided and transported across that difficult region on the backs of donkeys or small ponies, if they could be obtained, besides being subjected to heavy import taxes and the plunderings of barbarous tribes. Under all these circumstances he believed the project to be commercially unsatisfactory, if not altogether impossible. He would as soon think of adopting it as of returning to the old middle-age process of going to India and China overland, and abandoning Vasco da Gama's discovery altogether.

SIR JOHN DAVIS, F.R.G.S., said that highly as he valued the geographical information which had been placed before the Society, he was quite at issue with the two gentlemen whose papers had been read as to the capabilities of the Yunan province. On that point he agreed with his friend Mr. Crawford. But with respect to Esmok, although he had never heard of the place before, he could not go so far as to deny its existence on account of its alleged name. The corruption to which the Chinese language was subject would account for the objections pointed out by Mr. Crawford. At the same time he believed it would be found to lie considerably within the frontier claimed by the Chinese, claiming, as they generally did, much more than they were entitled to. With regard to Du Halde, he, Sir John, placed a modified reliance upon his writings, which were chiefly compiled from the statements of the Jesuits, always grandiloquent as to China. An able and zealous French missionary who had resided thirty years at Peking had informed him of the natural obstacles to commerce and transit which would be encountered in the mountainous province of Yunan, apart from its unproductiveness. At present England enjoyed a trade with the eastern coast of China by sea, and it only required peace and quiet to make it almost illimitable. The ancients called the ocean *dissociabilis*, but it was now the best commercial highway for nations, and it appeared to him that any English merchant awake to his real interests (which, after all, in trade were the safest impulses) would never dream of preferring a land route of such a mountainous character to the sea route. At the same time he had no doubt that, should it be proved that the proposed route presented the facilities which were ascribed to it, the merchants and traders of this country, with their usual enterprise and keenness, would avail themselves of it. With respect to Canton, though it was originally, as Mr. Crawford observed, a poor province, the foreign trade which had been carried on there for 200 years had really made it a very wealthy place. A mandarin was said to be "promoted" to Canton—the only place which was spoken of in that manner—but an appointment to Yunan was considered in a very different

light. Commissioner Lin, after his disgrace, was appointed there to quell a rebellion, and the appointment so ill agreed with him that he died on the route to his uncoveted honours.

CAPTAIN SHERARD OSBORN, R.N., F.R.G.S., thought it was of very little use discussing the point until there was some possibility of gaining access to the interior of China, either by treaty or by conquest. When that point was gained it would be desirable to ascertain the tracks in which the native commerce flowed, and as far as practicable to follow in its footsteps. Surely a country numbering 300,000,000 souls ought to have fifty places of trade instead of five open ports, and yet be able to carry on a profitable trade. With reference to Esmok he was delighted with the information given by Captain Sprye, with whom he felt bound to say his own researches enabled him perfectly to agree. He was sorry that Mr. Crawford repudiated the works from which Captain Sprye had given quotations, but they still had an impartial and able authority in Dr. Williams, whose writings had also been quoted. True, he spoke of Yunan as mountainous, with large portions of table-land, but the products of the province were most valuable, and, Captain Osborn believed, quite accessible. In spite of the difficulties presented by the proposed route, he believed it would eventually be adopted, and it would be a long while before the western provinces were reached except through the Bay of Bengal. He was prepared to the utmost of his power to second and assist Captain Sprye in his efforts to open this route, and he was satisfied that their excellent Chairman would encourage geographers in this endeavour to advance the interests of commerce and the influence of correct geographical knowledge.

MR. LAURENCE OLIPHANT, F.R.G.S., said the question was of a twofold character. Viewed geographically he thought Captain Sprye's proposal highly desirable, but he did not take that sanguine view of the commercial advantages likely to be derived from prosecuting geographical researches in that direction which Captain Sprye did. He was not sure whether Dr. Williams, who had derived much of his information from the Chinese Repository, could be said on some points to be a better authority than Du Halde. With the exception of General McLeod no one had traversed the country over which the proposed route lay, and General McLeod described it as mountainous and barren and difficult of access. The tea produced at Yunan was used by the Chinese very much as Constantia wine was used at the Cape. Whether it would suit English palates or not, he could not exactly say.

MR. W. LOCKHART, F.R.G.S., said the word Semok was a corruption, being intended to convey the sounds of the two characters Sze-mau, but the town really did exist, though it was much more distant from the frontier than was marked on the map. He admitted that serious difficulties would have to be overcome on approaching the town, but he felt that, as geographers, the members of that Society were much indebted to Captain Sprye for the manner in which he had brought the subject forward. He did not argue that all Du Halde's statements were worthy of credit, but many of them certainly were borne out by the statements of others who had given great attention to the topography of China. Dr. Williams, whose name has been mentioned, was a good Chinese scholar, and had paid great attention to the geography of China. The products of Yunan, as testified to by those who were acquainted with the province, comprised almost all the richer minerals—gold, silver, copper, brass, &c.—also precious stones. All China was supplied with copper from Yunan. True, it was a wild country, as most mineral countries were. Its agricultural produce was not sufficient for the consumption of its inhabitants, and they imported rice from the eastern provinces. Not that it was wholly without agricultural wealth, but the vast number of miners who lived there made it requisite to draw upon other provinces for their sup-

port. The Chinese sink deep mines, and it is notorious that their Artesian wells are the deepest in the world. He trusted the day would come when there would be uninterrupted commerce with Yunan from the westward. In the case of such an event taking place, the commerce with the eastern coast would probably not be injured. The cotton and woollen goods from this country would still be taken to the eastern ports, and the tea would continue to be exported from the same places, owing to the weight of the goods, which would preclude their being taken over the western route. At the same time he trusted the Society would support such enterprising travellers as Captain Sprye and Dr. M'Cosh in their efforts to promote intercourse with Western China and to develop its resources; and he trusted also the day was not far distant when there would be free access for our merchants and travellers to China across the western frontier.

SIR JOHN LOGIN, F.R.G.S., had no personal knowledge of the countries to which the papers which had been read, referred. He was only interested in the subject from its bearings upon our position in India and on our future relations with the empire of China.

When, as we are told by the best authority (Sir Alexander Tulloch, in his evidence before the Royal Commission for the Reorganization of the Indian Army), that no less than 12,000 men are annually required to keep up our European force in India on the present system, exceeding the number of recruits raised annually in the United Kingdom, between 1845 and 1849, for the British army; and that, unless means can be adopted to reduce the mortality and invaliding, we cannot hope to maintain our present force of Europeans in that country, it will at once be seen how important it becomes to ascertain the capabilities of every part of our northern frontier which appears likely to be suitable for the location of our soldiers, or in any way adapted to European colonization.

Having, for the present, shut ourselves out of Cashmir, and Nepal not being available for our purpose, our choice of localities for European settlements on our northern frontier is limited to comparatively small detached localities along the southern ranges of the Himalayas, between Murree and Darjeeling, where there does not appear to be sufficient space for colonization to the extent which would be required to assist materially in keeping up our military strength by recruits of European descent; and, as we can never colonize the plains of India, our only hope of retaining a *permanent* position in those countries is by establishing an Anglo-Saxon population in localities likely to become important from their geographical situation.

Looking at the geographical position of that part of our Indian frontier which approximates to China and the sources of the Yang-tse-Kiang, and to the unexplored tract of country through which some of the rivers of Burma, Siam, Cochin China, and Cambodia are supposed to find their way from Tibet, it has always appeared to him to be very much to our discredit that so little should be known respecting it, and that we should for so many years since our possession of Assam have neglected to ascertain even the nature of the country beyond our frontier, or the difficulties which prevent communication between the two largest sections of the human race.

It is impossible not to be struck with the importance of a position which commands the direct line of intercourse between the two mighty empires of India and of China, and which, if occupied by an enterprising people, might exercise the greatest influence on the future destinies of the East.

As far as our present knowledge extends, the difficulties of intercourse between India and China by this route are more political than physical; and as events now taking place in China may speedily cause the former to disappear, it is desirable that we should be prepared for such a contingency.

On referring to the map of Eastern Asia, we find that there are several

ways by which this position may be reached, and by which communication may be maintained with more or less difficulty :—

1st. By the valley of Assam, in which we are most interested.

2nd. Through Burma and the valley of the Irawaddi.

3rd. If the maps are correct, by the valley of the Lantsang-kiang or Camboja River, of which the French are believed to be in possession.

4th. From China Proper by the Yang-tse-Kiang and its tributaries; and

5th. From Tibet.

Leaving the French, the Russians, and the Chinese, when organised and accustomed to fight under French and Russian officers, as they soon may be, to consider the advantages of the other routes, and avoiding that through Burma, as likely to lead us into difficulties, and to the expenditure of English lives and English money in foreign states, which might be more profitably employed in consolidating our own, he trusts that the Royal Geographical Society may be induced to recommend to Government that an exploring party may be sent, from our advanced station of Sudiya in Assam, to follow up the investigations of the late Colonel Wilcox, to ascertain the various passes by which access may be had to China in that direction, and whether localities may not be found at which English soldiers, missionaries, merchants, and miners may be advantageously settled on that frontier.

In our preparations for the defence of India against invasion by a Russian army advancing over the steppes of Central Asia and through the defiles of Afghanistan, we have expended thousands of English lives and millions of English money; let us take care that we may not be called upon to meet a much less chimerical and more formidable danger from another quarter, when, in the disruption of the Chinese empire, we may have to contend against Russian and French influences nearer at hand. The countries to which attention has been drawn are said to be rich in mineral wealth of every description. We have seen what that has done for *California*, *Australia*, and *Columbia* in attracting English enterprise; and the same influences, under the guidance of Providence, may place us in a position to retain dominion over India, until we can safely make it over to the Christian rule of its native governments, and be united to it by firmer bonds than can in any other way exist.

The CHAIRMAN, in closing the meeting, congratulated the Society upon the discussion which had taken place. Whatever might be thought of the commercial advantages of the proposed routes, one thing was certain, namely, that geographical curiosity had been excited by the papers which had been read, and geographers would now be stimulated to go on with those inquiries which had been thought so important by former Governors-General of India.

The meeting was then adjourned till January, 1861.

Fourth Meeting, Monday, January 14th, 1861.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—Colonel W. K. Loyd, and Walter Spencer Stanhope, Esq., were presented upon their Election.

ELECTIONS.—The Right Hon. H. U. Addington; Consul A. W. Hanson; Sir R. Digby Neave, Bart.; Colonel T. P. Shaffner, of the U. S.; Captain A. Wilson; and S. Orchart Beeton; C. J. A. Rumbold; T. H. Rumbold, and J. Ralph Shaw, Esqrs., were elected Fellows.

ACCESSIONS.—Among the accessions to the Library and Map-rooms since the former Meeting were the Radcliffe Catalogue of Stars; Bohn's Pictorial Geography; Bagster's Bible of Every Land; Stainton's Entomologist's Annual for 1861; Stanford's Australia; Commander Maury's Storm and Rain Chart; M'Douall Stuart's Map of his discoveries in Australia; Schwenzen's Map of Sweden, Denmark, and Norway; Williams's Map of Pegu, and Hobday's Martaban; Du Chaillu's Western Equatorial Africa, &c.

EXHIBITIONS.—Certain specimens of Australian Ores, presented to him by Mr. A. C. Gregory, of the North Australian Expedition, were exhibited by Professor J. Tennant, F.R.G.S.

The Paper read was—

Journal of his Expedition across the Centre of Australia, from Spencer Gulf on the South to Latitude 18° 47' on the North. By J. McDouall Stuart.

Communicated by Messrs. CHAMBERS and FINKE, through Sir R. I. Murchison,
VICE-PRES. R.G.S.

[The paper will be printed in the Journal.]

FROM the Journal of Mr. Stuart it appears that he left Chambers Creek, in South Australia, at the beginning of March last year, with Mr. Keckwick and one other man, and proceeded in a north-westerly direction, his object being to penetrate across the continent. As he proceeded, instead of meeting with an arid desert, as geologists had predicted, he found a well-watered country, with numerous creeks, several rivers; abundance of grass and scrub. The geological character of the country for the first 400 miles was tertiary and secondary, and occasionally he saw large masses of sandstone. He then crossed a high primary range, and for the remainder of his advance met with little else than the older rocks, or those of volcanic formation. He proceeded without meeting with any serious obstacle, and without encountering any of the natives, until he reached the centre of Australia. There he erected a pile of stones, planted the British flag, and enclosed within the pile a bottle containing a paper with a notice of the fact. This occurred on the 16th of June. On his progress north-west his difficulties commenced. The scrub was in places impenetrable, and he was obliged to make his route more easterly towards the Gulf of Carpentaria. Water became scarce, and the soil sandy. The vegetation hitherto met with had been principally scrub and gum-trees, but on approaching the central regions he saw palm-trees. Water was procured at a short distance under ground, but there was none on the surface.

The country Mr. Stuart had passed through, after the first or M'Donnell range, had been undulatory or flat; but on advancing north he came to ranges of mountainous hills, the principal of which he called the Murchison range; and from these hills the rivers that flow north-west and north-east take their rise. Looking from an eminence towards the west he saw a high mountain and elevated ground. The valleys between the ranges of hills were fertile; and one river, which was flowing towards the north by west, was about ten chains wide, and had the appearance of being a constant stream. This he conceived to be the character of many of the creeks and springs that he came to. On looking towards the east there were indications in the atmosphere of the presence of a large body of water behind the high land which bounded the horizon in that direction. Until he reached the range of hills he had not seen many natives, though numerous traces of them were frequently observed; but they then began to show themselves, and made hostile signs. Two of them were first seen near the scrub, but as soon as Mr. Stuart approached they ran away. A few days afterwards they appeared in greater numbers, and, with menaces, made signs to his party to go back. It was in vain that Mr. Stuart made friendly demonstrations; and at last the natives threw a shower of boomerangs at him. His men were ordered to load their guns, and as the savages approached nearer for the purpose of surrounding the little party, they were compelled to fire. The savages did not desist from their attacks, and a second volley was fired at them. Under these circumstances Mr. Stuart, with great reluctance, felt obliged to retrace his steps. He returned to the point he started from on the 9th of September, after having travelled upwards of 2300 miles in six months and two days, and having penetrated within 250 miles south-west of the Gulf of Carpentaria. The geological character of the mountainous ranges was igneous, the appearance of quartz and other granitic rocks giving evidence of the presence of metallic treasures. Only one portion of the route, for the distance of about 60 miles, was sterile and sandy.

The PRESIDENT said, of the various subjects that had been brought before the Society, he knew of none which exceeded in importance the one they were about to discuss. Explorations in Africa, or in any other part of the globe, were interesting to us as citizens of the world, but the present exploration was interesting to us, not only as citizens of the world, but more especially as citizens of this great country. We might take pride in the fact that a discovery had been made, not at the expense of the Government, but of two or three of our fellow-citizens; who, not daunted by a succession of disasters and failures, had not shrunk from supplying the necessary funds, and they further had the judgment to secure the proper man, to whose abilities, energy, and perseverance, was owing the success of the expedition. And so great was

Mr. Stuart's energy that he had gone forth again with a larger party, with strength sufficient to daunt the natives, and to overcome any of those impediments which had been the cause of his returning on the last occasion. There was one curious circumstance: it was that an old chief, accompanied by two sons, made a freemason's sign to Mr. Stuart; and on Mr. Stuart looking intently at him he repeated the sign, and showed great satisfaction when it was answered.

SIR RODERICK MURCHISON, F.R.G.S., said he had always taken a special interest in the exploration of Australia, and had lost no opportunity of stimulating those researches, which had terminated in this most glorious expedition of Mr. Stuart. The exploration, though carried out by private individuals, had been warmly encouraged by the Governor of the colony, Sir Richard M'Donnell. Gentlemen would recollect that a very expensive expedition had been sent out, with twenty camels, from Melbourne, to accomplish the same end from another point. In the mean time Mr. Stuart, with his two men and thirteen horses, had accomplished more than the efforts of all other explorers in that direction. Ever since he (Sir R.) had been connected with the Society he had had at heart the establishment of some colony in one of the great bays on the north of Australia, either in the Gulf of Carpentaria, or more particularly in Cambridge Gulf, or near the mouth of the Victoria River, where Gregory's expedition was so long encamped.

He was now about to make an apology for a theoretical opinion he had formed as to the difficulty of traversing this continent; and he might explain why he, in common with other eminent geographers, had entertained great doubts upon the feasibility of this enterprise. When Mr. Gregory arrived at the extreme point of his expedition from the north, he was stopped by a completely saline desert. Again, when Captain Sturt advanced into the centre from the south, he also was stopped by an impenetrable saline desert. With these facts before them, it was not unreasonable to arrive at the conclusion that the interior consisted of desert. Yet this Stuart, who was one of Sturt's men, devised for himself the route which he had taken, and which he had so successfully followed. The discovery might be of very great importance to this country, because, with the establishment of a port of refuge or a colony on the north coast, it would give us a ready access to the Eastern Archipelago, and also enable us to lay down a telegraph for communication right across the continent with all our great colonies in the south and west of Australia. Sir Richard M'Donnell proposed that the whole of the interior in question should form a part of the colony of South Australia. He could not sit down without acknowledging the high credit that was due to Colonel Gawler, formerly Governor of South Australia, who, in spite of the reasoning of others, and in spite of adverse appearances, had always maintained that a passage could be accomplished.

COLONEL GAWLER, F.R.G.S., complimented Sir Roderick Murchison upon his candour in acknowledging that he had altered, to a certain extent, his former opinion. It was like men of true science, who, when realities came before them, grasped them at once, notwithstanding their own anticipations. They had stood opposed, but it was an amicable suit, and at last Mr. Stuart had settled the question. He (Col. Gawler) rejoiced in the result, not because it proved that his anticipations were correct, but on account of two circumstances which had been often referred to. In the first place, it showed that Great Britain possessed in Australia not only capabilities for a fringe of colonies with some twenty or thirty millions of inhabitants along the shores of that continent, but capabilities for a great and compact empire, which might possibly contain a hundred millions of souls. A perusal of Mr. Stuart's narrative satisfied him that, from Chambers Creek to the end of the flat-topped hills near to the James and M'Donnell ranges, there was a very beautiful country for

Australia. In the Adelaide district, the proportion of good to inferior land was about one-third; and he thought the same proportion would be found to prevail in this newly-discovered territory. The M'Donnell range was manifestly the great dividing barrier between the waters of Northern and Southern Australia; and, as Mr. Stuart observed that the streams south of that range flowed in an easterly and southerly direction, it left the water system of Western Australia a greater mystery than ever. He quite expected that a large portion of the drainage of Western Australia went down into Lake Torrens, but it was now quite evident that it did not take that course. In the next place, he conceived there would be no difficulty in running a line of railway to the northern coast, except over the M'Donnell range; for on the other side of the range there were the immense plains where Mr. Stuart was turned back. These plains extended, apparently, up to the Red Sand, which stopped Mr. Gregory from the Sturt Creek. But on them there was a large number of gum-trees, and the gum-tree would never grow without moisture; and, though there might be no surface water, yet it was evident there must be a large amount of water below the surface. Therefore he saw no reason why a line of communication should not at once be carried across from the south-eastern coast to a north-western colony, and thus open an outlet for the produce of the continent, to be shipped to the rich neighbouring islands and the southern parts of Asia.

MR. C. BONNEY said he could bear testimony to the energy, courage, and endurance that must have been required to accomplish the journey undertaken by Mr. Stuart. He had recently returned from Australia, and five months ago was within a few hundred miles of the centre of that continent. It was then the cool season, but even at that time travelling was a work of great difficulty from the almost entire absence of water and grass for horses. He could, therefore, well appreciate the merit due to Mr. Stuart and to Messrs. Chambers and Finke, who had fitted out the expedition. But with regard to the result of the journey, it must not be too hastily concluded, that because Mr. Stuart had been able to cross from south to north, therefore the whole interior of Australia was a good and habitable country. His own impression still remained the same, that the great bulk of Australia was uninhabitable. There was no country more likely to deceive the traveller from the different aspect which it bore under different circumstances. A traveller going through the country after rain would be led to the conclusion that he saw before him a fertile country; but if he went a few months afterwards, he would find nothing but a sterile desert, altogether unfit for the habitation of man.

He had that day received a letter from Captain Sturt, the well-known Australian explorer, from which, with the permission of the President, he would read an extract.

He rejoiced, however, to think that at last a practicable route had been discovered from south to north, which might be made available for the electric telegraph and railway communication.

"I am not at all surprised at Stuart's success, for I know him to be a plucky little fellow—cool, persevering, and intelligent, as well as an excellent bushman; so that when I heard that he had gained such a footing in the interior on his first excursion, I felt sure he would succeed in crossing the continent sooner or later. He is entitled to all praise for his exertions; and it is really a matter of pride to me that it has fallen on one of my oldest and best followers to have achieved so very creditable an enterprise, and to have shown so much energy and zeal. He has fairly passed, or I should say surpassed, me, and may justly claim the laurels.

"Now with regard to his journey, and the character of the country he traversed, as far as I can judge from his letter to Chambers, I am really surprised that he did not cross any desert such as he and I traversed together.

He states that he crossed a plain of red sand with spinifex of about 60 miles in breadth, on which, I presume, there was no water; and this tract I should be disposed to call desert, though of limited extent; but I took it for granted that as Gregory, in lat. 20° and in long. 127° , found precisely the same kind of country as that from which I was forced to retreat in lat. 24° and in long. 138° , so the intervening country would be the same.

"Gregory found the creeks by which he descended from the hills to the south underwent exactly the same changes as those by which I had advanced towards the north—that is to say, that they gradually lost their current, assumed the character of a chain of ponds, and were ultimately lost amidst sandy ridges. Having myself penetrated at least 400 miles into the desert, I could not have imagined that it would so soon change its features to take them up again at a distance of 700 miles, that being about the distance between Gregory's position and my own.

"I believe Stuart started with the intention of making Cambridge Gulf on the west coast, but that, not being able to push to the westward, he ran up north, and passed about midway between Gregory and myself, and as near as could be the centre of the continent, and, being forced to the eastward of north, at last succeeded in gaining the southern fall of water, in lat. $19^{\circ} 47'$ and in long. 134° , which would be a point about 280 or 300 miles from the Gulf of Carpentaria in a N.E. direction, about 380 miles from me in a S.S.E. direction, and about the same distance from Gregory in a direction of W. $\frac{1}{2}$ S. Stuart's course must therefore have been to the *eastward* of the point from which he started, the nature of the country being such as to prevent his going to the *west* of it. Now if you refer to the Introduction to my Central Expeditions you will find that one reason I gave for taking the line I did was, that from observations I had made of the migration of birds on the banks of the Darling and in South Australia, I had been led to hope that about lat. 20° and long. 134° a better country would be found, because I calculated that the two lines of migration would meet, the one N.W. from the Darling, the other due S. from the shores of St. Vincent's Gulf, about where I have pointed out; and there, it would now appear, Stuart has discovered a better country, and added another proof to the many that have been recorded of the truth of these natural indications.

"Had Gregory found it practicable to keep more to the south, when crossing from the Victoria to the Gulf of Carpentaria, he would probably have struck the heads of the creek from which Stuart retreated; but he was forced to the north by the sandy and sterile nature of the table-land on which he travelled, and could never get a glimpse of the depressed southern interior. I take it that the country Stuart has discovered is far to the south and west of Gregory's track. Van Diemen and Arnheim Lands must at one time have been an island, as the whole continent was once an archipelago; and it was the conviction on my mind as to this fact that led me to hope Gregory would be able to descend at different points of his passage across the northern portion of the continent by streams, the *opposites* to those debouching on the coast, of which there are so many; but from the account he gave of the appearance of the country to the south of him, I was led to apprehend that the desert came right up to where he was, and that vast masses of sand having been deposited on the southern slopes of the hills imbibed all the water, and thus rendered a descent to the south impossible.

"It is worthy of observation, that whereas I found the sand-hills running N. and S. nearly, Gregory, at a distance of 700 miles to the W.N.W., found them running E. and W. nearly, and that too at a difference of elevation of between six and seven hundred feet."

COL. SYKES, F.R.G.S., said he should not have risen but for what had fallen from the last speaker, whose observations would seem to modify the expecta-

tions held out by Mr. Stuart, of the country being habitable and suitable for colonization. An extensive and impenetrable scrub was found flourishing in the tract, therefore there must necessarily be a supply of moisture to enable the scrub to grow. Whether the water was under or over the surface was another question, but there must be moisture to a great extent. Again, physical geographers were aware that the world was surrounded by a belt $22\frac{1}{2}^{\circ}$ to the north and to the south of the equator which was subject to annual supplies of water both during the south-west and the north-east monsoons. The greater portion of Australia traversed by Mr. Stuart lay within that parallel, and it was therefore natural to assume that it came under the same physical conditions as other parts of the earth as to supply of moisture. This probable fact would remove the impression that might have been produced upon the minds of the audience by what had just been said.

LORD ALFRED CHURCHILL, F.R.G.S., stated that he had received a letter by the last mail from Sir Charles Nicholson, which bore out the observations of Sir Roderick Murchison relative to the capabilities for the formation of a colony in the northern part of Australia. The discovery of Mr. Stuart was likely to effect very great consequences to the future of Australia, because according to the present means of connecting Sydney and Melbourne with India, a very long and dangerous voyage was necessary. Now, if it was possible to form a new colony at the north of the continent, the establishment of telegraphs and railroads, to which he saw no physical objection, would be of very great value to the south by opening up a direct communication with it. With regard to hot winds, at Melbourne they came from the north, and at Sydney from the north-west; and the theory had been formed that those hot winds were caused by passing over a desert tract in the centre of Australia. That had been proved by Mr. Stuart not to be correct as regarded the whole of the interior. Possibly there might be desert on both sides of the region he traversed. However, so far as he had gone he had discovered a fine country, which, from its peculiar formation and peculiar vegetation, might afford or would afford facilities for intercourse between the northern and southern parts of the continent.

COUNT STRZELECKI, F.R.G.S., reminded the meeting that in 1858 he was selected by Sir Roderick Murchison to transmit to Mr. Stuart the first token of the Society's approval of his exertions in exploring the north at his own expense; and having on that occasion expressed his belief that this acknowledgment would stimulate Mr. Stuart to further exertion, he was extremely happy now to find that his expectations had been more than realised. Mr. Stuart had cleared up the mystery which for so long a time had hung over the centre of Australia. After reviewing the various theories which had been propounded based upon the observations of previous travellers, Count Strzelecki said that he was at one time himself of opinion that the interior was a vast desert. He was ready now to recant that view, to acknowledge the value of the discovery which Mr. Stuart had made, and to render full justice to those, less successful, who preceded Mr. Stuart in his enterprise.

The Noble PRESIDENT, in closing the discussion, said, this no doubt was a most important point in the history of Australia; and both that country as well as our own must feel deeply indebted to the individuals who had either contributed the means, or through whose gallantry and energy the exploration had been so successfully carried out.

Fifth Meeting, Monday, January 28th, 1861.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*The Rev. G. Richards, D.D. ; Consul A. W. Hanson ; and W. R. Looker, Esq., were presented upon their Election.*

ELECTIONS.—*Sir Charles T. Bright ; General Eber ; the Rev. C. J. Fynes-Clinton ; Consul C. Pemberton Hodgson ; the Rev. E. H. Mainwaring Sladen ; the Marquis of Sligo ; the Rev. C. Hill Wallace ; the Rev. S. E. Wharton ; Lieut. A. T. Windus, I.N. ; and James Aikin ; Walter Brodie ; James Campbell ; John E. Davis, Master R.N. ; N. Vaughan Edwards-Vaughan ; J. Wilson Holmes ; John Learmonth ; Alexander Macmillan ; George Newman ; G. H. Oliphant Ferguson ; Julius Reuter ; Frederick Simpson ; Ronald Thomson (Attaché Persian Mission) ; John Walker ; and W. Warder, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map Rooms since the former Meeting were Dunlop's Hunting in the Himalaya ; Shaffner's Telegraph Manual ; Jinman's Winds and their Courses ; Transactions of the Institute of Civil Engineers, of the Society of Natural History of Geneva, Royal Society of Edinburgh, &c. ; Storm Chart of the British Islands by the Board of Trade ; Admiralty Chart of the North Atlantic Ocean, &c.

THE PRESIDENT.—The subjects for our consideration to-day are of so interesting a character, that I should be doing unwisely if I were to occupy your time beyond a few moments, in making such preliminary observations as are expected from your President. The papers which are about to be read relate altogether to the physical and geographical facts upon which the proposition has been based for the extension of the Electric Telegraph line between this country and America, by the route of the Færøe Islands, Iceland, Greenland, and Labrador. It comes especially within the province of the Royal Geographical Society to receive and to record those facts as purely belonging to the science of Physical Geography. We are so fortunate as to have a great many labourers working for us in the field of geography ; some who have been sent out by the Society, like Speke and Livingstone, are doing our work, and at the same time doing work for many other societies. We have labourers also not less diligent, and not less useful to us as well as to the world : they are those who are occupied in other pursuits, but who come to us to record the facts they have observed, and to enable us to treasure them up as the material for future research. Among the labours of this class, not the least valuable are the researches which we are met to record to-day. They were undertaken not for the purpose of acquiring geographical knowledge simply, but in order to carry out the great and beneficent scheme of connecting the two continents of Europe and America by means of telegraphic communication. Yet, at the same time that we receive these facts, we must take care not to suffer ourselves to be led away into that which is altogether out of our province, an attempt to pronounce any judgment upon the value of that scheme. That is a question for others to decide, not for us. Therefore, whilst we ourselves may look upon the facts that may be presented to us with philosophic

calmness, there may, on the other hand, be those who are so deeply interested in the material success of electric telegraph connection with America, as to be drawn into an eager contest to set up the merits of one scheme in preference to those of another. Should there be any gentlemen present prepared to carry these feelings into the discussion, I feel assured they will remember this, that it is those who are beaten that generally complain, and that the man who is the winner at chess is not the man to throw the pieces at his adversary's head. I believe we shall have no symptoms of distress exhibited; that we shall not have anybody manifesting the conviction passing in his mind that he is worsted in the argument. I will now call upon Sir Leopold McClintock to read the first paper that is set down on the list.

The Papers read were—

1. *Surveys of H. M. S. Bulldog.* By Capt. SIR F. LEOPOLD MCCLINTOCK,
R.N., F.R.G.S.

IN compliance with a request from the promoters of the North Atlantic Telegraph Route, Her Majesty's Government despatched the *Bulldog* under my command, on the 1st of July last, with orders to ascertain the depth of the ocean, and as far as possible the nature of the bottom, between the Færøe Islands and Iceland, Iceland and Greenland, and between Greenland and Hamilton Inlet on the Labrador coast. I was also directed, should my time permit, to make a slight examination of that inlet—being British territory; but in no other instance did my duty extend to the examination of any of the coasts I was required to approach. With the exception of Hamilton Inlet, none of the positions for the shore-ends of the proposed lengths of cable were suggested when I sailed from England. The duty of selecting them was subsequently entrusted, by the promoters of this Telegraph Route, to Captain Allen Young in the *Fox*; consequently, my lines of soundings have not in every instance been carried in from the deep sea, so as to unite exactly with the coast explorations of Captain Young.

Although my visit to the Færøe Islands was not for the purpose of making any examination of their shores, yet I could not fail to observe that a submarine cable, in connection with the main island, and a land-wire across it, could be maintained with perfect ease. In my official report to the Secretary of the Admiralty, written previously to my return to England, and which I shall have frequent occasion to quote, I have remarked that on landing at Thorshaven, the chief town of the islands, I observed that the little bays near it afforded ample shelter and security for any cable landed within them. The best harbour in the group is Westmanshaven, but it is situated in a channel through which the tide runs fully six miles an hour, and for this reason it would not be advisable to bring the cable there.

I was informed that the channel between the islands of Stromöe and Osteröe is almost obstructed in the middle, being contracted to fifty or eighty yards; hence there can be but a very slight flow of tide through it, and upon this account I would seek a landing-place for the Iceland cable near to the north-west outlet of this channel, at Haldervig or Eide.

Leaving the Færöe Isles on the 6th of July, we sounded across towards Ingolfsholde upon the south-east shore of Iceland, a distance of 280 miles, and found the depth to be generally less than 300 fathoms, the greatest depth being 680 fathoms. The specimens of the bottom consisted chiefly of fine sand, or mud and broken shells, and, in two instances, of minute volcanic débris; the temperature of the sea at 100 fathoms below the surface scarcely varied from 46°. The depth of water upon this section of the telegraph route is so moderate that it would be an easy matter to lay down a cable between Færöe and Iceland. Since my return I find that Beru Fiord, upon the east coast of Iceland, has been examined with a view to its selection as the landing-place for a cable; it is about 80 miles to the north-east of Ingolfsholde, and has the advantage of being somewhat nearer to Færöe.

On the 11th of July I arrived at Reikiavik, the chief town of Iceland; an expected supply of coals had not arrived, therefore I remained only three days, but returned again in October, when my stay extended from the 19th to the 28th. During these visits I obtained some interesting information about its physical aspect, its climatic condition, and the movements of the ice in the adjacent seas. I was informed that a telegraphic wire could not be carried along the south shore eastward of Portland, on account of the many wide rivers which have their sources amidst the mountains and glaciers of the interior. These rivers are much swollen in spring, when they carry down vast quantities of ice, and sometimes change their beds; but to the north of the central mountains no such difficulty would be experienced.

The east and west coasts are very seldom visited by drift-ice, not oftener than seven or eight times in each century, whilst it is only upon two or three of these occasions that the drift of Arctic ice is sufficiently extensive to reach the south coast. True icebergs are *never* seen; the masses sometimes mistaken for them are small enough to float in comparatively shallow water, so that a cable would remain undisturbed at the bottom, its shore-end being carried into a fiord. Faxø Bay, on the south-west coast, enjoys a remarkable exemption from drift-ice; the last mention of its appearance within it is as long ago as 1683: neither does it freeze over—mer-

chant vessels trade there throughout the winter. A cable could therefore be landed in this bay with perfect ease and security, and probably to the westward of Reikiavik.

The entire population of Iceland scarcely exceeds 60,000 souls.

Education is perhaps more generally diffused than in any other country, and the topographical maps recently published by the Danish Government delineate its features most fully, and with the greatest possible accuracy, and would greatly facilitate the survey of a land-line.

Although Iceland is considerably larger than Ireland, and is of volcanic origin throughout, yet for long ages the disturbance occasioned by its subterranean fires has been limited almost exclusively to its south-western quarter, where Hecla is occasionally, and Katla has been very recently, in an active state, and where Geysers and boiling springs are numerous; nor is the adjacent sea free from like convulsions. In 1783 a submarine volcano burst forth in a probable depth of 200 fathoms, about 30 miles off the south-west extreme of the island; by it a new islet was formed; it soon after subsided, but still exists under water as a dangerous sunken rock. This volcano was again active in 1830;* its action appears to have been very limited, and within 4 leagues of it stands the time-honoured "Grenadier's Cap," a basaltic column, 80 feet above the sea; within 500 or 600 yards of this most remarkable rock the *Bulldog* sounded in 70 fathoms. Fortunately the telegraph route is not required to pass, by sea or land, through any part of this disturbed or suspected area. Five days of very calm weather enabled us to complete the line of soundings between Faxe Bay and the south-east coast of Greenland. The depths generally were very regular, the greatest being 1572 fathoms, and situated in mid-channel; but when within 40 miles of Greenland the depth decreased from 806 fathoms to 228 fathoms, in the short distance of $3\frac{1}{4}$ geographical miles.

The nature of the bottom was chiefly oaze, that is, fine mud partly consisting of minute organic remains; but near to Iceland volcanic mud and sand were more frequently brought up. The temperature of the sea at 100 fathoms below the surface gradually diminished from 46° near Iceland, to 39° off the Greenland coast. Circumstances which it is unnecessary to allude to here prevented me from commencing before 18th August the line of soundings between the south-west coast of Greenland and Hamilton Inlet on the Labrador coast, a distance of 550 miles.

* Some interesting notices of this and other submarine volcanoes are published in the 'Nautical Magazine' for July, 1860.

The Greenland shore was still blockaded by such a vast accumulation of drift-ice that we could not approach within 45 miles of it, at which distance the depth was ascertained to be 1175 fathoms. This line of soundings to Hamilton Inlet shows that the greatest depth—which is in mid-channel—is 2032 fathoms; and that the decrease is very gradual until within about 80 miles of Labrador, where there is a change from about 900 fathoms to 150 fathoms in 7 or 8 miles.

The ocean-bed consisted of ooze, but with fewer microscopic organisms than previously met with, whilst the average temperature of the sea at 100 fathoms below the surface was 40°.

Seven days were all I could devote to the examination of Hamilton Inlet. Its length was found to be 120 miles, whilst its width varies from about 15 miles at its mouth to scarcely half a mile at "the Narrows," which are about half-way up to its head, and above which it expands into an inland sea of about 20 miles in width. All this great inlet was rapidly explored, its main channel from "the Narrows" to seaward was sounded, and the whole laid down by Mr. Reed, master and assistant-surveyor, with sufficient accuracy for ordinary purposes; but these soundings are not nearly sufficient to meet the requirements of a cable-route, nor even to decide whether a cable should be landed there.

We found the depths to be very irregular, and seldom sufficient to secure a submerged cable from disturbance by icebergs. A perfect survey is absolutely necessary, and may show that the shallow water and reefs of rocks, which to our imperfect knowledge appeared intricate and unfavourable, may not only be avoided, but may afford a sure protection against the intrusion of icebergs within the mouth of the inlet. There are some small rocky islets off the mouth of this inlet, and of these the *Hern* Islets lie nearly in the middle and contract the widest channel of entrance to about 5 miles; the greatest depth obtained in this channel was 49 fathoms. Had the depth of water amounted to 70 fathoms in as far as this position, I would not hesitate in pronouncing favourably of Hamilton Inlet as a terminus to the cable from Greenland.

The greater part of the local information which I obtained here was kindly furnished by Captain Norman, a Newfoundland merchant, who has traded here each successive summer for twenty-four years; during the summer he resides at Indian Harbour, at the north entrance of the inlet, where there is a secure anchorage for vessels of moderate size. Captain Norman states that icebergs very rarely enter the mouth of Hamilton Inlet, and never pass within the *Hern* Islets; and for these reasons: 1st, that the current

which has borne them from the north is here deflected off-shore by the Esquimaux Islands, and carries them past the mouth of the inlet; and 2ndly, that the flow of water caused by the discharge of several large rivers into the inlet still further aids in carrying the drift-ice and icebergs out to seaward. During winter and spring this drifting ice prevents all access to Labrador; but by June Hamilton Inlet is usually quite free from it.

From Captain Norman I also learned that the deepest water along the coast is off Cape Harrison, and that a large river runs into Byron Bay adjoining it; moreover, Sloop Harbour (which is close to the river) is said to be an excellent one. Unfortunately my time was too limited to admit of any examination of this promising locality. It is very desirable to obtain more information respecting the ice and icebergs upon this coast. It could be furnished by the Newfoundland traders and seal-fishers, and perhaps by persons in the employ of Messrs. Hunt, Henley, and Co., of 8, Broad-street Buildings, E. C., a firm which has maintained an extensive establishment near to Hamilton Inlet for a very long period, fifty or sixty years, I believe. In addition to these sources of information, there are intelligent Moravian missionaries, whose settlements on the Labrador coast have existed for more than one hundred years.

The shores of Hamilton Inlet appear bold, rocky, and almost devoid of vegetation when viewed from the sea; as we advance up it, the land becomes lower, the undulations more gentle, verdure and trees appear, and at its head the whole country is densely covered with spruce, white pine, and white birch, but the tallest trees do not exceed 40 feet. I was informed that the interior is similarly wooded, and has an exceedingly scanty population of Indians, allied to the Cree nation; they all profess Christianity, and are a strictly honest, quiet race. The residents along the shores of this great inlet are of European or mixed blood, and do not amount to 200 souls. During summer they catch cod-fish, herrings, and salmon, and in winter they are occupied in trapping fur-bearing animals.

At the Hudson Bay trading-post upon North-West River, at the head of the inlet, I met Mr. Smith, the gentleman in charge, who kindly supplied me with the only information respecting the interior that I was able to obtain. He seemed to think there would be no difficulty in carrying a wire from here overland to Mingan, on the Gulf of St. Lawrence. The Indians frequently travel from one place to the other, the distance not exceeding 250 miles. Should the cable be taken to this inlet, I would suggest that it be landed upon the south shore, to seaward of "the Narrows," as the tides

run through them with very great velocity. All other parts of the inlet freeze over to a depth of 3 feet, for the winters are very severe. The summers, though short, are no less remarkable for their warmth. At North-West River barley and oats ripen, and potatoes and other vegetables grow tolerably well. Mosquitoes are such an intolerable plague, especially to new comers, that unless their faces are carefully veiled or smeared with camphorated oil, brimstone ointment, or dilute creosote, they cannot either repel or endure their bloodthirsty attacks.

Leaving Labrador on the 17th September, I returned to Greenland for the purpose of completing such soundings as the drift-ice had previously compelled me to leave undone. Being, moreover, very desirous of meeting the *Fox*, and of ascertaining from Captain Young where the cables were to be landed, so that I might continue the deep-sea soundings in to those positions, I visited the settlement of Julianshaab on the 29th September, but no information could there be obtained of the *Fox*. The season was very remarkable for the great quantity of drift-ice which encumbered the shore, and had hitherto prevented vessels from approaching Julianshaab; in fact, so much ice had not been known for nearly thirty years. This coast, I may remark, is usually quite free from ice by September. Following up my inquiries, I learned that the climate is not nearly so severe as is generally supposed, the fiords are only partially frozen over in winter; a few cows, goats, and poultry are reared; and although the summers are cold, turnips, spinach, lettuce, and radishes grow in the open air.

I was informed that the large fiord of Tessermiut, which lies midway between Julianshaab and Cape Farewell, was the most likely place to afford security for a cable: that icebergs never came into it, and that there would be found ample depth of water from it out to sea; also that there is safe anchorage in a spacious bay near its mouth as well as high up in the fiord. On 3rd October I put to sea, intending to sound into Tessermiut Fiord, should the ice permit; but it was with difficulty we got out, for a south-east wind had brought up much more ice from Cape Farewell, and prevented our approaching within 40 miles of Tessermiut or the adjoining coast; and the ship sustained considerable damage from unavoidable collisions with the ice before she got clear out to sea. It is well known that a current from the North Atlantic Ocean bears along with it all this ice round Cape Farewell, and up the west coast of Greenland for several hundred miles. It carries the drift-ice for the most part along the outer islands, and it is only when there is a strong wind blowing in from the sea that the ice

comes in between the islands and enters the fiords; it is almost exclusively low or flat ice which thus drifts in, the larger masses and icebergs, which draw more water, nearly always keep in the main stream along the outer islands.

It is evident that were a cable brought in from the deep water existing outside and between these islands, and carried sufficiently far up a deep fiord, its security from icebergs would be insured; and that to protect the mere shore-end from the ordinary flat-ice would be a matter of no great difficulty.

Since my return to England I have received a letter from the Resident Inspector of South Greenland, the well-known Dr. Rink, whose writings on Greenland have added so largely to our knowledge of the physical condition of that great Arctic continent. The opinion of such a man deserves serious attention, since it is scarcely possible to quote a higher authority upon the point in question. I therefore do so almost in his own words.

"I have thought much," he writes, "over the proposed route for the North Atlantic Telegraph; at first I doubted the possibility of accomplishing it, but now I am of a contrary opinion. You can lay down the cable from Iceland round Cape Farewell into some fiord upon the south-west coast, where ice cannot ground upon it, or touch it except for a few fathoms out from the shore, and this last part may be easily protected. But to carry the wire across the interior of Greenland, as I have heard of, would be impracticable." This letter was written in Greenland, before either the *Bulldog* or *Fox* had arrived there, and experience has since shown the necessity for acting in accordance with the suggestion of Dr. Rink. The length of cable required to unite Iceland with West Greenland will be about 800 miles.

Finding that nothing more could be done upon the Greenland coast, I commenced a line of soundings towards Rockall, but a succession of tremendous storms and want of fuel prevented the completion of this service. One of the few casts obtained deserves particular mention; the depth was first ascertained to be 1260 fathoms: then a sounding-machine was lowered to obtain a specimen of the bottom, and about 50 fathoms of line more than the depth required was payed overboard to ensure its being down. On hauling it in, several small star-fishes were found adhering to that part of the line which had lain upon the bottom! The nearest land at the time was Iceland, and it was 250 miles distant. I simply mention this interesting fact, which I witnessed, leaving it to be enlarged upon by Dr. Wallich, the able naturalist of the Expedition, who is still employed by the Admiralty in the micro-

scopic examination of our specimens of the sea-bottom. The result of his investigations (which will be published hereafter) may be of great importance to Marine Telegraphy, proving, as it will do, the existence of animal life at very great depths.

We are aware that the coating of a Mediterranean cable was attacked by minute creatures allied to the ordinary *Teredo*,* at the depth of 60 or 70 fathoms, and should it be found that similar boring animals exist in great depths, it will become imperative to protect the insulation of the wire against their ravages; but time does not admit of a digression from the object of this paper, which is simply to lay before you my experience and opinion with regard to the physical aspect of the proposed route; it may not, however, be out of place to mention that the great pressure exerted at depths approaching to 2000 fathoms is sufficient to squeeze the tar freely out of rope: could we recover a cable from these depths, we should find the tar similarly expressed from its canvas wrappings. If the tar used were of a sufficiently viscid description to harden and remain coated upon the wrappings, it would probably afford quite a sufficient protection against these destructive creatures.

Once laid in deep water, the North Atlantic Cable will probably be more secure and more durable than any other; as it will lie at the bottom of a sea where the temperature is unusually low, and where animal life is proportionately rare.

If, during the coming summer, a final selection and survey of a landing-place in Greenland be made, all that will remain to complete the entire route will be a landing position in Labrador; and that a cable can be safely landed upon some part of this coast, if not in Hamilton Inlet, it is hardly possible to doubt.

Judging then from my own experience, and from the facts which the voyage of the *Bulldog* has brought to light—many of which are supported by the most reliable local authorities—I am of opinion that with regard to the practicability of laying a North Atlantic cable there are no grounds for serious misgivings; on the contrary, nearly all the information which has so far been ascertained is of a kind favourable to the accomplishment of the undertaking.

That there is usually impenetrable ice upon the south-west coast of Greenland for eight months out of the twelve—(i.e. from January until September)—we are well aware; and hence originates the chief difficulty of the route. It is obvious that the Greenland cables cannot possibly be laid down whilst this ice remains upon the coast; but in ordinary seasons it does not clear away until

* See a Paper by J. Gwyn Jefferys, F.R.S., on 'The British Species of *Teredo*,' published in 'The Annals and Magazine of Natural History' for August, 1860.

autumn is far advanced, and stormy weather becomes frequent. This difficulty, I apprehend, however, is not an insuperable or extraordinary one, since it is common to all similar operations at sea requiring for their accomplishment a like period of four or five consecutive days.

I have assumed that the ice ceases to obstruct the south-west shore of Greenland about the middle of September; but we can no more predict its movements than we can foretell the temperatures of the seasons, and the winds by which those movements are governed.

Exceptional seasons occur when it would be imprudent to attempt laying a Greenland cable: also rare seasons when it could be laid as early as July: again, there are seasons when the icedrifts are detached from each other, so that vessels watching their opportunity may freely pass into harbour or out to sea during the summer months.

In order to meet these ever-varying circumstances, it is the more necessary that the utmost caution be observed in all matters connected with the laying down of the Greenland lengths of the great cable; that the most suitable steamers be selected, and the highest engineering and nautical skill be employed.

And that this country possesses all the needful appliances and the amount of professional talent requisite for the accomplishment of this great undertaking, is no more to be doubted than that she possesses men of sagacity to appreciate its vast utility, and of commercial enterprise to bring about so desirable an issue within the next two or three years.

The second Paper read was—

2. *Synopsis of the Surveys of the Fox, under the Command of Capt. ALLEN YOUNG, F.R.G.S.* By Sir CHARLES T. BRIGHT, F.R.G.S.

I HAVE been requested by the promoters of the North Atlantic Telegraph to present to the Royal Geographical Society a synopsis of the report which has been handed to me by Captain Allen Young, upon his recent voyage in the steam yacht *Fox*, and his careful and elaborate survey of the proposed telegraphic route between Europe and America, by way of the Færøes, Iceland, and Greenland.

FÆRØE ISLANDS.

This most interesting group of isles, the capital of which is Thors-haven, lies some 200 miles north of Scotland, and is under the authority of the Danish Crown. I will not occupy the time of the

Society in discussing the political, physical, or other characteristics of these islands, but proceed at once to quote some interesting extracts from Captain Young's report. He says:—"We were naturally anxious to reach the spot at which our work was to commence, and to ascertain the first foreign station at which the telegraph cable was to be landed. We were glad to make the Færøe Islands, distant 50 miles, on the evening of the 2nd August, the remarkable clearness of the atmosphere and the height of the land making our distance from it apparently far less than we were by our observations. When 46 miles E.S.E. from Naalsøe we obtained soundings in 102 fathoms, sand and shells. We here passed through many patches of discoloured water of a reddish hue, caused probably by minute animalcules on the surface, specimens of which, brought up by the towing-net, were preserved. Specimens of water, both on the surface and at various depths, were frequently obtained during our voyage and preserved, the temperature and specific gravity being registered in the meteorological journal.

"On the morning of the 3rd the land was obscured by clouds and mist, which, as the sun rose, gradually dispersed, and enabled us to obtain views of the land, and also to fix our positions by Born's chart to commence a line of soundings into the north point of Naalsøe; the depths were 36 to 26 fathoms, with a bottom of sand and shell."

Thorshaven.—"On rounding the north part of Naalsøe we took a fisherman on board as pilot, and at 10.50 anchored in Thorshaven, and immediately commenced an inquiry and examination of the locality, and testing the accuracy of all the charts and maps in our possession. The results were as follow:—Thorshaven and bay is protected by Naalsøe, and is land-locked, excepting on two points to the south-east, and on one point to the north-east. A swell sets in to the inner harbour with south-east gales; but this cannot be to any very great extent, from the fact that vessels lie at their moorings throughout the winter. The bay has good anchorage, varying in depth from 25 to 8 fathoms, bottom of sand, gravel, and shells, with a few patches of hard ground. Vessels usually moor in the two inner harbours or creeks, the northern being most frequented for the facility it offers for loading and discharging cargoes. Either of the inner harbours would do very well to land the telegraph-wires; but from the many vessels frequenting the port it appeared desirable to select another place; for, even were the cable to be buoyed, the risk from the ships' anchors would be considerable, on account of the want of space; but half a mile southward of Thorshaven is a small cove called Sandygerde, where the cable could be

landed in safety and clear of ships' anchors. This cove is $1\frac{1}{2}$ cable's length across and about the same depth, and shoals gradually to a sandy beach; it is intersected at the head by a watercourse and mill, the land sloping gradually up an extensive valley to the interior. As many additional soundings were obtained across the fiord as our time would admit, proving that although the channel is uneven, there is nothing to prevent bringing a cable in from sea. From the most reliable information from pilots and our own observations, the stream on the flood never exceeds 4 knots on the strongest spring tides, whilst on the ebb it is much weaker, and at times scarcely perceptible. It is high water at full and change at 4 o'clock: the flood runs to the southward. The Gulf Stream appears to sweep round these islands from left to right, or direct as the hands of a watch; and therefore in sailing from Thorshaven for the northward, by starting with the first of the flood and passing to the southward of Stromøe, and through Hestøe and Westmanshaven Fiords, you can carry a 9 hours' favourable tide. The rise of tide at Thorshaven does not exceed 6 feet."

Westmanshaven.—"We left Thorshaven at 1 P.M., passing through Hestøe and Westmanshaven Fiords, and anchored in Westmanshaven in the evening. The scenery in these fiords is very magnificent, and as we steamed through with a strong head-wind and weather tide, the surface of the water covered with sea-birds, the lofty hills on either hand rising to the height of 1500 to 2000 feet, with vast basaltic caverns and columns in the cliffs, formed a picture not easily forgotten. As I had heard that Sir Leopold M'Clintock had already examined this port, I did not deem it necessary to delay the ship for that purpose. The fiord appears clean and clear, with deep water close into either shore. I was informed that there is 70 fathoms water in the middle, a little north of Welbestad, and the stream in strongest spring tides runs 6 knots through the fiord. The rise of water is much influenced by the winds outside; it has reached 10 feet at spring tides, and has been known as low as 4, but the mean rise appears to be from 6 to 8 feet. Westmanshaven is said to be the best harbour in the islands; it is completely landlocked, with a bar, probably formed of the débris washed down from the surrounding hills, and accumulated by the action of the streams and eddies in the fiord. I fear the current in this fiord would be disadvantageous."

Haldervig.—"We left Westmanshaven on the evening of August 5th, and, after weathering the northern extremity of Stromøe, entered the sound between Stromøe and Osterøe, and anchored at Haldervig at 11.30 P.M. on the same night. An examination of the

port and estuary of the sound was commenced. The results of these observations, which occupied two days, were, that little or no stream is found in the sound; that Haldervig has good anchorage, and is perfectly landlocked; the deepest water is 34 fathoms, bottom black mud and sand, but that a sand-bar exists between Eide Point and Stromøe, over which there are 8½ fathoms in the deepest part; and as in northerly gales the sea is said to break upon it, I consider that the cable would require a strong shore-end to ensure its safety in crossing this place. This bar lies rather within the entrance and narrowest neck of the sound." In the summary Captain Young states:—"At Haldervig we surveyed harbour and fiord, and found all satisfactory, and I think that place to be well adapted for the reception of the cable. We found but little current, and the cable can be taken in, in a tolerable depth of water, into a perfectly land-locked position."

ICELAND.

"On approaching the coast of Iceland we got occasional soundings towards Ostré Horn, under which we were obliged to anchor in a dense fog, after getting inside an extensive and dangerous reef of rocks, called by the Icelanders the Hartinger and Bortinger. These reefs lie two miles east (true) off this cape. They do not appear on the Danish surveys, but I afterwards found them as a single rock upon a French chart."

Beru Fiord.—"On the morning of August 12th, the fog having lifted, we weighed under steam, and got into a position to carry a line of soundings into Beru Fiord, between the islands of Papey and Kogar Point: these soundings average about 30 fathoms, principally sand and shells. We anchored off Djupivogr factory the same day, and it being Sunday we ceased operations during the afternoon. The weather that day was the finest we had had since we left England, and the evening was truly summer-like. During the following five days, and when not prevented by the prevalent rain and fogs, we proceeded with the examination of the fiord, and finding it would not be advisable to carry a cable into the small harbour of Djupivogr, on account of many rocks in its vicinity and its being the anchorage of the small vessels frequenting the coast, we sought for a more suitable landing-place higher up the fiord, and succeeded in finding an excellent bay, called Gautavik, on the north shore, five miles from the entrance. A depth of near 30 fathoms can be carried in from sea to within a quarter of a mile of the shore, while the bay itself afforded good protection and

anchorage for any large ships that might be employed in the undertaking.

"High water at Djupivogr at 3 o'clock, full and change; rise 6 feet. The tide has been known to rise $6\frac{1}{2}$ feet before the coming of easterly gales; about the same time flood outside runs s.s.w. (true), ebb n.n.e., between Papey Island and the main. The strongest known stream has 4 knots, but the average in ordinary spring tides is not more than $2\frac{1}{2}$ knots.

"In 1860 drift-ice appeared off the coast and entered the fiord, and again (though in very small quantities) in 1859-60 (sic). This ice, called here Greenland ice, is the ordinary washed and decayed floe-ice, and comes from the north-west. *No icebergs have ever been seen on the coast.* The drift-ice appears with northerly and departs with southerly winds, and less of it comes into Beru Fiord than any other fiord on the east coast of Iceland; the residents accounting for this fact by Beru Fiord having a south-west direction, and is consequently protected by the more northerly and projecting capes which shunt the ice off, while the local tides keep it drifting up and down the coast. The fiord itself never freezes, but thin ice has been known to cover the harbour off the factory for a day or two during the winter.

"A tolerably complete survey of the fiord from the entrance to Gautavik was completed, but a further examination would be advisable outside, to ascertain the proper channel in which to lay the cable. The greatest difficulties experienced on the coast by seamen, are from the prevalent fogs during the summer months, and with easterly winds, *and this would render it advisable to start from this coast towards Færøes*, in laying the cable, because making a good landfall here would be attended with considerable uncertainty." Finally, as to the practicability of Beru Fiord, Captain Young says, "There will be no difficulties from the sea, ice, or otherwise, and the only obstacles will be from fogs and thick weather, but which may be overcome by selecting proper seasons, and taking precautions in landing or embarking the telegraph cable."

Reikiavik.—Captain Young sailed from Beru Fiord on the 17th day of August, and arrived at Reikiavik, the capital of Iceland, on the 21st day of August, and after making inquiries as to the coasts, he says, "I then determined to examine Hval Fiord, as from its situation it appeared to have the advantage over any place in Faxø Bay, and on the 27th I proceeded up that fiord, sounding it as far as 'Maria Havn,' a small harbour and salmon river on the south shore, 7 miles from the entrance of the fiord. The least depth of water in the

channel of the fiord is 14 fathoms, with deeper water both outside and in, the general depth being 18 to 20 fathoms, soft mud. The cable could be taken into Maria Havn through soft mud, on a sandy beach in a landlocked position. Hval Fiord is protected from a heavy sea breaking into it by the shoals of 'Vesthrham' and 'Sydiahraun' in Faxø Bay, and on which there is less water than in the shoalest part of the channel of the fiord. The bays in the fiord are sometimes covered with thin ice, but the fiord itself never freezes; and with reference to drift-ice on this part of the coast, I cannot do better than quote the words of Sir Leopold M'Clintock. 'Faxø Bay never freezes over, and I can find no record of drift-ice within, since 1683. Merchant-vessels come and go throughout the winter.'

GREENLAND.

The *Fox* left Reikiavik August 31st, and after a very rough passage arrived at Frederikshaab October 2nd. Captain Young remained there to make some necessary repairs, and finally arrived at Julianshaab on the 22nd October. He then reports:—"Having made all inquiries about Igalikko or Julianshaab Fiord, I deemed it advisable at once to commence a survey of this beautiful arm of the sea, and acting upon the opinion of Colonel Shaffner, that were this fiord found practicable, the electric circuit from Reikiavik would not be too extended."

Julianshaab Fiord.—"We first sounded up to the head of the Fiord, which gave an opportunity for our landing a travelling party, under command of Dr. Rae, to examine the inland ice and nature of the country. A party also went to the Old Nordisker Ruins, at Igalikko." Returning with the *Fox* to Julianshaab, October 27th, Captain Young then surveyed the estuary of the fiord, and from the soundings obtained, says, "I am of a decided opinion that a depth of not less than 150 to 160 fathoms can be carried from the middle of the fiord abreast the settlement, out to sea, with a general muddy bottom.

"The depth of water will effectually preclude injury to the cable from the largest icebergs ever seen upon the coast. Although many bergs lay along the coast, we saw none aground in this valley of the fiord, nor, according to information obtained from the residents, have they been seen grounded in that channel." Captain Young then proceeds to say—"This report and my previous letters will show that my decided opinion (so far as we have been upon that route) is favourable to the practicability of the undertaking, and that Julianshaab will, under all circumstances, be well adapted for the reception of the cable. With regard to the operation of laying the cable, I

consider that no apprehension may be felt on that point; for, from the sudden disappearance which we witnessed of the ice from the coast, and from the ice *usually* dispersing from the south-east shores of Greenland in the autumnal months, opportunities will always occur when a ship having the cable on board, and lying in readiness in Julianshaab, may depend upon having a period of clear and open sea. *The cable once laid, no drift ice can in any way injure it, if the proper precautions are taken in securing the shore end."*

Ice of the Greenland Seas.—"Since my arrival I have seen the admirable remarks of Mr. J. W. Taylor upon the southern coast of Greenland, the results of his experience during seven years' residence there. His opinions must be most satisfactory to you, and I am sure that all who are interested in the work must be grateful to him for having so freely given them.

"I perfectly coincide with his views with regard to the size of the icebergs frequenting the above coast and accompanying the Spitzbergen drift-ice; and as this bears upon my own opinion, that no iceberg will ground in the channel of Julianshaab Fiord, I think I may here explain my reasons for this statement. Having navigated the entire west coast of Greenland, and into all the principal settlements, and having experienced a whole winter's drift in the ice, through Baffin's Sea and Davis' Strait, I have had occasion to remark and to gather all possible information upon the ice movements.

"Around the coast of Greenland, westward of Cape Farewell, there are two distinct descriptions, or rather kinds, of drift-ice ever approaching, but never meeting together. The first is the ice formed during the winter on the vast area of Baffin's Sea and the different channels from the Polar Seas westward of Greenland. This ice, called by the Greenlanders *the west ice*, often blocks up throughout the year the upper part of Melville Bay, and drifts constantly throughout the winter and early spring to the southward, through Davis' Strait, into the Atlantic. It seldom comes in contact with the coast of Greenland below the parallel of Disko, *and there is always an open sea between it and Greenland as far up as Holsteinberg throughout the winter.* The second is the Spitzbergen, called also the 'store ice,' which, as has been shown, comes down the east coast of Greenland, around Cape Farewell, and is carried by the current up the west coast, at times even to the Arctic Circle; but by which time it is usually pretty much broken up, and, if not entirely dispersed, the last remnants are supposed to return southward, by Davis' Strait, to the Atlantic—so near these two great ice streams approach, that vessels bound to the colonies have in the early spring

passed up Davis' Strait with the west ice and the Spitzbergen ice on either hand. But as there are two kinds of oceanic ice, so also are there two distinct classes of icebergs, namely, the bergs from the stupendous glaciers far up the west coast of Greenland, and especially in Melville Bay; these bergs attain an astonishing magnitude, but like the west ice, which they accompany or outsail, they do not come upon the west coast of Greenland below the same parallel, although in exceptional seasons of violent gales, such as the last, they may be blown in upon the land a little more to the southward; and I saw some of these *ice islands* last October aground, upon and near Tallert Bank, northward of Fredrikshaab. The other icebergs are those which accompany the Spitzbergen ice, and may be said to follow its movements. They are launched from the glaciers far up the east coast of Greenland, and from those in the island of Spitzbergen; and besides being originally far less in their dimensions, they are exposed during their long passage southward to the warmer Atlantic winds and heavy swells, and are proportionally reduced before their arrival at Cape Farewell. The bergs from the southern glaciers of Greenland are but small, and need scarcely to be taken into consideration; for, as they must come out from the heads of the fiords, they surely would not take the ground in again entering the *channel* of the deepest fiords.

“With regard to the flotation of ice, it has been calculated that seven-eighths of a cubical mass of ice will be immersed; but icebergs being very irregular in their formation, and having usually very peaked and angular summits, whilst below the water they are smooth, rounded, and most frequently widened out, I think that icebergs are not found that draw more water than the proportion of six feet below to one foot of perpendicular height above the water. Therefore in 150 fathoms of water (the very least found in the entrance to Julianshaab Fiord) an iceberg of an elevation above the water of 150 feet, or having an entire perpendicular height of 1050 feet, will there be suspended above the ground, and such bergs are not to be met with in that place.”

Remarks upon the Seasons.—“The finest months in the Færøes are June and July, and in these months only should the cable be laid, and then about the last quarter of the moon, because the tides are greater at the full than at the change, consequently the neap tides immediately after the last quarter should be selected, as the currents are then inconsiderable. I have already given my reasons for recommending that the cable be laid from Iceland towards the Færøes, not only on account of the prevailing fogs on the east coast of Iceland, but also from the greater facilities for making the

coast of the Færöes, and the opportunity that the comparatively speaking shallow water off the north-west coast would give of shipping and buoying the cable in the event of a sudden gale of wind occurring at the time of laying it. The finest months upon the east coast of Iceland are also June and July, but I was informed that the weather is clearer earlier in the season, in the months of May and June—I suppose from the alternations of temperature being then less frequent. A few hours, however, of clear weather would always carry a ship beyond these mists, which usually hang only on the land. With reference to Faxø Bay station, the west coast of Iceland is generally free from fogs, and the gulf stream which sets round Cape Reikianess, and appears to keep up a continuous flow around Faxø Bay to the northward, passing out by Snøfellsness, also appears to considerably affect the climatic condition of the west coast. Navigation is open all the year round, and the operation of bringing the cable here can be timed to the opportunities for departing from Greenland. A fine pyramidal beacon has lately been erected on the Skagen, and is of great assistance to navigators entering Faxø Bay from the southward."

Conclusion.—Before concluding, it is proper to state that the voyage was one surrounded with much peril, on account of the succession of gales and the extraordinary quantities of ice found in the Greenland seas; never within the memory of man has there been so much and so long a continuation of ice upon the Greenland coasts as during the past year. In the arduous labours of the voyage Captain Young was most ably assisted by Mr. J. E. Davis, Master in the Royal Navy, who by the kindness of Captain Washington, Hydrographer to the Admiralty, was permitted to accompany the expedition and take part in the necessary surveys; and his former well-known services under Sir James Ross in the Antarctic regions, and great experience as a marine surveyor, enabled him to render the most valuable assistance in the especial mission of the *Fox*, which is acknowledged by Captain Young in his report in the highest possible terms. During the voyage various specimens of deep interest to the geologist and naturalist were collected; a large number of scientific observations were made, and a detailed meteorological journal was kept, which, together with other valuable information and an extensive collection of photographs, made with great zeal by Mr. Woods, under very difficult circumstances, have been furnished by Captain Young and Dr. Rae to the promoters of the enterprise, with the hope that they will be found to contribute to the cause of science, as well as to the immediate object for which they were made. Time will not now

permit me to give further details of this most interesting voyage ; but any members of this Society who may desire to make personal inspection of the charts, meteorological tables, logs, reports, and specimens, will be gladly permitted to do so.

Having thus presented to the Society some of the most valuable and interesting portions of Captain Young's report, I have only to observe, that the result of the recent survey has been to remove from my mind the apprehensions which I previously entertained in common with many others, as to the extent and character of the difficulties to be overcome in carrying a line of telegraph to America by the northern route.

Prior to the dispatch of the surveying expedition we had no knowledge of the depth of the seas to be crossed, with the exception of the few soundings obtained by Colonel Shaffner in 1859, and our information as to the nature of the shores of Greenland in regard to the requirements for a telegraphic cable was equally small.

These points are of vital consequence to the prospects of the North Atlantic Route, and the survey has placed us in possession of satisfactory particulars respecting them. The soundings taken by Sir Leopold M'Clintock will be a guide in the selection of the most suitable form for the deep-sea lengths of the cables, while the information furnished by Captain Young will direct the construction of the more massive cables to be laid in the inlets of the coast. It is not necessary to determine upon the precise landing places and other points of detail in connection with the enterprise at the present time, but the promoters of the undertaking have received ample encouragement from the survey, and from the testimony of competent and experienced voyagers and sojourners in the countries to which the line is to be carried, to warrant them in proceeding with their labours with renewed vigour and confidence. When they have achieved that success which their perseverance and energy deserve, I am sure they will always gratefully remember that their endeavours at the stage of their operations which is now under discussion would have been very much less productive of good results, but for the patriotic foresight of Lord Palmerston in ordering the *Bulldog* on her late successful service ; and for the assistance of Sir Leopold M'Clintock, Captain Young, Dr. Rae, and the Commissioners appointed to accompany the *Fox* by the Danish Government, as well as others who took part in the cause, whose patience and devotion to their self-imposed work have been above all praise. Nor can those interested in this important undertaking forget the great assistance which has been rendered to them by the Royal Geographical Society.

The third Paper read was—

3. *Exploration of the Færöes and Iceland, &c.* By DR. JOHN RAE, F.R.G.S., commanding the Land Party.

THE FÆRÖE ISLES.

AFTER a passage of fourteen days from England in the screw yacht *Fox*, we arrived, on the 3rd August, at Thorshaven, the capital of the Færöes. It contains about 900 inhabitants.

On the day following Colonel Shaffner, Lieutenant Von Zeilau (Danish Commissioner), and myself, accompanied by two Færöese as guides, commenced a journey over Stromöe, our destination being Haldervig, a village near the northern extremity of that island. Our course for the first two miles was w.n.w., over the shoulder of a hill (named Klubbin), the height of which about 50 feet below its summit was 1048 feet; we then turned more to the northward until we reached the high land immediately south of Kalbakfiord, 1408 feet above the sea level. The walking round the head of this fiord was fatiguing in consequence of the unfinished state of the path. At the end of five hours we reached the top of the pass overlooking Kollefiord, having an altitude of 1179 feet. When we descended to the valley we took up our night's quarters at the house of Mr. Dam, a farmer, who gave us a hospitable welcome and provided us with a good dinner of fish, dried mutton, ham, cheese, butter, milk, cream, and coffee. Next morning I ascended a hill named Skarling, said to be the highest on Stromöe. Strong squalls of wind, with heavy rain changing into snow as we neared the summit, made the climbing difficult. The barometer indicated a height of 2506 feet. The Colonel had in the mean time travelled along the path a distance of 5 miles to the house of J. C. Jacobson, where we joined him. We were again hospitably entertained, and after remaining an hour we resumed our journey. Our active guides led us by the shortest but the most difficult of two routes, the highest point of which was 1711 feet above the sea. We arrived in the afternoon at Qualvig, a village having 132 inhabitants, where we passed the night. Next morning we traced back the more level but longer route between Qualvig and Kollefiord. We found its highest point to be 1275 feet at $2\frac{1}{2}$ miles' distance from Qualvig. The hill is not too steep for loaded ponies. We hired some of these excellent little animals for the purpose of testing their qualities. They were strong, sure footed, and carried with ease a man weighing over 15 stone. From Qualvig to Haldervig the distance is 9 miles, and the path lies close to the shore all the way. We found the *Fox* at Haldervig.

The formation of the island of Stromøe is almost wholly basaltic, with an occasional thin stratum of red tufa. Opals are found in the hills north of Kollefjord. No difficulties of importance present themselves to the placing of a telegraph line over the route examined, which is about 27 miles in length. At three points of the line some expense would necessarily be incurred in improving the paths, so as to make them more easy for loaded ponies to travel over. These places are the ascent of the high grounds north and south of Kalbakfjord, the descent to Kollefjord, and the height between Kollefjord and Qualvig.

The inhabitants generally appear to be well educated and religious, and so fully aware of the advantages they would derive from a telegraph being carried through their island, that they would use their best efforts to protect it from injury.

Labour is comparatively cheap, the average day's wages being about 1s. 4d. sterling. Our guides were well pleased to receive 2s. each per day.

The climate is not well suited for the growth of grain, but small quantities of barley and oats are raised, and a few potatoes, turnips, and other vegetables are cultivated. The live stock of the farmers are sheep, horned cattle, and ponies, sheep being the principal and most valuable productive source. The population of Stromøe is upwards of 2600. The chief exports are wool, woollen goods, eider-down, fish, ponies, and oil. The inland transport is principally by pack-horses.

Two small bays, the one a short distance to the south of Thors-haven, the other at Haldervig, having been examined by Captain Allen Young, were found well adapted for the landing of a telegraph cable; and the route examined by me overland forms the connection of the projected telegraph.

The sound separating Stromøe from Osterøe offers great facilities for the transport of materials, as it is navigable throughout the whole length, with the exception of about 100 yards near Qualvig, for vessels of ordinary size. The arms of this sound, namely, Kalbakfjord, Kollefjord, and Qualvig Bay, afford good anchorages and approach at three points to within a quarter of a mile of the projected route.

ICELAND.

The *Fox* reached Berufjord, on the east coast of Iceland, on the afternoon of the 12th, and anchored in the harbour of Djupivog, near the entrance of the fjord. From this place the land expedition resumed its labours to travel across the island to Reikiavik. About fourteen horses, and two men to act as guides and pony-drivers,

were required. We had two very zealous auxiliaries in the persons of Mr. Weywadt, the Danish merchant, and Lieutenant Von Zeilau, both of whom exerted themselves to procure the necessary assistance and accommodations for the journey. Only eight ponies, exclusive of those of the guides, could be obtained at prices varying from 2*l.* 12*s.* to 5*l.* 10*s.* Hoping to complete our number of ponies on the way, we left Djupivogr on the afternoon of the 15th. With the exception of the guides, our party was the same as that when travelling across Stromøe. Our path ran along the south shore of Berufiord, and was rough and stony. It was getting late when we reached the head of the fiord, a distance of only $9\frac{1}{2}$ miles in a straight line; so we proceeded to the pastor's house, which we made our home for the night. This worthy man, Sira Hosias, who had been to Djupivogr, overtook us as we were dismounting at his door, and gave us a hearty welcome.

It was difficult to make an early morning's start. Our horse-drivers were active and willing enough, yet we could seldom get away before eight or nine o'clock. A lamb was bought for 2*s.* 3*d.* sterling. After taking an observation with the barometer we resumed our journey, and ascended to the tableland west of Berufiord by a series of four steps. The path, which is formed among stones, gravel, and earth, might be much improved by a very little labour. Two observations for altitude were obtained: the first about halfway up, giving 891 feet; the last near the top, 1282 feet, at which the latitude $64^{\circ} 49' 3''$ N. was also observed.

From this point our path lay nearly due north for 8 miles to a small lake, 426 feet above the sea level. After travelling 7 miles farther in the same direction we arrived at Thingmuli, and took up our quarters in the church, where we found ourselves very comfortable. The clergyman, Sira Biarni, was a kind and good man. A strong horse suitable for either pack or riding was bought here for 3*l.* 8*s.*

Our course for 5 miles was north, along the slope of a hill. We then travelled west until crossing the ridge, when we turned to the south-west, and reached in a short time Hallormstadr, on the banks of Lagar Fliot. Hitherto we had been surrounded by a dense fog, which we emerged from on descending the hill. We here allowed our horses to feed for an hour, and an observation with the barometer gave the altitude of our position 528 feet; that of the river, which was upwards of a quarter of a mile distant, being 90 feet lower. This river has its source in the Vatna Jökul, and the muddy and white colour of its water indicates its glacier origin. As far as we could see to the northward the river widens into the form of a narrow lake

having little or no current. This was the case we were told for 30 miles or more. As we rode to the southward along the stream we passed through a grove of small birch trees, many of which were from 16 to 18 feet in height. At 4 miles above Hallormstadr the lake-like river ends, and 4 miles farther up we came to the ferry. The river was here about 170 yards wide, the current strong, and the water so deep from the recent rains that the horses had to swim when crossing. The ferry-boat carried us all over with the baggage at two trips. We walked to the parsonage of Valthiofstadr, 2 miles distant, and met with a most kind reception from Sira Pietra. Taking the direct route to Valthiofstadr, it may be reached in one day from Beruford, as the distance is about 26 geographical miles, and we learned that the road was not bad.

The morning of the 18th was very beautiful. Our horses having strayed during the night, we were detained some hours. We here bought another horse for 2*l.* 14*s.* After riding 8 miles along a fine level path, we turned to the north-west and commenced the ascent of a steep hill, up which we had not gone half way before we were in a thick fog. Fortunately we had engaged a guide, otherwise it would have been difficult to have kept the proper track. It was half-past nine and very dark when we arrived opposite to Bru, where we had to cross a river on one of those curious swing-bridges before reaching the house. This conveyance was about 2 feet 6 inches long, 2 feet wide, and 2 feet deep, suspended by pulleys to two ropes, which stretch over the river at a height of 30 feet above the stream, which is about 70 feet wide.

Our day's ride had been long and fatiguing, but there were only two parts of the road by any means difficult: the first being the ascent of the hill in the early part of the day already mentioned, and the other where we descended to a small stream, about 7 miles distant from Bru. In both instances the ground is of such a nature that the paths are capable of easy improvement. The heavy rains had made a portion of the road rather swampy.

Sunday, 19th.—Taking with us a guide, we started for Mödrudalr. For 12 miles our course was north; we then turned to the westward, which we kept all the way to Mödrudalr, where we arrived at half-past six. The roads were good throughout the day's journey, and we passed great quantities of dwarf willow; at 8 miles from Mödrudalr we traversed a perfectly desert plain, flat as a bowling-green, and covered with black sand and gravel, the débris of lava. Sigurder Jonsson, the owner of the comfortable farm-house, gave us a most hearty welcome. The farm is extensive, and produces an excellent crop of grass and quantities of dwarf willow, which, when

cut and dried, furnishes excellent fodder for both sheep and cattle. Mr. Jonsson possesses 600 of the former, three or four of the latter, and a number of horses.

Mödrudalr is situated in a beautiful plain, extending to a long distance north and south. Far to the south, at least 45 miles off, you see one of the peaks of Vatna Jökul, having a deep snow-filled cleft in the centre. Within 15 miles to the south-west is Herdubreid, one of the highest mountains in Iceland.

20th.—In company with a Mr. Skulason, who was going in the same direction as ourselves, we left Mödrudalr at nine A.M. Our course during the whole day's travel was north, with a very little westing. The road was good, and we arrived at Grimstadr, 25 miles distant, at half-past two P.M.

21st.—Mr. Skulason still gave us the advantage of his company. We arrived at the ferry on the Jökulsa Axarfiordr at 9.15 A.M., which is 4 miles from Grimstadr. The river is 150 yards wide, the water deep, and the current very strong. The horses had to swim about half the way. We crossed in a boat. The banks of the river are of fine black sand. The water was white and muddy, bearing the characteristics of a river that has its source from a jökul, or glacier. Its west bank is 951 feet above the sea-level. When we had ridden 16 miles from the river we arrived at an immense bed of very rugged lava in a valley to our left, and in one place there was an appearance as if it had filled up the bed of a river. We rode for 7 miles along this lava and then turned aside to visit a number of boiling mud-springs.

Before reaching Reikialith we had ridden among or close to the most recent lava we had seen. The only object I could compare the rough lava beds to, except in colour, was a field of ice that had been floated at high water to a low flat beach, covered with large boulder rocks, which, when the tide ebbed, broke up the ice into all sorts of forms. Reikialith is situated on the shores of Myvatn (Lake), which is very irregular in form and studded with rugged lava islands. Our course to-day was nearly west, and the distance travelled fully 30 miles.

22nd.—The first portion of the route was crooked, to avoid holes in the lava which were overgrown with moss and grass. A ride of six and a half hours, including an hour of stoppage, to graze horses, brought us to the ford of Arndisarstadr, on the Skialfandafliot. It was about 100 yards wide, 2 feet deep, the current strong, and the water white and muddy. We reached the house of the worthy pastor (Sira Pallson) at Hals in the evening.

Hals is in lat. 65° 44' N., and was the farthest north point reached

by us. I learned that, during the winter, snow occasionally falls to great depth, and is blown into deep drifts. The cold is not usually severe, the lowest temperature being 20° or 21° below zero of Reaumur, equal to 13° or 15° below zero of Fahrenheit, and this occurs but rarely.

Thursday, 23rd.—We resumed our journey, having with us Mr. Eggerd Olafsson, a young student, who most obligingly offered his services as guide. After travelling south 2 miles along the small river that flows northward past Hals, we forded the stream. We crossed to the west the ridge of hills, about 1900 feet high, that lies between Hals and Akreyri. This last-named place is next in size to Reikiavik. As soon as we appeared from under the fog on the hill side, the twelve vessels at anchor in the harbour hoisted their colours. Akreyri is built at the head and on the west shore of Eyjafjord. Its harbour is sheltered by a spit of land that runs half way across the fiord where its width is about a mile. From the beginning of November to the end of March or April the navigation is usually closed by ice; but during the summer months there is considerable trade at this place. The valley is one extensive and productive grass meadow running southward for nearly 30 miles, on which a great number of persons were occupied haymaking. The river I found to be navigable for boats drawing about 2 feet of water, to the distance of 25 or 30 miles: its width varies from 25 to 80 yards. The path was good and level, fitted for a waggon in summer or for a sledge in winter.

Early in the evening we came to Saurbær, and were most cordially welcomed by Sira Thorlacius, a clergyman distinguished for his goodness and learning. We here made our arrangements for the next three days' journey, which lay through an uninhabited part of the country. The guide lived at some distance, and our young student rode to his house and engaged him.

24th.—From Holar the path led us south for four miles along the east bank of the stream; we then commenced an ascent of the high grounds in a south-west direction. The hill was 2868 feet in height, being the greatest altitude we had yet passed over. We reached the top in an hour and a half: although the road was now pretty level and many of the larger stones had been removed to one side, the path was not good enough to permit us to ride fast.

We made many détours so as to avoid the rougher portions of the ground, but the general direction of our travel was to w.s.w. In the evening a thick fog came on, and as the cairns of stone set up as marks became less frequent, the guide lost his way, and I had to put him right by the compass. About half-past eight we pitched

our tent on the bank of a small stream, where there was a little grass for our tired horses. Generally speaking, when travelling over Iceland, sufficient dry willows and willow-roots can be picked up for cooking; but here none could be found, so we had recourse to an "Etna" and some alcohol we had carried with us for the preparation of our coffee.

25th.—Our position by computation was in latitude $65^{\circ} 8' N.$, longitude $18^{\circ} 53' W.$; height by observation above sea, 2385 feet. The fog still continued this morning, but not very thick. We had to put back a short distance to recover the proper route; we then crossed a small white water stream, very rapid and stony, named Jökulsa Eystri. Our course was generally south-west by west, marked by little heaps of stones. As usual, we stopped twice to-day to grass the horses near some lakes, where several swans were seen. We should have made a long journey to-day, but fog again came on in the evening, notwithstanding which our guide insisted that he could find the way. His confidence in himself was misplaced.

Two observations for height were obtained to-day: one at Pollar, latitude $65^{\circ} 5' N.$, $19^{\circ} 2' W.$, gave altitude 2368 feet; the other, 6 miles south-west of Pollar, 2463 feet. Both these places afford good grass and water for horses. In latitude $64^{\circ} 45'$ we crossed nearly two miles of very rough lava, extremely difficult to travel over. A small amount of labour would remedy this evil. Farther on we passed quagmires of very adhesive clay. These by a little care can be easily avoided.

Between the latitudes of 65° and $64^{\circ} 45' N.$, and in longitude $19^{\circ} 20' W.$, we crossed a number of rivers, very rapid and some of them 2 feet deep, flowing from Hofsjökul, which lay to our left. Many of these streams appear to change their beds or to spread out to considerable extent during thaws or rainy weather, and could be crossed with difficulty by a telegraph wire, were it not that I noticed at some points the water was kept within bounds on both sides by solid barriers of rock or lava, generally not more than 20 yards apart.

26th.—Our position by account was in latitude $64^{\circ} 40' N.$, longitude $19^{\circ} 33' W.$, and height above sea 1983 feet. It was ten o'clock before we got away. Our road was better than for the past two days, and we went ahead faster. About half-past three P.M. we arrived at the Hvita River, a mile or two below its source from Hvitarvatn, having come 22 miles down hill, the incline being very gradual. The altitude here was 1580 feet.

The river, which is 120 yards wide, could be forded by the horses, but they were very nearly swimming; so, to save our baggage from

getting wet, we had a boat brought across and were ferried over. After permitting the horses to feed for an hour and a half, we travelled westward for five miles round the base of the craggy and lofty Blafell. We now passed over a ridge 400 feet higher than the ferry on the Hvita.

From this point we had a very extensive view of more than fifty miles down the valley of the Hvita, with its numerous lakes and boiling springs—the clouds of white vapour from the latter indicating their positions. We now made a south course, and at the end of seven miles again came to the banks of the Hvita, along which we found an excellent path, over which we trotted at a great rate until late, when the guide again lost his way and left us at a good grazing place to search for a house in the neighbourhood.

27th.—After waiting until half-past eleven in vain for the return of our truant guide, we unpacked our tent and lay under it, having no poles to pitch it with. The guide joined us at five in the morning. He said he had wandered about all night in search of his friend's house, which was within less than ten minutes' ride of where we were. We reached Haukadalr at a little before six and took up our quarters in the church, where we had a good and substantial breakfast.

We then rode forward to the Geysers, where we found Lord Milton encamped. We collected specimens and sounded a Geyser, obtaining 78 feet depth. The barometer gave the height of the position 626 feet above the sea in latitude by observation $64^{\circ} 18' 16''$ N.

Our breakfast at Haukadalr had not been so superior as to prevent us enjoying the good things that Lord Milton most kindly invited us to join him in partaking of, and after a parting glass of champagne with his Lordship we rode for sixteen miles farther on our way to Reikiavik, and then took up our night's quarters at Laugarvatn. Near this house are several boiling springs of very pure water, which are used for cooking.

We arrived at Reikiavik at eight o'clock on the morning of the 29th August, all well, but our horses very much used up by a journey of nearly 450 statute miles.

The results of this journey went to prove that there would be no serious difficulty in carrying a telegraph across Iceland by the route travelled over. Doubtless considerable expense would be incurred in repairing the old paths so as to make them more easy for loaded pack-horses, and in making new ones to shorten distances; but this work will be materially facilitated, as the Icelandic Diet has appropriated a considerable amount of money to be paid annually for this purpose. The six largest rivers that we crossed had high well-

defined banks, that showed no indication of ice action or of changing their position.

A shorter and in every respect a better route across Iceland for telegraphic purposes than the one described is that marked on the chart in a dotted line. This route, from Berufjord as far as Mödrudalr, in latitude $65^{\circ} 17' N.$, longitude $16^{\circ} W.$, is nearly the same as that followed by us. From this point, instead of running northward, it strikes nearly west for 45 miles over what is said to be not a difficult country, to Isholl, a farm on the Skialfanda river. Following up the west bank of this stream to near its source, you cross the centre of Iceland in a south-westerly direction, by the Sprengisandr road, until you fall upon the head waters of the Thorsa. Trace this stream to south-west, keeping on its left bank to avoid the numerous jökul streams that enter it on the right, until reaching latitude $64^{\circ} 20'$, where the river would be crossed. The course then would be west to the Hvita and the Geysers. On nearly fifty miles of this route there is little or no grass, but depôts of hay can be established. Having measured on the charts four different routes from Berufjord to Reikiavik, the distances are about as follows:—

	Geographical Miles.
Route travelled over, cutting off several unnecessary détours..	310
By contemplated telegraph route, <i>viâ</i> Sprengisandr.. ..	250
In a straight line, keeping north of Vatna Jökul	210
Along south shore of Iceland	260

The modes of transport through Iceland are by pack-horses, wag-gons, and in winter on sledges. Of these the pack-horse is by far the most general. These little animals are remarkably sure-footed, and so strong that they can carry a load of 200 or 250 lbs. with apparent ease. They are easily kept in condition with no other food than grass or hay. Their prices vary from 2*l.* to 3*l.*, those for riding being more expensive. The pack-saddle in general use is an extremely primitive affair, the pads employed to protect the back from being injured being composed of turf which has been well dried, and a portion of the mould beat out of it. Boats might be used with advantage on some of the rivers.

The population of Iceland amounts at present to some 60,000; at one time it is said to have been as high as 100,000, but the ravages of epidemic diseases and other causes reduced the numbers to less than those at present on the island.

The masses of the people are able and active, harmless and honest. Wherever we went we were received with much kindness and hospitality, and even at the poorest cottages milk, coffee, and brandy were handed to us. All classes seem more or less educated, and

the Lutheran religion prevails. The chief occupations of the people are fishing and farming, both being combined when the farms are near the sea. The women spin, knit woollens, and weave cloth for home consumption. The farm live stock consists of sheep, ponies, and horned cattle; the two last are of small size. Of these, the sheep are the chief source of wealth. A farmer having 800 or 1000 sheep is considered wealthy. The usual food is mutton, fish (fresh and dried), rye-bread, butter, cheese, milk, one preparation of which, named *skuer*, is much used.

The price of labour varies from 1s. 2d. to 2s. 8d. per day, according to the season. During the haymaking, in the months of July, August, and September, it is highest.

Reikiavik, the capital of Iceland (a town of 1500 inhabitants), has been so often described by others, that it is needless for me to say anything on the subject. A little thin ice forms along shore near Reikiavik during calm weather in the winter time, but the first breeze of wind disperses it.

GREENLAND.

The *Fox* sailed from Reikiavik on the 31st August for Greenland. On the 2nd of October we reached Fredrikshaab. There are a Danish superintendent, a clergyman, and several clerks at this place, and about 200 Esquimaux. These Esquimaux are civilized; sober, honest, and faithful, apt and willing to be instructed—attentive to their religious observances, and thankful for kindness. The evening amusement was dancing. The principal food of the natives is fish, seal, whale, a few ptarmigan, waterfowl, including eider duck, with biscuit and coffee, imported from Denmark. Large quantities of a small fish (the kepling), called by the Esquimaux "*amaset*," are caught in scoop nets in the summer and dried on the rocks. These are laid up for winter food and sometimes given to the cattle. After lying here eighteen days the *Fox* sailed on the 20th of October for Julianshaab, at which place she anchored on the evening of the 22nd. Julianshaab is one of the principal stations on the coast.

On the 24th I learned that it had been decided to sound and examine the Fiord of Igalikko, which ran by Julianshaab. During the time that the *Fox* would be employed on this service, which I was told by Captain Young might probably occupy four days, I thought with Colonel Shaffner that a short journey should be made to the interior of the country, for the purpose of ascertaining the practicability of travelling over it. The use of one seaman and a whale-boat was obtained from Captain Young to enable us to return from the head of the fiord to Julianshaab. Four Esquimaux women were engaged

as rowers. At 16 miles inland from the fiord a heavy fall of snow stopped farther travel. After an absence of four days we returned to our boat, but found that the fall of snow, followed by unusually cold weather, had already caused the fiord to freeze up for many miles. We had enough of provisions, and were supplied with some excellent fresh mutton, milk, and butter by an Esquimaux that lived in the neighbourhood, to whose house we removed. The frost continued for several days with unusual severity, and made the ice strong enough to enable Captain Young (after coming half way up the fiord in a boat) to travel over the ice with a sledge party from the *Fox* to our relief. Another party of men, sent by Superintendent Möller from Julianshaab to aid us, arrived at the same time. We all returned next day (the 6th) to the *Fox*.

At Julianshaab, as at Fredrikshaab, nothing could exceed the kindness and hospitality of the resident Danish gentlemen. Mr. Möller, the superintendent, Mr. Höyer, his assistant, the doctor, and others vied with each other in paying us attention.

The chief exports of the place are whale and seal oil, fox skins (blue and white), bear skins, and eider down. A few cattle, goats, and sheep are kept. The hay is usually collected at the summer encamping places of the natives, and must be very nutritious, as I was informed that one small cow during the past summer had not only yielded sufficient milk and cream to supply the family, but also to make eighty Danish pounds of butter. The natives here, as at Fredrikshaab, are honest, docile, and well conducted, doing great credit to the Danish government. The prevailing form of worship is the Lutheran.

The result of this expedition, as far as regards the land portion of it over the Færøe Isles and Iceland, was extremely favourable to the practicability of laying down or erecting a telegraphic wire. The question in Iceland will be, whether the telegraph should be carried across the whole island from Beru Fiord to Faxø Bay, or only from Portland Bay to the latter place. The latter will reduce the distance on land from about 250 to 90 miles.

The fourth Paper read was—

4. *Fiords of South Greenland.* By J. W. TAYLER, Esq.

THE land of Greenland is very elevated, the average height of its mountains being not less, perhaps, than 1500 feet, and in some places exceeding 6000 feet, above the level of the sea. It appears that at the time of the elevation of the west coast of Greenland, a chain of mountains of about 50 miles in breadth, running about

north and south, was acted on in a wave-like manner, *i. e.* leaving depressions nearly equal to the elevations, and more or less at right angles with the direction of the chain. These depressions or long valleys into which the sea runs constitute the fiords: they vary in breadth from 1 to 8 miles, and run up into the interior from 10 to 60 or more miles.

The scenery in these fiords is magnificent, perhaps unequalled. The lofty mountains—rugged, precipitous, and barren—with patches of ice (projections from the great interior glaciers), and snow unmelted by the summer's sun; with valleys half filled up by enormous angular blocks of stone detached from the sides of the steep mountains by the alternate frost and thaws; the solitude, and the almost total absence of life, animal and vegetable, make up a picture of indescribable desolation.

In other places the more rounded and sloping mountains are covered with green and yellow moss. Grass, heath, and wild flowers grow in the valleys; whilst in some still more favoured and sheltered dales, miniature forests of Arctic willow, six feet in height, are pointed out by the Esquimaux as proofs of the extraordinary excellence of the climate of Greenland and fertility of the soil. Of the latter material there is not, however, in many places sufficient to bury the dead, and they are compelled to place the body on the surface and form a grave by building up stones around it.

These fiords with grassy dales offer the most pleasant places of abode in Greenland; in fact, it is only to the more fertile parts of the fiords that the name of Greenland is at all appropriate. But these parts of the fiords form a striking contrast to the outer coast of Greenland.

The Danish settlements are mostly at the entrance of the fiords, for the convenience of seal-hunting and of shipping; but the old Scandinavians who settled in Greenland in the ninth century brought cattle with them, and therefore established themselves at the interior ends of the fiords and bays, where grass was to be found. The ruins of their habitations, constructed of very large blocks of stone, are still to be seen at all the more fertile places. Judging from the number of ruins and the accounts in the Icelandic Sagas, their number must at one time have reached about 10,000. But the Scandinavians of Greenland have perished; cattle no longer graze in the valleys as then; and some heaps of stones are all that remain to show the enterprise of those early western pioneers.

The Icelandic Sagas contain descriptions of most of the fiords of South Greenland and of the chief settlers in them. Perhaps the

most notable in this respect is the fiord of Igalikko. This fiord ends in two forks or arms: in the northern stand the ruins of Brattelid, the first town in Greenland, built by the first settler, Eric the Red, in 986; in the other was built the town of Garde, the residence of the Bishop of Greenland. These two towns vied with each other in the claim for precedence—Brattelid claiming it on the ground of its being the first erected, and the residence of Eric the Red and his descendants; whilst Garde asserted its superior worthiness in being the residence of the bishop. After much wordy quarrelling and sundry duels, Garde appears to have triumphed, and was henceforth considered as the capital of Greenland.

But Garde now shares the ruin and desolation of Brattelid, with nothing else to recommend it to our further notice. Not so, however, with its rival Brattelid. In the time of Eric the Red, A.D. 1000, there sailed from the fiord of Igalikko and from the town of Brattelid an expedition of discovery. These enterprising Scandinavians were not contented with having discovered the vast territory of Greenland; this appears to have only stimulated their thirst for further discoveries, and it may perhaps also be that, after two or three years' residence in Greenland, they found it was not the El Dorado they had dreamed of; however, the expedition sailed to the west and south, and finally discovered the continent of America. They found good prairie land, which they called Markland, and sailing on they came to a land bearing wild grapes in great abundance: this they called Viinland. They wintered in America, left some settlers (who after some time succumbed to the natives), carved their runics on the rocks, and taking in cargoes of timber and supplies of wild grapes, sailed the next summer and safely returned to Brattelid.

Thus the credit of discovering America is certainly due to the Scandinavians of Greenland. And Columbus, when he visited Iceland some years previous to his celebrated voyage, no doubt read the accounts of the discovery in the Icelandic Sagas. But as these accounts were suffered to remain almost unknown to the world, and as the navigators of northern Europe had in his time forgotten the route discovered by their more energetic forefathers not only to America but also to Greenland (which was then called the "Lost Land"), all honour is certainly due to Columbus for the re-discovery of America.

When Eric the Red first settled in the fiord of Igalikko, the Christian religion had not reached Iceland or Norway. Thor with his hammer reigned supreme. But Thor and his worshippers have sunk into oblivion, bequeathing us his hammer, the symbol of

industry. The fiords of Greenland are about to witness a new era of enterprise and engineering skill: ere long the North Atlantic Telegraph Cable will repose at the bottom of one of its fiords, again uniting with Europe the countries of Iceland, Greenland, and America.

In the neighbourhood of high land the water is generally of great depth, and the fiords of Greenland form no exception to the rule; in fact, it is only near the lower and more sloping land that vessels can lie at anchor, and this only in small coves so near to the land that it is the general practice to make fast to the shore by hawsers. Outside of this the water deepens rapidly, and in the middle of many of the fiords there is some 500 fathoms water. I should say that of the deeper fiords 300 fathoms will be found to be the average depth. In some places, where the rocks are nearly perpendicular, a fishing-line of 100 fathoms fails to reach the bottom within a few yards of the shore.

Looking at the map of Julianshaab district, you will see that some of the fiords terminate at the continental ice, whilst others do not reach it; the former fiords have glaciers, the latter have not.

These glaciers are the outlets of the continental ice, which has a motion from the interior towards the sea coasts; and as the deep valleys or fiords are the only outlets, the ice is forced into them until, by projecting from the land into the sea, or fiord, portions give way and break off, owing to not being sufficiently supported by being adequately immersed, or owing to the rifts and chasms which exist in the glacier. The larger of these portions, when thus detached from the glacier, constitute icebergs.

The glaciers in the fiords of the southern parts of the west coast of Greenland are not very large, and consequently their icebergs are never of great dimensions. I do not think any iceberg produced by the glaciers of the fiords within 100 miles north or south of Julianshaab would ground in 60 fathoms.

The glaciers bring down with them boulders, sand, and much fine clay, the result of attrition; the boulders are always rounded, owing to the severe abrasion they have undergone by being transported over the rocks below, whilst under the enormous pressure of the vast thickness of continental ice. This glacial clay floats suspended in the water, several miles from the glacier, rendering it turbid or milky, and depositing itself gradually throughout the whole length of the fiord. So vast has been the quantity, and so long the period of time during which this transport of clay has proceeded, that some fiords have been so completely filled up by it

that they are only navigable in boats of light draught and at high water.

From this choking up of the fiord the glacier has ended in being unable to longer launch its icebergs; it has, therefore, found a new outlet through some other valley, where it will repeat the process of gradually filling up the fiord.

As nearly all the fiords have, or have had, glaciers in them bringing down the clayey deposits I have mentioned, the bottom must be of soft material. If the cable be taken into a fiord having a glacier, I think the clay which will be gradually deposited over it will be of great service in protecting it from injury by marine animals or other damaging agents.

The existence of these fiords is extremely advantageous to the carrying of the telegraph cable to Greenland, and there bringing it on shore. Were it not for these, some difficulties might have been met with in finding a suitable place for the landing, owing to the ice-streams on the outside coast; but in several of these fiords, Tessermiut, for example, the water is of such depth as to preclude the possibility of icebergs grounding upon the cable, and the almost perpendicular mountains forming parts of the lateral coasts of the fiords, and the deep water at their bases, offer excellent situations for leading up the cable from the middle of the fiord to the shore, without exposing it in the slightest degree to the grounding of icebergs upon it.

In conclusion, I beg to state, that from the results of seven years' observation in Greenland, I am of opinion that neither the ice nor the configuration of the coast will offer any impediment to the successful laying and landing of the telegraph cable in Greenland.

The fifth Paper read was—

5. *Electric Circuits.* By Colonel T. P. SHAFFNER, of the U. S.,
F.R.G.S., &c.

LANDING PLACES AND LENGTHS OF CIRCUITS.

Scotland to Færøe Isles.—One end of the cable for this section will be landed in one of the many safe bays in North Scotland—the precise place has not been determined. The other end it is proposed to land in a beautiful bay near Thorshaven. This section will be some 225 miles, and the depth of the sea not exceeding 254 fathoms; bottom, mud and shells.

Færøes to Iceland.—One end of the cable will probably be landed at Haldervig, near the north of Stromøe Isle. Captain Young

strongly recommends this bay, and that the other end be landed in Beruford, Iceland, a very good place, with deep water and muddy bottom. The cable to this place will be about 240 miles. Depth of sea, maximum, 683 fathoms, bottom mud and shells. It may be found more advantageous, for reasons not necessary now to be discussed, to carry the cable more westward, to or near Portland, and to which place it can be laid on a muddy and sandy bottom, in water of good depth. Both of these places, namely, Beruford and Portland, are free from any volcanic influences whatever, and ever have been, as far back as the discovery of that remarkable island in the year 863.

Iceland to Greenland.—This section will be the longest of the series, between 600 and 700 miles. Captain Young has reported in favour of Hvalfiord, a little north of Reikiavik, in the Faxe Bay; but in order to economise as to length of cable, it is quite probable that a more westerly place will be selected, on the south side of Faxe Bay. The other end of the cable he recommends be landed in Julianshaab Fiord, on the south-west coast of Greenland. He examined that beautiful bay, and found it to contain deep water, with muddy bottom; and he states that it is his decided opinion that bergs cannot reach the cable when laid in it. The reports of others concur in this opinion. There are other fiords near Cape Farewell, equally favourable. Tessermiut and Illoa Fiords are considered well suited for the cables.

Heretofore it was contemplated to land this section of the cable upon the east coast of Greenland, south of latitude 61° north, in or near Prince Christian Sound, and then, either to carry the cable out at the other end of the sound, or to connect this section with the next by a cable around Cape Farewell; or, by a line across the land, avoiding the inland ice. For the present, the intention to land on the east coast has been abandoned, not because it has been found to be impracticable, but because it has not been proved to be practicable. It is now proposed to carry the cable from Iceland, around Cape Farewell, to one of the fiords on the west side, and from the same fiord run the cable to Labrador. Hereafter the Company may find it best to land on the east coast, and carry out the original intentions as above stated.

Greenland to Labrador.—The cable will start from Greenland, and land at or near Hamilton Inlet. The soundings taken by Sir Leopold M'Clintock show 180 fathoms interior from the outer rocks on the coast, so that the cable can be laid into the inlet from the sea in water sufficiently deep to place the cable beyond the reach of icebergs. If, however, the depths be found more favourable from

the sea into Byron Bay, near and south of Cape Harrison, that place will be equally satisfactory, all questions being considered; and from thence the cable can be carried into Hamilton Inlet, through one of the several channels connecting Byron Bay with the Inlet. Length of section about 510 miles.

Before the respective cables are laid, each of the places will be carefully sounded, and buoys will be placed indicating the deep trenches; and, besides, steam tenders will be in readiness to serve as pilots. Every precaution will be taken to obtain the most complete information with regard to the depths of the bays and of the sea.

The PRESIDENT.—The Society has heard, I have no doubt with much pleasure, the very interesting Papers that have been read this evening, and to afford an opportunity for a discussion upon them, their consideration will be continued at the next meeting.

ADDITIONAL NOTICE.

Additional Instrumental Instructions to Mr. Consul PETHERICK.

By F. GALTON, Esq., Hon. Sec.

The observations that it is absolutely requisite you should make, are—

1. You are earnestly recommended to use every opportunity of practising with your sextants *upon stars* while on the Lower Nile, and able to check your results with known latitudes; also to practise observing eclipses and occultations under the same circumstances.

2. As a general rule, observations should be made at marked points, such as the confluence of rivers, prominent hills, and native towns, rather than at mere encampments.

3. Reliable latitudes of different places on the White Nile between Khartum and Gondokoro, and on your further line of travel. The latitude of Gondokoro is especially desired, and the meridian altitudes of at least six stars; three north and three south should there be observed.

4. Longitudes by the exceedingly simple methods of the eclipses of Jupiter's satellites, or of occultations of stars, to be made at Gondokoro and at the furthest point of your travel, or at places adjacent to these. The local time should there be determined by more than one set of observations, to guard against error, and the method of altitudes on both sides of the meridian should always be used. Any longitude south of the parallel of the Bahr el Ghazal would be very valuable.

5. The elevation above the sea of the following places by observation of the temperature of boiling water:—Cairo; Thebes; Assouan; Junction of Atbara; Khartum; the capital of the Shilluk country; the river at a point opposite the Bahr el Ghazal; Gondokoro, and different stations on your further route.

6. The three boiling-point thermometers to be occasionally compared, and to be carefully preserved, with the view of determining any changes in their index errors. They are also to be compared with those of Captain Speke, in

the event of the hoped-for meeting taking place between you and that gentleman.

7. Simultaneous observations of the rise and fall of the Nile, at Gondokoro and Khartum, should be instituted, and also at as many other places as trustworthy observers may be found to make them.

8. It is of great geographical importance that the breadth, depth, and velocity of the Upper White Nile and its tributaries be ascertained, in order that their sections may be protracted, and the quantity of water that passes down them be determined. A few notes on practical methods of doing this will be prepared and given to you by Mr. George.

9. The compass bearing of marked hills should be frequently taken, and the position whence they are observed defined and laid down as unmistakeably as possible by cross bearing. Your course and estimated distances should be noted continuously day by day, and the variation of the compass frequently determined.

10. Time observations with your chronometer should be taken whenever latitude observations are made. These will serve to connect distant points whose longitude has been reliably determined by the rare occurrence of satellite eclipses and of occultations.

11. If any architectural monuments are met with, it would be important to take sketches and photographs of them, however rude; to make a general plan by measurement (for which a measuring-tape should be taken); and to note any peculiarities of construction or style, such as the use of the arch, the angles of the walls, doorways, and windows. If there be any inscriptions or hieroglyphs, they should be copied, or impressions taken of them, if possible, with coarse paper damped in water and pressed with a brush, upon the inscription. Any small objects of art or antiquity found amongst the natives should, if possible, be collected.

12. Every observation is to be copied from your rough notes into the Register-book which is supplied to you. Your entries, up to the last opportunity of communicating this winter with Khartum, to be forwarded from Gondokoro to the Secretary of the Royal Geographical Society.

List of Instruments and Books.

2 sextants; 1 artificial horizon and spare mercury; 1 chronometer; 1 telescope and stand; 1 prismatic compass; 1 lantern; 1 hypsometrical apparatus attached to the lantern; 3 W.B. thermometers and 5 ordinary ones; Nautical Almanacks, 1861, 1862, and 1863; calculated list of those occultations and eclipses of satellites which may possibly be available; Raper's Tables; Manuals, viz. 'Hints to Travellers'; books of blank forms and register-books; 2 measuring tapes (50 feet and 100 feet).

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1860-61.

Sixth Meeting, Monday, February 11th, 1861.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Rev. C. J. Fynes-Clinton and James Campbell, Esq., were presented upon their Election.*

ELECTIONS.—*Vice-Chancellor Sir John Stuart; and G. Cox Bompas; Charles Bonney; Thomas Combe; John Jermyn Cowell; Passmore Edwards; William Fairbairn; John Fleming; William Forsyth; William Bosville James; Hayes Kyd; William Robertson Sandbach; Peter Sharp, and James Simpson, Esqrs., were elected Fellows.*

ANNOUNCEMENT.—*The subscription list in aid of Consul Petherick's expedition up the White Nile, amounting already to upwards of 1000*l.*, was laid upon the table.*

ACCESSIONS.—*Among the accessions to the Library and Map-Rooms since the former meeting were Sir John Richardson's Polar Regions; Bombay Magnetical and Meteorological Observations; Mercantile Navy List for 1861; Du Chaillu's Western Equatorial Africa; Sketch of Country explored by Mr. J. M. Stuart; the Royal Illustrated Atlas, Parts 21 and 22; Keith Johnston's Royal Atlas, Part 8, &c.*

1. *Discussion on the North Atlantic Telegraph Papers.*

[Adjourned from the last Meeting.]

The PRESIDENT said he need not read over again to the Society the names of the very interesting Papers that were submitted to them on the last occasion of their meeting. There were now amongst them travellers who had gained experience in every quarter of the globe;—many learned geographers, who had been themselves present in those portions of the earth which had been alluded to in those Papers: and he trusted that they might have their assistance in correcting what they may have seen to be wrong; in amplifying and illustrating what they had heard. The subjects which come before the Society, within its province, are the geographical features; they were not engineers, nor electricians, to judge of the power of electric currents to pass from this or that part of the earth; they were not members of Parliament, who were to determine what aid, what facilities by law were to be afforded to men who had devoted themselves to this great enterprise; nor were they capable of judging of the respective merits of the many plans which had been put forward before

the public. All that they could judge of were the geographical facts which had been laid before them, and of those facts there could not be better judges than the assembly that he saw before him. It was, therefore, with hopes of receiving instruction and much knowledge, that he called upon those gentlemen, more particularly, who had been in these scenes, to give them the advantage of their experience, in either amplifying, correcting, or illustrating, the several facts which had been brought before the Society.

SIR EDWARD BELCHER took a very deep interest in the deputation to Lord Palmerston to get the expedition sent out for this northern telegraph; and he was very happy indeed to find that nearly all the arguments that were then used have been so thoroughly realised. He thought, in the first instance, as has been proved, that they should find a great connecting bank between Scotland and the Færöes, and between Iceland and Greenland. As to the difficulties which were raised with reference to the Labrador shore, he was very glad to find that the reefs, which it was said would entirely prevent any cable being laid across there, have vanished with the ice; they have gone southerly somewhere or other, and have not yet been found; at least those reefs that are there, are rather helps than otherwise by preventing the ice coming down upon the entrance. He should have liked very much to have been present at the last meeting to have understood the nature of the soundings;—and while speaking of the soundings, he was sorry to say that before another institution—the Civil Engineers—it had been assumed that surveyors like himself knew nothing at all about soundings—that they did not know their business, and that really some civilians would have to teach them their work. Now, as far as he was himself concerned, during the whole of his servitude he adopted a particular means for getting up the bottom in large quantities, and in such large quantities that he thought nothing of bringing up a hatful at a time. He had six cases of microscopic shells, a very handsome collection, all of which he had got up by that means. The very simple mode that he adopted to sink his lead and to get up the soundings from the bottom was this:—The sounding lead was encased by a cylinder, and the lead being conical, the cylinder on striking the ground flew up, then the lower part of the lead stuck to the bottom, picked up its quantity of soundings, and, as the lead was withdrawn, the cylinder slipped down and completely protected whatever adhered to the lead from being washed away. The other instrument which he used for obtaining shells was a small dredge attached to the lead, and as the lead struck the bottom, the flanges scraped up a quantity of earth.

MR. PLINY MILES mentioned one or two facts that he had noticed while travelling in Iceland a few years since in regard to its climate, whence it may be concluded that that country is not so cold as it might be imagined from its name and locality. The small hardy race of horses there subsist entirely out of doors in the winter, without any kind of food, in the shape of hay, being given to any of them, excepting only to those which they use for domestic purposes, during those months. The rest are without any kind of food, except what they gather from the open country. He saw in one case a mahogany tree on the shore, not far from Portland, on the south coast of Iceland, that had unquestionably floated with the Gulf Stream from the Gulf of Mexico itself. He was told also by Professor Johnson, that it was not unfrequently the case that spruce or other logs from Norway were found driven on to the northern coast, at the same time that logs of wood floated thither from the southern portion of the North American continent. They are there found together; the one current having come from Spitzbergen, and the other from the Gulf Stream. Standing on any mountain or height in Iceland, one sees a green and beautiful landscape; in fact, the natives say, "Iceland is the finest country the sun shines upon," though at some seasons of the year they have very little of the sun to shine. With regard to the absence or presence of trees in Iceland, that has nothing to do with the coldness or the severity of

the climate. It is well known that there are trees of large size on the coast of Norway, where the climate is far colder than in the most severe seasons that have ever been known in Iceland, or in regions still farther north. It is a fact, that on some portions of the coast of Scotland, and in all parts of the Orkney and Shetland and Færøe Islands, not a single tree 6 feet high will be seen, while they are found in Iceland 18 feet high. He would not attempt to explain why trees are found growing in one very severe climate, and not in others, but it is undoubtedly owing, to a certain extent, to the direction of the wind, and to the sea air. At any rate no trees whatever are found on some of our more southern coasts, while farther north, on the Labrador coast, there are large trees, spruce, pine, larch, and others. So that the fact that there are no trees in Iceland, must not lead persons to suppose that the cold is necessarily extremely severe. He would refer to a statement made by a gentleman who read a Paper at the last meeting of the Society, with regard to the thickness of ice at Reikiavik. He had a distinct recollection that the lake spoken of is seldom known to be frozen to the depth of 18 inches. He had been told that sometimes it was not frozen more than 2 inches during the whole course of the winter, showing most conclusively the mildness of the climate.

CAPTAIN SHERARD OSBORN, R.N., would not attempt to say anything as to the practicability of the route, inasmuch as the distinguished travellers and navigators, who read their Papers at the last meeting, have given us sufficient authority to say that there were obstacles on the route undoubtedly, but that all those obstacles are surmountable. Touching the soundings, he would call the attention of the meeting to the agreeable fact that the entire line of soundings show that there is no depth greater than 1000 fathoms between Scotland and longitude 30° w. on the proposed route, or exactly halfway across the Atlantic Ocean. There are then two valleys of deep water, of small width, on either side of Greenland. The soundings diminish very abruptly as Greenland is approached, and shallow water will be found probably round Cape Farewell. With regard to the Labrador coast, the principal difficulty was in carrying the cable within the 150 fathoms of water, so that it might not be exposed to the action of the icebergs. He was sure that Arctic men all agree that 150 fathoms would be about the maximum draught of any iceberg, so that the chief object to be secured in placing the cable is to push the 150 fathom-mark as near into the coast as possible. They would remember that Sir Leopold M'Clintock had said that he would like to have a more accurate survey of the Labrador coast, so as to carry the deep water a little closer. If they looked at the map they would see 1190 fathoms carried just to the north of Hamilton Inlet, and there was every reason to believe that the bank of Newfoundland—they might call it so, although it extended a long way up the Labrador coast—deepened suddenly there. As far as one might speculate upon the question, he had no doubt that a more accurate survey would lead to the obtaining of such information as would give a channel leading close into the Labrador shore, near Cape Harrison. He would propose, that the cable there should open out and form, say, half-a-dozen straits running into the shore at certain distances from each other, so that if a berg drifted down and happened to pick up one, it would not pick up all the rest, and by that means the cable in the deep water would be at all times safe and recoverable by following out those straits. There was one feature that struck him particularly, and on which he wrote to Captain M'Clintock. No man would dispute that bergs of ice sounding the bottom would rip it up, just as a plough would a ploughed field; and that if that bank was thus ripped up by the flocs of ice, there would be hardly any animal or vegetable life upon it; it would be a kind of subterranean desert. Sir Leopold M'Clintock was continually dredging there, and in a note just received, that distinguished navigator said, "The bank of Hamilton Inlet has from 100 to 200 fathoms upon it. I am of opinion that icebergs which ever drift down there cannot possibly reach the bottom. They

ground near the islands at the entrance and are not bergs of the largest size. Shells and other small things were brought up by the sounding machines in 40 or 50 fathoms, *as in other parts of the sea* where icebergs cannot possibly interfere with them." Near Frederickshaab Captain Sir L. M'Clintock says they dredged up in 26 fathoms, delicate corals and creatures which could not live at the bottom of the sea if much disturbed by icebergs,—and adds "*so much for the destructive propensities of icebergs.*" How all this came about was a question he (Captain Osborn) did not pretend to solve, but the fact was very curious, as showing that bergs could touch the bottom without sweeping everything before them. He was sure that every geographer would be interested in the following fact, for it related to the late Sir John Ross, who stated that in his voyage in 1818 he brought up mud from 1050 fathoms, the deepest soundings ever obtained at that time; and in the mud were shells and fish. So to that old navigator they first owed that the fact of animal life in great depths had been discovered. There were remarks at the last meeting about difficulties with regard to the intense cold and the aurora borealis affecting the telegraph. It might be interesting for the Society to know that a few seasons ago, Captain Kellett and Captain M'Clintock were beset in the ice in $74\frac{1}{2}^{\circ}$ N., and they communicated with each other by telegraph from ship to ship. Now $74\frac{1}{2}^{\circ}$ N. latitude was a long way in the Arctic zone, and the cable, the practicability of which they were at present discussing, would lie a long way without it. That telegraph was at work throughout the whole winter, and was not in any way affected by that terrible bug-bear the aurora borealis, nor by the intense cold experienced so far north.

MR. JOHN BALL said it was impossible to over-rate the importance of the subject brought to the attention of the Society by the gentlemen who had read their Papers. It was very desirable not to under-rate the difficulties which still remained, and which he thought had not all of them been sufficiently brought forward, for it was by pointing out the difficulties at this early stage that they would soonest arrive at the solution of those difficulties and the great end which, he trusted, they would live to see accomplished. He had long felt that this northern route was the right one; but he was not blind to the many difficulties which still remained in the way. With reference to the precise points which came particularly under the attention of this Society, and were brought clearly before them at the last meeting, there were two or three on which he wished to make a few observations. As to the Færøes, he apprehended there was no great difficulty. As to Iceland, it was proposed to land the cable at the south-east side of the island, to carry it across the island, and start again from Reikiavik in order to communicate from thence to Greenland. Now there, are they not unnecessarily encountering very serious difficulties and incurring a great increase of expenditure? It is true that it is possible to cross Iceland—perfectly possible—but so experienced a traveller as Dr. Rae found that it was not practicable without very great sacrifice of time, and encountering great difficulties, to take that direct route; but had he at all considered what were the difficulties and cost of laying down a telegraphic wire? He thought Dr. Rae had mentioned—every traveller in Iceland has mentioned—that large district in the interior of the island over which travellers must hurry as fast as their horses can carry them, for the simple reason that there is nothing upon which to live; and if they were to lay down a telegraph across that interior desert of Iceland, they must be prepared for a vast number of difficulties and an enormous amount of money, and time, and labour. But, furthermore, how is it to be done? If they required piles, they must carry every pile into the island, across the island by horses; and supposing they could hire every one of the horses in Iceland, there are not enough to enable them, in one or two seasons, to accomplish the work. And then, again, as to the difficulty with respect to the breakers. Would it not be better to confine the difficulties to one point alone—the entrance into the Faxe Fiord? He did not know whether it was pro-

posed to land the cable at that point or not, but let the difficulties be confined to one point instead of two. With reference to Labrador, even though it be true that they could carry the 150 fathoms depth near to the coast, still that might be as formidable as 10, or 20, or 50 miles in another place. If it be a part of the coast on which there are icebergs, it is necessary, as it appears to him, not only to carry the 150 fathoms of water close in shore, but also to get it safe behind some headland which will throw aside the icebergs. Might it not be possible that by making the line a little longer, and running it into the strait of Belle Isle, the true solution would be found?

SIR RODERICK MURCHISON would not have occupied the time of the Society for one moment, upon a subject of which he knew so little, if any Arctic geographer or voyager had been prepared to rise. He would only say he was one of the very many well-wishers to every expedition of this sort which the Royal Geographical Society holds within its number. They were not there, as the President very properly said, to discuss the engineering merits of the project, nor were we really capable of estimating the difficulties that had been apprehended by his friend Mr. Ball; but they were capable of estimating, in a very decisive manner, the facts that Sir Leopold M'Clintock and Captain Sherard Osborn, who are men of great experience as Arctic voyagers, have pronounced in favour of this scheme. He made no observations upon the scheme, except to say that had he spoken at their last meeting when the President adjourned the discussion to this evening, he should have felt it necessary to say, that they owed a deep debt of obligation to those five gentlemen who brought before us on that occasion their well elaborated Papers. They produced a mass of geographical knowledge which might never have been gained, had not this expedition been matured—he said it to his honour—through the patronage of Lord Palmerston, and carried out through the active enterprise of the gentlemen who undertook this service. Being in favour of all such expeditions, the moment his distinguished friend Captain Allen Young offered to go out in command of the little *Fox*, in which endeavour he took a deep interest, he went down to Southampton, to attend a great meeting assembled by the Mayor of that town in honour of this expedition. There Colonel Shaffner and Mr. Croskey, of the United States, and the other gentlemen associated with them, as well as the Danish officers present received from them as Englishmen, every encouragement they could offer to promote this enterprise. The details of the two expeditions have been so admirably laid before the Society that he, for one, should have been contented with the results, if he were in any way embarked as a speculator in the success of the undertaking. But not having any pecuniary interest in it, or in any rival speculation, he might say to the gentlemen of the North Atlantic Company, they had put their case so well before the public that no gentleman associated with other lines could say that they had not treated the subject in a most ingenuous and fair manner.

He could not sit down without saying that it gave him very great satisfaction to hear Dr. Rae expatiate upon the warm and hearty reception he received from the inhabitants of the Danish settlement of the *Færøe* Islands and of Iceland. He said this in the presence of the Danish minister; and he was sure Dr. Rae was justified when he spoke in the name of Englishmen, of their gratitude to the King of Denmark, and his Government, for having so warmly assisted them in one of those enterprises, which may lead them to connect America most directly with their own country.

DR. RAE said the time allowed him at the last meeting of this Society was necessarily so short, that he left unmentioned some important points connected with his journey over Iceland; so he now begged to say a few words in reply to the observations of Mr. Ball. The interior of Iceland over which they travelled was not devoid of grass, there being sufficient for their horses throughout the whole route, which offered comparatively few difficulties. Although two of the party were heavy men, they crossed the island in 13 or 14 days,

riding the same horses at the rate of more than 30 miles per day. These ponies can carry a load of 200 lbs. or upwards, and pieces of wood 10 or 15 feet long can be carried by them over the highest and steepest ground on the route. The best line for the telegraph lies to the south of that they travelled over, and is marked on the chart by a dotted line. Along this route there is abundance of water, and grass also, except at one station, to supply which a depôt of hay could be made. This portion of the way (about the centre of Iceland), called the Springisandr Road, is almost a flat table-land. Again, some of the larger rivers that flow northward appear to be navigable for boats similar to those used in Hudson's Bay, which carry from three to four tons weight. By this means materials could be deposited at several stations near to the proposed line. He did not profess to be a surveyor, but having travelled a good deal both in the United States and Canada, he had seen telegraphs carried over more difficult and rougher country than they encountered in crossing Iceland. But should objections be offered to carrying the telegraph completely across the island, he was of opinion, from information obtained, that Portland, in the south of Iceland, although no safe harbour for ships, would form a good landing-place for a cable. From Portland to Reikiavik the distance is not over 90 miles, and the road offers no obstacles. The object of their journey was not to make a minute or detailed survey, but to determine if it were practicable to carry a telegraph over the island.

The second Paper read was—

2. *Further Details relative to the Discoveries in Central Australia.*

By Mr. J. MACDOUALL STUART.

Communicated by Sir R. I. MURCHISON.

THE expedition of Mr. Stuart, to which the present journals refer, took place in the year 1859, and was introductory to the great journey which he made through the middle of Australia. Mr. Stuart's object was a thorough examination of the country including and adjacent to that remarkable district of springs which lies between the 28th and 29th parallels of s. latitude and the 136th and 137th w. meridians. Many of these were first discovered in the present expedition, and the entire list includes the springs of Hope, Strangeways, Fanny, Freeling, and Primrose.

The waters from nearly all of them run in the rainy season into the Neales, which supplies a large saline lake that extends between the above-mentioned parallels and apparently still further to the north. It represents a middle section of that large horse-shoe representation of water which appears in early maps of Australia under the name of Lake Torrens, but which recent discoveries have shown to be discontinuous. The opposite side of the lake was in no case seen by Mr. Stuart; however, the low shores afforded him no point of view of a greater altitude than 30 feet.

On the road between the Strangeways and the Hope, Mr. Stuart found a remarkable specimen of that peculiar type of springs which characterize much of this part of Australia. Observing a hill at

the head of a salt lagoon, upwards of 100 feet in height, and having the appearance of rushes growing on the summit, he climbed to the top, and found such was really the case, and that the reeds and rushes were due to a collection of water upwards of 100 feet in length, that trickled over and oozed through the sides of its basin and finally drained into the lake below.

SIR RODERICK MURCHISON said, as this Paper had been sent to him by Messrs. Chambers and Fincke, he felt it necessary to lay before the Society a general view of the relations this Paper bore to Mr. Stuart's discoveries. In the first instance that traveller explored the very region which had just been described; and on a subsequent occasion he made that remarkable journey almost across the continent which had been recently made known. But they were quite ignorant of the fact, that between these two explorations, he had diverged from his route to the east, and, to his surprise, he found the rivers which ran to the east, falling into a low saline country, and ultimately into an intensely salt lake. About sixty or seventy miles farther northward he still found this great salt lake, and mounting the highest hill in the neighbourhood, could not see the end of this saline depression.

On a former occasion he (Sir R. M.) and Count Strzelecki apologised for having endeavoured to speculate too much upon the supposition of there being a saline lake in the interior, Mr. Stuart having found oasis after oasis of good land, and having discovered, as Colonel Gawler had suggested, that there was a vast region of country capable of colonization. But admitting all this, he (Sir R. M.) was still prepared, from the evidence of the last paper, to suggest the probability of the existence of a central saline desert. There was room enough for this low arid depression between the fertile regions claimed by Colonel Gawler to the westward, and the countries to the east, which were known to be fit for occupation. At present, however, they were only theorists, and must be theorists until the country was more opened up. Yet he maintained that the theory of an interior saline tract had something to rest upon, for Sturt, Stuart, and Gregory, the first on the east, the second on the west, and the third on the north, had been stopped by saline interior tracts. These facts showed that Colonel Strzelecki and himself were not altogether wrong as to the physical geography of this region. In conclusion Sir Roderick pointed out the value of Mr. Stuart's researches, and expressed his hope that the Society would, at a very early day, confer upon that remarkable man one of its highest honours, and at the same time return their cordial thanks to Messrs. Chambers and Fincke for the munificent manner in which they had acted.

MR. J. BAKER, a member of the Legislative Council of South Australia, said he believed that the theory of Sir Roderick Murchison would prove to be correct. Having a thorough knowledge of the country, he had no doubt, from the direction of the water-courses, that there was a considerable depression and probably a large lake in the interior. He went into the neighbourhood whence Mr. Stuart started on his first expedition, and he performed a long journey with Mr. Fincke, in the expectation of finding a lake in that direction. The natives, in describing the country, indicated the existence of a depression into which the drainage from the east and west flowed. They also gave them to understand that large fish were to be found there, and that there were numerous springs frequented by wild fowl, including the black swan. A subsequent visit realised the descriptions given by the natives as to the springs and wild fowl, and he had no doubt that their other indications with respect to a depression in the interior would prove to be correct. In 1858 the Deputy-Surveyor-General, in an excursion to that country, discovered what he supposed to be

a lake, but upon making a subsequent exploration he was surprised to find no lake there at all, but merely a water-washed plain, the waters of which had subsided in a very short space of time. Now where could that water have gone if there were not some larger reservoir to receive it? There was not time for evaporation or absorption, and in his opinion it must have gone into this larger reservoir still farther to the north.

But, while believing in the truth of Sir Roderick Murchison's theory, he at the same time hoped that the expectations of Colonel Gawler would be fulfilled, and that the good country which Mr. Stuart had traversed would become available for colonization, and for supplying with stock the settlement which would one day, no doubt, be formed on the Victoria River. It had already been proposed to organise a party for the purpose of sending a small quantity of stock from South Australia to the North, with the view to form the nucleus of some future settlement on that river.

Mr. Baker next dwelt upon the supplies of wool and produce which the region in question would probably be the means of contributing to the English markets, and to the great outlet which it would afford for drawing off the surplus population of this country, and thus diminish the mass of poverty which struck an Australian with surprise upon visiting London for the first time.

In conclusion Mr. Baker said he felt it was but an act of justice to vindicate Mr. Fincke from some imputation cast upon his honour and integrity in a despatch which had been sent over to this country and read before the Geographical Society.

SIR RODERICK MURCHISON assured Mr. Baker that no such despatch had been received, and that the name of Mr. Fincke, which had only recently been made known to the Society, was duly honoured by them.

COLONEL GAWLER said he was perfectly gratified if but one part of his theory should remain, viz., that there should be an open road for stock, railways, a telegraph, and so on, from the south-eastern provinces to the north-western coast. Mr. Stuart had established that this did exist, and that the settlers who followed his footsteps might travel with ease and security, and establish themselves in the country with much facility. It was known that there was also much good land to the eastward, and it only remained for this country to take advantage of these discoveries. It was also desirable that a colony should be formed on the north-western coast, and on the Victoria River, for the sake of receiving the stock and merchandise which would come up to it from the south-east colonies. No time should be lost, because squatters and bushmen would be settling on the land; and (as he had heard from Mr. Baker) a party had already set out with stock to traverse the route Mr. Stuart had opened up, in the endeavour to find shipment on the Victoria River for the south of India. If this region were settled he had no doubt a railway and telegraphic communication would soon be carried across the Continent, the latter to be continued to Singapore, and thence to England. Colonel Gawler proceeded to remark upon the results of Mr. Stuart's discovery, and argued that, from the evidences of its being an auriferous district, it ought to be brought under law as speedily as possible.

THE PRESIDENT, in closing the discussion, remarked upon what he termed the dramatic manner in which the structure of Australia was little by little revealed to us. Sometimes one theory was up, sometimes another, and we had seen the life and death of theories within the last few weeks. He had no doubt the expeditions which had just been sent out would clear up all these uncertainties and show us what Australia was really made of.

Seventh Meeting, Monday, February 25th, 1861.

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

PRESENTATIONS.—*Captain Chas. Duncan Cameron ; Edmund Gabriel ; Nathaniel Gould ; Wm. Bosville James ; and Julius Reuter, Esqrs., were presented upon their election.*

ELECTIONS.—*Captain H. B. Carter ; Lord Colville ; Commander C. Golding Constable, I.N. ; Dr. Thomson, Provost of Queen's College, Oxford ; and W. Blackney ; C. C. Bowen ; W. C. Knight Clowes ; R. Kerr Dick, B.C.S. ; A. Gilliat ; H. Hardinge, M.D. ; T. Hawksley, C.E. ; A. Steinmetz Kennard ; L. Mackinnon ; W. Napier ; A. Adams Reilly ; E. Wynn Roberts ; E. Schenley ; J. Sidney Smith ; A. J. R. Stewart ; and E. Webster, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the accessions to the Library and Map Rooms since the former meeting were—Mackay's Manual of Modern Geography ; Transactions of the Royal Society of Tasmania ; Landsberg's Map of Queensland, Australia ; Continuation of Ordnance Survey Maps, &c. &c.

Before reading the Paper of the evening—

The CHAIRMAN said, as he had invariably taken the deepest interest in the exploration of the interior of Africa, and had often, as former President of the Society, to speak in commendation of the various distinguished travellers who have from time to time made us acquainted with large regions unknown to our ancestors, so it was well known to the Society, as well as to himself, that the African subject which has most recently absorbed our attention is the expedition under Captain Speke, who is now on his journey from Zanzibar to that Lake Nyanza Victoria which he discovered when associated with Captain Burton, and from the northern end of which he hopes to trace the source of the Nile. But when the gallant captain brought before us his project, he was most imperfectly acquainted with the very great difficulties he would have to encounter even if he reached the northern extremity of the Lake Nyanza, in having to cross a broad, wild region, inhabited by savage tribes of negroes, who dwell above the highest cataracts of the Nile. To aid him in this effort, there was, however, happily for him and for the progress of geographical science, a gentleman on leave of absence in this country, who, having been our Vice-Consul in Soudan and many years a resident in that region, had made explorations up the western branches of the White Nile, and who had gone northwards to Gondokoro towards the lake discovered by Speke. Consul Petherick was that individual, and he (the Chairman) was persuaded he was the only European who, from his great experience and his influence over the natives, could afford real assistance to Captains Speke and Grant in their endeavour to solve the great problem of all time as to the real sources of the Nile. When he presided over the meeting of the geographers and ethnologists at the last meeting of the British Association at Oxford, he invited all his friends to unite in subscribing such a sum of money as would enable Mr. Petherick to purchase grain enough to succour the party of Speke and Grant when they arrived from the south, Petherick himself engaging to proceed beyond Gondokoro to meet the explorers. To the honour of the Royal Geographical Society, it has realized through private subscription upwards of 1000*l*.

for this noble object; and as Consul Petherick is about to proceed immediately to his post at Khartum, and thence to carry out their behests, the Chairman was sure the Society would rejoice to wish him every success, whilst they were all quite certain that in the heart of Africa, and in overcoming all difficulties, Consul Petherick is truly "the right man in the right place." And as Mrs. Petherick is to accompany him, he felt confident that, with the same spirit of geographical research which animates the ladies who have honoured us with their presence, she would warmly second and support the resolve of her daring and distinguished husband.

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 connection 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.

SIR RODERICK MURCHISON then called upon M. Du Chaillu to read the remarkable communication which he was about to make to the meeting. He had had the pleasure of M. Du Chaillu's acquaintance since he arrived in this country, and he had been impressed with the deepest respect for his acquirements and his unbounded activity. As a traveller, M. Du Chaillu had realized for them a knowledge of a large portion of the equatorial Western region of Africa, of which they were previously entirely ignorant.

The Paper read was—

*The Geographical Features and Natural History of a hitherto
unexplored region of Western Africa.*

By PAUL B. DU CHAILLU, of New York.

The singular region of Africa explored by M. Du Chaillu during the four years, 1856, 7, 8, and 9, lies within 2° on either side of the equator, and extends from the western coast to an estimated distance of 400 miles into the interior. It is characterised by mountains covered with forests of tropical richness, and traversed by many rivers. Instead of the thinly wooded and sparsely watered plains of many parts of Africa, or marshy plateaux such as are found elsewhere, the explorer is involved in a jungle of extreme density, through which he cannot penetrate except by following the tracks of wild beasts, or the miserable paths kept open by the natives from one village to another, or else by hewing his way. Wild animals are so scarce, though of numerous and novel species, that the traveller is unable to supply himself with sufficient game for sub-

sistence, but has to depend on the food he carries with him. The lion, rhinoceros, giraffe, zebra, and ostrich are all absent, but there are elephants and a few noble antelopes, and huge man-like apes, including the gorilla. The domestic animals of the comparatively few natives who inhabit this country, so desolate of life though rich in vegetation, are goats, sheep, fowls, and a small species of dog. The horse, ox, and ass are unknown; man, or rather woman, is the only animal of burden.

In the country under consideration, there are three rivers north of the Equator which can be entered and ascended by large vessels, viz. the Muni, the Moondah, and the Gaboon. The two first of these debouch into the beautiful bay of Corisco, which, were it not for its sandbanks, would be one of the finest roadsteads in the world, while the estuary at the mouth of the Gaboon is one of the best harbours in Western Africa. All these rivers, and other small ones, rise about 80 miles from the coast, in the so-called Sierra del Crystal: near their mouths they traverse vast mangrove-swamps, where their banks are little occupied; the Moondah is especially malarious. South of the equator M. du Chaillu found that three rivers, the Nazareth, Mexias, Fernando Vaz, all communicated with one another, and that, although the Fernando Vaz has a source of its own, it as well the others are the outlets of a great interior river, the Ogobai. They form a very complicated network of creeks and swamps, covered with dense forests, flooded in the rainy season, and uninhabited save by wild beasts, reptiles, and intolerable swarms of musquitoes. These rivers throw an immense amount of water into the sea, and in this they differ much from the sluggish Muni, Moondah, and Gaboon. Though their mouths are hardly half a mile across, they severally launch out so much water during the rains that it keeps separate from the ocean for four or five miles. The entrance to all of these rivers is intricate, owing to shifting sandbanks; that of the Fernando Vaz is the least so. M. Du Chaillu looks upon the Ogobai as a very important river. He ascended its trunk stream for only a short distance, but he afterwards came upon the southern and the smaller of its two tributaries at a great distance from the coast, and found it a splendid river from 300 to 400 yards wide, running at 3 or 4 miles an hour, and 4 fathoms deep in different places where he sounded it. This was during the rainy season.

As far as M. Du Chaillu penetrated, and for a distance of 20 days further on which he obtained information, there lay a mountainous country running east and west, which he believes to be part of a vast chain extending to a much greater distance inland, and possibly crossing the entire continent. He thinks that from this range may arise affluents to the Niger on the one side and to the

Ogobai and the Congo on the other, and also that it may afford a natural limit to the advance of Mohammedan conquest.

M. Du Chaillu described the various nations among whom he travelled, including the cannibal tribes of the Fan and the Osheba. He also gave accounts of his conflicts with the gorilla, illustrating his remarks by numerous stuffed specimens that were exhibited in the room. He described its habits and those of the arboreal-building ape, the *nshiego mbouvé*, and dwelt at length on the fauna of the land, the study of which was the main object of M. Du Chaillu's journey.

SIR RODERICK MURCHISON remarked that geography, in the broad sense of the word, included all natural history, and especially ethnology; therefore neither of his friends—Professor Owen, and Mr. Craufurd, the President of the Ethnological Society—would quarrel with the geographers for having that night given so much attention to these topics. The communication just read had not been confined simply to the courses of the rivers and the nature of the mountains, as illustrated in M. Du Chaillu's sketch-map. He therefore felt they were bound to return M. Du Chaillu their grateful thanks for the varied information contained in his papers, and to prove that they were proud of an occasion which had shown to the world that their Society could, from time to time, embrace all those collateral subjects of which geography was the foundation. M. Du Chaillu, who was the first European who had ever penetrated into the interior of Equatorial Africa from the west coast, had thus made us acquainted with the existence of a large range of lofty and densely-wooded mountains, to some extent inhabited by cannibal races, and also the chief abode of the gigantic ape gorilla. He has also told us that the Mahomedan conquerors, proceeding from the north, had never passed that chain, and that to the south of it no other religion than Fetichism was found to exist. The inhabitants had never seen a Mahomedan, and were entirely ignorant of that religion. It was now his duty to call upon any gentleman to speak upon the very remarkable memoir, the result of such perilous and adventurous journeys, which had been communicated to them.

MR. GALTON said this exploration of M. Du Chaillu, most interesting in itself, had a farther interest in regard to our notions of the physical geography of still more distant parts of Africa. If we looked in any of our ordinary maps, we saw that the drainage of the central part of Africa, where equatorial rains fell with extreme violence, was wholly unrepresented by any rivers except the Congo, and even that river was not usually represented as receiving tributaries from the north. In those latitudes where M. Du Chaillu travelled, rain fell for nine months in the year. There was also a spreading out of the coast, suggestive of the delta of some large river which had displaced the sea by its deposit, yet no large river had hitherto been ascertained, on European testimony, to exist in this place. Far more towards the interior, in these equatorial latitudes, reports are heard of rivers flowing to the west, which may be tributaries of the Congo, but which it is at least an equal matter of probability are the head-waters of the northern branch of Du Chaillu's rivers. There is, for instance, that account given in vol. xxiii. of the Society's 'Journal' of an itinerary which Dr. Barth obtained from a well-informed Fellatah, who accompanied a marauding expedition from Darfur southwards, across the mountains, and whose progress was ultimately stopped by a magnificent river running west, from which the terrified natives had removed their boats. Then again there is Mr. Petherick's river; and lastly, the river with an east and west course, either running in or running out of Lake Nyanza.

Mr. Galton stated that, so far as testimony went, it was now a matter of complete uncertainty whether this river fed or drained the lake. He wished to show that this was a zone characterized by great rivers, of whose existence we are beginning to be aware and of whose course we know nothing, but on which the discovery of one great outlet, like that described to-night, makes it difficult to refrain from speculating. He added that, so far as we yet know, there is no valid reason why Du Chaillu's river should not have its origin on the other side of the continent, nor why the waters of Lake Nyanza (as he wrote some months back to Captain Speke) should not have their outlet by it or by the Congo instead of by the Nile. He merely mentioned this to show how many elementary problems in African geography are waiting to be solved, and he hoped that the further exploration of this river, of which M. Du Chaillu had brought us the first certain information, would become a recognized object of the Geographical Society.

PROFESSOR OWEN said natural history had rarely received a more remarkable or acceptable acquisition to its stores than had been imparted that evening by the adventurous traveller M. Du Chaillu. Hitherto it had only obtained a few material evidences—dead skins or dry bones—of this great gorilla; but now for the first time the naturalist had heard from one who had seen the gorilla in its native country some authentic account of its living powers and habits. Seven years ago he (Prof. Owen) had obtained the first reliable indication of the existence of such a creature from a missionary at the Gaboon, who sent him a pen-and-ink sketch of the skull of one of these great apes, which he had seen stuck upon a pole and worshipped as a fetish by some tribe in the interior. By degrees there came parts of the skeleton, then the badly-conserved skins of young or immature animals, finally the entire skeleton of the full-grown male, which had enabled him to make a thorough comparison of the bony framework of the huge quadrumanous beast with that of man. But now M. Du Chaillu had brought a plenitude of evidence, skins and skeletons of adult males, females and young of all ages, showing for the first time, indubitably, the characteristic colours, and affording the richest illustrations of this most strange and extraordinary animal of the brute creation. In natural history, as we went on comparing form with form, of course we soon became impressed with the idea of a connected scale, and the interest increased as we ascended; but when we came so near to ourselves as we did in the comparison of this tailless anthropoid ape the interest became truly exciting.

The learned Professor then called attention to a diagram showing the skeleton structure of the gorilla as compared with that of man; and he pointed out how much closer the approximations were in this creature to the human frame than in the chimpanzee and the orang. The most extraordinary feature in the structure of the gorilla, he added, was the prodigious strength of the trunk, which in its proportions exceeded that of the Irish giant, 8 feet 2 inches in height; and the only reason why it did not overtop man was that the lower limbs were dwarfed, in order that they should do the work of great grasping arms rather than of legs. There was a difference, however, in the number of lumbar vertebræ: in man there were five, and in the gorilla two. In man, again, there were twelve pairs of ribs, in the gorilla thirteen: an additional pair being given to support the muscles that were to act upon and from the trunk; but he explained the artificial nature of these vertebral differences. The brain-case was not so large as that of the human infant, while, as contradistinguished from man—in whom the great brain not only covered the little brain but went behind and beyond it—there was in the gorilla no trace of this posterior lobe beyond the cerebellum. Limited as the gorilla was to localities, with special conditions for abundance of tropical vegetable food, he supposed in progress of time it would become extinct.

Professor Owen next adverted to the progress made in the study of natural history during the last twenty or thirty years, and to the numerous accessions

which had been made in this particular branch; and concluded by expressing the hope that Government would provide a suitably-sized building for the classification and exhibition of objects in comparative zoology.

SIR RODERICK MURCHISON said there were several distinguished travellers from Africa in the room, but the hour had arrived at which they generally closed their discussions; and, after the admirable discourse of Professor Owen and the remarks of Mr. Galton, they could not be otherwise than gratified at the result. They were honoured on that occasion by the presence of his Royal Highness the Count De Paris, and also by that of one of the most distinguished men in her Majesty's Government. If Mr. Gladstone would address them in a few words, he (Sir Roderick) was sure they would willingly listen to him; for they were all proud to see a man of such eminence and distinction giving his marked attention to the subject before them.

THE RIGHT HON. W. E. GLADSTONE, M.P., said, that being called upon to address this assembly on such an occasion he felt like the lowest schoolboy in the school being called upon to lecture his instructor. He wished it were in his power more frequently to appear in these rooms in the character of a pupil. But really, although on previous occasions he had once or twice enjoyed the privilege of attending these meetings, yet he could not believe that even that Society would be able frequently to receive such a treat as they had had that night. For it could be no presumption even for him to say, that we had heard to night one of the most modest, one of the most talented, and one of the most enterprising of modern travellers. And that the rich and rare discoveries which he communicated, we had heard illustrated, developed, and applied to many of the highest and most important points of knowledge, by a man who is gifted with perhaps the most brilliant genius among those who in this or any other period have applied themselves to the study of natural history. He was sorry that his eminent friend Sir Roderick Murchison's old friendship induced him to call upon him (Mr. Gladstone) to address the meeting even in these few words, yet he at least felt that regret was qualified by satisfaction in having that opportunity of expressing his gratitude to both those gentlemen for the extraordinary boon they had respectively conferred.

The Meeting was then adjourned to March 11th.

Eighth Meeting, March 11th, 1861.

SIR RODERICK MURCHISON, VICE-PRESIDENT, in the Chair.

PRESENTATION.—*Sir Charles Bright.*

ELECTIONS.—*Commanders P. H. Dyke and H. E. Gunnell, R.N.; Major W. Ross King; Dr. W. Lauder Lindsay, M.D.; Rev. E. J. Moon; the Hon. Roden Noel; Sir Henry Stacey, M.P.; Major Alexander Strange; Rev. W. H. Walker; John Anderson; Robert Armstrong, late Chief Magistrate of Sierra Leone; Henry Baillie; William Brodie; Peter Morrison; Samuel Ingall; T. G. Knox; George Lorimer; W. Robert McConnell; Pliny Miles; and John Edward Woods, Esquires, were elected Fellows.*

ACCESSIONS.—Among the Accessions to the LIBRARY and MAP Rooms since the former Meeting were *Der Stille Ocean und die Spanischen Besitzungen im Ostindischen Archipel*, by Baron Ch.

Hügel; Vol. XI. of Reports of Explorations and Surveys for Railroad from the Mississippi River to the Pacific Ocean; Map of the Rio Colorado of the West; Beriah Botfield's Shropshire; Lawson's British and Native Cochin; Continuation of the Ordnance Map of Lanarkshire, &c. &c.

EXHIBITIONS.—Numerous Japanese Works, Maps, and Atlases, including Japanese Dictionary, Books of Buddhist Charm, Themes and Odes, Geography, Description of European Instruments and Machinery, Hobson's Natural Philosophy, Comparative Anatomy, Surgery, &c., were exhibited by Mr. A. Wylie, the Missionary; also several Coins by Mr. Hodgson.

ANNOUNCEMENTS.—The Chairman announced that, in order to illustrate the Memoir of M. Du Chaillu on Equatorial Africa, recently read before the Society, the large room in the house of the Society would be used, for a few weeks after Easter, to exhibit his specimens, with maps and drawings. The Fellows, on application, would have tickets placed at their disposal; and a certain number would also be sent to the councils of various scientific bodies in London. Also that the Council had granted to the Royal Institution the loan of maps and drawings illustrative of the region of M. Du Chaillu's explorations for his intended lecture on Monday, the 18th inst.

The Papers read were—

1. *Account of Four Excursions in the Japanese island of Yesso.* By PEMBERTON HODGSON, H.M.'s Consul at Hakodadi.

MR. HODGSON describes four journeys which he made from Hakodadi. They were of from four to six days' duration: two of them were into the interior, and two along the coast. He rode unarmed with a party of ladies, attended by thirty or forty servants, and did not experience the slightest obstruction. He found the island to be uninhabited and almost unknown to the Japanese in the interior, though supporting a large population of fishermen along its coast. The aborigines, who are unkempt and demi-savage, and are despised by the Japanese, number about 80,000. Large quantities of fish and edible seaweed are collected on the coast and exported to China. In one part Mr. Hodgson mentions villages every few hundred yards, where the natives mow the abundant seaweed off the rocks. They live on this, on fish, and on rice. Five miles from the line of coast there remains hardly any sign of habitation. The interior of the island is mountainous on a small scale, and beautifully wooded. Its vegetation is exceedingly various and ornate, including chestnut, oak, beech, pine, silver-birch, sycamore, magnolia, and catalpa among

the larger trees, together with an undergrowth of remarkable richness. Two active volcanoes were ascended by the party; a medico-botanical garden was visited, where students were busily engaged; also a lead-mine and some iron-works: a few indications of gold were found. The botanical collections that were made have been sent to Kew. Mr. Hodgson speaks admiringly of the perfect courtesy and hospitality he experienced throughout his short journeys.

THE CHAIRMAN returned his hearty thanks to the gentlemen who had forwarded to the Society the interesting document which had just been read. He might truly say that this communication was one of the many proofs of the usefulness of the Royal Geographical Society; for Mr. Hodgson's paper might have been tied up in red tape and never have been known if the Geographical Society had not existed. It was to the public interest that such papers should come from the Secretary of State, being of real use to the country in pointing out new channels of commerce, and he considered that the Society in discussing and publishing them became an important auxiliary to the State. On that occasion they had not many gentlemen present who had visited Japan. He regretted that they had not with them Captain Osborn, but fortunately they had present the gentleman who was recently appointed her Majesty's Secretary of Legation, and who would have to proceed immediately to Japan, that well-known traveller whose works were descriptive of the geographical and physical features and the political condition of many parts of the world as well as of China and Japan. He alluded to Mr. Oliphant, and, as he was about to proceed to those regions, he (the chairman) wished to impress upon him that when he sent his dispatches to Lord John Russell this Society would receive any portion of them with delight.

MR. OLIPHANT thanking the meeting for the kind manner in which they had received his name, expressed his determination to send home to the Geographical Society, through her Majesty's Government, any information which he might collect; and said he hoped he should be able to push his explorations far into Japan. They might not be aware that by the conditions of the treaty, the right of travelling into the interior was confined to the members of the mission at Jeddo, so that he and his colleagues would have a monopoly of explorations into this most interesting country. When he was there before, the limited opportunities which he had for observation were confined entirely to Nagasaki and Jeddo; therefore, he knew very little of the island upon which the paper treated. He was sure, however, that that island was extremely important in a geographical point of view. It was a remarkable circumstance that the Japanese themselves hardly seemed to have known of its existence so recently as the beginning of the seventeenth century, for in the treaty negotiated between King James I. and the Emperor of Japan in 1613, the last clause stipulated that the English should have the right to go and *discover* the island of Yesso. It showed at any rate that in those days the Japanese were not afraid of us, and that the island of Yesso was a *terra incognita*. They trusted us then, and he hoped they would trust us still, and allow us to develop the natural resources of that island without interference. He should be glad to hear from Mr. Hodgson what the articles of trade were which Yesso produced for foreign merchants. It was to Yesso that we to a great extent owed our treaty, because the Americans who first opened Japan did so from the necessity which had arisen to induce the Japanese Government to relax their laws with reference to the crews of ships which might be wrecked upon their coasts. In the summer of 1850, there were no less than 800 American whalers in the seas in the immediate neighbourhood of the island of Yesso,

and wrecks were constantly taking place. It, therefore, became very important for the American Government to make arrangements with the Japanese Government that the crews of wrecked ships should be protected; and the treaty which the Americans made had been followed by our treaty. He thought it was a reflection upon us that we should know so little of that coast, and should only have one surveying ship out there. The fact mentioned by Mr. Hodgson, that he went through the country totally unarmed, was worthy of notice, because the later accounts we had received of Japan rather contradicted the impression which he (Mr. Oliphant) had conveyed in his book, and which he certainly obtained while he was there, of the favourable disposition of the Japanese towards Europeans and the kindheartedness of the people themselves. He believed he should have no reason to change his opinion when he went there again. It was very natural that in a country where the whole government was conducted on a system of exclusiveness, prejudices should exist, especially on the part of what we in this country should call the extreme Conservative section of the aristocracy, against Europeans. Those who had the task of governing the country felt the difficulties which might be incurred by admitting a new element altogether into the condition of affairs. Their politico-economical system had been regulated upon the hypothesis that Japan was excluded from the rest of the world. Sumptuary laws existed, defining exactly what each class should wear, and very often what they should eat. Supply and demand were regulated accordingly: it was quite manifest, therefore, where a new and an uncertain element was introduced, such as the fluctuations of foreign commerce, tending to produce a disturbance of this supply and demand, which at present were exactly proportioned the one to the other—that the ruling classes should become very anxious as to the result and show some reluctance to the carrying out of the treaty. He was quite sure it rested with the English merchants there, so far to conciliate this feeling on the part of the ruling classes as to render the task of conducting our relations with that country every day more easy.

SIR FREDERICK NICHOLSON said that, having visited Hakodadi, he wished to make a few remarks on the paper which had just been read. With reference to the survey of Hakodadi harbour, made by the officers of the United States navy, he must bear his testimony to its great accuracy. He could confirm Mr. Hodgson's statement as to the friendliness both of the people and of the official authorities at that port. They were far less exclusive than those at the southern ports of Japan; and they evinced on all occasions the greatest desire to obtain information respecting European arts, sciences, and customs. Although no opportunity had presented itself to travel as far into the country as Mr. Hodgson had done, he (Sir Frederick) agreed with that gentleman in comparing parts of the country to Switzerland, and he instanced a beautiful valley in the immediate neighbourhood of Hakodadi, where the houses greatly resembled Swiss chalets in their construction. He also alluded to the extreme discipline to which the Japanese people are subjected. With respect to the importance of Hakodadi as a harbour, he considered that the abundance of vegetables, especially of potatoes, which are an excellent antiscorbutic, would render it a valuable place of resort to whalers and other vessels navigating those seas; and, taking into consideration the number of convenient and well-sheltered harbours recently acquired by Russia on the adjoining coast of Chinese Tartary, he was of opinion that Hakodadi might in future times be most useful to us, especially if our trade with Japan were to increase, as there is every prospect of its doing.

MR. PEMBERTON HODGSON considered that Hakodadi was one of the largest ports in Japan. From the opening of the port, June, 1859, to his leaving it in October 1860, he thought that no fewer than 117 ships had entered it, and amongst them were 57 whalers. The exports consisted chiefly of fish for the Chinese. As to the mineral productions of the country, there was sulphur and

a small quantity of lead. There was also a good deal of tea from the neighbouring isle of Nippon brought there. While he was at Hakodadi several men-of-war visited the place from Russia, though during last year, since the opening of the ice in June, there had been only three Russian vessels of that kind. He had no doubt that some day or other Hakodadi would be a place of great importance. As to the Government of Hakodadi, he had himself found no difficulty. He did not wish to throw unnecessary blame upon his own countrymen, but a great deal of the difficulty which they experienced had to be laid on their own shoulders.

The CHAIRMAN said that there were several Japanese productions which had been sent to the Society by the Rev. Mr. Wylie, who had been a missionary in Japan. If Mr. Wylie was present, he was sure they would be glad to hear any thing from him in reference to that remarkable island.

MR. A. WYLIE said he had no information to communicate to them in reference to the island which had been mentioned that night, as he had never been there; but as he supposed that anything regarding Japan might be interesting, he would mention some things which he had seen and heard in reference to it. While he was there, it was his desire to inquire and gain as much information as he could in regard to the habits of the people, and he mixed with them as much as possible. His impression with regard to the people must, of course, be accepted as merely the result of a short stay in one part of the empire. Comparing the Japanese with the Chinese, his opinion was that they were inferior as a race in a physical point of view, and he believed them to be also mentally inferior to the Chinese. He might be wrong, but he stated what was his impression from a short observation. He believed also that there was much in the Japanese character to which they, as Europeans and Christians, would be averse. He had found much *finesse* among them: in fact, he might say that they were accomplished in the art of deception. Having said so much about the black side of Japan, he thought also that there was a great deal in their favour. They were a very energetic people, and they were very desirous of improving their position; they took every means in their power of advancing their intellectual skill and raising themselves in the scale of civilization. He thought it was important, now that the country had been opened to us, that we should know something about the Japanese character. He was happy to hear from Mr. Oliphant that he proposed to treat with them in a conciliatory manner; for their system of civilization was very different from our own, and if we did not make allowance for their ideas and habits we should inevitably get into trouble. As to the desire of the people to improve themselves, there were in the country very many who were well acquainted with the Dutch language: they had on the table abundant proof of that in the books which they had written. The Dutch were the only people who had been admitted to them for two hundred years; but now the country was about to be opened to Russia, England, and France, and it was found that the people were equally anxious to obtain a knowledge of the languages of those countries. He found that many even of the children were already acquiring a tolerable knowledge of English, and were able to speak English; but it appeared that though they desired to have that knowledge for the sake of commerce, they had also another object in view,—they had an earnest desire to read books published in Europe. Of this we had an evidence in the fact that the Japanese had transferred many of these into their own language unaided. The English were very badly off for works to aid them in acquiring the language of Japan. A vocabulary was published by Dr. Medhurst more than thirty years ago, and the Japanese had got that book and reprinted it entire. It was almost the only work the English had for teaching the Japanese language, and the Japanese used it in their turn for learning the English language. More recently a number of works had been published in China for the purpose of imparting a knowledge of European

science in that country, and many of them had gone to Japan. He might refer to the recent publications of Dr. Hobson in Chinese, which had been largely distributed in Japan. Those surgical and medical works had been reprinted by the Japanese. At present there were several Dutch, imparting to the Japanese a knowledge of the arts and sciences. In Nagasaki the emperor had a large factory, under the superintendence of Mr. Hardes, for the manufacture and repair of steam engines, with an apparatus equal to that of a first-class machine-shop in this country. They had a Dutch officer for two years instructing them in military tactics; and Dr. Pompe van Meerdervoort, a medical man, had been applying himself for a considerable time past to a dissemination of medical knowledge amongst them. The latter gentleman had recently received from the Japanese Government several bodies of culprits for the purpose of teaching anatomy to the native students. These bodies were dissected by the Japanese, under his superintendence, and he said they were making great progress in the study of the science. From the reports of that gentleman and others, he (Mr. Wylie) had been induced to conclude that such an operation had never taken place before; but he was somewhat surprised and interested to find in a native work, a detailed account of a dissection, performed at the capital in 1822, exclusively by Japanese operators, who had obtained their knowledge by means of the study of European anatomical publications. He was led to believe, while in the country, that there were great resources for commerce in Japan which were yet undeveloped. The trade in tea was increasing, and he imagined that after a time, when Europeans became more accustomed to the tea of Japan, it would be considerable. With regard to mineral productions, he believed there was an immense store in Japan of which we had very little knowledge. He was very anxious to ascertain as much as he could as to the religious position of Japan, and he prosecuted his inquiries as far as practicable; in doing so he had the assistance of a gentleman who had lived for some time in the country, and consequently had a knowledge of the inhabitants, their customs, and their views. He found that although the ritual of Confucius was generally adopted in Japan, yet they were not so devoted to it as the Chinese were. Buddhism was much more prevalent, but it differed considerably from that of China; its secular development seeming to have been arrested in Japan at an earlier period of its history. Idolatry was not carried to such an extent; and image-worship was more restricted than in China. There were six different schools of Buddhism in Japan, one of which was of a very singular character: the priests were allowed to eat flesh-meat and to marry, innovations utterly opposed to the spirit of Buddhism in any other country. But besides these there was the Sintoo religion, which might be termed par excellence the national creed; the emperor being the high priest. The origin of this system was lost in the mazes of prehistorical antiquity, and offered a renumerative field for the researches of the philosophic archæologist. In its initial period probably much analogy would be found with the early religion of the Chinese, which formed the basis where on had been raised the present conglomerate of absurdities under the name of Tavianism. Although they had literally "gods many, and lords many," even amounting to several thousands, yet as far as his observations went, these were chiefly ideal, and the spirit of the system was repugnant to material representations of the deity. It was well known that Christianity had been unconditionally prohibited in the empire for two centuries past; and even at the present day, the jealousy of the Government forbade the discussion of the question by its subjects. There had probably been too much cause for the exclusive policy adopted in former days; but we might hope that in due time the views of the powers that be would be so far modified as to tolerate the practice and profession of the Christian religion in a purer form. For this end much would depend on the character and conduct of our countrymen who profess to follow that faith. There were at present a few American

missionaries there, zealous self-denying men, who were preparing themselves by a knowledge of the language and the people, for any future opening for more direct effort which might occur. They lived among the people, and were closely watched by the Japanese, upon whom a favourable impression would doubtless be effected by observing their simple and blameless style of life. For the first time in history, protestant worship had been established at Nagasaki within the past twelve months, and there was a probability of a church being built at Kanagawa. With the introduction of Christianity into that empire, we might naturally look for the disappearance of much that is at present so repulsive in the national character.

The second Paper read was—

2. *Travels in Siam.* By Sir R. H. SCHOMBURGK, Cor. F.R.G.S.,
H.M.'s Consul at Bangkok.

SIR R. SCHOMBURGK left Bangkok in December, in company with two nephews of the King, who were students at the Baptist Missionaries' school in that place. He passed in barges up the Mènam, which he describes as being on the whole a monotonous river. In three weeks' time he reached Rahaing, the most southern of the Lao states, which are presided over by petty princes tributary to Siam. Here the river was left on account of its being too low for further navigation, and the journey was pursued on the backs of elephants—a mode of conveyance of which Sir R. Schomburgk complains bitterly. Lahong, the battlemented capital of another Lao state, was reached in eleven days, after travelling along a mountainous road, "of a description that would have set a timid person into the most nervous state. The pathway up and down the high mountains has no greater breadth than from 5 to 6 feet, with ledges and shelves of rock resembling steps, and frequently a precipice on the right or the left. But the security with which that sagacious animal the elephant travels soon inspires confidence. He draws near to the ledge of the rock he has to descend, sounds its depth with his proboscis, and cautiously puts down one of his fore-feet, and, having acquired footing, the other follows; then the hind-legs are doubled, and he glides upon his haunches to the edge of the ledge, and the first hind-foot, then the next, is put down. If he were not to double up his hind-legs, the angle, when his fore-legs were at the bottom of the ledge, would be of that description that no person could keep on his back. As it is, one has to hold on with all force."

Three days more of a similar road brought the party to Lampoon, and one more, through fertile and highly-cultivated country, to Xiengmai, the largest of all the Laos cities, and about 3 miles in circumference. Sir R. Schomburgk states that there is a yearly export of 400,000*l.* worth of teak-wood from Xiengmai to Moulmein.

It is floated down the river Salween, and may be considered as the only source of supply to the navy-yards in Great Britain of timber of that description. Starting afresh with 150 men and 33 elephants, he passed for three days down the banks of the river Ping, and thence across the great pine-covered mountain-chain which divides Siam from Her Majesty's possessions in Burmah and Tenasserim, and reached Moulmein in twenty-four days.

The CHAIRMAN, after reminding the Fellows of the achievements of Sir R. Schomburgk through a long series of years, and after due praise of his present labours, called upon his friend Mr. Crawford, who knew so much about Siam, to speak on the subject under consideration.

MR. CRAWFORD said they had heard the nature of the country which Sir Robert Schomburgk had visited. That gentleman was twenty-four days upon his journey, and he travelled across the very same sort of country as that through which their friend Captain Sprye desired to carry on the whole of the trade of China. It was a country of extreme difficulty to traverse,—a pathless mountainous forest. His friend the Chairman told him that he ought to say something about the white elephants of the country, and he would do so shortly. The King of Siam had white elephants. He believed he had six when he was there; he saw four, and there were two he did not see. A white elephant was regarded by ourselves as a defective animal; but the Siamese believed in the transmigration of souls, and they believed that a white elephant contained the soul of a king on his way to beatitude. Alluding to the trade of Siam, he said that it had risen to the extent of half a million of exports, and half a million of imports. There was some of the best fruit in the world in the country, and much corn, but with respect to animal food the Siamese were not abundantly supplied.

The Meeting was then adjourned to March 25th.

Ninth Meeting, March 25th, 1861.

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

On assembling the Chairman said, "Our gracious Patron the Queen having met with the first real affliction in her life, and the mother of our Sovereign having been interred this day, the Council of our Society has decided that all business be suspended, and that this our ordinary Meeting be adjourned.

"For my own part, let me assure you that the untoward conjunction of the day of our meeting with that of this Royal burial was not brought to my mind until the close of last week, when it was too late to call together a Council and announce publicly that the Meeting would be adjourned. Acting therefore for my friend, our President, Lord Ashburton, who is detained in the country by ill-health, I took upon myself to propose to the Council, this afternoon, that no business should be transacted in the evening, but that, out of courtesy to Members and their friends, who have had no notice of the postponement, I should take the Chair, and make the explana-

tion which was due to them. On this melancholy occasion, when the whole nation is sympathising with their Sovereign, I am sure, Gentlemen, that, as Fellows of the Royal Geographical Society, you unite with the Council and myself in the expression of our devotion to our illustrious Patron, and our heartfelt sorrow for the bereavement she has sustained; and I have now, therefore, simply to announce that this meeting is adjourned to the 8th April."

The Meeting then adjourned to April 8th.

Tenth Meeting, April 8th, 1861.

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

PRESENTATIONS.—*Commander Peché H. Dyke, R.N.; the Rev. C. H. Wallace; Robert Armstrong; and E. W. H. Schenley, Esqrs., were presented upon their Election.*

ELECTIONS.—*Colonel W. Anderson, C.B.; the Earl of Erroll; Lieut.-Colonel G. P. Evelyn; Captain Fitzgerald; the Hon. Dudley Fortescue, M.P.; Captain Francis Green; Dr. James Hector, M.D.; Rev. John Henn; Consul G. S. Lennox Hunt; Colonel James Holland; Captain Richard Llewellyn; Lieut. H. Matthew Miller, R.N.; and J. B. Arundel Acland; John Baker; H. Lewis Bartlett; Higford Burr; Alfred John Elkington; W. Kennedy Erskine; R. W. Kennard, M.P.; Patrick C. Leckie; W. John Legh, M.P.; F. Lehmann; Swallow Leyland; T. Kerr Lynch; W. Morgan, R.N.; T. Page, C.E.; L. M. Rate; W. Reid, C.E.; Graham Moore; Robertson James Theobald, Jun.; and C. Essington Walker, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the accessions to the Library and Map Rooms since the last Meeting were Harper's American edition of Burton's Lake Regions of Central Africa; Petherick's Egypt, Soudan, and Central Africa; Vol. XI. of Smithsonian Contributions to Knowledge; La Confédération Argentine, by Dr. F. M. de Moussy; Plan of J. McDouall's Discovery; Continuation of Ordnance Maps of Ireland; and several atlases, maps, and plans of towns, presented by A. West, Esq., &c. &c.

EXHIBITIONS.—Geological specimens, collected by Mr. F. T. Gregory in North-Western Australia, were exhibited by Professor Tennant, F.R.G.S.; and some specimens of Australian native workmanship by Captain W. Parker Snow.

The Papers read were—

1. *Communication to DR. SHAW from MR. FRANK GREGORY, on the Expedition from Perth to the North-West of Australia.*

MR. FRANK GREGORY, on arriving in West Australia to take command of his expedition, found difficulties in his way. The Imperial Government had granted 2000*l.* towards its expenses conditionally on an equal sum being raised in the colony. However, the Colonial Government were unwilling to take their share, unless certain modifications were made in the plan of the expedition, having reference to their especial exigencies. If Mr. Gregory had waited to refer this altered plan to the approbation of the Imperial Government, the season for travel would be lost long before he could obtain an answer. He therefore advanced the 2000*l.* out of his own funds, and applies to the Government in trust that they would authorize the change of plan and would repay him. He was on the point of starting, and his Excellency the Governor strongly seconds Mr. Gregory's application.

The CHAIRMAN, SIR R. MURCHISON, strongly commended the project of Mr. Frank Gregory, and had every hope that the difficulties alluded to would be overcome.

The second Paper read was—

2. *Memoranda on North-East Australia*, by A. C. GREGORY, F.R.G.S.; with *Report on the Exploring Expedition to the River Burdekin*, by J. W. SMITH, R.N.

Communicated by SIR G. BOWEN, F.R.G.S., Governor of Queensland, through the DUKE OF NEWCASTLE, F.R.G.S.

THE despatches from Sir G. Bowen enclose memoranda furnished to him, at his request, by Mr. A. C. Gregory, the Surveyor-General of Queensland, in which he describes in detail the capabilities and present condition of the chief positions in that colony. His Excellency, speaking of Maryborough, says—

“On the banks of the River Mary, as of all the other rivers of central and northern Queensland, there are vast tracts of country admirably adapted for the growth of cotton, of sugar, and of all other tropical and semi-tropical productions.

“Port Curtis is the best harbour, after that of Sydney, on the eastern coast of Australia. It was here that Mr. Gladstone, when Secretary of State for the Colonies, in 1846, founded a new colony, which was abandoned in the following year by Earl Grey on succeeding to office. However, in 1854, the Government of New South Wales again formed on the shores of Port Curtis a township which

has been named Gladstone, and which is the outlet of the adjacent pastoral countries of Pelham and Clinton. The excellence of the harbour, the salubrity of the climate, and the beauty of the surrounding scenery combine to render Gladstone an eligible site for a flourishing city; but the river Fitzroy, farther north, affords a more ready access to the interior of the colony, and consequently the settlement of Rockhampton, on its banks, has advanced more rapidly up to the present time. The town of Rockhampton was founded in 1858, and was then the extreme point of European settlement in this part of Australia. As the outlet of the vast regions watered by the Fitzroy and its tributaries, it is even now a flourishing place, and pastoral occupation has already extended to the Peak Downs and to the shores of Broad Sound, fully two hundred miles farther inland and northward. The Queensland Government is about to found a new settlement at Port Denison, as the outlet of the recently proclaimed district of Kennedy, which will reach to within about three hundred miles of the Gulf of Carpentaria.

“Though Rockhampton is within the tropics, the climate of the neighbouring districts, especially on the upland downs and beautiful prairies of the interior, is in a high degree healthy and invigorating. Fresh settlers are fast arriving from New South Wales and Victoria, and bring their flocks and herds with them. Nor is the value of the wool of the merino sheep deteriorated to any sensible extent in these warm latitudes. What the fleece loses in weight it gains in softness and delicacy.

“It will afford some idea of the great space already covered by the settlements of this colony to mention that, on my official tours during the last twelve months, I have myself visited two flourishing towns in Queensland (Warwick and Rockhampton) which are distant from each other by the nearest road at least five hundred miles: that is, much farther than Galway and Kirkwall respectively are distant from London. There is something almost sublime in the steady, silent flow of pastoral occupation over north-eastern Australia. It resembles the rise of the tide, or some other operation of nature, rather than the work of man.

“Although it is difficult to ascertain exactly what progress may have been made at the end of each week and month, still at the close of every year we find that the margin of Christianity and civilization has been pushed forward by some two hundred miles.”

The *Spitfire* was despatched by Governor Sir George Bowen last August to examine the north-eastern coast of Australia and to search for the mouth of the river Burdekin. She was placed under the command of Mr. J. W. Smith, who was accompanied by Mr. Dalrymple, Commissioner of Crown Lands; Mr. Stone, surveyor;

and Mr. Fitzallan, botanical collector. She sailed in August, 1860, and passed through the group of Northumberland Islands, which are described as presenting a most pleasing appearance. Their summits rise to 600 or 800 feet, and were clothed with acacias, gum-trees, cypress, laurel, and groups of a very beautiful and useful pine. The adjacent "Pine Islands" of Captain King formed unbroken forests of straight pines of large dimensions, and afforded an excellent harbour. These islands are visited by natives of the neighbouring continent, but are not permanently inhabited. The *Spitfire* next sailed to Port Molle, a very good harbour, but unfortunately shut in by a semicircle of mountains, so unbroken and covered with dense scrub as to cut off all apparent means of communication with the interior and make it useless for commercial purposes. Port Denison, the newly discovered harbour, was then sought and easily found. "Nothing could be more gratifying than the appearance of this splendid little port," sheltered from all winds. Starting from here, the coast of Australia was carefully examined for the mouth of the Burdekin. First, Cape Upstart was reached, where the anchorage was found open and useless, and the "Station Hill" of Captain Stokes was ascended, whence a clear view was obtained of a network of salt-water creeks, none of which could by any possibility be the outlet of the Burdekin. Hence the party sailed to the roadstead of Cape Cleveland, where the natives made such hostile demonstrations against them that they went on to Magnetical Island, opposite which a long unbroken ridge, running from the s.s.e., meets the coast, and affords no gap for the passage of any river. Again they returned to Cape Cleveland, and on searching its "inner western corner" found large entrances tending in the direction where, in the previous year, Mr. Dalrymple had left the Burdekin a broad running stream. These entrances were carefully examined. They were found to form a delta extending over 60 miles, and to present flood-marks at a height of 20 feet. None of them were accessible from the sea, except with great difficulty, and their exploration was the more dangerous owing to the attitude of the natives. Nevertheless, they were all traced, and found to converge in one point close to Dalrymple's furthest in 1859. No doubt, therefore, remained with the explorers that they were the outlets of the river Burdekin, and, at the same time, that they were utterly useless for the purposes of navigation.

The CHAIRMAN, in calling on the Society to thank the Duke of Newcastle for this communication, adverted to the highly prosperous and inviting condition of the new colony of Queensland, under the judicious and vigorous administration of his friend Sir G. Bowen, the Governor.

The third Paper read was—

3. *Expedition in South Australia.* By SIR RICHARD M'DONNELL, C.B.,
and Major R. WARBURTON.

HIS EXCELLENCY the Lieut.-Governor, Sir R. M'Donnell, started with a large party to inspect the newly-explored districts north of Mount Serle, and the result of his experience showed that there was greater difficulty in finding feed for his horses in the settled districts south of Angipena than anywhere else in his entire journey. He first inspected numerous mines, including the Appealina, Chambers', and Finch's, and the copper-mine near Mount Rose; then he started upon the more adventurous part of his journey, suffering everywhere from the extreme drought of the season. His course lay by Lake Weatherstone, Mount Attraction Springs, Blanche Cup, and Strangway Springs. These latter are nearly 100 in number, and are mostly formed on the same type as Blanche Cup: that is to say, they consist of stony mounds with reeds at the top and a hollow basin in the centre, containing water of a depth varying from a few inches to 6 feet, which either overflows the brim or issues from its side in a stream proportionate to the strength of the supplying spring. The water of Strangway Springs was abundant enough, but slightly brackish and ill-calculated to quench thirst. Here the party suffered severely from illness, originating previously, but developed by the intense heat. Nevertheless, they determined to push on still further to Loddon Springs, guided only by a sketch-map of Mr. Stuart, which that gentleman had lent to his Excellency. This attempt led the party into serious danger; for after 45 miles' travel across a succession of sand-hills and other difficult country, they could not for a long time discover the waters of which they were in search, and which they lighted upon only at the last moment, when they were on the point of undertaking the serious hazard of a retreat, with utterly exhausted men and cattle. His Excellency still continued his route to the interior for three days farther, when, having been absent long from the colony, his provisions failing, and an accident having happened to one of his best horses, he reluctantly returned, and riding in long and rapid stages reached Adelaide in safety.

Major Warburton travelled from Fowler's Bay to the head of the great Australian bight, the neighbourhood of which he explored with very discouraging results. There is indeed abundant water along the sand-hills at the head of the bight, but hardly any is to be found elsewhere. He therefore pronounces the country west-

wards of Fowler's Bay as unfitted for occupation. He came upon Eyre's tracks, but found difficulty in identifying that traveller's positions, chiefly owing to an uncertainty as to the exact point which Eyre had considered to be the head of the bight. Major Warburton's explorations were carried on with so much toil that his exhausted party had difficulty in returning.

THE CHAIRMAN, in commenting on this communication, adverted to the energy displayed by the Governor, Sir R. M'Donnell, in his endeavour to satisfy himself, by personal examination, of the real state of large portions of the interior of S. Australia. He then called on the Fellows present who took an interest in either of the great colonies adverted to, to offer their comments.

MR. CRAWFURD believed that the colony of Queensland was capable of producing cotton for Manchester. They had more cotton in Lancashire than all the rest of the world, but they must have still more to satisfy their demands. Queensland really seemed to be adapted for the production of cotton; but unfortunately the climate was also adapted for the cultivation of the sugar-cane, and that might be a serious rival. As to the production of cotton, it was one of the plants that required but a small quantity of water; it was, in fact, what was called a dry-land product, and he had no doubt that the country would be found well adapted to its growth. He thought they had now sufficient evidence to show that the great mass of Australia was a mere desert, and he did not see how it could be otherwise. Different exploring parties had penetrated so far from the south and from the north, that one or other of those parties must have seen a range of mountains in the interior, if any such existed, of 7000 or 8000 feet in height; and as they had not, it must be concluded that mountains of that character did not exist. Yet without them there could be no water, and without water there could be nothing but sterility. Such was the case in every part of the world. Wherever such ranges existed water was always found, and water in the tropics meant fertility. India, for instance, would be a desert if it were not for its range of mountains. With respect to Queensland, he could not believe that it was as good a place for sheep as had been represented, as he thought the climate would be too hot. Queensland was in the latitude of Canton, and Canton was much too hot for sheep. However, of all the places he knew, he believed it was the most eminently adapted for the production of cotton. He had himself seen samples from there both raw and manufactured, and he had scarcely seen better specimens of either. What it would produce to the greatest advantage would most probably be that which was called sea-land; and a very considerable quantity of that fine kind of cotton from Georgia and South Carolina was used by our manufacturers. He considered that the samples from Queensland were quite equal to any he had seen.

J. BAKER, Esq., a member of the Legislative Council of Australia, said he should not have ventured to address any observations to the meeting, if it had not been for the remarks of Mr. Crawford that the centre of Australia was a desert. Now he differed entirely from Mr. Crawford, as he thought it was proved, by the late explorations of Mr. Stuart, that such was not the fact; and he should not be doing his duty to the country which he claimed as his home, if he listened to the statement without attempting to refute it. It appeared to him that the paper from Sir Richard M'Donnell had been the immediate cause of Mr. Crawford making his observations, recounting as it did the hardships Sir Richard M'Donnell had to endure, and the difficulties with which he had to contend. But Sir Richard M'Donnell was not a practised

explorer. He started with Mr. Stuart's maps in his pocket, but he lost his way, and, travelling round the wrong side of Lake Tibbs, missed the Hermit range, for which he was aiming. Being disappointed in the water which was represented as existing in that neighbourhood, he examined Mr. Stuart's chart, and found the Hermit range with abundance of water by it. He (Mr. Baker) therefore thought it was not right to condemn the whole country as a desert, merely because Sir Richard M'Donnell had lost his way and had difficulties. There was no doubt that Sir Richard M'Donnell was entitled to great praise, and also to their sympathy for the hardships which it was represented he had had to endure; but what Sir Richard M'Donnell called fatigue and privation would very likely not be noticed at all by a man like Mr. Stuart, to whose labours he thought this Society could not award too high a meed of commendation. Mr. Stuart had himself said that much of the interior of Australia was quite equal in fertility and in rich picturesque beauty to the O'Halloran Hills, which were as lovely a part of country as could be seen. A great portion was under cultivation, producing all the cereals in the most luxuriant manner; and he thought the safety with which the exploring parties had made and returned from their expeditions to the interior proved that the country was not a desert. He, however, by no means meant to say that the whole of the vast interior would ever be profitable to work or hold. The banks of the river Darling, and much of the splendid tract of country through which it passed, were also as well adapted as the fertile plains of Queensland for the production of cotton. He considered that a few thousand pounds expended on the river, in the erection of four or five lock-gates, would not be thrown away, as it would render navigable upwards of 1000 miles of water, along the course of which there was a deposit of soil equal in rich abundance and luxuriance to that of the valley of the Nile, and capable of producing an immense quantity of cotton. If they thought their thanks were due to Sir Richard M'Donnell, what would they have to say with regard to Mr. Stuart? He contended that Mr. Stuart had already accomplished a victory, and was entitled to all the praise the Society could bestow upon him, even if he should die in the attempt to complete his discoveries in Australia.

LORD ALFRED CHURCHILL said he did not think his friend Mr. Baker had at all overstated the advantages of Australia as a fertile and good cotton-growing country, but these were especially great in respect to the new district of Queensland. With regard to the immediate products of Australia, which were so necessary for the manufacturers of this country, he scarcely knew any of them that were capable of being obtained more readily, and in larger quantities, than in the colony of Queensland. Australia now supplied 50,000,000 lbs. of wool a-year, and he had not the least doubt that, if the colonists took up the question of cotton-growing, they would do equally well with it. He certainly did not think, from what he had heard, that Queensland was at all too hot for sheep. The alpaca or llama of South America had now been introduced, and the animals appeared to thrive very well indeed. There was every reason to believe that important experiment would be successful; and if it should be so, flocks of those animals would add another and most profitable branch to colonial industry. There could be no doubt, from all the evidence they had heard, that immense tracts of country were pre-eminently fitted for the cultivation of cotton; and, in fact, there were few parts of Australia in which it could not be cultivated. The explorations of Mr. F. Gregory, on the northern and western side of Australia, were likely to be very beneficial in opening out new country whence more cotton could be obtained, and where cooley labour might be introduced for its cultivation. He thought the Society should do all in its power to encourage explorations of this nature.

MR. B. W. GEE said he had been some eight or nine years in Australia, and he could fully support the statements made by Mr. Baker. He had been

both in Calcutta and Queensland, so that he could judge of the relative merits of the two climates, and the advantages were incomparably in favour of the latter. The climate was unusually healthy, and the vegetation luxuriant beyond description. He had himself received honourable mention from the Commissioners of the Paris Exhibition for his samples of Australian cotton grown at Queensland, and he therefore knew what the young colony could do in respect to that cultivation. However, cotton required labour; and though he was an advocate for free, he was obliged to admit that convicts would do much more work in cotton plantations than any labourers whom the settlers could now obtain in the colony. He believed that if, under proper regulations and arrangements, convicts were sent to Queensland for ten years, there would be cotton enough coming from that district alone to supply all Manchester.

MR. CHILDERS, M.P., thought they owed a deep debt of gratitude to Mr. Crawford for eliciting the statement which had been made by Mr. Baker. He advocated the introduction of cotton plantations into Australia.

CAPTAIN DUCANE considered that, with respect to Western Australia, the expedition of Mr. Gregory was one of great hope, and, if successful, would be productive of great advantages.

MR. ROE, Surveyor-General of Western Australia, thought it a matter of great congratulation to the Society which had originated, fostered, and now brought to a successful issue, the expedition which he hoped had already started under their able leader Mr. Frank Gregory, who, he was certain, would do full justice to the task he had undertaken.

The CHAIRMAN congratulated the Society upon the discussion which had taken place. As to the observations in reference to Sir Richard M'Donnell and Mr. Stuart, he considered that no comparison had been drawn between them. No one had ever doubted that Mr. Stuart was entitled to the highest praise, and no one had stated this more decisively than Sir Richard M'Donnell himself.

4. *Latest Intelligence from the Expedition to the Sources of the Nile under Captains SPEKE and GRANT.*

THE intelligence from Captain Speke is of a fortnight later date than that which has already been communicated to the Society. It informs us that he had reached the upland districts, but had not yet arrived at the Rubeho Pass. All of his Hottentot guard had suffered severely from fever, and three of them had to be sent back invalided to Zanzibar. The rest of the party appear to be well.

Captain Speke sends back numerous lunar observations for the determination of the longitude of Zungomero, and speaks of having despatched an herbarium of plants.

The Meeting then adjourned to April 22nd.

Eleventh Meeting, April 22nd.

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

PRESENTATIONS.—*Lord Colville ; Rev. E. Graham Moon ; Vice-Chancellor Sir John Stuart ; Rev. W. H. Walker ; and John Anderson ; W. John Legh, M.P. ; Peter Morrison ; G. Moore Robertson ; and J. Ralph Shaw, Esqrs., were presented upon their election.*

ELECTIONS.—*The Rev. S. F. Cresswell ; Colonels John Gardner and Nicholson, R.E. ; the Hon. J. F. Stuart Wortley ; and James F. Beckett, R.N. ; Oswald Bloxsome ; G. Farmer Miller ; A. Fullerton Mollison ; J. Carrick Moore, M.A., F.R.S. ; and H. S. Dazley Smith, M.A., Esqrs., were proposed as Candidates for election at the ensuing meeting.*

ACCESSIONS.—Among the Accessions to the Library and Map Rooms since the last meeting were Vol. XII. of Reports, Explorations, and Surveys for Railroad from the Mississippi River to the Pacific Ocean ; American Almanac for 1861 ; Report of International Statistical Congress of 1860 ; Chart of the Arctic Regions ; Geological Survey Map of Victoria ; Maps of Iceland, Norway ; Continuation of the Ordnance Survey Maps, &c. &c.

ANNOUNCEMENT.—The Chairman expressed his regret that the President, Lord Ashburton, was detained by illness at home, and announced that the President's soirées would be held on the 15th of May and the 5th of June at Bath House, Piccadilly.

The Papers read were—

1. *Latest Intelligence from Dr. Livingstone and his Party in Central Africa.*

Communicated by Sir R. I. MURCHISON and SIR G. BACK.

FEELING in honour bound to take the Makololo back to their own country, and disliking to remain quiet while waiting for his new steamer, Dr. Livingstone left Tete on May 16, 1860, and travelled to Sesheke, a distance of some 600 miles. During their five years, sojourn at Tete, many of the Makololo had married slave women and had families. These Dr. Livingstone had expected would be disinclined to return with him, and he repeatedly gave them their option of remaining. However, they behaved badly, for they started in his company, and afterwards ran away on the march. The route of the party lay along the north bank of the Zambesi, crossing the mountain mass in which Kebrabrasa lies, and the rivers Loangua and Kafue at their confluences, then along the fine fertile valley of the Zambesi (being new ground) for about 100 miles ;

then turning westward in lat. $17^{\circ} 18'$ S. up a sandy river, the Zongue, till they saw the source of the fragments of coal strewn on its bed; then ascended about 2000 feet above the Zambesi, or 3300 above the level of the sea, where there was actually hoar-frost, and descended on the other side into the great valley of the Makololo. The columns of vapour from the Victoria Falls were seen by the naked eye at a distance of twenty miles, and the party went out of their way to visit them. Dr. Livingstone thinks he had understated everything about them except the height of the columns of vapour. The depth of the fall is not 100, but fully 310 feet. The breadth from bank to bank is not 1000 yards, but between 1860 and 2000 yards. On this occasion the river was at extreme low water, so that people could even wade from the north bank to Garden Island, to make a stockade for the protection of the seeds. The hippopotami had eaten up nearly all that the Doctor had planted on his previous visit. The lips of the fissure which runs across the river, and into which the entire body of water falls, are 80 feet apart opposite to Garden Island. The arrangement of the fissures is at first something like the letter T, the horizontal bar of the letter corresponding to the cross fissure, and the vertical stem to the commencement of a continuous series of zigzag cracks, at the bottom of which, far below the generally level surface of the land, the river takes its onward course. Sekeletu was found labouring under a skin disease, and many headmen had been executed for the alleged crime of having caused it by their witchcraft. A party of London missionaries had been to Linyanti, where, during a stay of only three months, six out of the nine Europeans which composed it perished: the remainder had left. Dr. Livingstone regrets that he had not been by to give them his long-tried remedies for fever. Returning to Tete, he visited the river twice between the Falls and Sinamanes, and on both occasions found it running at the bottom of a deep crack. He mentions that Mr. Moffat informed him that all the rivers in Moselikatzé's country run N.W. or N.N.W., and that they enter the Zambesi above Sinamanes. Dr. Livingstone took canoes at Sinamanes, where the level of the Zambesi was found by boiling-water observation to be 1600 feet lower than at the Falls, and continued his route down the stream in order to examine the river at low water. Kausalo presented no difficulty; Kariba, a few miles below it, is a basaltic dyke, stretched across the stream, with a wide opening in it, dangerous for heavily-laden canoes, whose gunwales are only 6 inches above the water. At Mburumas there is a rapid of 100 yards in length, running at six knots an hour. This is the most rapid part that has been seen in the whole river. Below Chicova, four and a half knots had been the extreme rate at the time of the

upward journey, but on return to the same place the falling of the river had developed several dangerous rapids, and even cataracts. There would seem to be a trap-dyke here, like that of Kariba, but with two openings, through one or other of which the canoes must have passed. There was a large seam of fine coal in the bank at this place, and another in the bank at Manyerire Hill; besides seeing fragments of the mineral in many rivulets on both banks, the existence of the coal-field at Zambo was verified, and was found to extend nearly to Sinamanes. The only real difficulty in the river is that at Morumbua; and this could be passed in full flood, as a rise of 80 feet must smooth it over.

"On arriving here (at Tete, September, 1860) two days ago, we had travelled from Linyanti and back, some 1400 miles, the greater part on foot. We have thus kept faith with the Makololo, though we have done nothing else. We were swamped once, but the men behaved admirably, leaping out and swimming alongside, till we got into smooth water. In another place one canoe was upset and property lost. We then abandoned the canoes and came home on foot, thankful to say, 'All well.'"

The CHAIRMAN said their thanks were certainly due to Dr. Livingstone and his brother for the valuable communications which had been read. His distinguished friend Dr. Livingstone had been pleased to say that he had done little more than take his friends the Makololo back to their native region, but the gentlemen present who had heard the papers read would admit that he had added very considerably to their knowledge. And if Dr. Livingstone had done nothing more than realise the promise he made to the Africans that he would return and conduct them to their home, he had not only redeemed his pledge, but had raised the character of England throughout Southern Africa. Dr. Livingstone had given us a large amount of geological and mineralogical knowledge which would be very valuable. He (Sir Roderick) thought that while Dr. Livingstone was engaged in his explorations they should cheer him on, to show that his labours had been received with applause by the Royal Geographical Society, and that they wished to encourage him. He could not but congratulate the Government on having appointed Dr. Livingstone to be not only the British Consul at the mouths of the Zambesi, there to point out to British merchants what advantages might be derived from people dealing with the natives, but also for having accredited him, as it were, to the tribes of South Africa. Thus, he had power to proceed to the interior of that country, and there sow those seeds of civilization which would redound to the honour of the British name.

ADMIRAL SIR GEORGE BACK said it might be interesting to the meeting to know that Dr. Livingstone in a letter to him stated that the temperature in the Batoka country at three o'clock in the afternoon was 136 degrees, and the thermometer was often over 100 degrees on the shady side of his person; and furthermore, his blood showed a temperature of 99½ degrees, while that of the natives was only 98 degrees; but the most remarkable feature in the climate was the rate of evaporation, there being a difference of 33 to 36, and even 40 degrees, between the wet and dry bulbs of the thermometer. And then, as regarded the fatal fever from which both the Makololo and some missionaries had severely suffered, Dr. Livingstone had discovered a remedy

which had been found effectual in curing the disease ever since 1850. This he did not like to make a fuss about, notwithstanding the frequent opportunities that had occurred for testing its valuable properties.

CONSUL HANSON said,—However much the Africans might be divided into different tribes, there yet seemed to be an undercurrent which tended to prove that they were everywhere the same family. He felt that Dr. Livingstone had achieved a greater measure of success than, perhaps, any other European who had ever gone amongst the Africans with a view of understanding them. He had himself seen a great many Englishmen in Africa, and had noticed the different points of view from which they looked at the people. He believed that one part of the success of Dr. Livingstone was attributable to the temper of the man himself—that he looked at the people from the right point of view—he went amongst them, dealt with them, treated them with kindness and as men. Men of different temperaments would, perhaps, have spoken of them as uncivilised, rude, barbarous, naked savages, who were beneath contempt; but it was not so with him. Dr. Livingstone knew that, though he went to further the purposes of this Society, he had also another and higher object in view, and that was, to diffuse amongst them the glorious light of the Gospel of his blessed Master; and he (Consul Hanson) believed that wherever travellers treated the Africans with kindness and with courtesy they would in like manner be met with kindness, hospitality, and favour. It was because Dr. Livingstone had ever kept faith with them that they on their part kept faith with him; and he believed that the same kind of feeling would continue mutually to exist.

The second Paper read was—

2. *Communication from Bishop Mackenzie, of the United University Central African Mission, to Sydney Strong, Esq.*

BISHOP MACKENZIE arrived off the Kongone mouth of the Zambesi early in February, where he found not only Livingstone and his associates, but also the remainder of his own party who had preceded him in Livingstone's new steamer, the *Pioneer*. Livingstone was about to start immediately to explore the Rufuma river, in hopes of discovering by its waters a more convenient access to the Nyassa and Shire district. He strongly urged the Bishop not to settle until that expedition had been completed; for there was no single chief to whom he could recommend him with confidence, and that if he landed his goods close to the sea-shore, the persons in charge of them would be sure to take fever. Yielding reluctantly to these and other reasons, it was agreed that the Bishop and one companion should join Livingstone's expedition up the Rufuma, and that the remainder of the missionary party should await their return at Johanna, one of the Comoro Islands, and perfectly healthy. This determination was at once carried into effect, and the parties went on their several routes without delay.

After a few concluding observations by the Chairman, the meeting was then adjourned to May 13.

Twelfth Meeting, Monday, May 13th, 1861.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*The Rev. W. D. West; Colonel James Holland; Captain D. Nasmyth; and J. Allen Brown; and R. Broadwater, Esqrs., were presented upon their election.*

ELECTIONS.—*Colonel John Lardner; Lieut.-Colonel Lothian Nicholson, R.E.; the Hon. J. F. Stuart Wortley; and James F. Beckett, R.N.; Oswald S. Bloxsome; Rev. F. S. Cresswell; George Farmer Miller; Alexander F. Mollison; John Carrick Moore; and H. S. Dazley Smith, Esqrs., were elected Fellows.*

The Paper read was—

Journey from Jeddo into the Interior of the Island of Nipon, with Ascent of the Volcano of Fusi-yama. By RUTHERFORD ALCOCK, Esq., H.M. Minister in Japan.

Communicated through SIR R. I. MURCHISON.

THERE are usually but two months in the year—July and August—when Fusi-yama is sufficiently free from snow to admit of being ascended. August had already passed, while Mr. Alcock was still engaged in removing obstacles put in his way by the Japanese ministers with felicitous invention and remarkable persistence. It was not considered dignified for him to go there, as the lower class of people were those who chiefly made the pilgrimage, and the roads were described as unsafe, and so forth. The Japanese have exerted all their ingenuity to nullify that clause of the treaty which allows liberty of travel to members of the legation. However, Mr. Alcock succeeded in making his arrangements to start, and as soon as it was absolutely fixed he should go, great pains were taken to render his journey agreeable. He travelled with eight Englishmen and a very large cavalcade along the high road, by which the Daimios travel every year to and from the coast, for their forced residence of six months; and where the mountain-passes of Hakoni, 7000 feet above the sea, are strictly guarded, to prevent arms being conveyed by their followers to the capital, or the wife or female child of a Daimio being taken out with him, as these remain hostages during his absence. Clean and spacious houses for the accommodation of the Daimios were erected along the road. The way was exceedingly beautiful; generally a gravelled avenue running through cultivated plains and valleys, where, though there is no freedom of the press or of speech, but a system of universal

espionage with Draconian laws, the peasantry are happy-looking, and notable for their careless freedom. Mr. Alcock says, "Greater evidence may be seen in the British Isles, any day of the year, of misery, destitution, and discontent, than I have been able to discover during a long residence. It is difficult, indeed, to reconcile all these tangible signs of material prosperity and well-being with an essentially bad Government, and equally impossible to doubt that, in many respects, if not in all, the mass of the population is much to be envied, even when brought into comparison with nations of the Western Hemisphere; with or without Free Press, Free Trade, Liberty of Speech, Representative Government, Trial by Jury, or any other Palladium of the Liberties of the People." However, the Japanese are sad story-tellers.

The mountain-passes of Hakoni reminded Mr. Alcock of the Swiss valley of Lauterbrunnen, and one dense forest of luxuriant trees and shrubs lay from the valleys to the highest summits. Crossing Hakoni and descending on the other side, the foot of Fusi-yama was attained. The horses were left behind after part of the mountain had been ascended, and the rest of the way, about eight hours' climb, was performed on foot. The top is a crater, long since extinct, some 1100 yards in length, and the highest peak was calculated by boiling-water observations at 14,177 feet above the sea. The Japanese pilgrims who ascend it, do so in white dresses.

Returning homewards Mr. Alcock crossed the Hakoni range at another point, and visited Atami, where there are numerous sources of steam and sulphureous water, ejected in irregular explosions.

Mr. Alcock enriched the sketch of his journey with a valuable and elaborate account of the history and political condition of Japan, and concluded it with an Appendix, on the Vegetable Productions of Japan, by Mr. Veitch, who accompanied the expedition.

The PRESIDENT said they had on that occasion the pleasure of seeing amongst them a distinguished public man, to whose decision and energy the treaty was to be attributed. Lord Elgin had not only seen Japan itself as well as its people, but had had the advantage of mingling with its public men, discussing questions of public interest, and making himself acquainted with subjects of a political and economical character, and he hoped Lord Elgin would give them some account of that which he had seen.

The EARL OF ELGIN wished most unaffectedly to say, that it would give him the very greatest pleasure if he thought he could contribute any information whatever that would be worthy their hearing, in addition to the interesting and very instructive paper which they had just heard read. But, in truth, he came there quite as much to listen and to learn as any individual present; and if he obeyed the summons of the noble President, he did so simply in order that he might, with much regret—he must say some contrition—plead his inability to give them the information which they supposed he could furnish. The truth was, that he had the satisfaction of being one of the pioneers of

England at Yeddo; but all knew that it was not from those shaggy beards and leather aprons that they could expect to get geographical information, and he must say that he always felt the necessity of great caution in offering hasty opinions with respect to foreign countries. His Lordship then explained how they were conveyed to their station by his gallant friend Captain Osborn, who conducted them successfully not only through the storms which prevailed about the coasts of Japan, but who had also furnished a full and detailed report upon the subject. His Lordship said that, as regarded himself, he must remind them that he was only a fortnight at Yeddo, and he was only a very short time in other parts of the country; and he thought they would believe him when he said that his time was so much taken up with his official duties, that he was able to obtain but little information of a different kind, but he would say that there was no place he had seen that so much surpassed his expectations as Japan. There was a neatness about all their arrangements, a cleanliness about their habits, a finish and a perfectitude about their work, an aptitude to do it, and a readiness to take up any of the results of civilization, which was perfectly astonishing. With respect to his own duties, for instance, he never met with diplomatists who were more shrewd, and he might also say that he never met with a greater readiness to take up a joke and enjoy it. He was bound to say that whenever he got into a difficulty with the diplomatists of Japan, the readiest way to get out of it was to make a joke. His Lordship illustrated the truth of his remarks by anecdotes; after which, he expressed his opinion that if they treated the people of the country to which he referred in a kind way, and did not ride rough-shod over them, no difficulty would be experienced. He was prepared to say that neither in the Japanese nor the Chinese treaty, was there a clause that was injurious to the people. It was true that there were some clauses which might be said to run counter to their habits and prejudices, and perhaps it was desirable that there were habits and prejudices of which they ought to get rid; but when they were running counter to their prejudices, they should do it with kindness. As to the trade with Japan, it was much greater than had been expected. He was told, while in China, that there would be 7000 bales of silk sent from Japan this year. The Japanese silk was superior in quality to that of China. Of course, it was natural that it should take some time to develop a country which had been for 200 years shut out from intercourse with other nations, and had for that long period existed on its own resources. Still there was a disposition to take goods, but the Government had put in force sumptuary laws to prevent them. He thought it was very likely that they should soon have a very great and flourishing trade with Japan, and he could not but think that the state of things in Japan was favourable, and would be for the benefit of this country. His Lordship then concluded with a few remarks on Chinese affairs, in the course of which he paid a hearty tribute to the personal character and great courage of Mr. Parkes.

CAPT. SHERRARD OSBORN said that as Japan was now being opened, he felt more and more convinced that, apart from a little tendency to colour which prevailed, the facts proved every day that the statements which had been made were correct. The extraordinary way in which the writer of the paper mentioned the existence of the arts, the vast number of houses, the state of agriculture, and the wonderful energy displayed by the people in the arrangement of every thing, whether the clipping of trees or cultivating the soil, must have struck every one. It was perfectly astonishing to see what their industry had done in cultivating the beauties of God's works. It was the *finish* of what they did which struck every one.

MAJOR BIDDULPH said he was at Yeddo for ten days, and he passed afterwards through the inland sea of Japan. Nothing could be more interesting than what he saw when passing through it. The shores were

covered with villages, boats were plying from one side to the other, the islands were covered with evergreens, which, though it was in the midst of winter, gave them quite a luxuriant appearance.

THE PRESIDENT said they would perhaps allow him to refer to one expression which had fallen from Captain Osborn, and that was with respect to the way in which the people cultivated God's works—or to the pleasure which they felt in decorating their mother earth. He was sorry to say that they saw comparatively little of that feeling in Europe. Lucre was generally the great object which the people had in view, and the decoration of the earth was not attended to as it ought to be. He thought there was evidence of want of civilisation and refinement in its neglect. They must all feel that especial thanks were due to Mr. Alcock, and also to Lord Elgin for his remarks. Unfortunately, in dealing with other races, the disposition "*I am a Roman*"—*Romanus sum*—prevailed among our countrymen to too great an extent; but he hoped that the spirit of disregarding the disposition and the feelings of the people would not be encouraged by our authorities in Japan.

The meeting was then adjourned to the Anniversary, May 27th.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1860-61.

Thirteenth Meeting (ANNIVERSARY), 1 P.M., May 27th, 1861.

IN the absence of the President, Lord Ashburton, the Chair was taken by SIR RODERICK I. MURCHISON, VICE-PRESIDENT.

The Minutes of the previous Meeting having been read and confirmed, and the regulations respecting the Anniversary Meetings having been read, the Chairman appointed J. Lyons M'Leod and J. Allen Brown, Esqrs., Scrutineers for the Ballot.

Lieutenant Langham Rokeby, R.N.; the Hon. Wellington P. Manvers Chetwynd Talbot; William Aubyn; David Balfour; William Blenkin; Charles Butler; George Frederick Chambers; J. Coghlan; Thomas W. Duprée, M.D.; Henry Edwards; John Bromley Foord; John Gallagher, M.D.; Charles Hall Hall; Alexander Hector; James Stewart Hodgson; James Lamont; Alexander Ogilvie Lloyd; Arthur Pemberton Lonsdale; Junius Spencer Morgan; Lonsdale Pounden; William Severin Salting; Joseph Travers Smith and Henry Thurburn, Esqrs., were proposed as Candidates for election at the next Meeting.

The Report of the Council, with the Balance Sheet for 1860, and the Estimate for 1861, was then read and adopted, and the two motions,* as recommended by the Council at pp. 6 and 7 of the Council Report, were, after some discussion, carried.

The Chairman then delivered the FOUNDER'S GOLD MEDAL to the Earl de Grey and Ripon, on behalf of Captain John Hanning Speke, of the Indian Army, for his eminent geographical discoveries in Africa, and more especially for the discovery of the Great Lake Victoria Nyanza; and the PATRON'S GOLD MEDAL to the Duke of Newcastle, on behalf of John Macdouall Stuart, for his explorations

* Viz., That the Election of Fellows should henceforth be by the Council and not by the Society, and that the 'Proceedings' should in future be edited by the Honorary Secretary.

in the interior of Australia, and particularly for his last journey from South Australia to the water-parting of Northern Australia.

The Anniversary Address was next read by Sir Roderick Murchison, and a unanimous vote of thanks was subsequently passed by the Meeting, with a request that he would allow the Address to be printed.

At the conclusion of the Ballot, the Scrutineers reported that the following changes, advised by the Council, had been adopted:—The Earl de Grey and Ripon retiring from the Vice-Presidents, to be succeeded by Major-General J. E. Portlock; and the vacancies among the Ordinary Councillors occasioned by the retirement of Sir Benjamin C. Brodie, Bart., the Hon. F. G. H. Calthorpe, M.P.; A. J. B. Hope; Laurence Oliphant; H. D. Seymour, M.P.; E. Osborne Smith, and by the decease of J. A. Warre, M.P., Esqrs.; to be supplied by Lord Alfred Churchill; Lord Colchester; Colonel J. H. Lefroy; Major-General Sir Henry Rawlinson; Sir Justin Sheil; Count P. E. de Strzelecki; and Colonel Sir A. Scott Waugh.

Thanks having been voted to the President, Vice-Presidents, Members of Council, Auditors, and Scrutineers, the Chairman finally directed attention to the usual Anniversary Dinner, and the Meeting adjourned.

PRESENTATION
OF THE
ROYAL AWARDS

TO CAPTAIN SPEKE, THE DISCOVERER OF LAKE NYANZA; AND
MR. MACDOUALL STUART, THE EXPLORER OF CENTRAL
AUSTRALIA.

AT a previous anniversary it was made known by the Council that in awarding one of our Gold Medals to Captain Burton for his various adventurous explorations, we also fully recognised the high merits of his coadjutor Captain Speke, not only for his geographical labours in laying down their joint map, but also for his independent discovery of the Lake Nyanza Victoria. Had not the Council then desired to divide its honours between the leaders of discoveries in Africa on the one hand, and in North America on the other, there can be no doubt that Burton and Speke would have been simultaneously honoured.

As it is, however, we now have it in our power to give to Captain Speke precisely the same honour which was conferred last year on Captain Burton. Our satisfaction in doing this is increased by knowing that the man we now honour is at this moment employed by the Royal Geographical Society, assisted by Her Majesty's Government, in one of the most arduous enterprizes which was ever contemplated. For if Captain Speke, with his gallant associate Captain Grant, should succeed in defining the whole of the Lake Nyanza, and should be able so to pass northwards as to join Consul Petherick on that southernmost portion of the White Nile, up to which boats and canoes can transport provisions from the north, then truly he will have laid open a vast portion of the interior of Africa hitherto entirely unknown. Whether, indeed, he may be able to determine (even with the aid of the bold and successful Petherick) what may be truly the remotest source of the White Nile, is very problematical. For the Lake Victoria Nyanza, along the banks of which he will proceed, must doubtless be fed by affluents, some of the most powerful of which may descend from the lofty chain of Kenia and Doengo-Engai on the east, and others from the so-called Mountains of the Moon on the south-west.

In this point of view, many a year may elapse before the geographer will be able to trace to its spring-head the largest of these countless affluents. But looking to the White Nile as a gigantic stream which flows directly from south to north, and is subtended and barred in by flanking chains, it will be a sufficient triumph for this our expedition, if Speke can but prove to us, as he has indeed suggested, that his Lake Nyanza Victoria does so range from south to north as to be in direct communication with, and in the same meridian as the Upper White Nile, into which it is supposed the stream descends by cataracts from the water-parting near the Equator, through the Nyanza Victoria.

If Captain Speke should work out this important feature of the mission we have confided to him, he will assuredly reap a scientific glory from his exploits at the sources of the Nile, and thus be entitled to share the honour of the anagram applied to the illustrious Nelson after his victory at the mouth of that classic stream,—

“Honor est a Nilo!”

Sir Roderick Murchison then addressed Earl de Grey in these words:—

“MY LORD,—I have naturally great pleasure in requesting your Lordship, who sat in this chair so recently, and who now occupy so distinguished a post in the government of India, to receive this our Founder’s Medal for Captain Speke, a gallant officer of the Indian army.

“As you are quite familiar with the merits of Captain Speke, and are acquainted with the undaunted zeal with which he and his brother officer, Captain Grant, also of the Indian Service, are now endeavouring to trace the sources of the Nile, your approval of their labours will assuredly be most grateful to the feelings of these explorers and their relatives at home.

“I will not ask you to transmit this medal to Captain Speke; for although an Anglo-Indian army did once pass through Lower Egypt, I apprehend that, even the colossal power of the Administration of which you form a part, might fail in catching our Medalist on his way to his lake Nyanza Victoria; but I request you to convey to the parents of the absent traveller this token of our good will and regard for what he has already accomplished, with the expression of our earnest hope that he may be entirely successful in his present noble endeavour.”

Earl de Grey replied by expressing the very great pleasure he experienced in accepting, on behalf of Captain Speke, that symbol of the high estimation in which the Royal Geographical Society held the services he had rendered, and was still rendering, to geo-

graphical science. He cordially and entirely concurred in the course which the Society had taken in awarding that medal to Captain Speke. As President of the Society last year, he had the gratification of presenting a similar medal to Captain Burton, also an officer in the Indian army; and connected as he (Earl de Grey) now was with the Indian-office, it was a source of pleasure to him to think that officers of the old Indian army were amalgamating with the rest of the service without yielding any portion of the honourable heritage which, as travellers and geographers, seemed to be pre-eminently their own.

The Chairman then continued: The Patron's Medal has been adjudicated, as you have just heard, to Mr. MacDouall Stuart, for his great and successful explorations in the interior of Australia. When we reflect upon the many endeavours which have been made to traverse the interior of this vast continent, and the partial successes only which have attended the efforts of the most justly distinguished of those explorers, we must at once admit that never was our Gold Medal more worthily bestowed than on this occasion. Of all the precursors of Stuart, the champion in this field of toil and adventure has been Sturt; for even in the year 1837 that distinguished topographer, proceeding from the south to the north-west, reached s. lat. $24^{\circ} 30'$, e. long. $137^{\circ} 59'$. Then it was that, when arrested by arid, saline wastes, in which no drop of fresh water could be detected, Sturt taught one of his subordinates, whilst braving such difficulties, and during such perilous and exhausting journeys, to lay down the precise geographical position of every mountain, valley, or river, and to mark the exact width of every desert tract of "scrub" that separates those oases from each other which are fertilized by fresh-water springs.

As the surveying officer thus instructed was our Medallist of this day, who has now surpassed his old chief (by reaching s. lat. $18^{\circ} 46'$ and e. long. $135^{\circ} 52'$, or 447 English miles farther to the north-west), let us, in honouring the last prizeman, never cease to recollect that, unless there had been a Sturt, to whom we formerly also gave our medal, there might not for many a day have arisen a MacDouall Stuart! It is thus that the value of our honours is recognised, and that, acting up to the motto "*Præmiando incitat*," we increase and score up the new triumphs of advancing knowledge.

From his previous surveys, then, our Medallist had satisfied himself that in the easterly meridian on which Sturt had endeavoured to proceed from the south, all his efforts would be fruitless. We know not if he had then formed the opinion, that to the west of his former

exploration there existed a great depression, which, extending northwards from Lake Torrens, constituted a saline band of some breadth; but we do know that his last discoveries have proved the existence of such an interior depression. Well aware, from the previous labours of Eyre, that the south-western coast-lands constituted an intensely saline region, and, from the actual efforts of Babbage, Warburton, and others, that the environs of Lake Torrens were also intensely saline, the lightly-equipped Stuart darted off to the north-west, and there discovered that fine range of well-watered hills which were alluded to at our last Anniversary. Subsequently indeed he demonstrated—what has not been dwelt upon except at a recent evening meeting—that the rivers proceeding from those hills of small elevation flow into the north and south depression above alluded to, and, becoming saline near their mouths, terminate in an extensive salt-water lake. With our present knowledge, therefore, we may infer that Stuart has fixed the western boundary of a low saline desert, on the eastern shores of which Stuart was arrested. Whether this desert may or not be found to extend much farther to the north, or whether it may be connected with the saliferous sandy tracts reached by Gregory in his efforts to penetrate southwards from the tropical region of northern Victoria, can alone be determined by future explorers. As far as exploration has gone there seems good grounds for believing, with Colonel Gawler, that there may be a vast region of interior lands to the west and north-west which may at some future day be occupied by our colonists.

In the meantime what a noble and successful effort has not MacDouall Stuart made to reach the northern coast—for he was within 245 English miles of the Gulf of Carpentaria—and how sincerely have we to thank him for having laid down his devious path so accurately on a map! No one, however, who has not completely read his diary can duly form an idea of the difficulties Stuart had to contend with, and of the invincible fortitude, talent, and sagacity with which he traversed the numerous intervening breadths of scrub and desert to reach a water-hole. Many of the tracts around these springs will doubtless at no distant period be centres of the sheep and cattle pastures of our colonists. And if some of the largest and best of these tracts should fall to the lot of the individuals who originally furnished MacDouall Stuart with the funds and appliances to make these discoveries, let us say that Messrs. Chambers and Finke are richly deserving of that recompense. These gentlemen must indeed be viewed by us as the persons

without whose energy and well-employed capital we should not now have been recounting one of the most striking geographical exploits of modern times.

Having already penetrated to the water-parting of Central and Northern Australia, or where the rivers flow either north-eastwards to the Gulf of Carpentaria, or north-westwards into Cambridge Gulf, MacDouall Stuart may be said to have all but traversed the entire continent from north to south. His present effort to complete that traverse will, we anticipate, be crowned with entire success; and we trust that he may already have reached that fertile tract at the mouth of the Victoria where Gregory's expedition was so long encamped. We are indeed informed by Mr. Chambers that MacDouall Stuart left Chambers' Creek on the 31st January, his party consisting of about 50 horses, with 8 men, and a second in command. He was provisioned for three months, and is to form a dépôt at Bonny's Creek, and, if possible, to strike the Victoria with a small party.

And here I cannot but regret that the suggestions offered by myself, in more than one Anniversary Discourse addressed to this Society, have not hitherto been followed up by any endeavours to form settlements on the north coast of Australia, wherein our fleets might find harbours of refuge, and where, in case of war, our armed forces would occupy a position flanking the whole of that Indian Archipelago in which Britain possesses such rich, vested interests. Had we already one such settlement only, and had thus substantially claimed as our own the northern shore of a continent of which we already occupy the other sides, then truly should we have rejoiced in the prospect that, whilst I now address you, our Medallist had reached a haven of repose. But, even as it is, no great gift of seerdom is required to prophesy that the mere passage to the north coast which has been effected by MacDouall Stuart will not only cause the occupation of the intermediate country, but will soon lead to the formation of regular settlements on the northern shores of this great British continent.

The Governor of South Australia, Sir R. MacDonnell, has already anticipated the establishment of a telegraphic communication across the continent, and this again will necessitate the occupation of stations on the north coast, by which the colony of Victoria, as well as that of South Australia, will have a much easier and more rapid communication with India than by the circuitous route of the eastern coast and the Torres Straits. And when this telegraphic communication from south to north is opened out across Australia,

may the first message transmitted by it be, "Honour to MacDouall Stuart!" *

Sir Roderick Murchison then addressed the Duke of Newcastle, Her Majesty's Secretary for the Colonies, in these words:—

"My Lord Duke,—As you have heard the reasons assigned for granting the Patron's Medal of this Society to Mr. MacDouall Stuart, and are, of course, well aware of the merits of that explorer, I may say that I am right glad to see your Grace present on this occasion, notwithstanding the great pressure of official business which is, I know, thrown upon you this very day. Your attendance here is, indeed, the most pregnant proof of the lively interest you take in the vast colonies of Australia.

"I am certain, therefore, that in transmitting the Victoria Medal, I hope by this evening's mail, your Grace will much increase the honour by adding to it the sanction of your own approbation.

"The President and Council are already deeply impressed with the conviction that you have on numerous occasions promoted the advancement of geographical science, by the communications you have sent from the Colonial Office, and I now have to thank you for taking this opportunity of testifying to the colonists of Australia, that you rejoice with the geographers of England in recognising the great and important services of Mr. MacDouall Stuart."

The Duke of Newcastle replied that it had afforded him great pleasure to obey the invitation of the President, Lord Ashburton, and attend for the purpose of receiving the medal, for two reasons—first, because he was anxious to testify his entire concurrence in the objects of this important Society, of which he was a humble member, and secondly to express on behalf of the Imperial Government, and more especially of the department over which he had the honour to preside, their entire approval and sympathy in the labours and exertions of that persevering and enterprising explorer to whom that memorial had been awarded. Sir Roderick Murchison had alluded to the former exploits of Captain Sturt, the predecessor of Mr. Stuart in the field of Australian enterprise. He (the Duke of Newcastle) was sure there was no man who would feel less jealousy at the success of Mr. Stuart than that eminent individual. Mr. Stuart commenced his exploration under the auspices of Mr. Chambers, who provided funds for that purpose. He returned in August, 1859, from one of his expeditions, having reason to believe

* The bay at the mouth of the Victoria River is 15° south of the equator, and our countrymen, under Gregory (encampment of Mr. Wilson) were there for eight months, and enjoyed perfect health. If it be objected that Europeans will suffer too severely from the climate to carry on works on the coast of North Australia, it may be suggested, that the chief labourers may be Chinamen or Coolies, to work under English direction.

he should eventually succeed in the object he had in view. Starting again with fresh means and appliances, he ultimately succeeded in reaching a point 100 miles further north than that to which Mr. Gregory had penetrated, when he was stopped by the hostility of the natives. He had travelled a distance of 3000 miles, and undergone great hardships, having, for instance, on one occasion passed 101 hours without water, under a burning sun; and, although he had been driven back by the natives, he might fairly be considered to have accomplished the object he had at heart, which was to strike the north coast somewhere near Cambridge Gulf. It would be out of place at that moment to raise any controversy on such a subject, but as the Chairman had raised the question he must remark that the result of Mr. Stuart's exertions, and the anticipations they held out for the future, convinced him (the Duke of Newcastle) that the Government had for the present done right in not forcing colonization on the northern shores of Australia. He anticipated that those shores would now very soon become peopled, though there might be some difference of opinion as to the best means by which that could be done. The last account of Mr. Stuart was that he was about to start again, and the only circumstance which he (the Duke of Newcastle) regretted in connexion with the expedition, upon which by this time Mr. Stuart must have entered, was that he had gone alone, without scientific companions. But he anticipated that Mr. Stuart would be successful even without those companions, and he should have great pleasure in transmitting the Society's medal to him by the mail which would leave England that day, conscious as he was of the eminent services which that gentleman had rendered to geographical science, and to the colony and his country at large.

Reward for the best Reflecting Instrument.—The Society, last year, recognizing the importance of reflecting instruments to geography, offered a reward of 50*l.* for the best instrument of that description. Representations have, however, been made that sufficient time was not allowed for proper competition: the Council have deferred the award for another season. In the mean time a sextant has been deposited in the Society's office by Messrs. Elliot, which, in addition to other improvements, comprises a stand of great portability.

A D D R E S S
TO THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON;

Delivered at the Anniversary Meeting on the 27th May, 1861,

BY SIR RODERICK IMPEY MURCHISON,

VICE-PRESIDENT.

(In the absence of the President, LORD ASHBURTON.*)

GENTLEMEN,

As our respected and noble President, who has truly the interests of our body at heart, has been suddenly compelled to leave London for the north of Scotland, on account of the alarming illness of the noble chieftainess, his lady's mother, whose loss, if it should occur, will grieve many a Highlander besides myself, I am unexpectedly called upon to resume my old place, and act as your President. Under these circumstances you will, I am sure, grant me more than the share of indulgence which you have bestowed upon me on many former occasions.

You will readily comprehend that I could not have prepared the elaborate materials which form the bulk of the Address which lies before me. This address is indeed chiefly made up, as our President would have told you had he been here, from the contributions of the several geographers to whom he appealed; and my duty will be mainly confined to the selection of a few of these materials for reading.

I will, however, add some passages of my own to what I have already read to you on the adjudication of the medals; and these, with a very brief conclusion, constitute all that the short space of

* The President, Lord Ashburton, was suddenly called to the north of Scotland by the alarming illness of the Hon. Mrs. Stewart Mackenzie of Seaforth.

time at my disposal permitted me to accomplish. I regret this the more because I feel certain that if Lord Ashburton had been present he would have efficiently directed your attention to other subjects of practical usefulness and importance, which are intimately connected with the progress of this Society.

OBITUARY.

IN opening this discourse in the usual manner with a sketch of the lives of those Fellows who have been taken from us, I naturally commence with a notice of the most important of the losses we have to deplore, in that of the late George Hamilton Gordon, Earl of ABERDEEN. Born in 1784, and educated at Harrow, he graduated at St. John's College, Cambridge; and already in 1802, being then only eighteen, visited Paris, in company with a young collegian, Mr. Whittington. He there formed the acquaintance of our esteemed and venerable Associate, Mr. Hudson Gurney, with whom, in the subsequent year, he travelled into Italy. From Naples, as Mr. Hudson Gurney informs me, Lord Aberdeen proceeded to Constantinople, Sir W. Drummond being then the British Ambassador at the Porte. Thence he made his celebrated tour in Greece, and, coming home in 1804, was married in 1805. Lord Aberdeen attained to public distinction very early in life, for he had the Order of the Thistle conferred upon him when he was only twenty-four, and was appointed Ambassador to the Emperor of Austria at the age of twenty-nine years.

This is not the place in which the higher qualities and great characteristics of this distinguished statesman can be appropriately recorded. It is not here that we are entitled to trace, as was eloquently done in a powerful daily journal,* all the main features even of his public career. The full treatment of these topics belongs to the historian. Nor are we capable of analyzing the merits of the antiquary, "The travelled Thane, Athenian Aberdeen"—the man whose classic attainments and sound appreciation of the fine arts rendered him for so many years a chosen arbiter in all matters of good taste, whether in architecture or sculpture, and constituted in him an invaluable trustee of the British Museum. But while I am incapable of doing justice to the public services of such a man, I have

* See 'Times,' 15th Dec., 1859.

fortunately had put into my hands just as I take the chair, the following sketch of Lord Aberdeen's great actions, which I gladly avail myself of, as a truthful and appropriate tribute from our President, Lord Ashburton, who knew him well, and loved him much.

"Lord Aberdeen's first responsible service was the negotiation with Austria, by which he succeeded in detaching that Power from the French Alliance. He was present with the Allies during the whole campaign, from the battle of Dresden to the occupation of Paris; assisted in their councils, and did much to impart union and vigour to their operations. When Lord Castlereagh, by the threat of withholding British subsidies, decided the Allies to march upon Paris, and thereby finish the war; and when, at a later period, to rescue Poland from the grasp of Russia, he broke from the Holy Alliance, and formed a league with France to resist that usurpation by force of arms, Lord Aberdeen acted as his subordinate; and yet Lord Castlereagh was held up to the country as a slave of the Holy Alliance. Lord Aberdeen, his pupil and friend, has been, with like injustice, represented as the submissive tool of Russia and of France. But what were the facts? When, in 1829, Nicholas invaded Turkey, crossed the Balkan, took Varna, and seized on Adrianople, Lord Aberdeen exerted all his influence to induce France and Austria to interpose; and, when they refused, he sent a British squadron to the mouth of the Bosphorus. In 1843 the French Government refused to pay the Pritchard indemnity; the Chambers took part with their Government, but both Government and Chambers yielded to the stern insistence of the British Minister. There was a harmony between Lord Aberdeen's acts and his professions seldom to be found in public men, for his was a mind singularly devoid of guile, prejudice, and vanity; free, in short, from those disturbing influences which too often overbear the principles of ordinary politicians. ..

"He professed the doctrine of non-intervention, and we find him accordingly opposing restrictions of every kind; restrictions on conscience, restrictions on trade, as well as those minute and vexatious regulations of labour, imposed of old by ignorance, or suggested at present in the name of humanity. In the same spirit he was opposed to any interference in the domestic policy of foreign nations; not from indifference to misgovernment and oppression, but from the absolute conviction that by such interference neither misgovernment nor oppression could be redressed. We find accordingly that Lord Aberdeen discouraged a revolt which he was not

prepared to support; and, as a proof of his political integrity, let me add that he never fostered a popular delusion to gain a party triumph. He resisted the Ecclesiastical Titles Bill, and deplored the cry which it resulted from. He opposed the Russian war; posterity will better judge of that act of his than we can at the present time, who have not yet felt its full consequences.

“Lord Aberdeen was an honest public servant, a far-seeing and consistent statesman, a faithful friend, a delightful companion, exemplary in all the relations of private life; and when, in future times, the mists of prejudice and party spirit shall have passed away, it will then be acknowledged that he was far more liberal, far more consistent and enlightened than many who now profess themselves the exclusive champions of civil and religious liberty.”

With a formal exterior, Lord Aberdeen was endowed with a warmth of heart and largeness of views which few but his intimate friends could appreciate. In this assembly it is, indeed, gratifying to have made it known that the oldest of his friends was one of our Fellows, who still survives, and continues to diffuse knowledge and comfort around him. That learned and benevolent man (Hudson Gurney) gives this summary of the character of his early companion, and with whom he continued on terms of intimacy through life: —“I look upon Lord Aberdeen to have been the most perfectly honourable, excellent, and truthful man I ever knew, and who has left the fearful question whether such a one can ever long be Prime Minister of England. No one ever more attached those who came in contact with him. But the degree of his natural constitutional shyness was incredible, and to the last it was most marked how he always, in mixed company, would gather to the people whom he knew, thus diminishing his general popularity.”

The highest tribute, indeed, to the memory of Lord Aberdeen is, that our gracious Queen so deeply felt his value as an enlightened, honest, and firm friend, that whilst during his life she gave him the strongest proofs of her friendship, she also honoured his obsequies with especial marks of her affection.

The feature, however, in his truly liberal character which most distinctly connects Lord Aberdeen with this Society is, that he was the Prime Minister who, upon my own representation, perceived the desirableness of granting an annual sum of money to maintain our Society in perpetuity, and thus constituting it the map-office of the nation.

Admitting that no scientific body could have stronger claims upon

the consideration of the Government, most willingly did he approve of the motion of that honest economist, Joseph Hume, at whose instigation the House of Commons voted the grant which first enabled us to meet the difficulties of a rising Society, and which has since been continued to us annually.

I have often dwelt on the good influence exercised upon our prosperity by this grant, obtained under the administration of my illustrious and noble friend, for it was the turning point of the great advance we were destined to make; and, although it be but a small item in the many virtues of a great statesman, it is one which will always endear the name of Aberdeen to every geographer.

George BRAND was born at Arbuthnott, in Aberdeenshire, in 1816. He was educated at King's College, Aberdeen, where he gained several University prizes, and took his degrees as Master of Arts. He commenced his career as a public servant by accepting a civil appointment in Her Majesty's Navy, and serving two years in H.M.S. *Madagascar* on the west coast of Africa, winning for himself the esteem of all with whom he was associated. Mr. Brand entered the service of the Foreign Office in 1844, by being appointed Vice-Consul in the province of Angola by the late Earl of Aberdeen, then Secretary of State for Foreign Affairs. During a residence of nine years at that place, his zeal in the service of his country, the great attention he devoted to the subject of the trade and resources of Angola, and the worthy use he made of his influence and opportunities in suppressing the slave-trade, and promoting the cause of British mercantile interests, elicited high encomiums from the several distinguished statesmen who presided over the department of Foreign Affairs. In 1853, having suffered much from African climate, Mr. Brand was obliged to return to England, where, continuing to devote himself to African subjects, he became the author of various Reports, at the request of Her Majesty's Secretaries of State, including a very able one upon the Decree of the Portuguese Government for Registration and Emancipation of Slaves in the Colonial Possessions of Portugal.

In June 1859, having failed in obtaining an appointment elsewhere, he accepted the Consulate of Lagos in Western Africa, where, having discharged its duties during a brief residence with great judgment and skill, his career was brought to an early close. He died at sea, on board Her Majesty's steamer *Alecto*, having

embarked in that vessel in hopes that change of air might have restored him to health.

John BROWN, the zealous and unbiassed chronicler of the deeds of our Arctic heroes, who has just passed from us, was one of the earliest members of our Society, having been connected with it since 1837. Born of an old Kentish family, on August 2, 1797, he entered the service of the Hon. East India Company, in which capacity he made several voyages, until a weakness in sight, and other causes, compelled him to leave the sea. A love of geographical research, for which he had always been remarkable, now grew into a passion, and under its influence he became especially drawn towards a subject in which he never afterwards ceased to feel the deepest interest, viz., that of arctic and antarctic discovery. Mr. Brown entered with much ardour into the question of a North-West Passage; and, in later years, the fate of the heroic Franklin and his noble companions became to him subjects of heartfelt interest and earnest inquiry. In many papers published in 1850, he never ceased to urge that the instructions given to Franklin were the only clue by which he might be found, and that the regions hitherto explored had not been in the direction indicated by them. He showed by very just reasoning that, in consonance with these instructions and the ascertained flood-tides and currents of those regions, the missing expedition must be found "between Cape Walker, on the north-east, Bank's Land, to the north-west, Wollaston Land, to the south-west, and Victoria Land, to the south-east;" a deduction since almost literally verified. It was in 1858 that he published his well-known book entitled 'The North-West Passage, and the Plans for the Search for Sir John Franklin.' In 1843 he was among the founders of the Ethnological Society, and in 1847, having communicated some valuable information connected with various Runic monuments found in England to the Royal Society of Northern Antiquaries, Copenhagen, he was elected a *membre-fondateur* of that Society. The interest he took in archæology led him also to become associated with various other Societies connected with antiquarian research.

As indicative of the kindly nature of our deceased Fellow, we conclude these brief remarks with quoting some lines intended for inscription on a monument, about to be erected over his grave by a few sorrowing friends, who were extremely well acquainted with him, and deeply mourn his loss:—"Simple and true of heart, of rare intellect and distinguished attainments; an able and conscientious

administrator; a faithful friend: he was in life and death a true disciple of his Saviour, in whom alone he trusted." .

Dr. BUIST was born at Tannadice, Forfarshire, on the 17th November, 1805. At twelve years of age he was sent to St. Salvador's College, St. Andrew's, enrolled as a student, and educated for the Church, to which he was licensed as a preacher in 1826. However, he disliked the profession, and became editor of several newspapers in succession; while at College, he had studied chemistry, anatomy, and natural history, in addition to divinity, with the view of taking a diploma in medicine, as well as his preacher's licence. After an exceedingly active period employed in journalism and in science, he was appointed editor of the 'Bombay Times,' and set sail for India. Under his able management that newspaper has not only attained a first position among journals in India, but has acquired the character of an authority in Europe.

Side by side with the arduous duties bearing on the management of a newspaper in India, Dr. Buist carried on an immense amount of scientific and philanthropic labour. In July 1842, he was placed by Government in charge of the Astronomical, Magnetic, and Meteorological Observatory, Bombay. The appointment was unsalaried, but his duties were so successfully proceeded with, that in the course of three and a half years upwards of three hundred thousand observations had been made, corrected, recorded, and prepared for publication; and Government was pleased on six several occasions to express their approbation of his exertions. On the 4th November, 1845, Sir David Brewster, in moving the thanks of the St. Andrew's Philosophical Society to Dr. Buist, states, "That he had much occasion to correspond with the Observatories in all parts of Europe organized for like purposes with that of Bombay, and that nowhere in England, nowhere on the Continent, had he seen anything like so large an amount of work done as had been carried out by Dr. Buist." In addition to the astronomical department, Dr. Buist organized and introduced an extensive system of tidal and meteorological observations, from Cape Comorin to the Red Sea. Besides these labours immediately bearing upon the Observatory, Dr. Buist volunteered, while in charge of it, to give lectures on natural philosophy, chemistry, and natural history, to the young officers of the Indian navy.

In 1841, on the death of Dr. Heddle, Dr. Buist was appointed Honorary Secretary to the Bombay branch of the Geographical

Society, the 'Transactions' of which contain many valuable papers contributed by him. He originated the publication of ocean-current charts, and worked simultaneously with, though independently of, the well-known Lieutenant Maury, of the American navy, and in the same track of inquiry. He also drew up a valuable chart, showing the earthquake-wave in connexion with severe storms.

Nor are these his only labours; for in the introduction of the art of making and glazing pottery, in the establishment of the trade of printing, and, finally, in the foundation of the meritorious Polytechnic establishment of Bombay, where native workmen are educated, India has been benefited by Dr. Buist. On all occasions when he could benefit the public by the influence of his pen, or personal exertions, he was untiring in his energy, and unwearied in his large-hearted philanthropy; and when it is considered that his varied avocations were carried on independently of the duties appertaining to a newspaper, that in India it is impossible to find intelligent workmen to execute orders, so that detail in any new idea must be worked out by the designer, and that the climate is trying to body and mind, we may well wonder at the vast amount of work accomplished by this indefatigable and energetic man.

In 1859 Dr. Buist was appointed Superintendent of the Government Printing-press, Allahabad, a position in which he might have fairly hoped in a few years to realize a moderate competency, and thus, in some sort, replace the means he had with an over-sanguine and uncalculating philanthropy lavished on the improvement and increase of scientific knowledge, and the general welfare of his fellow men; when his active and useful career was abruptly cut short by an illness, the result of anxiety and over-exertion, which terminated fatally at Calcutta on the 1st October, 1860.

M. Pierre DAUSSY.—Amongst our foreign honorary members whose names death has lately removed from our list, no one has a stronger claim to the record of our esteem, and to the expression of our regret, than M. Pierre Daussey, a member of the Geographical Society of Paris, of which, like Laplace, Cuvier, and Humboldt, he had also been President.

He was born in Paris on the 8th of October, 1792. A hydrographer,—the son of a hydrographer,—he commenced his special studies at an early age, and continued the same pursuits with exemplary perseverance to the close of a long life. As a necessary consequence, he has left the proofs of what may be effected by combined ability and industry. Before he was twenty-one years of

age the Institute of France awarded to him Lalande's medal for his calculations of the elements of the orbits of two comets, and the determination of the perturbations of Vesta. His industry and executive mathematical skill gained him the patronage of Beaupré, and caused him to be appointed by the Government to conduct the trigonometrical survey of the coasts of France, when he still wanted three years of obtaining the rank of engineer of the third class. This service led him not merely to observe particular phenomena occurring in certain rivers, such as the Loire and the Garonne, but also the variations in the level of the sea, demonstrating their relation to variations of the barometer. This, his great discovery, was subsequently confirmed by our countryman Sir John Lubbock. Having become attached to the Bureau des Longitudes, and a contributor to the *Connaissance des Temps*, as well as a member of the *Société de Géographie*, he applied himself to the improvement of the tables containing the geographical positions of the principal places on the globe. The important and valuable memoirs which he continued to produce in quick succession are so numerous, that the mere detail of their titles would exceed the limits of this sketch. Those given to the Academy of Sciences, of which he was elected member—to the *Société de Géographie*—to the *Annales Maritimes*—to the *Annales Hydrographiques*—and to the *Société Météorologique*, of which he was the founder, amount to 54, besides a considerable number of charts. Whilst thus engaged for the public, he continued his astronomical observations, and kept up an active correspondence with foreign astronomers and geographers.

The distinguished intellectual and scientific attainments of our departed Associate were adorned and commended by their union with the most amiable qualities of the heart, and his intimate friend, M. de la Roquette, concludes an interesting notice of his life and labours with the remark that "he had many friends but not a single enemy."

The Chevalier DE ANGELIS, our corresponding member at Buenos Ayres, and recently deceased there at a very advanced age, was by birth a Neapolitan, and, like many others, exiled from his native land in consequence of his political opinions. In 1825 he accepted an offer of employment from the Government of Buenos Ayres, where he became well known for his political and other writings. Of his publications we may mention, as of especial interest to this Society, 'The Collection of Geographical and Historical Documents

and Memoirs relating to the Provinces of the Rio de la Plata and Paraguay,' printed at Buenos Ayres (1836-39), in six folio volumes, an analysis of which will be found in the sixth volume of our Journal, prepared for the Society by Sir Woodbine Parish. It comprises a selection of the most important papers on those subjects existing in the old Spanish archives of that viceroyalty, accompanied by copious explanatory and additional notices by the accomplished editor. In the latter years of his life M. de Angelis was invited to return to Naples, but, preferring to remain in South America, he was appointed Consul-General for his Sicilian Majesty in the provinces of the Rio de la Plata, a reward which he had fairly earned by his long and useful labours in those countries.

The Rev. John William DONALDSON, D.D., the second son of the late Stuart Donaldson, an eminent merchant in the city of London, was born in 1811, and entered Trinity College, Cambridge, in 1830. His distinguished talent soon attracted the attention of the authorities of the College, and was practically displayed in successful competition for the prize annually awarded for a Latin declamation. With this exercise, which, it may be incidentally remarked, received the warm commendation of the present Bishop of St. David's, Dr. Donaldson's long career of literary successes may be considered to have commenced. Shortly after his name appeared in all but the highest place among the competitors for classical honours; and again, after another short interval, among the Fellows of Trinity. He was soon chosen to take part in the tuition of the College, and, while thus engaged, found time to produce his first, and perhaps most famous, work, the '*New Cratylus*,' which, now in its third edition, deservedly maintains its position as by far the most important contribution to the science of comparative philology that has appeared in this kingdom. About the same time he superintended the compilation of the '*Theatre of the Greeks*,' which, after running through numerous editions, has now appeared freed from all extraneous additions, as the entire work of its former editor.

After a stay of a few years at Cambridge, Dr. Donaldson was appointed to the head-mastership of the public school at Bury St. Edmunds; and there, amidst calls on his time and energies which would have left to most men no power or opportunity to undertake anything beyond their professional duties, he was enabled to give to the world a series of educational works—a complete and valuable edition of Pindar; a fresh and idiomatic translation and

commentary on the *Antigone* of Sophocles; some useful works on the Hebrew language; and his now well-known treatise on the Latin language, entitled '*Varronianus*,' which stands as completely at the head of works on Latin as the '*New Cratylus*' does of works on Greek philology. Towards the close of his stay at Bury he published the remarkable volume entitled the '*Book of Jashar*,' which, however it may have provoked comment on other points, has justly been pointed to by all competent to form an opinion as a sample of an easy and felicitous Latinity which has not been equalled in the present century.

In 1855 Dr. Donaldson returned to Cambridge, and, after a brilliant course of lectures on Latin synonyms, which were attended by the best scholars of the place, he steadily devoted himself to the advancement of classical learning. One of his first works after his return was a treatise on Competitive Examinations in reference to Classical Scholarship, which showed such thorough good sense, and such just appreciation of the nature of these forms of examination, that it is only natural to observe that he was soon afterwards appointed one of the classical examiners of the University of London, and subsequently one of the examiners for the civil service. A work on controversial theology, entitled '*Christian Orthodoxy reconciled with the Conclusions of Modern Biblical Learning*,' appeared about the same time, and after but a short interval his completion of Ottfried Müller's famous '*Literature of Greece*'—a work which Dr. Donaldson had long been selected to finish, and which he now put forth in the three volumes that bear the united names of one of the greatest of the German and one of the greatest of the English scholars of our own times. He next addressed himself again more particularly to the study of language, and gave to the world successively a large and complete grammar of the Greek language, and one nearly as large and equally as complete of the Latin language, and the whole was to have found a fitting sequel in a large lexicon of the Greek language, with every improvement which the science of philology could have suggested or supplied. This last work he was only permitted to commence. Exhausted at length, not only by the labours above mentioned, but by every form of contribution to the many literary societies of which he was a prominent member, by the constant production of improved and enlarged editions of his numerous works, and by a general literary activity as ceaseless as it was successful, he sank, after a short but severe illness, borne

with the utmost patience and resignation; and has left to us a proof that in this country the scholarship of Bentley and Porson is still to be found in all its maturity and excellence.

Sir Charles FELLOWS was born in 1799, and at an early age showed himself to be endowed with the all-important qualities for the future traveller, of observation, quick perception, and artistic talent. Thus, at the age of fourteen, he illustrated by sketches, an excursion to the ruins of Newstead Abbey, then occupied by the youthful Byron, and these very sketches were engraved, twenty-five years afterwards, on the title page of the *Life of Byron*, published by John Murray. During the next six years he travelled through all parts of England, Wales, and Scotland. In 1820 he removed to London, where he at once entered into the best scientific and literary society of the day, joining many of the institutions; and he was amongst the earliest members of the British Association for the Advancement of Science. In 1827 he became a daring Swiss traveller; the first to traverse the Blumlis Alps at Kandersteg, and the discoverer of the modern route to the summit of Mont Blanc. He wrote an account of his ascent in an unpublished volume, elegantly illustrated with the first views which had ever been taken in that icy region. In 1832 he lost his mother, to whom he had been devotedly attached, and after this event his travels became more extended, spending during the next ten years the greatest part of each year in Italy, Greece, and the Levant. The use of his sketches is acknowledged with gratitude by Mr. Murray, who speaks of them as the chief source of the *Illustrations to Childe Harold*, engraved by Finden.

In 1838 Mr. Fellows started on an expedition into Asia Minor, his chief inducement in going there being his love of beautiful scenery, and his admiration of the simple character of its peasant class. He commenced by making short excursions around Smyrna, and eventually returned to that city, having ridden over more than 4000 miles of country then little known to Europeans. During five years from this time, Mr. Fellows made four separate tours in Asia Minor, chiefly to the provinces of Ancient Lycia, with which he has completely identified himself. His works upon the subject are, '*Asia Minor*,' 1839, '*Discoveries in Lycia*,' 1841, '*Xanthian Marbles*,' 1843, '*Ioni's Trophy Monument*,' 1848, and lastly a very ingenious and logical work, entitled, '*Coins of Ancient Lycia before the reign of Alexander, with an Essay on the relative dates of the Lycian monuments in the British Museum*,' 1855.

On the 7th May, 1845, Her Majesty conferred upon him the honour of Knighthood, "as an acknowledgment of the services rendered by Mr. Fellows in the removal of the Xanthian Antiquities to this country."

In the works of Sir Charles Fellows, above-mentioned, will be found the details of his archæological discoveries. In Lycia alone he examined the ruins of eleven cities never before visited. On his fourth and final expedition he had the management of a large party, consisting of more than a hundred men from Her Majesty's navy, besides stonecutters from Malta, men from Rome for taking casts, carpenters, interpreters, &c., an English artist and architect as companions and assistants. The portfolios of drawings, architectural measurements, and inscriptions, together with an account of the expeditions, as well as numerous specimens of natural history collected in Lycia, were presented by him to the British Museum in the spring of 1844.

Lionel GISBORNE was born at St. Petersburg, in the year 1823. He was educated partly in that city, partly at Repton School in Derbyshire, and partly at Geneva. He thus acquired a familiarity with French, and several other European languages, which was of the greatest service to him in after life. At the age of sixteen he returned to England, and shortly after entered the engineering department of the University of Durham; after graduating there he proceeded to Ireland, where he remained for nine years, first in the service of the Shannon Commissioners, and afterwards in that of the Board of Public Works. During this long period he made himself thoroughly acquainted with several important branches of his profession. He was employed principally upon the works undertaken for the improvement of the navigation of the Shannon, and for the arterial drainage of the country. He was also engaged in the relief works which were set on foot during the Irish famine, and at one time had several thousand men at work under him. In all these employments, and especially in the last, he had many opportunities of displaying that promptitude and decision in emergency, and that power of influencing, attaching, and working with other men, for which he was so greatly distinguished in after life.

In the year 1853 Mr. Gisborne was requested to undertake an expedition to the Isthmus of Darien, for the purpose of ascertaining the possibility of uniting the Atlantic and Pacific Oceans by a ship-canal. Accompanied by his friend Mr. M. C. Forde, he unfortunately arrived during the rainy season, and was prevented by

the weather, and by illness, and also by the opposition of the natives, from completing this survey. The next year Mr. Gisborne again proceeded to the Isthmus, accompanied by several other engineers, and by some troops provided by the Government of New Grenada. Shortly before his arrival two unsuccessful attempts had been made to cross the Isthmus; one by Captain Prevost of the Royal Navy, the other by Lieutenant Strain of the United States Navy. Mr. Gisborne and his party accomplished this, and the whole intervening country was carefully surveyed. It was found that the height of the mountains, forming the axis of the Isthmus, was so great as to render the construction of a ship-canal impossible, except at an enormous cost.

In the year 1852 Mr. Gisborne first entertained the idea of a scheme for the embankment of the River Thames. In 1853 carefully considered plans were made out and submitted to the Government. Mr. Gisborne also published his views in a printed statement which was widely circulated. Ultimately a bill for carrying the scheme into effect was introduced into the House of Commons; it passed the second reading, but was withdrawn in consequence of the outbreak of the Russian war. It is not too much to assert that the various plans for the embankment of the Thames which have been produced—some one of which now seems likely to be carried into effect—were all, to a considerable extent, founded on that originated by Mr. Gisborne. Besides the undertakings already mentioned, Mr. Gisborne was employed in engineering works in various parts of the continent; in Sweden, Switzerland, Naples, Russia, and France. In 1855 he began to turn his attention seriously to the subject of submarine telegraphy. In that year he went to Constantinople, and obtained from the Turkish Government the concession for the Dardanelles and Alexandria telegraph; whilst in the latter part of the same year his brother, Mr. Francis Gisborne, succeeded in obtaining from the Porte the concession for the Red Sea and Indian Telegraph. In 1859 Mr. Gisborne proceeded to the Red Sea to superintend the submersion of that part of the cable which was to connect Suez with Aden. This was successfully performed in the spring of the year, and on its conclusion he embarked on board the Peninsular and Oriental Company's steamer *Alma* on his return to Suez. The history of the wreck of the *Alma* is well known. The crew and passengers remained for four days upon a coral-reef near the island of Little Horvish, exposed to the intense heat of the climate, and almost

without fresh water. Mr. Gisborne distinguished himself greatly in saving the women and children, and in superintending the arrangements made for their safety and convenience while upon the reef, and received from his fellow passengers an address expressive of their sense of the services which he had rendered them. This was his last voyage. He had for some years been suffering from an affection of the heart, which was greatly aggravated by the exertions he made and the sufferings he underwent in the Red Sea; his health rapidly gave way during the autumn and winter of 1860, and he died in London on the 8th of March, 1861.

Mr. Robert JAMIESON was an enlightened philanthropist, who had for many years devoted time and wealth in endeavours to civilize the native races of Africa.

In 1839 he built and fitted out, with much care and expense, the *Ethiophe* steam-ship, appointing to her command the late Captain Beecroft, to whom he gave minute and ably-written instructions for his guidance in exploring and trading voyages. Narratives of her successful voyages were published by Mr. Jamieson, and others are given in the Journals of the Royal Geographical Society.

It will be recollected that it was Beecroft, in the *Ethiophe*, who steamed to the rescue of H.M.S. *Albert*—one of the vessels of the Government Niger Expedition, famous for its misfortunes—and brought her down the river and saved a remnant of her crew from that fearful fever of which their comrades had perished. Against the project of this disastrous expedition Mr. Jamieson had earnestly protested in two published appeals. In 1859, Mr. Jamieson published a tract, entitled 'Commerce with Africa,' pointing out the benefits that might be obtained by establishing a short inland communication between Cross River and the Niger, to avoid the swamps of the Delta; but his advancing years and failing health precluded further active exertions.

Macgregor LAIRD was born in Greenock in 1808. After completing his education at Edinburgh, he entered into partnership with his father, the late Mr. William Laird, in an engineering establishment in Liverpool, which he shortly afterwards relinquished in consequence of the field for enterprise seemingly opened up in Central Africa by the important discovery of the Landers, tracing the course of the river Niger to the sea. He took an active part in forming the Company which, in 1832, despatched from Liverpool an expedition consisting of two steam-vessels,

under the command of Richard Lander, with whom Mr. Laird was associated in carrying out the enterprise. One of the steamers, the *Alburkah*, was designed and built by Mr. Laird, being the first iron vessel that performed a sea voyage. The result of this expedition is generally known from the interesting and spirited narrative published by him. It was attended with a melancholy loss of life: for, out of the 48 Europeans who started with it, nine only survived. The steamers reached the confluence of the rivers Niger and Chadda, whence, suffering severely from the effects of the climate, Mr. Laird penetrated as far as Fundah, having been carried on a litter the greater part of the way. He returned to Liverpool in 1834, with his health much impaired by the hardships he had undergone, from which his constitution never fully recovered; and to which may be attributed his untimely death, at the age of fifty-two.

Mr. Laird next turned his attention to Atlantic steam navigation, and formed a Company, in 1837, with that object. The *Sirius* was despatched by them in April, 1838, and accomplished the first steam voyage across the Atlantic. She was followed shortly afterwards by the *British Queen* and *President*, built by the same Company, each upwards of 2000 tons—a decided stride in advance at the time, though we have since seen that tonnage greatly exceeded.

Mr. Laird removed to Birkenhead in 1844, where for several years he took an active part in furtherance of the great works in that place which has since risen, and is still increasing, so rapidly in importance. On his return to London he devoted the last twelve years of his life exclusively to the development of the resources of Africa, more especially towards establishing that trade with the interior which he had perseveringly advocated as the best means of counteracting and finally extinguishing the slave-trade. Having obtained a contract from Government, he established the African Steam Ship Company, which maintains a monthly communication with the various ports on the coast as far as Fernando Po. But Mr. Laird did not rest satisfied with the development of the coast-trade alone. He acted upon the idea of cutting off the slave-trade at its source by introducing into the interior habits of peaceful industry, and ultimately rendering the river Niger the highway of legitimate commerce. With these views he fitted out, in 1854, a trading and exploring expedition at his own expense and risk, but with Government support, which ascended the river Chadda in the steamer *Pleiad*, 150 miles beyond

the point previously reached. This voyage was distinguished by the gratifying and remarkable circumstance, that not a single death occurred during its progress—a result to be attributed mainly to the use of quinine as soon as the river was reached, as well as to the general excellence of the equipment and arrangements of the expedition.

Encouraged by this result, Mr. Laird prevailed on the Government to enter into contracts for annual voyages up the river, and for this purpose built the steamers *Dayspring*, *Sunbeam*, and *Rainbow*, which have made repeated ascents. The *Dayspring*, having reached Rabba, on the Niger, in safety, was lost in a rapid a few miles above that place; and the *Sunbeam* is now on the coast waiting the rising of the river for another ascent. Mr. Laird also established trading dépôts at the confluence of the Niger and Chadda, and at various places lower down, which are still in active operation.

It is due to the memory of Mr. Laird to state that he persevered in these undertakings with little or no prospect of personal advantage, and that, while in early life he participated to some extent in African exploration, he also deserves credit for his steadfast endeavours to promote the geographical discoveries of others.

Joseph LOCKE, M.P.—Foremost among the engineers who followed in the footsteps of George Stephenson we find the names of Robert Stephenson, Brunel, and Locke; and it is singular that, having passed many years in amicable rivalry—Brunel advocating the extension of his broad-gauge lines and its vast works; Stephenson and Locke, on the other hand, giving preference to the narrow-gauge; and the latter insisting upon the necessity of economy in construction—they should all three have passed away at very nearly the same age, and within a short period of each other, leaving works which will bear testimony in future ages to the enterprise and public spirit of the times in which they flourished. Mr. Locke's numerous lines of railway in Great Britain and the Continent are characterised by economy of construction, owing to the introduction of steeper gradients than those which had usually been adopted. Well acquainted as he was with the powers of the locomotive-engine, he did not hesitate to impose upon it tasks which his predecessors had thought beyond its power. Thus the line from Lancaster to the north rises 1000 feet above the level of the sea, avoiding tunnels or the very heavy works which an adherence to easy gradients would have rendered necessary. The true monument of his eminent engineering skill is therefore to be found in

those numerous districts which could never have supported the expense of railway communication under the old system, but have already realised its advantages under that of Mr. Locke.

General Sir Charles W. PASLEY, K.C.B., D.C.L., F.R.S., &c., was educated for the Royal Artillery, and in that branch of the army obtained his commission as second lieutenant in December, 1797, but he removed to the Royal Engineers the following year. He was present at the defence of Gaeta, the battle of Maida in 1806, and in 1807 at the siege of Copenhagen. Subsequently he took part in the retreat to and battle of Corunna, and again was chief-engineer to the Marquis of Huntley's division in the Walcheren Expedition. Since 1812 his services have been required in England. First he was appointed to the Plymouth division, then director of the Royal Engineer establishment at Chatham. It was when thus engaged that he undertook the task of blowing up the *Royal George*, at Spithead. His last appointment was Inspector-General of Railways in the Board of Trade. He was the inventor of some improvements in pontoon bridges, and author of a treatise on 'Military Instruction,' 'An Essay on the Military Policy and Institutions of the British Empire,' and other professional works.

During many of the last years of his life, this gallant veteran was a frequent attendant at the meetings of the various scientific societies of which he was a member, including the Royal, Royal Geographical, Geological, Astronomical, and Statistical Societies, and was an energetic supporter of our Anniversary Meetings.

Sir Geo. SIMPSON, when a youth, was received into the counting-house of a London firm, largely engaged in the West India trade. His active and energetic habits soon attracted the notice of the late Earl of Selkirk and of the late Mr. Andrew Colville, both of whom took prominent parts in the rivalry then carried on between the Hudson Bay and North-West Companies, in the former of which they were large stockholders. Through their influence Mr. George Simpson was selected to superintend the affairs of the Hudson Bay Company at their settlements in British North America, and he proceeded thither in February, 1820. A coalition of the rival Companies having taken place the following year, he was appointed resident Governor of Rupert Land, an office which he held till the day of his death, in last September. By his address and dexterity he softened, and ultimately removed, the enmity and rancour which rivalry had created between the officers and men of the two Com-

panies, and by his own example taught men to work amicably together to promote the interests of the new association. His experience in the Indian country, his intimate knowledge of its resources, and his influence both with its white and Indian population, tended greatly to facilitate the progress through it of the land Arctic expeditions fitted out by the Government, and to lessen the hardships and privations they had to encounter.

The Arctic expeditions undertaken by the Hudson Bay Company were planned and fitted out under his immediate direction, and the instructions which he gave to their respective commanders, independently of their admirable adaptation to the ends in view, were eminently calculated to promote the objects for which they were issued. For these he received the honour of knighthood in the year 1841; and on the 3rd of March of that year he set out from London on his overland journey round the world, which he accomplished in 19 months and 26 days. Of this journey he published a narrative four years afterwards.

In conclusion we may remark that his suavity of manners, his patience, fortitude, and resolution amidst scenes of trial and difficulty, his unflinching and disinterested devotion to business, the amazing accuracy and extent of his knowledge of the affairs over which he presided, and the masterly readiness and precision with which he invariably applied it, rendered him eminently qualified for the situation he held during 40 years in the service of the Hudson Bay Company.

The late Mr. Matthew UZIELLI died, after a short illness, at Ostend, on 5th October, 1860. Although not a man of science, his memory deserves a passing tribute on this occasion, as having been one of those useful members of the Society whose fortune is ever ready to sustain and promote the cause of art and science. As an illustration of his liberal spirit, the Anniversary Address of 1856 of our President, the late Admiral Beechey, records the following:—

“I cannot quit the subject of this expedition without mentioning an instance of rare liberality in the cause of geographical science which was communicated at one of our evening meetings during this session by Count Strzelecki. When the North Australian Expedition was first planned, and when, owing to the length of time which had elapsed before it started, it was supposed that funds were wanting to carry it out, an associate of this Society, Mr. M. Uzielli, generously offered to place the munificent sum of 10,000*l.* at its disposal. Another of our associates, Mr. W. S. Lindsay, M.P.,

had also previously offered to contribute largely towards the outfit of the expedition. As, however, the Government have taken the matter into their own hands, these gentlemen have not been called upon to fulfil their promises; but we must still look upon the offers as proofs that the labours of the Geographical Society are fully appreciated by practical men, and of the zeal that exists among us for the advancement of geographical knowledge."

But, independent of this offer, and his subscription of 10,000*l.* to the Guarantee Fund for the Exhibition of 1862, Mr. M. Uzielli was a constant promoter of philanthropic objects; and appeals in cases of general or individual distress were seldom made to him in vain.

John Ashley WARRE, M.P., was educated at Harrow and at Christ Church, Oxford, which he entered as a gentleman commoner. His political life extended over thirty years, having first represented Lostwithiel in 1812, and subsequently Taunton, Hastings, and Ripon. He was a steady, consistent Whig, of the old and most confirmed school, and advocated earnestly those great measures of Reform which at first caused so much uneasiness and alarm in the minds of many, but which are now acknowledged to be among the greatest blessings ever conferred on a nation.

That his services were duly appreciated may be inferred by his having been offered office more than once, but which, from an inherent sense of the value of freedom of action, he steadily declined. He knew how to be liberal in support of the principles to which he was attached without illiberality towards those from whom he widely differed; and for many years he enjoyed the friendship of many with whose political principles he had no sympathy.

His was no common mind: it was so well stored on every subject—the result of close study and deep thought—that it would have been difficult to find a topic for discussion on which he was not prepared to offer a ready remark.

His memory of past events generally, but more particularly of the navy, for which he entertained a perfect affection, was very remarkable. The glorious deeds of early naval history were accurately related in the most graphic manner, and he was equally well-informed on all the economy of modern improvements. Indeed he was a living naval chronicle.

In many of the scientific questions of the day, and especially with those advocated by this Society, he took an earnest interest, attaching himself to the gallant leaders in such matters, and enter-

ing warmly into the discussion of their particular theories. Such were ever welcome guests at his hospitable abode, and never left it without feeling that he had not only "entertained" them, but had communicated information well worth their remembrance.

Equally simple and unostentatious in manner, few men were more respected. Where his heart prompted, his hand obeyed; and numbers blessed a generosity that did good far and wide, without pretension and without display.

He was earnest and devout, making religion the principle of life; and none ever heard from his lips a word that lacked charity to others.

ADMIRALTY SURVEYS.*

The Coast surveys in course of execution, under the orders of the Admiralty, both at home and abroad, have made fair progress during the past* year. They are conducted by twenty different surveying parties, one-half of whom are employed on the coasts of the United Kingdom; the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, St. Lawrence, and Vancouver Island; also on the coast of Syria, in the Turkish Archipelago, in Banka Strait, China, and Japan.

England.—On the south coast, Commander Cox and Mr. Davis, R.N., carefully sounded the bar of Portsmouth harbour at the end of May, 1860, in order to ascertain the effect produced upon it by the dredging that had taken place during the past year. The soundings were made in sections, with intervals of only 8 yards between each cast of the lead, the lines of section were 17 yards apart, and the whole plotted on a scale of 60 inches to a mile. This operation has just been repeated by Messrs. Taylor and Reed, R.N., the soundings being accurately reduced to the same datum; and it is satisfactory to be enabled to state that a depth of nearly 6 feet has been gained over the greater part of the bar, and that a small amount of further dredging, so as to equalize the surface of the ground, will give a depth of 18 feet into the harbour at low water, or of 27 feet at high-water neaps, and 30 feet at high-water springs, thus greatly increasing the value of Portsmouth as a harbour. In the Channel Islands, Commander Sidney and Mr. Richards, R.N., have completed the survey of the east coast of Guernsey and of Sark, and sounded

* Captain Washington, R.N., F.R.S., Hydrographer to the Admiralty.

over an area of 50 square miles ; in the course of their examination it has been found that the depths over the great bank off Guernsey have materially decreased since the year 1821.

On the coast of Devon, Captain Stokes and Mr. Usborne, R.N., have completed 5 miles of open sea-coast to the eastward of the Mewstone, and about 21 miles of the shores of the Yealm River, and partially sounded over an area of 62 miles, including Bigbury Bay, and to a distance of 5 miles off shore ; while the plan of Plymouth Sound and Hamoaze, by Commander Cox, on the scale of 10 inches to a mile, has been published at the Admiralty. In the Scilly Isles, Captain Williams and Mr. Wells, R.N., have been occupied in making and computing the triangulation of the group, during which the positions of 518 stations on the islands and rocks have been fixed and plotted ready for delineating the high and low water features, on the scale of 6 inches to the mile, comprising altogether about 50 miles of coast-line. In the Bristol Channel, Commander Alldridge, with his assistants, Messrs. Hall, R.N., and William Quin, have been employed on the coast of Glamorganshire, during which 21 miles of open sea-coast have been surveyed, and an area of 88 square miles sounded over, in the course of which 18,600 casts of lead were made and recorded, and some small rocks and shoals discovered. A chart of the same coast, from Nash Point to New Passage, on the scale of 1 inch to a mile, and a plan of Swansea and Neath, on the scale of 3 inches, have been published by the Admiralty during the past year. On the coast of Lancashire, Mr. E. K. Calver, R.N., with his staff, Messrs. Inskip and Davison, have re-examined the estuary of the river Ribble, leading up to the town of Preston, with its approaches, and corrected the charts of that part of the coast.

Scotland.—In the river Clyde, the same officers, Mr. Calver and his assistants, have made a new survey from Greenock to Glasgow, showing the changes that have taken place during the last thirty years. The river was sounded in sections, in great detail, and laid down on a scale of 15 inches to a mile, so that the plan will form a standard for reference at any future period. It may serve as a specimen of the minuteness with which such works are done, to learn that in the course of this examination and that of the Ribble, 18,657 soundings were taken, and nearly all plotted.

In Argyleshire, Commander Bedford, with his assistants* Commander Creyke, Mr. Bouchier, and latterly Mr. Ray, R.N., and Mr. Stafford, have been engaged on the survey of Loch Linnhe, leading

up to the south-west entrance of the Caledonian Canal, and of the outlying rocks Dubh-Artach. In the course of this survey they have examined 70 miles of coast, and sounded over an area of 100 square miles. The western portion of the Isle of Mull has been published, on the scale of an inch and a-half to a mile; the north-west coast, drawn on double that scale, together with a plan of Loch Cuan on the 6-inch scale, is engraving, in order to meet the wants of the trade now springing up between the islands of Mull and Coll.

In Inverness-shire, Mr. Jeffery, R.N., with his assistants Messrs. Donald Matheson and James Hannan, has mapped the coast between Arasaig and Smirserei Points, on the scale of 6 inches, and Lochs Moidart and Kinhay, on the scale of 9 inches to a mile. In the Hebrides, Captain Otter, in the *Porcupine*, with her tender the *Seagull*, Lieutenant Chimmo, aided by his staff, Lieutenants Dent and Hawes and Messrs. Stanley and Boulton, R.N., have been employed on the west coast of North Uist, between that island and St. Kilda, and on part of the Islet of Rum; in the course of which they have mapped 138 miles of coast-line, and sounded over an area of 575 square miles. In their trip to the rarely-visited island of St. Kilda, they found the population, which appears to be stationary at 78 persons, suffering from famine, due to a loss of their crops. On this being made known in Scotland, it was immediately met by a most liberal subscription, that not only sufficed to relieve their hunger, but to establish some more permanent benefits for the use of the poor islanders. In Harris, Commander Thomas, with his assistants Messrs. Morrison and Sharban, has surveyed the Sound of Taransay and the East Bays, on the scale of 6 inches. All the above data have been added to the general chart of the west coast of Scotland, and the detailed charts are in progress of engraving; Loch Tuadh and the isles and Loch Scridain, by Commander Bedford, are already published, on the scale of 3 inches.

Ireland.—On the east coast of Ireland, Mr. Hoskyn, with his assistants Lieutenant Aird and Mr. Yule, R.N., have been engaged on the upper part of Lough Strangford, and on the shores of County Down, from Ballyferris Point to Donaghadee. Off the south-west and south coasts, Commander Edye and Lieutenant Horner have sounded over an area of 1450 square miles, carrying their soundings to an average distance of 23 miles off shore, and to a depth of 100 fathoms; so that the navigator, if he will but pay attention to his lead, and compare the depths and quality of the bottom

with his chart, may safely approach that coast by night, or in a fog.

In the course of last year several new charts of Ireland have been published at the Admiralty. Among these are Loch Larne and the entrance of Loch Carlingford, on the scale of 7 inches, by Mr. Hoskyn and staff; the coast from Larne to the Foreland, the joint production of that officer and Captain Bedford; Lough Swilly and Mulroy, Horn Head to the Foreland, and the Foreland to Aran Island; Killibegs, Donegal, and Teelin Harbour, from the surveys of Captain Bedford, and his assistants Lieutenants Sidney, Horner, and Mr. Davis: Broadhaven, Blacksod, Tralee, and Brandon bays, by Commander Beechey and Lieutenant Edye, thus nearly completing the publication of the hydrography of the north and west coasts of Ireland.

Iceland.—The project for laying a North Atlantic submarine electric-telegraph cable from Scotland, by the Færøe Isles to Iceland, Greenland, and Labrador, so that no relay should exceed 600 miles in length, has led to the carrying a line of deep-sea soundings by that circuitous route, and a more direct return-line of soundings from Cape Farewell to Ireland. This expedition, equipped by the Admiralty in the most efficient manner, was placed under the command of Captain Sir Leopold McClintock, in H.M.S. *Bulldog*, assisted by Mr. W. H. Reed, R.N., Admiralty Surveyor, and Dr. Wallich, as Naturalist; at the same time Captain Allen Young, McClintock's companion in his memorable Arctic voyage, with Dr. Rae, Colonel Shaffner, U.S., and Mr. J. E. Davis, R.N., Admiralty Surveyor, were despatched by the enterprising Company in the *Fox* yacht, to examine the coasts and landing-places more in detail. The results, in a geographical point of view, which is our mere immediate concern at present, have been highly valuable. The depth of the ocean between Iceland and Greenland was found not to exceed 1570 fathoms, and the bottom to be fairly regular; from Greenland to Labrador, across the entrance of Davis Strait, a depth of 2030 fathoms was reached; and, in crossing the Atlantic on the return voyage, the greatest depth was found to be 1575 fathoms. At all these depths specimens of the bottom were brought up, and on one occasion a cluster of living star-fish was obtained from a depth of 1260 fathoms; a similar occurrence, proving the existence of living animals at that depth, took place in Sir James Ross's Arctic voyage in the year 1829, and in Commander Dayman's line of deep-sea soundings across the Atlantic in

1858. In order that the full benefit to science which may be derived from these specimens of the bottom should be rendered available, the Admiralty have retained the services of Dr. Wallich to examine them carefully, and prepare a full description of them, which it is understood will be published shortly.

In the course of the above voyage, in addition to the deep-sea soundings, the Admiralty surveyors, Mr. Reed, in the *Bulldog*, and Mr. Davis, in the *Fox*, took advantage of the opportunities afforded them, to make plans of several of the harbours touched at, as Haldervig and Thorshavn, in the Færøe Isles; with the Fiords of Beru, Hval, and Igalik, on the east and west coasts of Iceland, by Mr. Davis; Julianshaab and part of Godhaab on the west coast of Greenland, and Hamilton's Inlet, Labrador, by Mr. Reed: this latter inlet has assumed an entirely new form in our maps and charts from any that has before appeared. As physical geographers, we cannot but feel gratified that the requirements of submarine telegraphy conduce so much towards a better acquaintance with little known lands, and especially with the bed of the ocean of which we are still so ignorant, and with which, if submarine cables are to succeed, we believe we must be yet better acquainted. Nor can we withhold our tribute of gratitude to those gallant men who, under difficulties and privations of no ordinary character, boldly grappled with storms and ice in pursuit of the required information. Yet, though grateful, we need not be surprised. Were not both the commanders trained in the Arctic school? That school which has produced a Parry, a Franklin, the two Rosses, Scoresby, Beechey, Back, Richardson, Belcher, Bellot, Kane, Kellett, Collinson, Richards, McClure, McClintock, and others, men of all countries, to whom the Geographical Society delighteth to do honour. And I am satisfied that I do but express the general feeling of the members of this large Society in saying that wherever difficult work is to be done, in whatever part of the globe they may be found, whether with Kellett and Collinson in China, Richards in Vancouver, or McClintock in the enervating clime of the coast of Syria, where he now is, there the Arctic navigator will prove the value of the hardy school he has been trained in, and be fully entitled to share in the proud motto of *Nulli secundus*.

Mediterranean.—In the Turkish Archipelago, Captain Spratt, with his able assistant Lieutenant Wilkinson and Messrs. Stokes, Drew, and Millard, have completed the surveys of the islands of Astropalaia, Scarpantio, and Kasso, with several small harbours in

Crete, and Sailing Directions for that island, all of which, with the western half of Crete, are in a forward state for publication, the Turkish, Arabic, and Greek names of places having been carefully revised by Viscount Strangford and Mr. W. Spottiswoode. Captain Spratt has also recently carried some careful and valuable lines of soundings between Malta, Tripoli, Benghazi, and Alexandria, with a view to prepare the way for a submarine electric-telegraph cable, which it is hoped will shortly connect Malta with Egypt.

On the coast of Syria, Commander Mansell in H.M.S. *Firefly*, with his assistants Lieutenant Brooker and Messrs. Hull, Skead, and Gray, have completed the survey of the northern portion of the coast from Iskanderún to Markab, with plans of Ruad, Tripoli, Beirút, &c., all of which have been published. In connexion with this nautical survey some travellers took advantage of the presence of a surveying vessel on the coast, and made a journey to the more important spots in the interior, and determined several positions and barometrical heights. The party, consisting of Captain Washington, R.N., Commander Mansell, Dr. Joseph Hooker, F.R.S., the Rev. George Washington, M.A., Mr. Hanbury, and Mr. Gray, R.N., being provided with three chronometers, a theodolite, six barometers (corresponding observations being carried on night and day on board the *Firefly* on the coast), left Beirút in September last, by way of the Nahr el Kelb, Akturah, Afka, and Bisherreh, to the Cedars of Lebanon.

This remarkable group of trees, not exceeding three-quarters of a mile in circuit, stands on an elevated plateau, at the head of Wady Kadisha, and forms the centre of a semicircular basin or recess in the Lebanon, from 6 to 8 miles in diameter, at an elevation of 6400 feet. It is all but encircled by a wall of barren grey limestone mountains, rising some 3000 feet above the plain. The cedars stand alone, upon several small knolls (possibly a broken-up moraine deposited by former glaciers), and there is but one other tree in sight. The trees are about 400 in number, of all sizes; the largest is 40½ feet in girth, but only a few of the old patriarchs remain; there are not more than eight trees above 20 feet in girth. It is understood that Dr. Hooker is of opinion that, judging from the number of concentric rings and other indications, there is no tree now existing more than 500 years of age, and none less than 30 years.

On leaving the Cedars two of the summits of Lebanon were ascended; the highest Dahar el Khádib, 5 miles to the north, was

found to be 10,400 feet above the sea, and afforded a magnificent prospect which was taken advantage of by Commander Mansell, who planted a theodolite on it and obtained a round of angles to Tripoli, Cape Madonna, and other points on the coast to the west, to Mount Casius very distant in the north, to Ba'albek, Hermon, Sunnín, and other points in the south, and to all the peaks of the Anti-Lebanon in the east and south-east, which were thus connected with the coast survey.

Proceeding onwards the party crossed the elevated plain of Cœlesyria, or El Buka'a, where the water-shed, between the Orontes, flowing to the north-east, and the Leontes to the south-west, is near 4000 feet high, and reached Ba'albek or Heliopolis, with its marvellous ruins, at the western foot of the Anti-Lebanon range, and 3700 feet above the sea. Thence by Zebedani and round the southern end of Anti-Lebanon to Damascus. This city also lies in an elevated plain, but fully 1000 feet lower than Ba'albek, or about 2500 feet above the sea. Returning thence by Zaghleh and the admirable military road from Beirút to Damascus, now in the course of construction by the French, which will cross the Lebanon at a height exceeding 5000 feet, the party went to Beirút, Sidon, Tyre, Akkah, Hhaifa, Mount Carmel, and by Yafa to Jerusalem. Among other elevations measured in the City of David, the highest point of Mount Zion was found to be 2600 feet above the level of the Mediterranean, and the summit of the Mount of Olives, about 100 feet higher, while the lowest point of the Valley of Hinnom was 700 feet beneath. Jericho, Bethlehem, and the Dead Sea, were also visited, and the remarkable depression of the surface of this latter sea of 1300 feet below the level of the Mediterranean, which has been observed by former travellers, was fully verified.

It is right to add that Van de Velde's map of Palestine, by Petermann, based upon the trigometrical survey by our countryman, Lieutenant Symonds, R.E., in 1841, and combining the researches of Eli Smith and Dr. Robinson of the U. S., and other travellers, was found to be generally correct, and the best map of the country published. While Murray's 'Handbook,' here as elsewhere, proved to be invaluable; nor can travellers in these regions adequately express their thankfulness for the aid derived from this work: it is no exaggeration to say that it adds tenfold to the interest, the benefit, and the enjoyment of the tour. Probably, too, the present party was the first who had been enabled to refer on the spot to the 'Biblical Dictionary' edited by Dr. William Smith, and to test,

book in hand, the marvellous accuracy and research displayed by the several learned contributors to that work.

The barometrical heights, by Von Wildenbruck, were found to agree better with the observations of the expedition than the measurements of any other traveller. It may be worth notice that a complete meteorological register for 12 years, from 1848 to 1860, has been kept by the late Dr. McGowan at Jerusalem, and his barometer (one of Newman's) on being compared with a standard, was found to be in good order. The geographical information obtained during the above journey will, it is understood, be embodied in the Admiralty charts of the coasts of Syria and Palestine, now in course of publication.

Africa.—On the west coast of Africa six sheets of the Kawara or Niger, by Lieutenant Glover, R.N., on the scale of one inch, and a detailed plan of the port of Lagos, have been published during the past year. At the Cape Colony, Mr. Francis Skead, R.N., has completed a large plan of Table Bay, on the scale of 8 inches; he has also re-examined the lower part of the Kongone, one of the safest entrances of the Zambesi. In the Red Sea, in the Strait of Jubal, Commander Mansell and Mr. Hull, in addition to their services on the coast of Syria, have re-examined the Ashraffi reef, and determined the site for a lighthouse, which it is hoped may be shortly built by the Egyptian Government, as it is much required in the narrow passage of that Strait.

Asia.—In the Persian Gulf, Commander Constable and Lieutenant Stiffe, of H.M. Indian Navy, have completed the gaps that were left in the survey of that gulf, revised the whole in position, and the charts are in the hands of the engraver, while Lieutenant Heathcote, I.N., has prepared a new chart of the Bay of Bengal, with a memoir, showing the currents that prevail in that sea during the southern monsoon.

The great pearl fisheries of the gulf of Persia are still in full activity, and as productive as of old. In the summer of 1859 there were employed no less than 2340 Arab boats, with crews of from eight to thirty men, in this branch of industry; the value of the pearls raised being estimated at 200,000*l*.

An admirable survey of part of the Shat el Arab, and of the city of Basrah, has been made by Lieutenant Collingwood, of Her Majesty's Indian Navy. Lieutenant Williams, I.N., in the surveying brig *Euphrates*, having finished the examination of a small portion that was wanting to complete the coast commonly called

the Malabar Coast, has gone to do some work on the coast of Ceylon. A survey of the rivers of the Panj'ab is in progress by Lieutenant Whish, I.N. Two surveying brigs, under Lieutenants Sweny and Jackson, I.N., are at work in the Bay of Bengal.

In Ceylon, Captain Pullen, in H.M.S. *Cyclops*, and Mr. G. F. Macdougall, R.N., have surveyed the dangerous rocks known as the Bassas, and examined the south-east coast of Ceylon, Galle Bay, and a part of the north-east coast of the island, all of which has been inserted in the Admiralty charts. On his passage to England Captain Pullen re-determined the position of the San Lazaro bank, in the Mozambique Strait, said to have only $3\frac{1}{2}$ fathoms over it; he also obtained several deep-sea casts of the lead, one of 2700 fathoms in the South Atlantic, one of 1800 fathoms on the Equator in longitude 20° w., and has swept away the vigia Devil Rock from its usual position in our charts, by dropping his lead on the site, and ascertaining that there is a depth of 2200 fathoms there, thus proving that no such danger can exist within a radius of 30 miles.

Two new charts of Banka and Gaspar straits, embodying all the surveys of Mr. Stanton, and his assistants, in H.M.S. *Saracen*, with the labours of the U.S. squadron, and of the Dutch surveying officers in Batavia, have been published at the Admiralty within the past year, and the Stanton Channel, along the coast of Banka, is now well known to every Eastern navigator.

China.—The requirements of the war, and the valuable assistance afforded by the Commander-in-Chief, Vice-Admiral Sir James Hope, have led to great activity in the surveying operations in China and the Korea during the past year. Commander Ward, in the *Actæon*, and Lieutenant Bullock, in the *Dove*, with their assistants Messrs. Kerr, Blackney, Farmer, Bedwell, Ellis, and Robinson, have surveyed Ta-lien-hwang Bay on the northern side of the strait of Pechili, where our fleet and army assembled preparatory to the late successful expedition which terminated in the capture of the Chinese capital, the restoration of peace, and the enlargement of commerce. Also the northern coast of the province of Shantung, with the anchorage off Chifu, the rendezvous of the French force, the Miau-tau group of islands, forming the strait of Pechili, and including the anchorage of Hope Sound, and, in fact, completing the shores of the gulfs of Pechili and Liau-Tung, from Staunton Island at the south-eastern extremity of Shang-Tung Promontory on the south, round to Ta-lien-hwang Bay on the north, embracing a coast-line of about

800 miles, hitherto but vaguely known, and very erroneous in position. On the eastern side of Liau-Tung Gulf occur Niū-chwang, one of the trading ports under the treaty, Hulu-Shan Bay and Port Adams, plans of which are in course of publication. In this latter portion the surveyors had the assistance of Commander Bythesea, v.c., and the officers of the *Cruizer* and *Slaney*, and it is gratifying to find that these young officers were ready to take an active and efficient part in the operations of the survey. When we look upon our maps and see the small space occupied by the gulf of Pechili, we are apt to form but a very inadequate idea of the extent of labour required to map its shores, but if it be recollected that in the course of this survey some 800 miles of the coast were examined and the positions of all important points fixed astronomically, those acquainted with the subject will be able to appreciate the material additions to our knowledge of the geography of China, which has thus been obtained, and which could not have been accomplished without the cordial co-operation of the Naval Commander-in-Chief on that station, to whom, as geographers, our thanks are heartily tendered.

Australia.—While inland discovery has been making rapid strides, the coast surveys in Australia have been rather in abeyance. Captain Denham, in *H.M.S. Herald*, after a prolonged stay of nine years on the station, has just arrived in England. On the passage through Torres Strait this officer was enabled to clear away some more of the reputed dangers of that passage, and to fix the position of certain shoals, a piece of good service rendered to navigation, as this route is fast becoming the highway between Sydney, Singapore, and China. And the Sailing Directions for this track, just completed by Commander Yule, will be a valuable boon to the mariner. In the new colony of Queensland, Mr. Smith, R.N., has recently examined Port Denison and the mouths of the Burdekin river, while a general chart of Tasmania, prepared under the superintendence of Mr. Fred. J. Evans, R.N., and including the portions surveyed by Mr. Douglas of Adelaide, and one of the southern portion of Australia, have been published by the Admiralty. A fresh impetus is, we trust, about to be given to the coast surveys of these colonies, as they have liberally offered to share the expense of an Admiralty survey, and five separate parties of surveyors have been organized for the purpose. Commander Cox, with a staff of assistants, Messrs. Bouchier and Boulton, R.N., and Mr. McHugh, have already broken ground at Melbourne, and are employed upon a detailed survey of Geelong

Harbour. Lieutenant Brooker and Mr. Guy, R.N., are about to proceed to Tasmania, and other parties will follow shortly, so that, if the Colonies will but continue their support, few years will elapse before their coasts and harbours will be completely examined.

British Columbia.—The surveying party under Captain George Richards, in H.M.S. *Plumper*, consisting of Messrs. Bull* and Pender, Lieutenant Mayne, and Messrs. Bedwell, Gowlland, and Browning, have, as usual, worked hard during the past season. They have surveyed Johnstone Strait, Jervis Inlet, and Home and Quatsimo sounds, in the course of which they have mapped 1100 miles of coast-line, and sounded thoroughly over an area of 350 miles, and partially over 50 square miles, chiefly between Vancouver Island and the mainland. Lieutenant (now Commander) Mayne also has explored the country between Jervis Inlet and Port Pemberton. The chart of Frazer River and Burrard Inlet, on the scale of one inch, and Nanaimo Harbour and Departure Bay, on the scale of 4 inches, by Captain Richards and his staff, have been published at the Admiralty during the past year. Also a new plan of the harbour of San Francisco, from the United States survey; and five sheets containing 15 plans of San Lorenzo, Santa Cruz, and other small ports on the west coast of South America, by Captain Kellett and Commander Wood.

Newfoundland.—There being no sufficient survey of the coast of Newfoundland, Captain Orlebar, with his assistants Commander Hancock, Messrs. Carey, Clifton, and Des Brisay, has been employed during the past season in examining the south coast of the island, in the course of which they mapped 190 miles of coast, including Burin and Placentia harbours, and sounded over an area of 2700 miles. The charts of the Upper St. Lawrence, from Montreal to Quebec, in 13 sheets, on the scale of 2 inches, and of the harbours of those two cities on the scale of 8 inches, have been published during the past year; and Liscomb, Marie-Joseph, Sheet, and Mushaboon harbours, in Nova Scotia, have also been published.

Bay of Fundy.—Captain Shortland, with his staff, Lieutenant Scott and Messrs. Pike, Scarnell, Mourilyan, and Archdeacon, has been chiefly employed at the upper end of the Bay of Fundy, and

* Captain Washington regrets to add that this was Mr. Bull's last work. On his return from a fortnight's absence in a boat sounding a bay, the fatigue and exposure proved too great for his constitution, and he died suddenly on the 13th November, 1860, and her Majesty's service was thus deprived of a good officer, a valuable surveyor, and an exemplary man.

in the Basin of Mines. In the course of the past season they have examined 60 miles of open coast and 100 miles of river and harbour shores, sounding over an area of 250 square miles. An useful Coasting-chart of these regions has recently been published by the Admiralty, extending from the eastern limits of the Bank of Newfoundland by Halifax to the Delaware. Some charts and plans taken from the admirable United States Coast-survey have also been published during the past year; as Long-Island Sound, leading up to New York, the Chesapeake as far as the survey has been made public, with Norfolk, Charleston, Savannah, and Pensacola harbours.

West Indies.—Mr. Parsons, and his assistants Messrs. W. B. Calver and Clifton, have completed a chart of the Grenadines, and are now at work in the Island of St. Vincent. An important correction in the position of some capes on the north-east coast of Cuba has been made by Commander Hamilton in H.M.S. *Hydra*, by order of Rear-Admiral Sir Alexander Milne, Commander-in-Chief on the West India station. Punta Lucrecia is shown to be in long. $75^{\circ} 40' \text{ w.}$, instead of long. 76° w. , as in many charts, and this correction of 20 miles of longitude gradually decreases east and west till it vanishes at Cape Maysi on the east, and Punta Maternillos on the west. The first volume of the 'West India Pilot,' comprising the coast of the mainland from the Orinoco, round by Yucatan and the Gulf of Mexico to Florida Strait, compiled by Captain Barnett, and revised and completed with a Table of Positions by Mr. James Penn, R.N., of the Hydrographic Office, has just been published at the Admiralty.

Variation.—Researches in the field of magnetism, in connexion with the security of navigation, are still engaging the attention of the Compass Department of the Admiralty. The causes of certain anomalies which existed in the compensation of some iron ships' compasses have been detected by an elaborate series of experiments undertaken by Mr. F. J. O. Evans, R.N., the superintendent, during the past year, and which have been ably investigated by the well-known mathematician, Mr. Archibald Smith of Lincoln's Inn. The combined results have been laid before the Royal Society, and will be doubtless published for the benefit of navigators of all nations. Terrestrial magnetism, in its relation to the progress of navigation, and thus indirectly to the advancement of geography, is a science deserving the cordial assistance of geographers, and we hope to see our travellers, especially when promoting their researches in the

remoter regions of the globe, devoting attention to the determination of its elements, in connexion with other objects of inquiry. Observations, chiefly for that primary element to the seaman and the traveller, the variation of the compass, are being made with much assiduity by the officers of the Navy. An elaborate series, by Captain Denham, has been brought up to the present time in *H.M.S. Herald*, from Australia, through the Indian Ocean, by the Cape of Good Hope to England; another series has just been made by Captain Pullen, in *H.M.S. Cyclops*, in the Red Sea, coast of Arabia, Indian Ocean, and Atlantic; and a third series off the west coast of Africa, between the Equator and the Cape of Good Hope, has been made under the auspices of Rear-Admiral Sir Frederick Grey, late Commander-in-Chief on that station.

Besides the surveys above enumerated, as in progress in different parts of the world, the labours of the Hydrographic Office, during the past year, have consisted in the publication, under the immediate superintendence of Mr. Michael Walker, Assistant-Hydrographer and chief Draughtsman, of about 90 new and corrected charts and plans, some of which have been already mentioned. It is with regret I add that increasing years have deprived the Admiralty of the valuable assistance of Mr. Walker, who, after 50 years of faithful public service, wisely retires into private life to spend the remainder of his days in peace and quietness. Those who can remember the state of our maps and charts half a century ago, will be best able to appreciate the labours of Mr. Walker. As Chief Draughtsman it was his duty to construct charts, often out of conflicting materials, and to reconcile longitudes which even some of our most skilful travellers and surveyors are too apt to leave in a state of uncertainty, as doubtless our excellent fellow-labourer, Mr. John Arrowsmith, would readily bear testimony. During the long period that Mr. Walker held this responsible post he had gained the entire confidence of Captain Hurd, Sir Edward Parry, Admiral W. H. Smyth, Sir Francis Beaufort, and the present Hydrographer, and served his country with a zeal, intelligence, and strict integrity, that cannot be too highly praised. And although he retires from official life, it is to be hoped that we shall long have the benefit of his counsel and co-operation as a Fellow of the Geographical Society, of which he was one of the earliest members.

ORDNANCE SURVEY.*

The progress of the Ordnance Survey in the north of England and in Scotland has been greatly retarded during the last year in consequence of the numerous detailed surveys in the south of England, which have had to be made for the purchase of land and for the laying out of the fortifications for the defence of the Royal arsenals, and upon which upwards of 400 surveyors and draftsmen, brought from the northern parts of the kingdom, have been employed.

The plans of Northumberland and Cumberland, on the $\frac{1}{25000}$ scale, are in course of publication, but, for the reason above stated, these counties will only be finished in about twelve months from the present time.

The plans of Perthshire and Forfarshire are also in course of publication, and the survey of these counties will also be finished about the same time.

England.—Yorkshire and Lancashire are published on the 6-inch scale, and Durham and Westmoreland on the $\frac{1}{25000}$ and 6-inch scales. The surveys made for military purposes at Portsmouth, Plymouth, Chatham, Sheerness, Dover, Pembroke, the environs of London, and several other places, have all been made and published on the same scales as those adopted for the National Survey, and as parts of the counties in which they are situated; should it therefore be decided by Government and Parliament to extend the Cadastral Survey to the south of England, these plans will form integral portions of the complete surveys of the several counties.


Scotland.—These counties have been published on the 6-inch scale:—Edinburgh, Fife, Kinross, Haddington, Kirkcudbright, Wigton, and Isle of Lewis; and the following on the 6-inch and $\frac{1}{25000}$ scales:—Linlithgow, Lanark, Ayr, Renfrew, Dumfries, Peebles, Selkirk, Roxburg, Berwick, Dumbarton, and Stirling; in fact, the Cadastral Survey of all the south of Scotland is finished.

In *Ireland* every county has been published on the 6-inch scale, and eight of the northern counties, which were not complete in all the details subsequently found necessary for the valuation and registration of property, have been revised and made complete.

The general map of the kingdom on the 1-inch scale has been retarded by the causes already stated, but the whole of *Ireland* has

* Colonel Sir Henry James, Superintendent of the Ordnance Survey.

been engraved in outline, and several sheets with the hill-features on them have also been published. In *Scotland* the progress of the 1-inch map proceeds *pari passu* with the survey for the larger scales, the plans being immediately reduced to the 1-inch scale and engraved. In *England*, the whole, with the exception of the five sheets which will include the portions not yet surveyed in Northumberland and Cumberland, have been engraved.

The great *trigonometrical operations* of the survey may be said to be closed, the "principal triangulation," the levelling taken in England and Wales, and in Ireland, have been published, and the levelling taken in Scotland is in the press, and in part printed, and will be published very shortly. The three volumes containing the levelling have indexes showing the lines which have been levelled throughout the kingdom, and along which marks  (a broad arrow with a horizontal line, to mark the exact point to which the levels are given) have been cut upon permanent objects, such as churches, bridges, &c., for reference. These volumes therefore contain very valuable information for all who are engaged in practical engineering operations, and for many other purposes.

The publication of the principal triangulation, with the figure, dimensions, and mean specific gravity of the earth derived therefrom, has been received in all parts of the world with the highest satisfaction. It has been described as an epoch-marking work in the higher branches of geodesy, and in Russia it has given rise to an interesting and valuable discussion between General Schubert and M. Otto von Struve, in communications to the Academy of Sciences at St. Petersburg, on the importance of making those corrections to the observed latitudes for the local attraction at the trigonometrical stations used in the measurement of arcs of meridian, which were first given in the principal triangulation of this country.

In the principal triangulation the figure and dimensions of the earth have been given as derived from our own measured arc of a meridian, and also as derived from the combined results of all the measured arcs in different parts of the world. In the estimates for the present year the sum of 1000*l.* has been taken to enable the Director of the Ordnance Survey to connect the triangulation of this country with that of Belgium, and with the triangulations of Prussia and Russia through that country. This will furnish the data for the measurement of an arc of parallel from Valentia, in the west of Ireland, to Oursk, on the river Oural, in Russia, of no less than 75 degrees in length, along the parallel of 52°.

This is the greatest geodetic operation that has ever yet been undertaken, or which could before have possibly been undertaken, and the result will put to a severe proof the determination of the figure and dimensions of the earth from the measured arcs of meridians.

From the Topographical Dépôt we have received the map of Montenegro, which has been recently made from the surveys of the Commissioners sent by our Government to mark the boundaries of that country, in conjunction with officers from the Government of Austria.

We have also received several lithographed sketches illustrative of the actions fought in China, and of the route followed by the allied armies in their advance upon Pekin.

The accuracy and perfection of the maps reduced by photography at the Ordnance Survey Office is well known to the public, and has been officially reported upon. The method of printing the reduced maps from zinc or stone, which the Superintendent of the Ordnance Office has named photozincography, has also been brought to great perfection, and promises to be of the greatest value for purposes not originally contemplated, viz., the printing of fac-simile copies of ancient MSS., an example of which has just been published in the copy of the part of Domesday Book relating to Cornwall.

A work on meteorology for observers, and especially for travellers, which should contain precise instructions as to the manner of reading and recording their observations, and with the necessary tables for their correction, has long been a desideratum, and this has now been supplied by the publication, by the Superintendent of the Ordnance Office, of a small work entitled 'Instructions for taking Meteorological Observations, &c.,' which has been adopted as the text-book for the Army Medical Department; all the officers belonging to which, wherever stationed, are now directed to make regular meteorological observations, and whose reports, when properly digested, will probably throw great light on this branch of science. A copy of this work will be found in the Library. The Superintendent has also presented the Society with a copy of his recently published 'Quadrant Atlas,' containing two maps of the world on his projection of two-thirds of the sphere, and on which the lines of equal magnetic declination are shown, and also four maps of the stars, two for the northern and two for the southern hemisphere, the central meridians being at six hours' intervals. These are circular maps, so folded as to form a quadrant, and are intended for the use of sailors and travellers.

GEOLOGICAL SURVEY OF BRITAIN.*

The connexion of the sciences of geology and geography is palpable, and there can be no doubt that every geographical surveyor will give a much truer character to his hills, escarpments, slopes, and valleys if he be well acquainted with their internal structure.

In the last Report presented to Parliament we learn from the explanation of the Director-General, Sir Roderick Murchison, that with the view of completing the classification of the older rocks of the British Isles, in which he had been assisted by Mr. Geikie, he was occupied during the last summer in more firmly establishing the views he had before propounded of the existence of a clear ascending series in the crystalline rocks of the Highlands, from vast basement-rocks of gneiss, which are of higher antiquity than any rock in England, Wales, or Ireland. The feature which renders this older or fundamental gneiss of singular interest to the physical geographer is that whilst the outline or external form of its chief masses, as seen in the Long Island and other parts of the Hebrides, are elongated geographically from N.E. to S.W.; the range of the strata is from N.W. to S.E., or transverse to the form of the land. A new sketch-map of Scotland, which is about to issue, as based on the original observations of Sir Roderick in the Highlands, and published in the Quarterly Journal of the Geological Society, has been prepared by Mr. Geikie, and in it will be shown for the first time that the upper portion of the crystalline rocks of the Highlands is the altered representative of the Lower Silurian rocks of the south of Scotland.

In the extension of the Geological Survey of England from the south to the north of England and Scotland, the insertion on the maps of the 6-inch scale of the subterranean knowledge obtained, is in no respect more interesting than in the correct delineation of the various altitudes to which the shore-deposits of antecedent periods have been carried up above the present sea-level. This is particularly conspicuous on all those sheets on which the contour lines have been laid down. It is out of place here to enter into details of the progress of this survey, so important in developing the mineral wealth of Britain; but it is gratifying to be able to state that the public are taking so much interest in the subject, that they now purchase threefold the number of geological maps which

* Sir Roderick Impey Murchison, Director-General of the Geological Survey of the United Kingdom.

they did two years ago. It would, indeed, be strange if such a result had not followed the labours of those who are continuously occupied in unfolding the mineral resources of their country.

Although Colonel (now Sir Henry) James, who so ably superintends the Topographical Survey, gave evidence 5 years since before a Committee of the House of Commons that in ten years the whole map of Scotland would be completed, it is, alas! now too probable that a very long period may elapse before North Britain will possess such a general geographical map as is already possessed by France and Germany. But this lamentable state of things is in nowise to be laid to the charge of the Map Office and its able superintendent, but is mainly due to the oscillation in the views of different Governments, and the sudden diminution this year of the Parliamentary grants (see also p. 179), coupled no doubt with an unwillingness to grant large sums for surveys on that stupendous scale, which, according to the mode adopted by the Map Office, were to serve as the basis for the construction of a *real map* on the 1-inch scale. It is for the latter or only manageable map that we, as geographers, have been calling out for thirty years, or ever since this Society was founded.

PROGRESS IN METEOROLOGY.*

Meteorology is not a science in which much progress can be made in so short a time as that which elapses between our Annual Reports. Nevertheless, since the last Anniversary Address from this chair, remarkable steps have been taken by Government tending to utilise this branch of knowledge in a general and important manner.

In 1857 it was arranged that simultaneous observations should be made daily at a large number of selected stations in the British Isles, in and around the Atlantic, and at places on the European continental coasts. By combining these observations in synchronous charts, and otherwise, it was seen that, irregular as changes of wind and weather seem to our usual apprehension, there is really so much uniformity and similarity of character in successive variations, that by means of a comparatively small number of observations, made daily at a few selected stations sufficiently far apart, and by the use of an "atmoscope" (or self-registering barometer) at a central station, to which meteorological telegrams may be sent from the other outlying stations; it was seen that

* Admiral FitzRoy, Director of the Meteorological Department, Board of Trade.

by such means a distinct intimation of marked changes of weather, and warning of dangerous storms, might be given at the centre, and thence to all other points of any telegraphic combination.

The idea of giving warnings of storms, by telegraph, was familiar to many meteorological observers—in America as well as in Europe. It was suggested before the year 1836, with a reference alone to the sémaphoric telegraph, but directly electricity was made man's messenger, its applicability to this object occurred immediately. Yet the subject attracted too little popular interest to be taken up by any influential body until in September 1859, at Aberdeen, the British Association resolved to express to Government their view of its importance. The Prince Consort, then President of the British Association, directed steps to be taken. Communications were made to the Board of Trade. The Treasury and the Admiralty were consulted, and the result was the establishment of a system, experimentally, by means of which it is hoped that much loss of valuable property, and a much more serious loss of *invaluable* lives may be prevented. This system, known through the newspapers, was commenced last September. Until January it was limited to receiving reports from practising observers.

Memorandum on Storm Warning Signals.

A staff and two canvas shapes being provided, the following use will be made of them occasionally, perhaps once or twice in a month:—

One shape, that of a drum (or cylinder), has the appearance of a black square of three feet (seen from any point of view), when suspended.

The other shape, a cone three feet high, appears triangular (from any point of view), when suspended.

A cone with the point upwards shows that a gale is *probable* from the northward.

A cone with the point downwards shows that a gale is *probable* from the southward.

A drum, alone, shows that dangerous winds may be expected from nearly opposite quarters successively.

A cone and drum give warning of dangerous wind, its probable *first* direction being shown by the position of the cone; point up and above the drum for polar or northerly wind—down and below for southerly.

Whenever such a signal is shown (in consequence of a telegram from London), it will be kept up—shown distinctly—till dusk of *that day only*, unless otherwise instructed afterwards.

These cautionary or warning signals advert to winds during part of the next following two or three days; and, therefore, due *vigilance* should prevail from the *beginning* of such time until the weather is again finally settled.

No further steps are necessary for these objects at the telegraph-stations for the present. Other organization may follow when the coast-guard have prepared arrangements for repeating these signals along the coast to certain distances.

A conspicuous place should be selected for signalling, near the telegraph-station.

If conveniently practicable, the signal pole or staff should be in view of some seafaring persons and of the nearest coast-guard.

When both these objects cannot be conveniently attained without too great distance from the telegraph-station, one only—that of visibility to some of the seafaring community—should be secured.

In this case a message should be sent to the nearest coast-guard, and charged at the Company's tariff.

Further local notice will be given, it is hoped confidentially, by *local interests and authorities*. London can warn the outports. The coast-guard may repeat the warning as far as means allow, and *completion* of such cautionary notices may be effected by *private* assistance along the most frequented shores.

It should be remembered that only the greater and more *general* disturbances of the atmosphere are to be made known by this method (warning signals), not merely local or sudden changes (however violent or dangerous), which are not felt at a certain distance, and do not therefore affect other localities. Such changes are indicated to observers at these places by their own instruments, by signs of the weather, and by consideration of the weather reports for a few previous days.

Much inequality of atmospheric pressure or temperature, great depression or elevation of the barometer, sudden or rapid alternations, great falls of rain or snow, indicate more or less change, more or less wind, with its usual accompaniments, either in some places only or throughout an extensive area of hundreds of miles, if not thousands.

Speaking *generally*, there is far less occasion to give warning of *southerly* storms by signal than of northerly, because those from the southward are preceded by notable signs in the atmosphere, by a falling barometer, and by a temperature higher than usual at the season; whereas, on the contrary, dangerous storms from a polar quarter (N.W. to N.E.) are sometimes sudden and usually are preceded by a *rising* barometer, which often misleads uninformed persons, especially if accompanied by a temporary lull of perhaps a day or two, with an appearance of fine weather.

On the 6th of February the first warnings were given, on the foregoing principle, after which eight other warnings followed between that date and March 19th; since when, no general or remarkably windy atmospheric disturbance has occurred.

The warning of February 6th was disregarded at Shields by a fleet of vessels, and many were wrecked on the 8th or 9th.

Subsequently, whether from having appreciated these storm-signals, or from some other reasons, the *fact* is that very few, if any, wrecks occurred on our coasts during all the notoriously tempestuous weather of last February and March.

It is well known that M. Leverrier and numerous scientific authorities on the Continent, especially M. Buys Ballot in Holland, have for some time had their attention directed to simultaneous meteorological observations, and their utilisation for maritime, commercial, and geographical interests.

But the range of M. Buys Ballot's stations is small, and, on the other hand, that of M. Leverrier is so extensive that great difficulty has hitherto been found in grouping, combining, and concluding from them for practical use.

M. Leverrier's letter to his British colleague at Greenwich, in April 1860, arrived opportunely at the time our Government had under consideration these suggestions of the British Association (which originated at Aberdeen) and, undoubtedly, had the weight due to such an authority as himself.

The British Islands have very peculiar facilities for meteorolo-

gical communication by telegraph between outlying stations, on the sea-coast, and a central place—all at nearly the same level, and all similarly uninfluenced by mountain ranges, which are well known to alter or impede the horizontal movements of atmospheric currents. Great distinctions should be marked between those ever alternate, often conflicting *main* currents, tropical and polar, and the *local effects* of their union or antagonism—namely, mixed winds, whether westerly or easterly, with occasional cyclones or circulating eddies on a large or small scale.*

During the month of April this year, and to this time,† a polar current, very extensive and uniform, has swept or flowed *near* or along the surface of our islands and adjacent area, while its counter or *super* current has moved in a more or less contrary direction, usually above, but at times intermixing with, and often affecting or influencing the lower and normal "*abpolar*" movement by here and there pushing down and onwards. Considering that the lower current does not extend very far upwards (only a few thousand feet) and that high land mountains, and especially ranges of mountains alter or impede its progress, a variety of eddy winds, or, as it were, streams, with local and apparently anomalous effects, must be frequently caused.

Electrical action, condensation of vapour in hail, snow, rain or fog, or its other changes—namely, evaporation, rarefaction and expansion—absorbing heat and therefore causing cold, immediately affect currents of air in a degree proportional to their influence.

The polar current always *advances* direct from the northward toward the southward, or the south-westerly quarter, while *laterally* moving eastward (like a ship making leeway), pressed toward the east by the tropical flow which advances from the south-westward, usually above, and at an angle with the polar stream or current of air, often mixing with it but, at times, separately sweeping and warming the earth's surface, uncombined with the polar current, even while feeling its approaching influence, and, as it were, forcing a passage between streams of the chilling polar air, that at the same time are moving in opposite, and nearly parallel or slightly angular directions.

Sometimes their opposition is so equal, and equilibrium is so complete, that a calm is the result, and then there is no sensible movement horizontally along the earth's surface.

* See last Report, Royal Geog. Soc., 1860.

† 13th May, 1861.

The "atmoscope" is found to be an exceedingly useful instrument. It was invented by Admiral Milne, and, though considerably modified, as its use has suggested, in principle it is the same as his self-registering barometer. It shows the alterations in pressure, or the pulsations, so to speak, of atmosphere, on a large scale, by four hourly marks; and the diagram expresses, to a practised observer, what the indicator-card of a steam cylinder shows to a skilful engineer, or a stethoscope to a physician. It may trace its curve, hourly if required, by night and day, for a week or more.

For *travellers*, attention should be drawn to improved aneroids, some on more correct principles of construction, some much smaller than previous to the expiration of the French patent (taken out by their ingenious inventor, M. Vidi); others very suitable for measuring heights not exceeding about 4000 feet.

New constructions of mountain mercurial barometers have been lately suggested, but not proved yet by practical use. Perhaps it will be difficult to devise a better one than that of Gay Lussac, if made stronger, with the glassblower's work better executed, than has been the case with some that have been found too delicate for mountain ascents.

Travellers should not be influenced, in such cases, by the very precise refinement desirable in an instrument for the observatory (to which superlativeness many an opportunity of observation, with sufficient accuracy, has been sacrificed by accidents in travelling), but should endeavour to secure a reliable, though less minutely accurate means of ensuring results, within *known limits* of moderate error. A tenth of an inch alteration in the Torricellian column is caused by nearly 100 feet of change in elevation. What is this compared with some 20,000 feet, and the yet little known atmospheric influences at such a height, where the mercury falls to about 12 inches? And yet to attain a nicety of measurement, to the thousandth of an inch, instruments are offered to zealous travellers or voyagers, suitable only for use at convenient stations. This defect, if it may be so called (though really an excess of goodness in one direction), has been too general in marine barometers, also, of late years: excellently made, admirable in principle respecting accuracy and permanent reliability, but too finely graduated for an ordinary observer at sea, or by night, and too delicate in structure to bear the common shocks unavoidable in a ship of war. These objections have been lately obviated by a less minute graduation on a porcelain, instead of a metal scale (liable

to tarnish or rust), and by "packing" the glass-tube with vulcanised India-rubber. Thus constructed, the accuracy and reliability of a Kew model marine-barometer is obtained, to the nearest hundredth of an inch, having the quality of withstanding even heavy gunfire (as proved on board H.M.S. *Excellent*), and a facility for adapting spare portable tubes, boiled and fixed in their cisterns, capable of adjustment to *any* similar barometer, *without the aid of an optician*.

In using these invaluable instruments (which some voyagers would rather have than a chronometer, though one costs three pounds and the other about forty), it is well to have some definite idea of the amount of change which indicates unusually violent wind, such as the *St. Kilda* cyclone of October, 1860, the *Camilla* typhoon of the same time nearly, and the *Royal Charter* gale of October, 1859. In each of those very similar storms the barometer fell at the rate of a tenth of an inch an hour before the shift of wind occurred, before which it ceased falling, then began to rise, and while the violence of the tempest prevailed, rose as rapidly as it had previously fallen.

Generally speaking, and adverting to *numerous other** instances, *sudden* changes at the rate (nearly) of a tenth of an inch in one hour, are indicative of immediate and great atmospheric commotion. On the other hand, when the column does *not* rise or fall rapidly, that is to say, at an hourly rate of about the hundredth of an inch or less, any change of wind or weather of an extensive or general nature, however remarkable it may be, if the movement continue *long*, will be gradual and lasting.

RECENT GEOGRAPHICAL PUBLICATIONS IN EUROPE.*

Britain.—The Royal Atlas of Geography, which has now reached an advanced state, as published by Mr. A. Keith Johnstone is, as might be supposed from the accurate knowledge of the author, and his perspicuous method of applying it, a most desirable addition to our works. The clearness of the coast lines and river drainage, as defined in blue tints, is particularly to be commended. This Royal Atlas, of which eight Parts are already issued, is to be completed in ten Parts; and, in approving the execution of the maps, we cannot avoid calling special attention to the tabular and alphabetical lists of names of places, and the good arrangement by which the position of any place is at once found upon the map.

* Sir R. Murchison, Vice-President, R.G.S., &c.

In addition to his other maps, Mr. Keith Johnstone is about to publish a new Geological Sketch-Map of Scotland, by Sir Roderick Murchison and Mr. Geikie, which is alluded to in the account of the progress of the Geological Survey.

The Rev. H. Mackay, a minister of the Free Church of Scotland, and resident at Rhynie, in Aberdeenshire, who is a Fellow of our Society, has in the last year brought out a Geological Manual, which does him great credit. For, when we reflect on the difficulties under which a pastor who is most zealous in the performance of his clerical duties, in a remote and inland tract of Aberdeenshire, must labour, and who, in the employment of his leisure hours, has compiled this work, we must admire the ability and persevering research with which he has succeeded in imparting to his Manual so much freshness and originality. In no respect is this character more apparent than in the plan of arrangement by which the author commences his description of the physical geography of each tract by a sketch of its true basis or geological structure. The work is largely sold in Scotland, but has not been sufficiently spoken of in England. It is, indeed, a most useful school-book in opening out geographical knowledge.

Germany.—The country which gave birth to a Humboldt and a Ritter may well be proud of the efforts which are made to do honour to the memory of these illustrious geographers, by the establishment of foundations under their respective names, by which researches in distant lands are to be aided and encouraged. We trust that, with such an eminent African explorer as Dr. Barth, resident in Berlin, and with the knowledge we possess of his powers of writing on geographical subjects, the loss of Karl Ritter may be not inadequately supplied.

The well-deserved success of that admirable periodical, the 'Mittheilungen,' of Justus Perthes and Co., as edited by M. Petermann, is a satisfactory proof of the profound interest taken by our German contemporaries in every branch of geographical inquiry. Referring to that work for many valuable details, and most clear and accurate analyses of maps and volumes which are constantly issuing from the continental press, it is a satisfaction to us to see how through the pages of the 'Mittheilungen' the public in Germany are regularly and promptly made acquainted with all the most important of our British explorations.

Among the publications which are issuing from the press of Austria it is incumbent on us to notice with full approbation the

narrative of the Circumnavigation of the Globe, by the frigate *Novara*, in the years 1857-8-9. Commanded by Commodore von Wüllerstorff-Urbair, the description of the voyage has fortunately fallen to the lot of Dr. Karl Scherzer, one of the scientific members of the expedition, who has executed his task with great ability. Already an English edition of the first volume has appeared. The physical and geognostic suggestions which were written out by Humboldt for the guidance of the scientific inquiries of the voyagers, and which are prefixed to the narrative, are full of that love of nature which, to the last, animated the great and illustrious traveller.

In the volume which is to follow we shall doubtless have good descriptions of the natural history of the regions visited, for, as respects the geological structure of some of those tracts, Dr. Hochstetter has already published excellent detached notices.

The woodcuts, as executed at Vienna, and which are spread throughout the first volume, are of first-rate excellence.

*Russia.**—Russia has always claimed our special attention, and our Presidents have always considered it an important duty to place before the Society a sketch of the Researches of Russian Geographers during the past year, which, being published in a language very little known, are accessible to but few of our members.

The *Compte-Rendu* of the proceedings of the Imperial Society, during the year 1860, is indeed already before the public in the French language, and does great credit to the Secretary, M. de Thörner, who has prepared it. For, as the detailed descriptions of the countries examined are published in the Russian language, this resumé of the proceedings of our old allies is really most important. Established, as this Imperial Society was, on the same basis as our own body, the Secretary commences, as we do, their last year's Report with sketches of the lives of the recently deceased geographers of Russia. M. Savelieff, M. P. Kalmykoff, and General Tanner, are spoken of in terms of well-merited praise. The last of these is indeed one of those eminent practical geographers whose labours have been before enlarged upon by Sir R. Murchison, and whose measurement of the great Russian arc of the meridian, in conjunction with Struve, has rendered his name famous for all time among geographers.

The attention of Russian geographers has recently been much

* Thomas Michell, Esq., F.R.G.S.

divided between the country of the Amùr, definitively ceded to Russia by General Ignatief's treaty, and those regions of Central Asia which Russia has been so long engaged in exploring.

English geographers have already been informed that a scientific expedition was despatched to the Amùr, under the auspices of the Imperial Geographical Society. Mr. Schmidt, the chief of the geological section of that expedition, made some very important observations during a voyage from the new town of Blagovestchensk, at the mouth of the Zeya River to the port of Nicolaefsk, at the mouth of the Amùr. He denies the existence of volcanic rocks reported by other travellers, and found nothing but sedimentary deposits.

Early in June of last year Mr. Schmidt visited the island of Sahalin, held jointly by Russia and Japan, though virtually, and notwithstanding the treaty of Simoda (1855), in the sole possession of Russia. On landing Mr. Schmidt at once recognised the rocks of the banks of the Amùr as belonging to the carboniferous formation which prevails in the island, as well as in the basin of the Amùr. Mr. Schmidt has been authorised by the Imperial Geographical Society to devote the whole of this summer to the exploration of the island of Sahalin.

The expedition will return to St. Petersburg in the autumn of 1862, after passing the summer of that year in a minute exploration of the Amùr basin. Two assistants have been sent out to Mr. Schmidt; Mr. Plehn, who replaced Baron Maidel, and Mr. Brylkin, despatched by the Siberian Section of the Geographical Society; the latter being a gentleman well known as an explorer of the rivers Ussuri and Amùr.

Mr. Schwartz, the chief astronomer of the Mathematical Section of the Amùr expedition, is busily completing his calculations, and his assistant, Captain Rajkof, whose name already appears in our Transactions, has been thanked by the Council of the Imperial Geographical Society for the remarkable manner in which he has fulfilled the various duties with which he was entrusted.

The Imperial Geographical Society is now engaged in preparing a map of Eastern Siberia, including a portion of the Trans-Baikal country, the government of Irkutsk, and a part of that of Yeniseik, also in compiling an account of the labours of the Siberian expedition, and a work on the meteorological data now collected by the latter.

We cannot but appreciate the indefatigable exertions of the

geographers of Russia in throwing the light of science over such a vast country, and we should indeed be sorry if so much labour, so many hardships and privations, and so much money, were not requited by some of the material advantages at first expected, though as yet but little realized.

The geography of Central Asia has been enriched by several communications by Fellows of the Imperial Geographical Society of Russia, travellers in that interesting country.

Mr. L. Venuikof, one of the best modern authorities on the countries adjoining the south-eastern frontier of Russia, read a memoir in October last on the lake of Issyk-kul, from which he had just returned. After giving a short account of the topographical labours of his expedition on that lake and the Kashkar River, and pointing out the valuable additions thereby made to the works of Nifantief, Kiepert, Semenof, and Fakharof, Mr. Venuikof entered into some particulars respecting the lake Issyk-kul and its immediate neighbourhood. His attention was more particularly directed towards the south-west part of the lake, and the valley of the Kashkar, a portion of the country which had never yet been explored by scientific travellers. This gentleman has, to a great extent, dissipated the illusions hitherto entertained by some persons in Russia as to the great fertility of the country in the vicinity of the Ili River, and its adaptability to cultivation, and especially in reference to colonization. He also gave a very interesting description of the Kuté-Mandakh River, uniting the river Chu, which forms to some extent the boundary of Russia, with the lake of Issyk-kul. His researches at the source of the Chu afford much valuable information. The Kashkar rises in the Celestial or Tian-chan Mountains, and flows through a natural pass in that chain, issuing from gorges which terminate in the valley of the Naryn and at the Alpine Lake of Son-kul, hitherto but vaguely known to geographers. Mr. Venuikof has further contributed some observations on the Sary-Baguiche tribe inhabiting that part of Central Asia.

Mr. Kuléwein, who accompanied General Ignatief in his late mission to Khiva and Bukhara, has given an account of his journey, which will be published in the Journal of the Geographical Society of Russia. He describes the Khanat of Khiva as it was under the administration of Seid-Mohammed-Khan (1856-1860), and traces the journey of the mission across the steppe of Orenburg, along the western shore of the Sea of Aral, as far as the lake of Aiboughir; the passage over that lake near the promontory of Urga, the arrival

of the mission at Kungrad on the Amu or Oxus, and a voyage of 18 days on that river, in native boats, as far as Khiva. Mr. Kuléwein proceeds to describe an audience of the Khan Seid-Mohammed, the administration of that chief, and the events which preceded his election, and to throw some light on the relations which then existed between Russia and that Khannat. Much valuable information has been obtained respecting the rising of the Turcomans, with whom Persia is now at war, the revolt of Kungrad, and the election of Mahommed-Fannah. As soon as Mr. Kulléwein's memoir appears in print many of us will, no doubt, eagerly apply to it for information regarding the limits of the Khannat of Khiva, its population, agriculture, and commerce, subjects which are extremely well treated by this able diplomatist. M. Kuléwein has presented to the Imperial Geographical Society photographic sketches of the country, and its native types, as well as of the coins in circulation in Khiva and Bukhara.

The explorations of a party sent by Dr. Bergstreusser to inquire into the practicability of uniting the Caspian with the Sea of Azof, and which were mentioned in the Address of last year, having resulted in a very favourable description of the country, and of the facilities which it afforded for colonization, the minister of the Crown domains of Russia despatched another expedition with the view of exploring scientifically the low valleys of the Kuma and Manych, and the Kalmuck steppe, which extends between the Don and the Volga. Instead of finding a navigable stream, the exploring party walked dry-shod along the so-called valley of the Manych from the Mojar salt-works, 60 miles from the Caspian to the very course of the Don. At the cost of great fatigue and many hardships this party ascertained that the Manych is nothing but a channel or bed eroded by the waters of spring, watered during a very short period of the year, and then left dry with a few intervening lakes or pools. Moreover the saline properties of the soil preclude all possibility of peopling these solitudes; and the absence of any population, added to the difficulty of collecting and retaining the spring waters in artificial reservoirs, are obstacles which can never be surmounted.

The geological researches of M. Barbet de Marny, a member of that expedition, have proved that the existence of the strait which united the Caspian with the Black and Azof seas, can only be referred to a period beyond the reach of history, and that its disappearance is to be attributed to that upheaval of the soil which pro-

duced the low country of the Manych, the country of the Cossacks, of the Black Sea, and raised up the steppe limestone of the Kuma and Volga, or country of the Don Cossacks. The examination of a canal would therefore necessitate the removal of those obstacles which the powerful hand of nature has placed between the two seas.

The officers of the Russian Surveying Expedition in the Caspian were enabled during the course of last summer to make a geodesical measurement of the peak of Demavend from two astronomical points, namely, from great Ashur Island, in Astrabad bay, a Russian naval station, and from the mouth of the Tedjen River, near Ferahabad, about 40 miles to the west of Ashur. The geographical position of those two points was determined astronomically, and by means of 17 chronometers used in the Caspian survey. The azimuths of the hill were determined at the two stations by one of Repsold's circles. The measurement from Ashur Island gave 18,551·0 Russian (or English) feet, above the level of the Caspian, and that from the point near Ferahabad 18,547·5; the mean altitude being 18,549·2 feet.

These measurements were apparently made with great care, and Captain Ivastchinzof, the chief of the expedition, is persuaded that, even under the most unfavourable circumstances, the altitude thus obtained must be quite within, at most, 130 feet of the truth.

It will be recollected that Mr. Thomson, Lord H. Schomburg Kerr, and Mr. St. Quentin, estimated the height of Demavend at 20,192 feet; and that Baron Minutoli and Dr. Burgsch, who, in July, 1860, likewise measured it by means of barometers, give figures almost similar, viz., 19,000 to 20,000 French feet.

The Surveying Expedition will probably have several other opportunities of measuring the height of Demavend. Captain Ivastchinzof expresses a wish that a similar measurement should be made from the Persian Gulf by means of stations, an undertaking which would decide the interesting question of a difference in level between the Caspian Sea and the Persian Gulf.

An article on the measurement of Demavend is contained in the 'Morskoi Sbornick,' or Naval Magazine, for the month of April, a work in the Russian language which is regularly received at the Hydrographic Department of the Admiralty.

While on the subject of mathematical geography attention must be directed to the proposal of Mr. K. Struve, Director of the Nicholas Observatory, at Pulkova, to effect a vast measurement of a meridional arc passing by the 52° of latitude, to extend from Valentia

in Ireland,* across the whole of Europe, to the fortress of Orsk, situated on the confines of the Government of Orenburg, and to embrace, therefore, 69 degrees of longitude. Last year Mr. Otto Struve was commissioned by the Russian Government to enter into communication on this subject with the Governments of Prussia, Belgium, France, and England; in each of which countries the project was most favourably received. Forty of the degrees of longitude to be embraced in this measurement belong to Russia, 12 to Prussia, 4 to Belgium, 2 to France, and 10 to Great Britain. It is also proposed to measure two other meridional arcs on the 47° of latitude as a means of checking the other operation: the first extending over 13 degrees in France, and the second over 20 degrees in Russia, from Kishenef to Astrakhan. Thanks to the careful triangulations already effected all over Europe, this gigantic work may be completed in the course of a few years. The necessary preparations are already being made in Russia and elsewhere.

Great as the activity of the Imperial Geographical Society of Russia would appear to have been, even from this imperfect sketch of its labours during the past year, a considerable portion of the attention of that industrious body has been devoted to statistics and political economy; branches of learning which belong to a distinct section of the Imperial Geographical Society. In the absence of a special Statistical Society at St. Petersburg, it is obvious that the labours of that section must be of immense advantage to Russia at a moment when the development of her vital resources is receiving the most serious attention of all classes, under the philanthropic inspiration and guidance of an enlightened Monarch.

Although not within the strict province of geography the very interesting labours of the Political Economy Committee of the Geographical Society of Russia must be noticed. This committee has held several meetings during the last winter, attended by some of the most enlightened men in Russia, including His Imperial Highness the Grand Duke Constantine, who, by taking an active part in the proceedings, has proved himself a real friend to the intellectual progress of his country.

This committee have had under consideration the causes of the financial difficulties of Russia, the recent stagnation in the trade of that country, the colonization of the Amur and Central Asia, the emancipation of the serfs (as a "*fait accompli*"), and the subject of an international decimal system of measures, weights, and coins.

* See page 180 of this Address.

Lastly, it must be stated, that under the auspices of the Imperial Geographical Society of Russia, all those important resolutions were carried by powerful majorities of the committee in a truly liberal spirit, and in consonance with the doctrines of Adam Smith, J. Stuart Mill, and other economists, of whose principles England has so long been the practical exponent.

HINDUSTAN, SIAM, BURMAH, CHINA, AND JAPAN.*

On the subject of India Proper or Hindustan no communications have been made to the Society, but the name suggests a duty which has often fallen to former Presidents, of referring to the triumphant scientific career of Sir Andrew Scott Waugh, late Surveyor-General of India, now happily returned to his native country, after the active service of two-and thirty years. As the worthy successor of Lambton and Everest, Colonel Waugh brought to a conclusion the great achievement of the Trigonometrical Survey of India. The value of his services may be judged by the single fact, that in seventeen years' time he executed the triangulation of 316,000 square miles, an area nearly equal to the united areas of France and Spain, while he effected the topographical survey of 94,000 square miles, but little short of the surface of the British Islands. Colonel Waugh's operations were sometimes carried on at an elevation of 20,000 feet above the level of the sea, and sometimes over swamps almost on the sea-level; the air, from its rarity, difficult to breathe in the first case, and, from its deleterious quality, dangerous in the last. The combination of high qualities necessary to conquer these difficulties may readily be imagined, and they met in the person of the late Surveyor-General of India, now Sir Andrew Waugh.

Respecting Persia, the only contribution we have during the season, is the Narrative of a Journey across the Eastern Frontier of that country to Afghanistan, by Captain Claude Clarke. The journey extended from Meshed to Herat, a country seldom visited by Europeans. It embraces a portion of the great Salt Desert of Khorassan, a tract of small fertility and greatly infested by predatory hordes of Turcomans.

On the subject of the little known but vast region which lies between India and China, we have had several interesting and instructive communications. Captain Sprye and Dr. McCosh furnished to the Society elaborate Papers respecting the countries

* John Craufurd, Esq., F.R.S.

which lie between the British frontiers, respectively, of Bengal and Pegu and the Western confines of China, suggesting routes for the establishment in this direction of a commercial intercourse with the Chinese empire. It is only necessary to say that the subject gave rise to a lively and interesting discussion at the meeting at which the Papers were read.

On the kingdom of Siam we have had two valuable communications, both from Sir Robert Schomburgk, her Majesty's consul. These are narratives of his own journeys over parts of the kingdom seldom if ever visited by intelligent Europeans. Siam, after being for a century and a half almost as much excluded from European intercourse as Japan itself, has of late years, chiefly owing to the enlightened character of its present sovereign and the large commerce which has resulted from it, become an object of interest and importance to all the European nations, and more especially to ourselves.

The great Asiatic Archipelago, including the Malay and Philippine Islands, has been brought under the notice of the Society by two original and valuable Papers, describing portions of them hitherto little or very imperfectly known. One of these, by Mr. Spencer St. John, her Majesty's Consul-General in Borneo, gives an elaborate account of the physical and political geography of the north-eastern portion of the great island of Borneo. The other is by the eminent naturalist, Mr. Alfred B. Wallace, and gives by far the completest account hitherto rendered of the trade of New Guinea and the adjacent islands inhabited by the Papuas or Oriental Negroes. The importance of the Great Archipelago in question may be judged by the facts, that its population is computed at not less than twenty-five millions, while its external commerce, as conducted by the Dutch Spaniards and ourselves, is of the yearly value of thirty-six millions sterling.

Several interesting contributions to our knowledge of the vast empire of China have been made during the season. Thus, we have had an account of the survey of the Si-kiang, or Western River, by Lieutenant Lindsay Brine, R.N., while her Majesty's Ministers have supplied us with the Admiralty directions for the navigation of the rivers Si-kiang, Yang-tse-kiang, and Pei-ho, with that of the gulf of Pechili. It may here be mentioned that, for the prosecution of geographical knowledge, two expeditions are at present in progress; the one from the British territory in India into Chinese Tartary, and the other into the north and western

provinces of China, passing from the eastern side of China by the Great River into the provinces in question, and from them into Tibet, ending with the neighbouring British Indian territory.

It would be superfluous in this place to expatiate on the importance of China to our own well-being, but a few facts may be noted, which are both striking and illustrative. The joint amount of our own trade, export and import, amounts to 14,000,000*l.* a-year, exclusive of the trade with our Indian possessions. This trade is furnishing us with 76 millions of pounds yearly of a commodity—tea—which no other country can supply, and without which we could not, from long habit, live comfortably. Through that commodity, from five to six millions sterling are placed in the public treasury. China pays a yearly tribute to India of not less than five millions, without which our Indian dominions could not be conveniently held. And, finally, it contributes one half of the raw material of one of our great manufactures, silk, which is even more than Australia does for the woollen manufacture, great as is its assistance.

The empire of Japan, with its singular population, equal at least in number to that of our own island, and, among Asiatic nations, second only to China in civilization, is now fairly open to us, after an almost total isolation of two centuries; the unquestionable work of steam navigation. On this interesting and important country we have valuable and original communications. One of these is by our able and experienced minister, Mr. Rutherford Alcock, describing a journey into the interior of the main island, Nippon, and another to the Sacred Mountain Fusiyama, which may be called the Olympus of the Greeks or the Meru of the Hindus. The second communication is by Mr. Pemberton Hodson, her Majesty's consul at Hakodadi, the chief town and port of the Island of Yesso, a conquest of the Japanese made within the last three centuries, and whose native population, its Japanese inhabitants being but colonists, consist of a distinct and peculiar race. It is satisfactory to think that already the trade of Japan holds out good promise, for we find that in the course of last year we received from it no less than 7000 bales of raw silk, being three times the quantity which China furnished forty years ago, the quality being equal to the best Indian.

ARCTIC REGIONS.*

There are at present two expeditions occupied in attempts to reach the Pole. One, under Dr. Hayes, sailed from Boston on July 10th, 1860, in a vessel of 140 tons, called the *United States*, and arrived at Upernavik on August 12th. Here he obtained dogs and furs, and an interpreter named Mr. Peter Johnson. The last accounts from him are dated Tessinsak, August 23rd: he hopes to reach Cape Frazer, in lat. $79^{\circ} 42'$, on the east side of Peabody Bay, where he intends to establish his winter-quarters, and then pursue his explorations northerly along the shore of Grinnell Land.

The second expedition, under Dr. Forell, with several volunteers of education, assembled in April at Tromsø where they would be joined by Petersen, who carries up with him 20 cases of pemmican remaining from the store of that article supplied by our Government to the *Fox*. They then proceed to Spitzbergen, where they will winter, and follow Parry's route to the northward. These two expeditions will, in all probability, settle the question of an open sea in the vicinity of the Pole, and afford meteorological and tidal observations of great importance in high latitudes.

Renewed search for the *Erebus* and *Terror*.—Mr. Hall, a native of Cincinnati, has started in a whaler called the *George Henry*, on board which vessel he intends to winter in Cumberland Inlet, and in the spring to start in a boat manned by Esquimaux, following up the east coast of Fox Channel to the Strait of the Hecla and Fury, and so round the bottom of Prince Regent Inlet. The latest account from him is dated from his winter-quarters in lat. $62^{\circ} 51'$ and long. $65^{\circ} 5'$, when he claims to have discovered that Frobisher's Strait is an inlet.

Captain Parker Snow is fitting out a small schooner, the *Intrepid*, of 45 tons, in which he hopes to get away in June, and, following up McClintock's track, endeavour to push through Bellot Strait and reach King William Land.

The operations connected with the proposed route for the North Atlantic telegraph has appeared in the Proceedings of the Society; and a translation of a Paper on the currents and ice drifts on the coast of Iceland has been forwarded by its author, our Corresponding Member, Captain Irminger, of the Royal Danish Navy, which

* Captain Richard Collinson, C.B., R.N.

will also find a place in our Proceedings, as it contains a succinct account of the ice-drifts round the shores of that island from the thirteenth century.

Sir John Richardson's account of the Polar Regions, reprinted from the *Encyclopædia Metropolitana*, has become so popular that there is perhaps no occasion to call the attention of the Members of this Society to it, unless it be to pay a just tribute to the author for the comprehensive view he has given of those portions of the globe which have of late years been the scene of so much exploration.

BRITISH NORTH AMERICA.*

The map of the country from Lake Superior to the Pacific coast, at Vancouver Island, which has been recently published in our Proceedings, to illustrate the various reports of PALLISER'S EXPE-
DITION, gives a clear view of the great additions which have been made within the last few years to our previously scanty knowledge of the geography of this region.

It is now placed beyond doubt that, within the British possessions, there are extensive areas, with good and varied soil, adapted for agricultural colonization, but at the same time subject to all the defects as well as the advantages of a temperate continental climate.

Within the territories of the United States, the Eastern Prairies, which have been so justly celebrated for their wonderful fertility, are succeeded to the west by a more or less arid desert, occupying a region on both sides of the Rocky Mountains, and interposing a barrier to the continuous growth of settlements between the valley of the Mississippi and the rich states of the Pacific coast. It is not therefore probable that, under such conditions, any line of route for heavy or rapid transport will be remunerative, while, in the present disturbed state of America, its construction may be indefinitely delayed. It is thus highly satisfactory for us to know that this central arid tract extends but a short way to the north of the boundary-line; and even there derives its character rather from the nature of the soil than from any climatic conditions. Further, along its northern border, there lies between it and the sub-Arctic forests a belt of land, from which the woods have been cleared by the agency of successive fires, the first and most arduous labour of removing the timber being thus spared to the future settler. This

* Dr. Hector, F.R.G.S.

"fertile belt," the first recognition of which most important feature is due to Palliser's Expedition, stretches from the southern end of Lake Winnipeg in a north-western direction continuously to the base of the Rocky Mountains, and affords throughout land which may be profitably cultivated; so that settlement within our territories will not meet with the same obstacle to its westward progress that it meets within the United States.

In this region the winter, though severe, is not more so than that experienced in Canada; and, in the western districts of the Upper Saskatchewan, the spring commences nearly a month earlier than on the shores of Lake Superior, six degrees farther to the south. On the other hand, in summer, owing to its higher latitude and altitude above the sea, the sun is less powerful; so that many crops which are readily raised in Canada will not meet with equal success here. All the ordinary cereals and green-crops have, however, been grown successfully, though severe frosts at night are occasionally experienced even late in the season. The depth of the snow is never excessive; while the pasture is so rich and abundant that cattle and horses may be left to obtain their own food throughout the greater part of the winter; and, with proper care and attention, there is no doubt that even sheep might be safely reared. It is only during the month of March, when the snow acquires a glassy crust, from the heat of the midday sun succeeded by hard frost at night, that stock would require to be fed.

While thus in some respects this country may bear comparison with Canada, we must not forget the total want of all the finer kinds of timber, which are such a valuable source of wealth to that province. To the settler deficient in capital, but content with the easy life and moderate gains of simple agricultural occupations, the Saskatchewan country offers a most desirable field; and it is only the difficulty of access to it that, for the present at all events, prevents its immediate occupation.

But upon this point we are no longer without abundant and accurate information. The route hitherto used by the Fur Company, which enters the country by Hudson's Bay, is so inferior that it has within the last few years been almost abandoned by them; that which they have now adopted, and which physically forms the natural entrance into the country, is through the American territory, from the valley of the Mississippi to that of the Red River of the north. A large portion of the fertile prairies of the latter valley lie to the south of the boundary-line, and will be "settled up" by

American citizens, and traversed by a line of railway; so that, whatever other route may be likewise opened, this will remain permanent, and will in all probability be preferred to any other by the emigrant. The only other route which, for political reasons would doubtless be the most desirable, is that which would connect the Red River settlements directly with Canada, without leaving British territory, by following the canoe-route from the shores of Lake Superior, in a north-west direction, by Rainy Lake and the Lake of the Woods. The united testimony, however, of the many exploring parties which have traversed this region shows that the construction of any such line of communication would be almost impracticable from its expense. This has been rendered only the more apparent by the minute survey of that district by the recent Canadian Expedition, the report of which, although excusably partial, affords small hope of obtaining any means of transport sufficiently inexpensive to be useful to the emigrant, by which stock could be conveyed into the country, or produce find its way thence to the Canadian marts.

There is no doubt that if the country of the Prairies were once inhabited by a large and producing population, this object could be obtained by a line of railway which would connect it directly with Canada; but at present such a line could only be made as part of a great national enterprise, with much wider aims in view than the mere extension of the Canadian settlements westward; as, for instance, the connection of the Canadian provinces with our new colonies on the Pacific coast. From Red River westward such a line, by following the "fertile belt," would pass through country that can be easily settled. The Rocky Mountains themselves, we now know, may be much more easily traversed than was formerly supposed, as they only present a narrow strip between 50 and 60 miles broad, beyond which commence the auriferous valleys of British Columbia. In reaching the Pacific coast from the Rocky Mountains, the difficulties to be overcome by the engineer are far more serious than any to be encountered along the eastern slope; but the mineral wealth of the country, necessitating the construction of roads, affords more inducement to the laying out of money on this than in any other part of the route.

The search for superficial gold ensures the active though temporary settlement of this country; while its buried, but more lasting, mineral products will retain a considerable permanent population, and give that solidity to the wealth of the country which alone

would warrant the construction of such a line of railway through a difficult and otherwise unproductive country.

The advantage of Vancouver Island as the western terminus for such a magnificent work, possessing as it does perfect natural harbours, and abundance of coal of good quality, are already well known to us all. Next year, however, we shall have an opportunity of becoming better acquainted with the resources of our new colonies, as, by advices just received, we learn that the colonists are energetically engaged in preparing a collection of samples of their mineral and other products for the Exhibition of 1862.

In connection with this subject, I may remind the Members, that on the islands of Japan and Formosa there exist extensive deposits of coal, which would thus form valuable stations between the north-west coast of America and our Indian dependencies and China—a natural fitness not to be overlooked in a scheme for communication with these countries by the Canadas, Sasketohewan, and British Columbia.

SOUTH AMERICA.*

We have received from Dr. V. Martin de Moussy the first two volumes of his work entitled '*Description Géographique et Statistique de la Confédération Argentine*,' recently published at Paris,—the result of four years' travels through the fourteen provinces of the Rio de la Plata for the express purpose of collecting for the Government of that republic, and with their aid, details relative to the physical geography and statistics of their population, agricultural, industrial and commercial capabilities, their geology, mineralogy, and natural history; in fact, to use the author's own words, he has had to form a general encyclopædia of the great basin of the Rio de la Plata, for which a residence of 12 years previously in the neighbouring state of the Uruguay seems to have well qualified him. We shall look with interest for the conclusion of this work, and especially for the atlas which is to accompany it; and in the mean time recommend Dr. de Moussy's book to all persons desirous of the most minute and detailed information regarding the countries of which he treats, and which seem only to require the aid of European emigration on a large scale to develop their vast natural resources, and to make them the most important of all the Spanish American states in South America.

* Sir Woodbine Parish, F.R.G.S.

On *Paraguay* another French writer, M. Demersay, has presented to the Society the first volume of a work he is now publishing, entitled '*Histoire Physique, Economique, et Politique du Paraguay, et des Etablissemens des Jesuites*' (Paris, 1860).

The author was sent to South America in 1844 to collect information relative to the least known parts of the interior of Brazil and Paraguay, of which this work professes to give the results. The present volume is divided into chapters upon the political boundaries, the orography, hydrography, and climate of Paraguay, its fauna and zoology, and, lastly, on the ethnological characters of its inhabitants.

At the outset of his travels in South America M. Demersay had the good fortune to find M. Bonpland, the venerable companion of Humboldt, still living at San Borja, who received him with the greatest kindness, and gave him access to the journals and diaries of his own travels and researches during the thirty years previous.

In alluding to M. Bonpland, M. Demersay supplies some information, which will, I am sure, be of interest to the members of this Society, regarding the fate of his papers and collections of natural history. He has no hesitation in stating that M. Bonpland had no work prepared or preparing for publication, although he left a voluminous collection of notes upon his travels in South America, including extensive geological and botanical observations on Paraguay, the Rio Grande du Sud, the province of Corrientes, and the Missions, in which he so long resided. Two chests full of these MSS. it appears have been forwarded to France, and are now claimed by his heirs.

With regard to his collections of minerals and natural history, M. Bonpland had made a special bequest of them to the Museum at Corrientes, which he had himself founded. The Government of Corrientes, however, have offered to give them up to that of France in exchange for books and instruments, which they are more in need of; and, as this offer has been accepted, they will probably be sent to Paris, where they will be most prized and rendered available for the sciences to which they pertain.

AUSTRALIA.*

Since the last anniversary the march of discovery in the hitherto unexplored portions of this vast mass of land has been most

* Sir R. Murchison, Vice-President, R.C.S., &c.

remarkable. In the adjudication of one of our Royal Medals to Mr. MacDouall Stuart, allusion has been already made to the value of travels, which, though undertaken under discouraging prognostics, were carried out with such perseverance and ability as to have thrown a new light on the condition and capabilities of large tracts of the interior.

The public must not, however, be led away by the success of this adventurous and successful traveller to adopt the belief that there are vast internal tracts of great *continuous extension* where colonists can settle. The data ascertained by Stuart amount simply to this—that, at considerable distances from each other, there exist *oases*, refreshed by springs, in and around which good pasturage for sheep and cattle are to be obtained. On the other hand, these oases are separated from each other by broad tracts of bushy scrub, often saline, most difficultly permeable, and in which no trace of springs has been detected. Such intercalated waterless tracts present, therefore, considerable but by no means insuperable obstacles: for, if Stuart could traverse and retrace them with his appliances, how much less will be the difficulty when the scattered and well-watered oases become so many centres of occupation by the location of herdsmen and the erection of rural habitations, such, for example, as Messrs. Chambers and Finke, the spirited employers of MacDouall Stuart, propose to establish.

So soon, indeed, as interest points out the road, most surely then will our adventurous colonists push their flocks northwards, and thus render South Australia mistress of many a tract in the interior.

This once accomplished, and the shores in the vicinity of Cambridge Gulf reached (which Stuart is now endeavouring to effect), we shall then have in our hands the means of establishing a ready line of telegraphic communication across the great continent from the south to the north, to which attention has been specially called by Sir Richard Macdonnell, and by which we may place our Australian colonies in direct communication with our East Indian possessions.

This view of the subject necessarily leads us to the main desideratum towards the completion of the successes of our great Australian colonies, by the establishment of a port in one of the numerous deep and capacious roadsteads on the coast of Northern Australia. This desideratum has been earnestly pointed out to this Society on previous occasions by Sir R. Murchison, who has for

many years taken a keen interest in the development of the resources of Australia; and now that we see our way to the formation of direct pathways thither across the continent, our Government may, if unwilling to lead, still deem it desirable to lend a fostering hand towards the formation of a settlement in tropical Australia. The surveys of Captain Stokes, followed by the expedition of Mr. F. Gregory, have completely proved that the eastern inlets of Cambridge Gulf and the mouth of the northern Victoria river are spots well adapted to receive a new colony.

Let it not be said that the heat of the climate, about 15° s. latitude, is a fatal impediment to the flourishing condition of any colony of which Englishmen are the leaders, but not the operatives. Nor let the example of Port Essington, which was occupied for a few years and then abandoned, be cited as a warning against the success of a better chosen settlement on that coast. Port Essington, besides being four degrees nearer to the Equator than the head of Cambridge Gulf, was so ill-selected a spot, so exposed to tornados and malaria, that its failure might *à priori* have been predicted. On the other hand, such a site as that near the mouth of the Northern Victoria, where Gregory's camp was pitched, would ensure a good result. For there our countrymen lived during many months without the loss of a man, and were surrounded by a rich vegetation, including native cotton. To such a settlement Malays, Chinese, and Coolies would easily be attracted by English wages, and, under the influence of the sea-breezes, fine cotton plantations might arise, and thus secure for us in our own Australia the very staple on which the chief manufacture of our country relies.

That North or Tropical Australia is destined to be occupied by our countrymen seems to be no longer doubtful, when we look to the advance made towards it by the other colonies of the continent as well as by South Australia.

Thus, Mr. F. Gregory, whose explorations in the interior of West Australia have already shown to how great an extent flocks may be pastured to the eastward of that colony, and have made us acquainted with the subsoil of large districts, is now at the head of an expedition supported jointly by the British and local governments, which, disembarking to the north-east of the Murchison and Gascoigne rivers, is proceeding towards the same goal whither Stuart is tending from the south.

At the same time we learn from Victoria, that with the hearty approbation of Sir H. Barkly, a great land expedition is proceeding

across the interior aided by camels—animals for the first time employed in Australia.

Again, if we turn to the remarkably flourishing new colony of Queensland, we know from the Governor, Sir G. Bowen, that its most forward northern settlers are already pushing on towards the Gulf of Carpentaria, whilst others are working their way gradually westwards into the interior. By such means therefore we cannot doubt that, as the material interests of the colonists lead them to extend their locations, we shall, ere a quarter of a century has elapsed, have so taken possession of the northern coast that no other nation can occupy grounds on which the British flag was first hoisted by Flinders, and whither we have since sent several explorers. In short, Britain being in actual possession of three sides of this continent can never permit any other nation to set foot on the remaining coast, facing as it does her great Eastern possessions.

In speculating, as many persons have, on the probable sterile and saline condition of a large portion of the interior of Australia, it is fair to say that many solid grounds existed to favour that hypothesis. The absence in the interior of any great rivers announces the non-existence of lofty ranges of mountains, and this fact constitutes the great difference between the central region and the eastern fringe of the continent, where a rocky cordillera, rising to a considerable altitude in its southern extremity, is the source of the mighty Murray river. As this chain arrests the clouds fleeing from the Eastern Ocean, it was naturally inferred that the interior on the west, if unprovided with high hills, must be sterile. And so, indeed, to a great extent, it has proved to be. For, although MacDonall Stuart has shown that along one devious path a traverse can be made from south to north, no sooner did he turn eastwards and follow the small streams which rise in the low ridges on the west as they flow to the central depression, than he found them becoming saline at their mouths, and terminating in a great salt lake ranging from south to north.

That this saline lacustrine depression must have a certain width is demonstrated by the fact, that when Sturt explored northwards to latitude $24\frac{1}{2}^{\circ}$, he found himself in a stony, arid desert, which was evidently the eastern side of that great watery saline north and south depression of which Stuart has defined the other side in a lower latitude.

Judging, then, from our present stock of information, it would seem rational, in the absence of any mountains of sufficient altitude

to condense vapour, and with the knowledge that certain waters flowing from low hills tend to a central depression, to infer that other low saline tracts besides those which we already know of will be detected in Central Australia. This view is, indeed, sustained by the exploration of Mr. F. Gregory in his memorable explorations in North Australia, when, after proceeding from the higher grounds near the northern coast, he descended into a lower interior country, and was stopped by its saline character.

But if such should prove to be the case in the internal tracts immediately to the north of Lake Torrens in South Australia, it is quite within the bounds of probability that the views of Colonel Gawler respecting the valuable and well-watered character of a very large region lying between Western and Southern Australia may be realized. In the mean time enough is already known to enable us to express a confident belief that, ere a generation shall have passed away, all the colonies of Australia will be united, if not by internal roads, at all events by electric telegraphs, whilst through her northern ports she will enjoy a direct communication with India and China.

AFRICA.*

The past year has been characterised rather by the publication of previously completed journeys, and by the outset of new expeditions, than by any accomplished work of actual exploration.

Livingstone is almost the only traveller who has advanced far into Africa since our last Anniversary; and even his journeyings, in which he took back to their home the remnant of that faithful Makololo body-guard whom their chief had confided to his honour, lay too near his previously-described route to afford much geographical novelty. We have, however, from his pen and from that of his brother an exceedingly graphic re-description, careful measurements, and a small map of the unique cataract of Mosioatunya, popularly called in England the Victoria Falls. They show that Livingstone, in his previous journey, had so anxiously avoided exaggeration as to fall into the opposite error, and that he had considerably underrated the scale of this marvellous cataract. It now appears that the river is upwards of a mile in breadth, and that, when flowing over a level country, it comes suddenly upon a connected series of deep and narrow chasms running in abrupt zigzags athwart its bed, but hardly extending beyond it: these finally

* F. Galton, Esq., Hon. Sec., R.G.S.

widen out, and lead away in the general direction of its course. Into the first of the chasms, which happens to be less than 100 yards across, the entire Zambesi tumbles at a single leap (but in many divisions, at least at the time of extreme low water) to a depth of 400 feet, and thus disappears from the surface of the land. After its fall, the river is visible from occasional points of view, struggling in those strangely-contracted and tortuous depths through which it has to make its further way.

By our last intelligence Livingstone's new steamer had reached the mouth of the Zambesi, and he had started in her to explore the Rufuma River, which may prove the most convenient highway from the coast, to the Shirwa and Niassa lakes. Bishop Mackenzie accompanied Livingstone. He had arrived, with about ten members of the Oxford and Cambridge mission, ready to commence operations at such point as Livingstone might recommend. Yielding to his urgency, he has postponed fixing on any locality until the Rufuma shall have been examined: in the mean time the other members of the Bishop's party are located in healthy quarters, in the Comoro Islands. Sad news has been received of the mortality among a party of missionaries who were despatched to the Makololo overland from the Cape.

Between the Rufuma River and the latitude of Zanzibar, we have to lament the failure of two expeditions undertaken with great zeal. The scientific German traveller Roscher was murdered close to the Niassa Lake, and the Baron von Decken, who started from Zanzibar in prosecution of Roscher's discoveries, and in search of his papers, has been robbed, repulsed, and compelled to return. However, in despite of this mischance, his energy is unabated, and he proposes a fresh attempt on a more northern district of Eastern Africa.*

Captain Speke has taken the first step on his adventurous journey towards the sources of the White Nile. At the date of his last letters † he had attained the high plateau of the interior, over which an unobstructed course lay along his old route to the Nianza Lake. Beyond its southern shore that district of mystery begins, whence we shall anxiously watch for his emergence into the basin of the White Nile. But lest he might arrive in distress at those bar-

* Intelligence has just been received by Sir R. Murchison, that the geologist, Mr. Thornton, formerly attached to Dr. Livingstone's expedition, had, after recent travels in the neighbourhood of the Zambesi, arrived at Zanzibar, and undertaken to accompany the Baron Von Decken, who was on the point of starting for the snowy mountains of Kilimandjaro.

† See postscript to the Address, p. 217.

barous outposts of North African commerce during the dead season of the year, when no civilized help is to be hoped for, and when adverse winds and heavy rains make further progress impossible either by water or by land, the Council of this Society has made every effort to utilise the proffered services of Mr. Petherick. That gentleman, H.B.M.'s Vice-Consul at Khartum, who is eminently capable from his position and his experience to render the desired assistance, offered to station himself at Gondokoro until July next, with well-armed and provisioned boats, to await the coming of Captain Speke. On our appealing for the necessary funds to the public, by a circular, in which the urgency of the case was explained, we must all have been gratified to witness the liberal response which that appeal elicited. A sufficient sum was speedily subscribed to carry out the above objects, and Mr. Petherick started last month on his journey.

Two travellers, stimulated by the first news of Speke's discovery of the Nyanza Lake, have anticipated him by a whole year in his present attempt. Both M. Legean and Dr. Peney left Khartum last summer, on the same errand, but by different routes—the former by Kordofan, and overland to the south; the latter in company with a large Egyptian expedition, by boats, to Gondokoro. Dr. Peney appears to have finally set at rest a long-disputed geographical fact, namely, the altitude of Khartum above the sea-level. By the published results of a large number of barometrical observations, he describes it to be 1100 English feet.

Lastly, some allusion must be made to the travels and sketch-map of Miani, who describes his route far beyond Gondokoro through a rugged and mountainous country traversed by the White Nile.

There is yet another traveller, the Austrian Consul at Khartum, Dr. Heuglin, in whom German geographers take an especial interest. He has started for Wadai, in search of the lost papers of Dr. Vogel, and with the intention of further research.

*West Africa.**—In Western Africa the energies of England during the past year have unhappily been more engaged in hostile collisions than in geographical research. The interesting republic of coloured men in Liberia has, like our own Australian colonies, encouraged exploration into the unknown interior behind their settlements which produced the results obtained by Seymour and

* Dr. Hodgkin, Hon. Foreign Sec., R.G.S.

Sims, which were referred to in the last Address. The first of these enterprising travellers started on a fresh expedition, hoping to penetrate still further into the interior; but he has fallen a sacrifice to the hardships and dangers to which he was exposed. He was a man whose name ought not to be consigned to oblivion. As one of the generally unfortunate class of persons of mixed African race, by birth Americans, he had not the advantage of early education, but he zealously improved such opportunities for self-instruction as came in his way; and it is doubtless to this cause that much of the value of the information which his energy and perseverance enabled him to collect is to be ascribed. Although he did not pretend to assign or correct latitudes and longitudes, he was able to note the character of the country, its soils and productions, in a manner well suited to advance the interests of commerce and civilization. His companion, James L. Sims, has for the present settled down, devoting himself to agricultural pursuits.

Some really interesting and valuable information regarding Western Africa, not however strictly geographical, is given by Robert Campbell, who appeared before the Geographical Society last year, in his pamphlet on Lagos, Abbeokuta, &c., printed in Philadelphia; and Alexander Crummell, a coloured graduate and ordained minister of Oxford, now a resident of Cape Palmas, and whose name appears in the President's Address of last year, has also published an important article in relation to the productions and capabilities of the same part of the world.

*Du Chaillu.**—Among the great problems which remained to be solved in South Africa, one of striking interest, which was alluded to at our last Anniversary, has been answered by M. Du Chaillu, a Frenchman by birth and education, and now a naturalized citizen of the United States. We have since had an opportunity of hearing from the traveller himself an account of his strange experience, of seeing his collection of huge anthropoid apes, quadrupeds, reptilia, and numerous birds, and of reading the detailed narrative of his eventful wanderings.

Livingstone was the first to reveal to us the great and important fact, that the region of Central Africa, extending northwards from the Cape Colony to 8° of s. lat., is a plateau-land occupied by great lakes, the waters of which, as previously suggested by Sir R. Murchison, would be found to escape to the

* Sir R. Murchison.

sea through gorges in subtending mountain-chains of greater altitude than the central watery plains. Du Chaillu, on his part, has so extended his adventurous explorations from the Western coast, north and south of the equator, as to describe for the first time the complicated river-drainage near the coast, which he has laid down on a map, and also to demonstrate that a lofty wooded chain extends so far into the heart of the continent as apparently to form a band of separation between Northern and Southern Africa. In many a tract to the north of this lofty zone, Mahomedanism has extended its sway; but to the south of it, in these meridians at least, no green flag of the Prophet has yet been unfurled; while a few zealous missionaries, living on the coasts under the Equator, and on both sides of the mouth of the river Gaboon, have established centres whence to propagate the Gospel of Christ. It was in one of those seats of the missionaries that young Du Chaillu, taken thither by his father who traded in the products of the country, first learnt the rudiments of the languages of the adjacent tribes, and obtained sufficient information to induce him, on his return to his adopted home, to fit himself out with presents, medicines, and arms, and then to enter upon one of the boldest ventures which man ever undertook. In vain had the missionaries and trading blacks dissuaded him from such an undertaking by depicting to him the savage character of the tribes of men (some of them cannibals) among whom he must trust himself, to say nothing of the ferocity of the quadrupeds and the impenetrable nature of the densely-wooded jungles and forests he would have to traverse. An intense love of natural history led him to plunge into these hitherto unexplored wilds. The giant anthropoid ape gorilla,* specimens of which had some years ago been for the first time brought to Europe by traders on the coast, was known to flourish in all his pristine vigour in the interior, and many a curious quadruped and bird were described as being common to that region. The die was therefore resolutely cast by the young naturalist; and, with a few black carriers and canoes, and without one white attendant, he dashed into thickets where no European had ever put his foot. Gaining the goodwill of chief after chief, and being probably con-

* Though a few years only have elapsed since specimens of the great *gorilla* ape were first brought to Europe, there seems to be no doubt that Hanno, a Carthaginian navigator who reached the western coast of Africa southwards, did bring back the skins of the females of certain hairy creatures called Γορίλλαι, and suspended them in the temple of Juno at Carthage, as evidences of the discoveries he had made. (See the Periplus of Hanno, and Du Chaillu's 'Equatorial Africa,' p. 343.)

sidered by their sable majesties as a white spirit whose wrath might be fatal to them, and whom they must therefore propitiate, he has been enabled not merely to describe the singular habits both of the people and of the wild animals, but also to make a sketch-map of the region, and to define the course of the chief rivers, before and after they unite in a network of streams near the coast. When at the extreme eastern point of his tours, the information he derived from the natives led him to believe that the rocky and densely-wooded mountains really extended for so great a distance to the east that they might be supposed to send out embranchments into those highlands north of the Unianyembe Lake of Burton and Speke, which these authors called the Mountains of the Moon. Including periods of return to his friends the missionaries on the coast, and his voyages to and fro, he occupied nearly four years in these arduous explorations, and got together a greater quantity of apes, quadrupeds, and birds (some of them never before seen) than probably ever fell to the lot of one unassisted traveller. It is not our province here to estimate the scientific value of these animals, but we know that, in the opinion of Owen and some of the first zoologists of Europe and America,* M. Du Chaillu has not only added greatly to their previous acquaintance with the fauna of South Africa, but has by his clear and animated descriptions, convinced them that he has been as close an eye-witness of the habits of the gorilla and his associates as he proved himself to be their successful assailant. Strikingly attractive and wonderful as are his descriptions, they carry in themselves an impress of substantial truthfulness.

He has introduced us to many novelties in a hitherto unknown land, partly mountainous and partly plain, deluged with heavy rains lasting nine months in the year, overgrown with gloomy forests, and sparsely inhabited by man or beasts. Although its native tribes seem to be similar in their superstitions, their ordeals, and their customs to those we read of elsewhere in African negro-land, the startling fact is presented to us of an avowed system of cannibalism among at least two tribes, who do not appear to be otherwise remarkable for brutality of character. Some passages

* See Hartlaub's 'System der Ornithologie West Africas,' 8vo., Bremen, 1857 (Preface). Also Cassin's 'Description of New Species of Birds from Western Africa,' 'Proceedings of the Academy of Natural Sciences, Philadelphia, during the years 1855-6-7-8-9.' Appended to these papers, extracts have been printed in his absence from letters to his correspondents—thus furnishing an independent record in the United States of the several journeys of Du Chaillu.

in Du Chaillu's work throw light on the probable origin of this revolting practice. Thus we learn that animal food is exceedingly scarce, and that, while an abundant supply of the vegetables which these negroes cultivate is barely sufficient to supply human wants in their depressing climate, their improvidence constantly reduces them to feed on the still less nutritious produce of the forest. Hence an uncontrollable craving for meat attacks individuals, and constitutes a recognised malady called *gouamba*, characterised by a pitiable state of nervous exhaustion. When this state of things prevails among numerous tribes, each of whom develops its own barbarous customs unchecked by the opinion of the rest, it is credible enough that cannibalism should have been resorted to in many instances, and that its practice should now and then take permanent root and become an established custom. In fact, the same want of animal food in New Zealand led, it is well known, to a similar system of cannibalism, before that country was colonized by Britain.

Aware that the faithful description of a region so exuberant in many natural productions, and inhabited by gigantic apes, and in one part by cannibal races, might probably be doubted, M. Du Chaillu is quite prepared to meet all cavillers and objectors. He knows as well as we do that although many of the discoveries of Bruce in the last century were repudiated and treated as fables, yet that, with the advancement of geographical research, the detractors of Bruce have had their own names consigned to oblivion, while the wonderful and so-called "travellers' tales" of the great Abyssinian explorer have been verified by his followers. Knowledge is indeed much more diffused than in the days of Bruce, and, to the honour of the contemporary press, the narrative of M. Du Chaillu has generally met with fair criticism, while most of the periodicals of the last fortnight have awarded to his work that praise to which, in the opinion of Professor Owen, as well as of many geographers, it is eminently entitled. His numerous friends have now only to express a hope that the work on Equatorial Africa may bring much profit as well reputation to the undaunted explorer, who, despite of numerous fevers, has gone over some thousands of miles of hitherto unknown lands, and has brought to us what most will admit to be unanswerable evidences of his fidelity of observation—evidences which the Council of this Society has considerably allowed him to exhibit in our own apartments in Whitehall-place.

Reverting then to what M. Du Chaillu has accomplished as a geographer, and to the sketch-map which he has prepared, let it be well understood that he never claimed to be a man of science. Far from pretending to have made astronomical observations, or to have determined either distances or altitudes with precision, he has simply told the tale of an adventurous explorer, and has laid down, as well as he could, the outline of his marches and canoe voyages. And when we consider the difficulties he had to overcome, surely we ought to make due allowance, if in the compilation of a work from his rough notes of several years, and in the endeavour to condense the account of so many curious and dangerous wanderings, there are one or two mistakes of dates.

But notwithstanding these defects, no one who reads the work of M. Du Chaillu can doubt, that he did hunt and kill the gorilla in the rocky woodlands of the interior, that he lived among cannibal tribes, and that he has graphically described the physical outlines and vegetation of tracts never before visited by any European. The truthfulness of his statements is indeed borne out by the printed records of the eminent ornithologist, M. Cassin, in the Proceedings of the Academy of Sciences of Philadelphia, at the request of which body he made his second and longest expedition of three years and eight months, and also by references to the very missionaries from whose dwellings he made his excursions.*

Let us therefore unite with our practical geographers, Arrow-smith, Findlay, and others, in attaching due merit to the sketch-map on our walls which has resulted from such labours, and let us join the ethnologists in thanking M. Du Chaillu for his vivid description of wild and barbarous natives. Above all, let us thank him for the indomitable energy and courage with which he has successfully played the part of a bold geographical pioneer.

CONCLUSION.

In the preceding summary of the progress of Geography during the past year, I regret to say that, notwithstanding the various able contributions of my associates, there are still omissions of great import-

* Whilst these pages are passing through the press, an unexpected and unsought-for testimony to the truthfulness of M. Du Chaillu's narrative has been produced by Mr. P. Lund Simmonds, F.S.S., in two letters from his brother-in-law, Mr. Walker, the missionary, who wrote in 1858 and 1859 from the Gaboon country, and who was himself acquainted with the explorations of our traveller, of whose deeds and character he speaks in terms of high commendation. (See the 'Critic,' weekly journal, July 6, 1861, p. 17, for the letters from Mr. Walker to Mr. Simmonds.)

ance which must be supplied at our next Anniversary. Thus, as respects Europe, I have not been enabled to lay before you a notice of the advance of our science in Scandinavia, France, Spain, Switzerland, Italy, Greece, and Turkey.

In our past Session we have, indeed, been favoured, as noted at p. 196, with some accounts of various Asiatic regions, of which the sketch, already alluded to, of the environs of Yeddo, and a journey to the celebrated volcanic mountain of Fusi-yana by Mr. Alcock, Her Majesty's Minister at the Court of Japan, is singularly attractive and interesting, and will form a rich addition to our next volume. For this memoir is not confined to a lively description of the customs and habits of the people, but gives us also a clear insight into their very peculiar political and social condition, which seems to have been permanent for at least three centuries.

Thanks to the triumph of the combined forces of England and France, the natural features of the interior of the Chinese empire are now fairly laid open for the first time to geographical explorers.

Among the efforts which our countrymen may make to penetrate these unknown lands, we have every reason to anticipate most striking and original results from the journey which Major Sarel and Captain Blakiston are now carrying out, by ascending to the sources of the Yang-tse-Kiang, and thence traversing the lofty chain which separates China from Hindostan—a project worthy of a Humboldt.

Again, we are informed that the Government of India, being desirous of ascertaining the real nature of the route between Burmah and China, are about to send a party to determine the position of the hitherto somewhat mythical city of Esmok, to the importance of which, and to the best line of commercial intercourse, our attention has been drawn by Captain Sprye. The re-consideration of these interesting subjects will probably form prominent features of the next Anniversary Address.

In now taking leave of you, gentlemen, for the eighth time, as your acting President, I cannot but feel highly gratified in having witnessed the surprising manner in which our Society has attained its present degree of popularity, and in seeing that it has acquired an influence which is vigorously exercised in promoting the highest behests of geography and travel.

When I bade you farewell in 1859, I prided myself on the fact that our body had increased from 600 to 1200 members, and now I rejoice to announce, that our numbers have further been swelled to

1550; so that we thus actually double the amount of any other scientific body in the metropolis. On a former occasion I had also to congratulate you on having obtained a Royal Charter, in which my efforts to promote your interests were more than fully repaid by the kindness with which you incorporated my name in that important document.

In the distinguished noblemen who succeeded me, we were unfortunately deprived of the valuable services of one, by his being called to take an active part in the administration of the country; whilst our present leader has, through ill health alone, been less among us than it was his earnest desire to be. But whenever Earl de Grey and Lord Ashburton have been able to preside, we have felt that we made a just selection in placing such men at our head, whilst it was pleasing to observe that persons of their social distinction esteemed it a high honour to be our chiefs.

Lastly, let me repeat, that had our actual accomplished President been able to attend this Anniversary, I feel assured he would have rendered better service in advancing our cause than I have been able to do in this emergency; and I therefore earnestly trust that at our next Annual Meeting we may welcome him in such good health, that he will then have it in his power to prove to you how truly he has it at heart to promote the continuous prosperity of the Royal Geographical Society.

P.S.—*July 15th.* The last accounts of the expedition of Captains Speke and Grant, communicated by Lieut.-Colonel Rigby from Zanzibar, are dated Dec. 12th, 1860, from Khoko, in Western Ugogo. The travellers had encountered heavy rains, and had lost some of the native followers and mules; but, nothing dispirited, they had killed rhinoceroses, buffaloes, many varieties of antelope, zebras, pigs, and a giraffe, and were proceeding to Tura and Kazeh.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1860-61.

Fourteenth Meeting, Monday, June 10th, 1861.

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

ELECTIONS.—Colonel the Hon. Hugh Annesley, M.P.; Lieut.-Colonel J. Dixon; Major Robert Jones Garden; Sir Willoughby Jones, Bart.; Lieut. Langham Rokeby; the Duke of Sutherland; Lieut.-Colonel the Hon. W. P. Manvers C. Talbot; Capt. Henry Thurburn; and G. T. Archer; William Aubin; David Balfour; George Berkley; William Blenkin; Henry Fox Bristowe; Charles Butler; George F. Chambers; J. Coghlan; David Cruikshank; George Hamilton Dundas; Thomas W. Du Pré, M.D.; Henry Edwards; John Bromley Foord; John Gallagher; Alexander Grant; Chas. Hall Hall; Blake Alex. Hankey; Alexander Hector; J. George Hodgins; Jas. Stewart Hodgson; William Kelly; James Lamont; John Pennington Legh; Alexander Ogilvie Lloyd; John C. Loch; Arthur Pemberton Lonsdale; Frederick Pike; Lonsdale Pounden; William Severin Salting; Hercules Scott; Joseph Travers Smith; J. D. Vaughan; Arthur Way; E. Wigzell; and Junius Spencer Morgan, Esqrs., were elected Fellows.

The First Paper read was—

1. *Notes on the direct Overland Telegraph to India.* By MAJOR-GEN. SIR H. C. RAWLINSON, K.C.B., F.R.G.S., &c.

THE author, in describing the present state and prospects of the overland telegraph to India, stated that his communication was wholly based upon public documents, and that he disclaimed all title to appear as the mouth-piece of the British Government.

In the year 1848, the Porte, after long negotiation with this country, undertook to construct, at its own expense, a line of telegraph from Constantinople to Bussorah. The condition was annexed that it should hereafter form a link in the communication between England and India, for it could not be expected to pay except through

carrying British messages. This line is now in working order between Constantinople and Baghdad, a distance of 1314 miles, but the further course of the great Indian communication has not yet been officially decided upon.

The original proposal of laying a sub-fluvial cable from Baghdad to Bussorah, and thence a submarine one onwards, has fallen into discredit owing to the widely-felt mistrust of telegraphic communications under water. Sir H. Rawlinson therefore confined himself to considering the land routes in minute detail. He showed it would be necessary to avoid the disturbed districts eastward of the lower course of the Euphrates, and concluded that a line passing to Teheran appeared the best course. Teheran has peculiar advantages as a principal station: first, because a line passing that way would be sure of the favour of the Persian Government; and secondly, because it would there be connected with other lines of telegraphs. An electric communication is already established between Teheran and Tabriz, while Persian telegraphy seems likely to progress and to connect itself with the Russian system by way of Tiflis, and even with our Scindian frontiers by way of Herat. After leaving Teheran the Indian line would naturally pass Ispahan and Shiraz and reach Bunder Abbas, at the mouth of the Persian Gulf. From Baghdad to Bunder Abbas would be 1302 miles. Nearly the whole of this route passes over ground with which geographers are acquainted, and a minute description of it is contained in the present paper.

From Bunder Abbas to Kurrachi the case is different, for we know much less of the land. However, the coast virtually belongs to two princes, both of whom are in close alliance with us, and sincerely desirous of aiding the construction of the telegraph; namely, the Imaum of Muscat and the Khan of Kelat. Moreover, we are not without some direct information, though the Reports which are most valuable are not of recent date:—one of these is by Capt. Grant ('Journal of the Royal Asiatic Society,' 1836), and the other by an Affghan agent named Hagi Abdul Nebi ('Journal of the Asiatic Society,' Bengal, 1844). Lastly, the steamers of the Indian Navy have been in the habit of touching at several points along the coast, and the *Zenobia* has been recently sounding close in shore. Officers will probably soon be deputed to execute a complete survey of the route along the coast. In the mean time preliminary reports have been received from the Commissioner in Scinde, and from the agent for the Government of India with the Imaum of Muscat, which are as favourable as could be wished.

From Bunder Abbas to Kurrachi would be 731 miles, and there-

fore the entire distance from Constantinople to Kurrachi by the line described by Sir H. Rawlinson would amount to 3351 miles.

SIR RODERICK MURCHISON said he thought they ought to renew their thank to the distinguished author of the paper they had just heard. They had great reason in that Society to be proud of Sir Henry Rawlinson, because they had a right to flatter themselves on the fact that the Royal Geographical Society was the first scientific body that, many years ago, perceived his merits. It was to them that Sir Henry communicated his first work on the North of Persia, and for that communication the Geographers adjudged to him their Royal medal. He did not say that that medal had incited him to do all the great things he had done since, for Rawlinson would have risen through every difficulty; without that reward he would have discovered the ruins of Babylon and deciphered the unknown languages of its peculiar inscriptions; but they had a right to flatter themselves that they were the first to discover the merits of that remarkable man. The paper that he had read had been put before them in a very clear manner, and showed distinctly what was doing and what had been done in connecting England with our East Indian possessions. There were several gentlemen present who had traversed those regions, amongst whom were Captain Selby and Captain Lynch, and no doubt they would give the Meeting their views on the subject.

CAPTAIN LYNCH thought the subject one of the most important ever brought before the Society. It had long engaged his attention, and he believed it the true path to India. He would, after the clear manner in which the paper had been brought before them, only allude to that part of the country which lay between Shiraz and Bunder Abbas. He had examined it many years ago, but not with reference to a telegraphic communication, and he still retained sufficient recollection of the route to know that between Shiraz and Bunder Abbas not the slightest physical difficulty would be experienced in establishing a telegraphic wire. It was a beautiful country, rising by steps from the Persian Gulf. The telegraphic wire would be perfectly safe in all that part of the country.

CAPTAIN SELBY said he had only just come from Baghdad, a part of the country where the telegraph had been laid, and could say it had been entirely successful. The wire had been carried over mountains, and over a part of the country where it would have been thought hardly possible to have done so. It had been laid throughout with great perseverance, and he had no doubt it would succeed. The first message was brought from Constantinople to Baghdad whilst he was there, and a very important message it was. When he was at Mosul the line was in perfect working order, and messages were constantly being transmitted. But he very much feared that, if left in the hands of Turkish officials, it would be conducted at much greater cost, and under much greater difficulties, than under English supervision. The Kurdish and Arab tribes had no belief that anything introduced by the Turks into their country could be for their good, and they would look upon the line as the forerunner of other and stronger measures for their repression. Indeed, when at Diarbekir on his way to England, he was present at an interview between a sheikh of the D'thuffeah Arabs and Mr. John Taylor, our consul at that town. Enjoying, as this gentleman does in a most marked and perfect manner, the entire confidence and affection of all the Arab tribes among whom he has been, speaking their language perfectly, and entirely conversant with all their manners and customs, his home is ever the resort of all who have known him in the desert, and who seek him either to renew old friendships or to ask counsel in times of difficulty. The conversation turned on the line that was then being carried through the country, and Mr. Taylor asked the D'thuffeah whether the Arab tribes would let it pass through the desert. "If in your hands,

yes," the D'thuffeeah replied; "but if in the hands of the Turks we should destroy it, looking upon it but as the forerunner of forts and soldiers to coerce us." He was also opposed to the submarine line from the Persian Gulf to Kurrachi, except close in shore along the Mukran coast; the bank of soundings was very irregular, and experience had proved that in very deep water there were difficulties to be overcome which as yet we had not taken into account. For his part, he believed that the enormous pressure to which the wire was subjected at great depths destroyed the insulation.

SIR CHARLES BRIGHT was sure that all those who, like him, were interested in telegraphic enterprise, must have felt greatly indebted to the gentlemen who had spoken, for the manner in which they had treated the subject. To have telegraphic communication with India was of vital interest to the country, and it was most satisfactory to be assured by travellers acquainted with the country, that it was possible to have an overland communication to India. But at the same time they must not be dependent altogether upon this proposed route *via* Baghdad. The overland line could be worked very well in times of peace, and the difficulties of maintaining it might have been over-rated; but it was necessary, looking forward to the possibility of times of trouble, that we should have an additional line of communication with India, seeing that there were really no natural obstacles of any consequence by the other route. It would not do to be dependent upon either the Turkish or the Persian Government; he therefore felt that they must have a direct line of communication by submarine wires laid down the Red Sea to Aden and thence to Kurrachi, in addition to the line described by Sir H. Rawlinson. That gentleman had started in advocating the line upon the assumption that submarine enterprise was at a standstill, and hitherto had been unsuccessful. In that he (Sir Charles) did not agree with him. The public did not always hear of those cables which were worked with success; they did not hear of those lines which were carrying our messages daily to the Continent, and working excellently in many other parts of the world. There were twenty-six different wires—some laid in shallow and some in deep water—working successfully to various parts of the Continent alone, without enumerating many others elsewhere, which had never ceased to work for an hour, and had not cost a shilling for repairs since the day they were laid. He thought Sir Henry, if he was acquainted with the real causes of the defects in the present Red Sea line, would agree with him that a line ought to be laid down the Red Sea as well as along the shores of the Persian Gulf. They ought to have by sea a massive durable line laid down with every appliance that modern science could suggest; and if this were done judiciously, and without parsimony, he was sure that this country would have a complete communication with India, and thence to Australia, of the most certain and permanent character.

MR. GEORGE SHAW LEFEVRE said he thought that some credit should be given to the much-abused Turkish Government for the enterprise they had shown in laying down a line of telegraph to Baghdad—a work of far greater importance to our country than to their own. He was about four years ago at Constantinople with the officers in the employ of the Euphrates Telegraph Company, and was witness to the intrigues which took place on the part of the Austrian and Russian diplomatists to prevent the formation of the line proposed by that Company, which was identical with that now completed as far as Baghdad. By the aid of Lord Stratford the consent of the Turkish Government was after many weeks obtained, but at the last moment the Company were thrown over by the home Government, owing to the recommendation of the late Mr. Wilson in favour of a Red Sea line and an Austrian line from Alexandria to Trieste—a decision which was most unfortunate, as it had postponed for some years the completion of telegraphic communication with India. He quite agreed with the last speaker that we should have a second line to India, but certainly not that which he advocated, the defunct Red Sea line. He should recommend, if the

Turkish line were continued from Baghdad to Ispahan, as proposed by Sir H. Rawlinson, that a line should be made from Ispahan to Tiflis, to which place he believed that the Russian Government had already laid down a telegraph, or were shortly intending to do so. It was to be noticed Tiflis and Ispahan were points upon the shortest line which could be drawn from London to Kurrachi, namely, the arc of a great circle, whose course would lie through the centre of Germany, the south of Russia, the Crimea, Tiflis, Persia, and Beloochistan. After what had been said to-night he believed that line to be practicable throughout.

SIR RODERICK MURCHISON said one of the Council of India was present, and he was sure the Meeting would like to hear him speak upon the subject.

MR. PRINSEP thought it was hard to be called upon to speak upon the geographical merits of a line with respect to which he could boast of no personal knowledge. All he could say was, that as a member of the Council of India he had always supported a land line in preference to a submarine one. He thought the idea of a submarine cable was chimerical. If one were laid down, he did not think it would be lasting; and those who speculated in submarine telegraphs, if once a failure took place, lost the whole of their capital. He had not the slightest doubt that the line which Sir Henry had brought before their notice would be laid successfully. The Government of India and the Government of England were both in favour of the enterprise. As regarded the extension of the line to our colonies, that was quite a new and a difficult question. There had been an attempt to carry a line via Singapore and Java, and thence to Sydney, but the cable met with an accident; and now they were going to lay the line from Egypt to somewhere in the Mediterranean. The Government had given up the idea of laying the cable to Singapore, as they did not think it could be successfully laid in the way it was intended.

SIR CHARLES BRIGHT.—A portion has just been laid from Malta to Tripoli.

MR. MARSHMAN said he did not come to the meeting with the intention of saying anything, but he felt called upon to say a few words respecting the Red Sea telegraph, and in the first place he must mention that his friend Mr. Prinsep was misinformed when he said those who embarked in that undertaking would be losers.

MR. PRINSEP.—Not forgetting the guarantee.

MR. MARSHMAN said they had a guarantee from Government of 4½ per cent., so that there could not be a doubt as far as the security of those who had embarked in the undertaking was concerned. He had alluded to the guarantee, which was a matter of the highest importance to the body of shareholders. With regard to the line itself, they must be fully aware that messages were conveyed by it for five days between Alexandria and Calcutta, and on one occasion a message was received from Calcutta to London, through the wires of the Red Sea telegraph, in six days, five days of which were occupied in conveying the message by steamer from Egypt to France. Some of the sections of their cable had given way, and they had not been able to go on with the repairs, because the Treasury had not yet given their sanction to the operation.

SIR RODERICK MURCHISON thought that, as Sir Henry Rawlinson had not said a word against the Red Sea line, the discussion had better be confined to the paper, which was the overland route.

MR. CRAWFORD would not have risen to say a word upon the subject, had it not been for the two last speakers. The Government had already sunk some hundreds of thousands of pounds upon oceanic cables, and he hoped they would never try them again. Whatever attempts might be made, he believed they would fail. By the Red Sea cable the shareholders had lost nothing, but Government had lost 800,000*l*. The shareholders of the At-

lantic cable had lost everything, and he repeated that he hoped they would never hear anything more about those distant oceanic cables. He was very much obliged to Sir Henry Rawlinson for his paper, for it dealt practically with a most important subject.

SIR RODERICK MURCHISON said that before Mr. Markham read his paper he had to apologise to the Meeting for the unavoidable absence of their President, Lord Ashburton. The President's next soirée was fixed for Wednesday the 19th inst., when his Lordship would be glad to see them all at Bath House. He also wished to state that they had a recent communication from Dr. Livingstone, which showed that he had made an attempt with the *Pioneer* to ascend the river Rufuma; and, after grounding several times, he had been obliged to desist, returning to the mouth of the river, and finding his way back to the Zambesi, with the intention of going to his old country watered by the Shire.

The Second Paper read was—

2. *Sources of the River Purus, in South America.* By C. R. MARKHAM, Esq., F.R.G.S.

MR. MARKHAM had been employed on a special service by H. M.'s Government in the early part of this year, to collect cinchona plants in South America—a duty which led him to explore the country immediately to the N. and N.W. of Lake Titicaca. There arise the rivers Madre de Dios and Ynambari, which are the chief headwaters of the still unexplored Purus. The Purus is the only great southern affluent of the Amazon which is entirely unknown to geographers, although, from its position and body of water, it seems destined to become the most important of them all. Without Mr. Markham's sketch-map it is difficult to explain the results of his explorations. They were chiefly in the province of Carabaya, which lies at the foot of the Eastern Andes, extending from Marcapata to the frontier of Bolivia. The history of this province dates from Inca historians, by whom we hear of it yielding great quantities of gold, and is continued in Charles V.'s time, when a party of runaway gold-digging mulattoes settled in it. Ultimately the Spaniards took possession. About seven years ago it attracted attention anew, and became a sort of California to South America, but success in gold-digging was found uncertain, and the excitement died away. Crucero, so called from the number of roads that cross in the place, is the mud-hut capital of the province, planted on a bleak table-land, 13,000 feet above the sea. On the west snow-mountains rise high above the town, but eastward the descent is rapid into the forest-covered plains of South America. In these warm slopes lie all the wealth and population of Carabaya. Its population is about 22,000, and they export cocoa, coffee, chili pepper, and gold. The valleys between the consecutive spurs of the Andes are described in order by Mr. Markham; the direct roads

from one to the other are so difficult, that it is often more troublesome to cross the intervening ridges than to travel up to Crucero and thence down the valley aimed for. To these geographical features is due the importance of the seat of the capital. Sandia is the most important of the valleys, and is the one where Mr. Markham stayed the longest. Its sides are terraced with the now abandoned gardens of the Incas, and the scenery—a mixture of tropical vegetation with crags and snowy mountains and silver torrents—is described as of superb beauty. Abundant cinchona-trees are found there.

SIR RODERICK MURCHISON thought they were very much indebted to Mr. Markham for the services he had rendered. He was one of the few travellers who had examined both sides of the Andes. Mr. Markham had recently been actively engaged in transporting the cinchona or bark-plant to India, to establish plantations of it in a country where vast sums are expended in the purchase of quinine to keep in health our troops and the natives employed by us. He (Sir Roderick) could not adjourn the Meeting without warmly congratulating them on the success of the Session just ended.

The proceedings then terminated, and the Meeting was adjourned to the next Session.

ADDITIONAL NOTICES.

1. *Currents and Icedrifts on the Coasts of Iceland.* By Capt. C. IRMINGER, of the Danish Navy, Corresponding Member R.G.S.

In the northern part of the Atlantic Ocean the surface-water sets steadily with a gentle flow towards the north. Coming, as it does, from more heated regions, and being constantly provided by fresh supplies of heated water, it maintains, as is well known, a moderating influence on the climate of the coasts which are washed by it.

Between Iceland and Norway this current takes a north-easterly direction to the Icy Sea, but without touching the extreme eastern coast of Iceland. It tempers the climate of the Faroe Islands, Shetland, &c.; and its influence is so considerable on the coasts of Norway, that harbours, even up to the North Cape (which is in about 71° lat. N.), admit shipping the whole year round, while in the coldest time of winter it is only the innermost of the smaller bays in the fiords that are covered with ice.

To the westward of the meridian that halves Iceland, the current from the south runs in a north-westerly, or even more northerly direction, until it is stopped by the current from the sea around Spitzbergen. This "Arctic current" runs south-west; it passes the north-west coast of Iceland on its way to Greenland, along whose coast it makes its way and rounds Cape Farewell. The first-mentioned current from the Atlantic Ocean washes the south-west and west coasts of Iceland, and is found to run true N. 33° W. at the rate of 1.19 nautical mile in 24 hours, throughout an area extending between W. long. 18° , N. lat. 62° , and the south coast of Iceland towards Cape Reikianæs; but, west of

Iceland, between N. lat. $64^{\circ} 15'$ and $65^{\circ} 50'$ and W. long. $23^{\circ} 51'$ and $25^{\circ} 48'$, to run N. 15° W. at 4·8 nautical miles in 24 hours.

During a protracted stay on the west coast of Iceland I have frequently been convinced of the fact, well known to fishermen there, that the current along the west coast of Iceland, in addition to a regular ebb and flood, considerably preponderates towards the north.

The annexed table, representing the temperatures of the surface of the sea in June, 1846, shows where the warmer current, running northward on the west side of Iceland, met the cold current from the Icy Sea off the north-west coast of Iceland.

1846, June 23, 6 P.M., the man-of-war brig <i>St. Croix</i> , Capt. E. Suenson, Fahr.			
was in $65^{\circ} 54'$ lat. N., and $25^{\circ} 5'$ long. W., and found the temperature of the sea			
June 24, 6 A.M., in $66^{\circ} 22'$ lat. N., and $26^{\circ} 13'$ long. W.			49·1
„ 9 A.M., in $66^{\circ} 30'$ „ „ $26^{\circ} 14'$ „ „			35·6 *
„ noon, in $66^{\circ} 17'$ „ „ $25^{\circ} 39'$ „ „			32·5
„ 4 P.M., in $65^{\circ} 53'$ „ „ $25^{\circ} 11'$ „ „			37·6
„ 8 P.M., in $65^{\circ} 38'$ „ „ $24^{\circ} 17'$ „ „			46·4
			47·5

* Drift-ice in sight to the N.E.

The current which comes from the Atlantic not only moderates the climate of the south-westerly and westerly coasts of Iceland, but is also the cause why the so-called “Greenland ice,” which is constantly found driving towards Greenland and along its eastern shores, does not visit the west and south coasts of Iceland. There, even if the greater part of the fiords and coves should be frozen up in a severe winter, the fishermen can keep their fishing going throughout the whole year in the two great bays, Faxe- and Brede-Bugt, because these bays never freeze up, owing to the influence of the warm Atlantic current. Again, although the days in the latitude of Iceland are very short in winter and the weather stormy, yet the vessel that carries the mail has succeeded, even in the middle of winter, in carrying on its voyages with regularity between Havnefiord (at Faxebugt) and England. It has never been stopped either by the Greenland ice or by the ice from the fiords or the coves.

Warm currents do not moderate the climate of the north-west, north, and east coasts of Iceland; on the contrary, these parts of the island are exposed to the cold currents from the Icy Sea, which frequently bring ice from the sea around Spitzbergen, by which navigation is frequently impeded to the greater part of the harbours here situated.

Though ebb and flood exist on all the coasts of Iceland, yet the current prevails from west to east near the north coast; possibly the cause of this is that a portion of the Arctic current impinges against that part of the north-west coast of Iceland which turns its face to the Icy Sea, and produces an eddy which runs to the eastward along the north coast of Iceland, in a nearly opposite direction to the principal stream of the Arctic current farther north.

Likewise, on the east coast of Iceland, the current is chiefly formed by an eddy, prevailing, in certain seasons at least, to the southward; a direction nearly contrary to the principal current, which, as before mentioned, sets to the north-east between Iceland and Norway. The wind has, however, much influence on the direction of this coast eddy; for though it is usually much easier to beat up to southward than northward through the help of this current, yet it does not escape the attention of the fishermen, who every year are lying on the fishing banks along the east coast, that the current may prevail to the north, when there is blowing weather from the south-west and south.

To give an idea of the force of the “Arctic current” I only need to call to mind some of the many whalers which, while being beset in various times, were carried along by it, together with the ice in which they were imbedded.

For instance, in 1777, many whalers were enclosed by the ice between Spitzbergen and Jan Mayen, and they were driven, while beset, in four months to Cape Farewell, a distance of 1400 nautical miles, with an average speed of between 11 and 12 miles in 24 hours.

W. Scoresby mentions (vol. i. p. 213) several cases in which ships, being beset between Spitzbergen and Greenland, were drifted along with the ice towards the south-west or south-west-by-south. One was a case in which a vessel drifted 182 miles in 13 days, giving a mean of 14 miles per 24 hours; another in 9 days 120 miles, or 13 miles in 24 hours; a third 420 miles in 49 days, or 8·7 miles; and a fourth case, 1300 miles in 108 days, averaging 12 miles per day. The mean of all these cases gives 11·9 miles in 24 hours; and it can therefore be assumed without much risk of error, that the mean rapidity of the Arctic current is 11 or 12 miles in 24 hours, at least during the season of navigation.

It is a well-known fact that the situation of the ice in the Icy Sea is subject to considerable changes from one year to another, for where an impenetrable ice-barrier was found in one year, vessels could in another year sail several degrees farther without being stopped by the ice; and, on the other hand, where the sea was void of ice one year, it might be impossible to penetrate so far north in the succeeding one.

The amount of the icedrift may thus be very different one year from another, and in proportion as the masses are greater which are carried away by the Arctic current from the Icy Sea, the more will the strait between north-west Iceland and Greenland become filled with it. Ice is nearly always met with here by fishermen, who ply every year from the harbours of the north-west coast of Iceland; they usually fall in with drift-ice in the strait between Iceland and Greenland at from 40 or 60 to 80 miles from Iceland.

This icedrift is frequently much more considerable. In such cases it fills not only the strait between the north-west coast of Iceland and Greenland, so that for long together it is impossible to round Cape Nord, but it also encloses the whole coast to unknown limits northwards and far to the eastward. To give an idea of the vast extent of an icedrift like this, I may mention that the distance between Iceland and Greenland is at least 160 nautical miles, and assuming the rapidity of the current at only 11 miles in 24 hours, it will follow on calculation that a mass of ice of not less than between 1700 and 1800 square nautical miles in area will have been carried away to the south-west every 24 hours from between north-west Iceland and Greenland.

This so-named Greenland drift-ice consists for the greater part of fields of ice, often piled on one another: these have been produced on the surface of the sea, sometimes to a thickness of 5 or 6 fathoms. Secondly, it consists of swimming icebergs, loosened from glaciers, and fallen into the sea; their size is sometimes so considerable that they have been seen grounded in more than 80 fathoms water.

When this ice, carried by the Arctic current, arrives at the coasts of Iceland, it brings with it a cold very prejudicial to vegetation. Usually the ice appears first on the coast near Cape Nord; it then drifts on the north-west coast, enclosing the fiords between Patrik's and Isefiord; and it will happen, though rarely, that part of this ice passes Fugle or Staalbiérghuk, and drives in the direction of the Bredebugt. The north coast of Iceland is then more or less enclosed; a considerable drift sets down to the bay of Skagestrand, and occasionally reaches even to the eastward of Langenæs, whence the current carries it upon the east coast of the island; and as the ice on the north as well as on the east coast is usually more compact than off the north-west fiords, the navigation there is sometimes wholly impeded from January or February until the following summer-time. When there is much ice on the east coast of Iceland, it may happen that some of it will drive round the south side of the island, though this never hinders navigation to the western coast.

The quantity of the ice, as well as the periods of its coming and leaving the coasts of Iceland, are very different. Some years, a great part of the coasts are enclosed by it; other years, it does not appear at all. Very seldom it comes before January or February; most frequently it comes in spring, and sometimes a little later. It is remarkable that the ice, even when the masses which enclose the coasts of Iceland are very considerable, always leaves the coasts by August at the latest.

That not only the icedrift but also the severity of the winters of Iceland are very different in different years, is well known from ancient and recent observations. Thus the annals of Iceland state in reference to the year 1348, "The winter was so severe that the sea was frozen around the island: it was possible to ride from one neck of land to another, and all the fiords were frozen up with ice." In the year 1615 it is mentioned, "That the Greenland ice enclosed the island in such a way that seals (*Vade Sæle*, a species of seal following Polar ice) were caught in 'South on the Nazes;' a great quantity of bears did likewise then come to the country, and some of them were killed on the south side of it; many large vessels, which were visible from the land, perished with crew and all."

Considerable ice-drifts have occurred in recent times. From notes communicated to me by Mr. Thorlacius, living at Stikkelsholm on the Bredebugt, by Mr. Sigurdsson, and by others, I find that the Greenland ice drifted into the north-west fiords (between Staalbierghuk and Cape Nord) late in December 1858 and in January 1859, and that about the same time ice appeared on the north and east coasts of Iceland, but left them a short while after. In February and March it returned, and enclosed the shore from Staalbierghuk to Cape Nord, also the whole north coast, even to eastward of Langenæs, and, lastly, a considerable part of the east coast, whence masses of ice drove along the south side of Iceland, passing Portland and Reikianæs. The fiords from Staalbierghuk, around the whole north coast and for some distance down the east coast, were filled with Greenland ice, which froze into a single mass with the winter ice in the fiords, and in consequence the ice did not break up in the north-west fiords before May; in the bay of Skagestrand not before June.

Still it seems that there was even more ice in 1807. The annals of this year mention, in addition to nearly the same facts as those observed in 1859, that "From the most elevated mountains on the north and east coasts no open water was visible; that the inhabitants from Grimsóe, which lies more than 20 nautical miles from the north coast of Iceland, went in spring over the Greenland ice to the trading-place Ofiord, and that several pieces of that ice were carried from the east coast round the south coast, and were seen in Faxebugt and Bredebugt; a state of things which nobody could remember to have been seen before."

As icedriffs along the south coast are unusual, I take the liberty to mention some other cases, the more readily as they confirm what I have already said on the setting of the current along this part of the coast of Iceland.

Mr. Abel, who was "Sysselmand" (functionary) in Westmanoe from 1821 to 1851, writes to me as follows:—"On the 26th of May, 1826, with calm and clear weather, a great quantity of ice was discovered from Westmanoe driving with a speed of 3 or 4 miles an hour from Portland along the coast to westward. When it came near to Elleroe and Biarneroe, two little islands between Westmanoe and the south coast of Iceland, several of the icebergs grounded to the east and south-east of them, and some larger icebergs grounded to the southward of Biarneroe, in 60 fathoms water. The mass of ice entirely covered the sound between Westmanoe and Iceland, being about 8 nautical miles in width, while it was not possible to discover how far that part of the ice stretched which passed to southward around Westmanoe. The passage of this

icedrift from beginning to end lasted between 4 and 5 hours. During a continuance of calm and clear weather and a perfectly smooth sea some majestic icebergs, which had grounded, remained in their places; now and then they changed their form, when considerable pieces broke loose and plunged in the sea. At last, on the 8th or 9th of June, a high swell carried off these remaining icebergs in the same westerly direction as the former ice."

Mr. Abel mentions that the oldest inhabitants had never seen such an ice-drift from Westmanoe, and that none had subsequently appeared, excepting a few fragments of Greenland ice in one year (the exact date is not mentioned, but between 1830 and 1840) and also in the year 1840. He further remarks, that during his thirty years' residence on Westmanoe he never had found it so cold as during the icedrift of 1826. The window-panes in his sitting-room were entirely frozen over during its occurrence, and it was not possible to thaw them by heat from the stove.

Undoubtedly the year alluded to by Mr. Abel as between 1830 and 1840 must have been 1834; for the present Bishop Thordersen, at Reikiavik, whom I visited at Odde very many years ago, where he was then the minister, writes to me: "During my residence at Odde, from 1825 to 1836, I saw twice from my home the Greenland ice drive between Westmanoe and the continent with considerable rapidity to westward. It was an imposing view. When the ice was first seen by the naked eye, it had the appearance of large vessels, but with a telescope I soon discovered it to be icebergs accompanied by great masses of field-ice. I can only recollect the date of one of these two years with certainty—it was 1834; the other year I have forgotten; but I recollect that when travelling to Reikiavik in the autumn of the year I do not remember (1826?) I saw at Orebak one of these icebergs which accidentally had stranded there, and which had, as well as I can remember, a height of at least 8 feet above the surface of the sea even after the heat of summer."

In 1859 an icedrift again passed Westmanoe. Some ice grounded at the entrance of the harbour and entirely blocked it for several days: this event must be considered as a very rare one.

It is not improbable that the very considerable icedrift of 1826 which, calculating from the data given above, must have covered an area of at least 200 square miles, may have been accompanied by ice-bears as well as by seals. These animals, as is well known, are found very frequently on Polar ice, and are carried away with it on its drift to the southward, and therefore it would not have been impossible that some of these animals, as in 1615, might have been killed "on the southern headlands of Iceland."

The reports of the year 1807, that some flakes of Greenland ice had been visible in the Faxebugt and Bredebugt, having come from the east coast round the south side of the island, can perhaps be explained thus: that the ice, after having passed Reikianæs and followed the run of the current in a north-north-westerly direction, was conveyed to the Faxebugt and Bredebugt by continual gales from the west.

This ice is a great rarity in the Faxebugt; but when it is known that stormy weather has influence on the usual direction of currents, and that about one-ninth of the driving ice is above the surface of the sea, and exposed to the immediate action of the wind, it may well happen that pieces of ice should appear where no such ice had previously been seen in the memory of men.

Besides repeated stays of long duration at several places on the south coast of Faxebugt, I have travelled on the south side of Bredebugt and the north side of Faxebugt; by proceeding from Stikkelsholm, travelling to Gronnefjord and Olufsvig, and going around the Sneefields-Jokul to Stappen, Budenstad, Miklaholt, &c. Everywhere I interested myself in obtaining a knowledge of the drift of the Greenland ice, and asked frequently if it was ever seen from any of

these places, but always received an answer in the negative. However, Mr. Olausen, who resided at Olufsvig during many years, communicated to me that, in 1830 or 1831, he had heard from an old man, who at that time lived at Olufsvig, that he could remember once, when a child, to have seen an iceberg stranded in the Bredebugt north of Grønnefjord. This iceberg lay grounded for some time; it came nearer the coast during a spring-tide in May, and it disappeared after the first spring-tide in June. According to the age of the informant, it is not improbable that this happened in 1777, the year when so many whalers were lost in the enormous masses of ice which were driven to south-west, between Iceland and Greenland.

I have taken the liberty of speaking minutely about the rare occurrence of ice on the west coast of Iceland, because a renowned English author has mentioned that intelligence had come to his notice that all the bays and creeks of Iceland, in 1816 as well as 1817, were filled with Greenland ice. According to the accounts given by me above, this cannot have been the case, at least so far as the Faxebugt and Bredebugt are concerned.

In recent times there are proofs that ice-bears have come with the Greenland ice to the north-west and north coasts of Iceland, where this ice is so frequent. In a letter from Mr. Thordersen I see that such an ice-bear was shot in Strande-Syssel a few years ago. There are traditions in Iceland that these bears now and then have killed cattle, and done other mischief; but usually they, like the bear killed in Strande-Syssel, have been of a peaceable nature, and it is a common saying in Iceland, that the bears constantly watch the opportunity to get off with the ice: as soon as it leaves the coast, they swim out to reach it.

According to information I have received, Iceland has been visited by the Greenland ice thirty-three times between the years 1800 and 1860 inclusive. On every occasion it came to the north coast, which was beset by it, and on nearly every occasion, during these thirty-three years, the coast between Cape Nord and the bay of Skagestrand was beset by it. Thirteen times it enclosed the whole of the north coast to Langenæs, and even farther to the eastward; fourteen times it lay outside the north-west fiords, between Staalbierghuk and Cape Nord, and blocked them up (either all or a few of them); thirteen times ice has appeared on the east coast, in various quantities; and in five different years ice has been driven from the east coast to the westward, along the south side of Iceland.

While travelling in North Iceland, I saw the Greenland ice from the mountains near Vellir, for the first time, on the 27th of July, 1834. I remember it was extremely clear on that day, and the sun felt very warm when riding on the paths between the mountains of the Nord-land. When I first came in sight of the Icy Sea, being unaware of the neighbourhood of enormous masses of ice, my surprise was so great that I called to my fellow-travellers who were behind me, "What a storm on the Icy Sea!" But, what I had presumed to be the foam of the waves and breakers, I soon discovered to be a quantity of the Greenland ice, by which the whole of the north coast and a considerable part of the east coast were enclosed in that year.

On my return to Reikiavik I inquired if any of the newly arrived vessels had fallen in with ice, and from many seafarers at Reikiavik, Havnefjord, and Kieblevik, I obtained the answer, that neither this year, nor at any time formerly, had they ever fallen in with ice on their voyages to or from those ports. I happened to be in Iceland both in 1826 and 1834, which were two of the five recorded years in which Greenland ice was driven along the south coast, and notwithstanding that both of these years I spent the greatest part of the summer on the south land of the island, I never heard mention that any seafaring man had fallen in with Greenland ice on the voyages between Europe and this part of Iceland, which sufficiently proves that icedriffs going along the

south coast of Iceland are such insignificant objects in the great ocean, that they do not impede navigation in any way.

I have already mentioned that experience teaches that the Greenland ice, even when it encloses the north and east coasts of Iceland in great masses, always leaves the coasts again in the course of August, if not earlier. I will now inquire into the reason of this, or at least give some hints which may throw light on the phenomenon.

1. A partial cause may perhaps be found in the melting of ice and snow on the enormous jokuls and snow-covered mountains in the interior of this great island. When travelling in Iceland in the warm season, in which the sun is nearly always above the horizon, it does not escape the traveller's attention, that the amount of melted ice and snow is very considerable, and I will try to give a proof of it. At the end of July, 1834, between Holum and Oford, I passed Heliardalsheden, which at the most elevated part of the road is about 2000 feet above the level of the sea. From a little glacier here, the "Svarfaraa" has its source. On following the course of this stream, a great many rivulets which all had their origin in the melted ice and snow, fell into the Svarfaraa; and in the valley, 8 or 10 miles from its source, this stream, which does not at all belong to the great watercourses of Iceland, had grown to an extremely rapid river. By considering how small is the area from which the Svarfaraa has its nourishment, we may estimate the very considerable quantity of water which is carried out into the sea from the whole interior of Iceland, by many other rapid and greater rivers, and it will not then appear improbable that the melting of the snow, which undoubtedly is greatest in July and August, and the consequent increased flow of the rivers, might contribute to remove the sea-ice farther from the coast. But if the ice from the east coast drifts out to sea within range of the principal current, which runs at a certain distance from shore, it will find its way to the Icy Sea again; for, as I have already mentioned, the principal current between Iceland and Norway is north-easterly, towards the Icy Sea. Again, if the ice which encloses the northern coast of Iceland be drifted out to sea, within range of the great current opposite, it will be carried away between Iceland and Greenland, and farther.

2. It is well known, and confirmed by the excellent charts on storms in the Atlantic, by Capt. Maury, that June, July, and August are the months in which the Northern Atlantic is least exposed to stormy weather; and as the prevailing gales in this part of the Atlantic are from the west, it is not improbable that the current coming from the south, and running between Iceland and Norway during the other months, in which the most blowy weather takes place, should, in the calm summer season, run somewhat more westerly and nearer to the eastern coast of Iceland. If so, it would contribute to remove the ice from its shores.

3. It is also well known that the limits of the Gulf Stream are very changeable in the different seasons: thus, in the meridian of Cape Race, its northern limit in winter is about north lat. 40° or 41° , while in September, when the Gulf Stream is most heated, it reaches 45° or 46° .^{*} It is highly probable that this current changes its position within defined but wide limits, or as Maury strikingly remarks, the Gulf Stream "may be supposed to waver about in the ocean, not unlike a pennon in the breeze." These variations of its course may extend to the latitude of Iceland, or even still farther north; and perhaps a branch of this stream in the summer season may swing somewhat nearer to the east coast of Iceland, and, turning along its north coast, may thus contribute to the ice leaving its shores. On examining the temperature of the surface of the sea on the east and north coasts of Iceland, it appears undoubtedly, that the eddy of the Arctic current, along the north coast of Iceland, does not exist

* Maury's 'Sailing Directions,' vol. i. p. 99. July, 1858.

in July and August: it is therefore probable that that eddy which, during the greatest part of the year, runs towards east, is displaced in the course of the summer by the current coming from more southerly latitudes. It is likewise remarkable that the temperature of the sea, on the east coast of Iceland, is not so high as it appears to be along the north coast; and the supposition is reasonable that the warmer current, on bending in a westerly direction, passes Langenæs along the north coast, without touching the shores of East Iceland. It is well known that the surface of the sea, even in high latitudes, can maintain a high temperature. Parry found 39° Fahr. on his voyage in summer from Farøe to Spitzbergen, even in north lat. 73° , and east long. 8° , and I shall corroborate this observation by a fact observed last year.

The schooner *Fox*, Captain Sodring, left Copenhagen in February, bound to the Icy Sea; an extract of its logbook gives the following:—

OFF LINDESNÆS, IN NORWAY.

		North Latitude.	Longitude from Greenwich.	Temperature of the Air.	Temperature of the Sea on the Surface.
	1860.	° ' "	° ' "	°	°
February	28 ..	.. ..	.. ..	36·5 Fahr.	37·7 Fahr.
,,	29 ..	53 32	4 22 East	38·8 ..	38·8 ..
March	1 ..	59 40	3 40 ..	37·0 ..	41·0 ..
,,	3 ..	61 56	0 8 ..	41·0 ..	45·5 ..
,,	4 ..	63 57	2 15 West	39·9 ..	39·9 ..
,,	5 ..	64 40	2 59 ..	34·2 ..	38·1 ..
,,	6 ..	65 15	1 35 ..	38·1 ..	38·8 ..
,,	7 ..	66 21	1 26 ..	34·2 ..	41·1 ..
,,	8 ..	68 31	4 15 ..	33·1 ..	34·2 ..
,,	9 ..	70 30	7 47 ..	32·0 ..	30·9* ..
,,	10 ..	.. ..	.. ..	11·7 ..	30·9* ..

* Between ice, in sight of Jan Mayen.

By this it will be seen that the sea on its surface, near the Polar Circle, even in the beginning of March, and notwithstanding the effects of a long and cold winter, still retained a heat of 41° Fahr.: therefore it is not improbable that a branch of the warmer current is connected with the above-mentioned high summer temperatures of the north coast of Iceland, and that it possibly displaces the eddy of the cold Arctic current, and helps to remove the Greenland ice from the coast of Iceland in July and August.

I beg to call attention to this point; further observations will show if my supposition be right or not.

The thermometers used on the voyages to North and East Iceland for determining the temperatures of the surface of the sea, as well as the thermometer used by the *Fox*, were all verified and delivered by me; the observations will be found noted down in the logbooks of the different vessels, and the captains being intelligent men, who all took an interest in their work, I do not doubt the veracity of their observations.

To prove the influence which the warmer currents have on the climate of Reikiavik (though its harbour is sometimes frozen in severe winters), in opposition to the climate of Ofiord, situated on the north coast of Iceland and exposed to cold currents from the Icy Sea the greatest part of the year, I add the following Tables of Temperature of the Air:—

REIKIAVIK, 64° 9' lat. N. (Obs. Met. in Islandiá. Thorsteinson. Hafnia, 1839).

Winter.	Spring.	Summer.	Autumn.	Mean for the Year.
°	°	°	°	°
29·1 Fahr.	37·0 Fahr.	53·5 Fahr.	37·9 Fahr.	39·4 Fahr.

OFIORD, 65° 40' lat. N. (Kaemtz, 1832, vol. ii., p. 88).

Winter.	Spring.	Summer.	Autumn.	Mean for the Year.
°	°	°	°	°
43·2 Fahr.	28·2 Fahr.	49·8 Fahr.	34·5 Fahr.	32·3 Fahr.

Difference in latitude 1° 31'

Difference in the annual mean temperature 7° Fahr.

As a proof of what kind of weather may be met with on the north coast of Iceland, even in summer, I give an extract of Scheel's meteorological observations, which are to be found in his second volume.

Station : A dwellinghouse at the inmost part of the Tharalatur-fjord, between Cape Nord and Geirólfsnup :—

	Morning.	Noon.	Evening.
1809.	°	°	°
August 1, gale from north-east	47·7 Fahr.	34·2 Fahr.	30·9 Fahr.
„ 2 „	33·1 „	33·1 „	32·0 „
„ 3, increasing gale	30·9 „	32·0 „	33·6 „
„ 4, moderating gale	33·1 „	32·0 „	33·8 „

Finally, I add the observations made by Dr. Thorsteinson on the surface of the sea at Reikiavik, given me by Professor P. Pedersen, in 1855 :—

Reikiavik.	Number of		Mean.	Highest.		Lowest.	
	Years.	Obs.	Fahr.	Fahr.	Years.	Fahr.	Years.
			°	°		°	
January	20	168	34·8	45·5	1833	29·8	1848
February	20	142	34·2	43·3	1841	30·9	1844
March	20	139	36·1	44·4	1851	30·9	1851
April	21	144	37·3	47·8	1833	32·0	1836, 1837
May	21	189	44·6	50·0	{1833, 1834, 1838, 1842}	36·5	1851
June	21	223	49·3	56·8	1833, 1843	41·0	1836
July	22	263	52·9	61·3	1833, 1843	46·6	1836
August	22	262	49·1	61·3	1843	43·5	1836
September	21	253	45·9	55·6	1843, 1852	38·8	1836
October	21	237	40·6	47·7	1838, 1842	28·6	1843
November	21	195	37·2	55·6	1844	28·6	1832
December	20	156	35·8	42·1	1840	30·9	1848

MEAN Temperature of the Surface of the Sea at Reikiavik.

Winter.	Spring.	Summer.	Autumn.	Year.
° 35·0 Fahr.	° 39·4 Fahr.	° 50·5 Fahr.	° 41·2 Fahr.	° 41·5 Fahr.

2. *On a Method for determining Longitude by means of Observations of the Moon's greatest Altitude.* By WILLIAM SPOTTISWOODE, M.A., F.R.S., F.R.G.S., &c.

THE object of the following Tables is the determination of longitude from a simple sextant observation of the moon's greatest altitude. Owing to her motion in declination, the moon's greatest altitude will always exceed her meridian altitude; and when the motion is sufficiently rapid, the former, which can always be made the subject of direct observation, may be used for determining the longitude. The Tables furnish the corrections required to be applied to the observed altitude in order to reduce it to the meridian altitude. The latter quantity and the latitude being known, the declination at meridian passage is also known; and the difference between this and the declination at her nearest Greenwich meridian passage will be the amount of declination gained or lost between the two meridians. The longitude being, as usual, supposed to be known approximately "by account," the rate of motion in declination can be taken out of the 'Nautical Almanac;' and the amount divided by the rate will give the true longitude in time.

The present method does not pretend to the same degree of accuracy as those of Jupiter's satellites, and of lunar distances; but the simplicity of both the observation and the calculation may render it useful for checking the dead-reckoning of a traveller whose last chronometer has broken down, either as supplementary to more elaborate processes, or as a substitute when they are not practicable.

The mathematical theory, upon which the present method is based, has been the subject of a communication to the Royal Astronomical Society, and is published *in extenso* in their Memoirs (vol. xxix., p. 343). It will therefore be sufficient here to subjoin the final formula from which the Tables have been calculated.

FORMULA.

FORMULA.

If D be the meridian declination sought,

L „ latitude,

A „ greatest altitude,

Δ' „ difference of declination for 10 minutes, given in the Nautical Almanac,

$$m = 1.04 \frac{dD}{dt},$$

then

$$D = 90^\circ - (A + L) + \frac{m^2}{2} \frac{\cos A}{\cos L \sin (A + L)},$$

and the rule for using the Tables may be thus stated :—

Meridian declination = difference between 90° and $(A + L) + \frac{\text{Corr. Table I.}}{\text{Corr. Table II.}}$

EXAMPLE.—1860, June 25 d. 5 h. 30 m. Lat. $51^\circ 45' 36''$ N. Long. by account 0. Apparent greatest altitude of \mathcal{D} 's upper limb $33^\circ 27' 0''$. Diff. of declination in 10 m., from 'Nautical Almanac,' $156''.7$.

By ordinary methods (worked *accurately*),

True alt. of \mathcal{D} 's centre	..	33	58	39
L	.. .. .	51	45	36
<hr/>				
$A + L$	.. .. .	85	44	15
		90		
<hr/>				
		4	14	45
Corr. Table I.	=	54''		
Corr. Table II.	=	1.17		
				46+
<hr/>				
\mathcal{D} 's meridian decln.	=	4	16	31
do, at 5 h. (Naut. Alm.)		4	5	29
<hr/>				
662''	=	11	2	
<hr/>				

Elapsed time since 5 h. : 10 minutes :: $662''$: $156''.7$

$\frac{6620}{156.7} = 42^m.25 = 42 \text{ m. } 15 \text{ s.}$	Greenwich time of local	} 5 h. 42 m. 15 s.
	meridian passage ..	
	Do. transit (Naut. Al.)	
		5 38 17
<hr/>		
Longitude		3 58 W.
<hr/>		

TABLE I.

TABLE I.—Part 1.

Alt.	LATITUDE.														
	70°	68°	66°	64°	62°	60°	58°	56°	54°	52°	50°	48°	46°	44°	42°
80°															10"
78															12
76															14
74															16
72												21"	20	19	17
70											24"	23	22	21	19
68										28"	26	25	24	22	20
66									32"	30	28	27	25	24	22
64								36"	34	32	30	28	27	25	23
62							41"	38	36	34	31	30	28	27	25
60.						46"	43	40	38	35	33	31	30	28	26
58					52"	48	45	42	39	37	34	33	31	30	28
56				59"	54	50	47	43	41	38	36	34	33	31	29
54			67"	61	56	52	48	45	42	40	37	36	34	33	31
52		76"		69	63	58	53	50	46	44	41	39	37	36	34
50	86"	78		71	65	59	55	51	48	45	43	40	39	37	35
48	88	80		73	66	61	56	53	49	47	44	42	40	39	37
46	90	82		74	68	62	58	54	51	48	46	43	42	40	38
44	92	83		76	69	64	59	56	52	50	47	45	43	41	39
42	93	85		77	71	65	61	57	54	51	49	46	44	43	41
40	95	86		79	72	67	62	59	55	53	50	47	46	44	42
38	96	88		80	74	68	64	60	57	54	51	49	47	46	44
36	98	89		82	75	70	65	62	58	55	53	50	49	47	45
34	99	91		83	77	71	67	63	59	57	54	52	50	48	46
32	101	92		85	78	73	68	64	61	58	56	53	51	50	48
30	102	94		86	80	74	69	66	62	60	57	54	53	51	50
28	104	95		88	81	75	71	67	64	61	58	56	54	53	51
26	105	97		89	82	77	72	69	65	62	60	57	56	54	53
24	107	98		90	84	78	74	70	66	64	61	59	57	56	54
22	108	99		92	85	80	75	71	68	65	63	60	59	57	56
20	109	101		93	87	81	76	73	69	67	64	62	60	59	58
18	111	102		95	88	82	78	74	71	68	66	63	62	61	60
16	112	104		96	89	84	79	76	72	70	67	65	64	63	61
14	114	105		97	91	85	81	77	74	71	69	67	66	64	
12	115	106		99	92	87	82	79	75	73	71	69	67		
10	116	108	100	94	88	84	80	77	75	73	70				
8	118	109	102	95	90	85	82	79	77	74					
6	119	111	103	97	91	87	84	81	78						
4	121	112	105	98	93	89	86	82							
2	122	114	106	100	95	91	87								
0	124	115	107	101	96	92									

TABLE I.—Part 2.

Alt.	LATITUDE.				
	40°	30°	20°	10°	0°
	80"	10"	9"	7"	7"
70	19	16	14	14	15
60	26	23	21	22	23
50	33	30	29	30	
40	40	38	37		
30	48	46			
20	56				

TABLE II.—Divisors of Table I.

Arg. Diff. of Declin. for 10m. Δ'' .							
Δ''	Δ''	Δ''	Δ''	Δ''	Δ''	Δ''	Δ''
5 0	11.6	8 0	4.51	11 0	2.39	14 0	1.47
1	11.2	1	4.40	1	2.35	1	1.45
2	10.8	2	4.30	2	2.31	2	1.43
3	10.4	3	4.20	3	2.27	3	1.41
4	10.0	4	4.10	4	2.23	4	1.39
5	9.6	5	4.00	5	2.19	5	1.37
6	9.2	6	3.91	6	2.15	6	1.35
7	8.9	7	3.82	7	2.11	7	1.33
8	8.6	8	3.73	8	2.07	8	1.31
9	8.3	9	3.65	9	2.04	9	1.29
6 0	8.0	9 0	3.57	12 0	2.01	15 0	1.28
1	7.7	1	3.49	1	1.97	1	1.26
2	7.4	2	3.41	2	1.94	2	1.25
3	7.2	3	3.34	3	1.91	3	1.23
4	7.0	4	3.27	4	1.88	4	1.21
5	6.8	5	3.20	5	1.85	5	1.20
6	6.6	6	3.13	6	1.82	6	1.18
7	6.4	7	3.07	7	1.79	7	1.17
8	6.2	8	3.01	8	1.76	8	1.15
9	6.0	9	2.95	9	1.73	9	1.14
7 0	5.9	10 0	2.89	13 0	1.71	16 0	1.13
1	5.7	1	2.83	1	1.68	1	1.11
2	5.6	2	2.77	2	1.65	2	1.10
3	5.4	3	2.72	3	1.62	3	1.08
4	5.3	4	2.67	4	1.60	4	1.07
5	5.1	5	2.62	5	1.58	5	1.06
6	4.9	6	2.57	6	1.55	6	1.04
7	4.8	7	2.52	7	1.53	7	1.03
8	4.7	8	2.47	8	1.51	8	1.02
9	4.6	9	2.43	9	1.49	9	1.01
8 0	4.5	11 0	2.39	14 0	1.47	17 0	1.00

3. *Expedition up the Si-kiang River.* By Lieut. LINDESAY BRINE,
R.N., F.R.G.S.

I HAVE the honour to forward to you the following account of the expedition up the Si-kiang, or Western River (generally called the Broadway), undertaken for the purpose of surveying that river and finding how far it was navigable, and also to accustom the Chinese to our presence, and compel them to receive us and open their gates in those cities hitherto unvisited by Europeans.

Our force consisted of seven gunboats, and the boats of H.M.S. *Cambrian*, *Assistance*, *Adventure*, and *Fury*, under the command of Captain McCleverty, R.N., and nine hundred troops, chiefly marines, under General Straubenzees. Mr. Parkes, the consul, accompanied us as interpreter. The French were represented by a small paddle-steamer and a company of seamen under Captain d'Abouville. Lord Elgin had intended accompanying the expedition, but, at the last day, changed his mind, and started for Cochin China, the scene of the French operations. The troops were embarked in large shallow draught-chops, towed by the gunboats, and on Wednesday, Feb. 16th, the expedition left Canton, picking up the boats of the ships at Whampoa en route: I proceeded with our boats to the *Staunch* gunboat. We entered the network of channels connecting the two rivers immediately below the second bar, about 15 miles above Boca Tigris, but did not reach the Western River until the afternoon of Saturday, 19th, on account of the delays occasioned by taking a wrong passage, by gunboats grounding on the spits and knolls, and by the necessity of always anchoring before night. Surveys of the channel were taken under the direction of Lieutenant Bullock, of H.M.S. *Actæon*.* A partial survey had been previously taken of this passage, and also of the Western River, as far as San-shui, by Commodore Elliot in 1857. The actual length of the passage is about 35 miles, with a depth of water averaging at low water 10 to 15 feet (rise and fall 8 feet); the breadth rarely less than 80 yards. The country to the south is flat and uninteresting, being chiefly devoted to the growth of rice and bamboos, the banks as usual being lined with banana-trees. On the opposite bank it is hilly, and there are three or four towns of considerable importance, two of them walled. Near one of these—Shan-tuk—I saw the mulberry in cultivation. We entered the Western River at about 50 miles from its mouth, and proceeded at our best speed, always anchoring at night. By eleven on Sunday morning we were abreast of San-shui, 40 miles west of Canton, the highest point reached by Commodore Elliot. Up to this the river was a clear, broad stream, with sufficient depth of water at all times for vessels of 15 feet draught. On its right bank ran a long range of brown, pine-skirted hills, of heights varying from 400 to 800 feet. The country on the left bank was chiefly flat, with occasional hillocks. The land was in good cultivation, but there was little activity on the river. The principal growth was the sugarcane and bamboo, several sugar-mills being at work on both sides. The whole country, both in grandeur and culture, was far superior to what I had yet seen or heard of in China. The river-banks, composed of sand and gravel, were large and sloping, and in many places cultivated in plots down to the water-level. Numbers of trees lined them, mostly of the banyan tribe. One class of trees, low and broad-crowned, is very common, and bears a most glorious sombre-green foliage. Abreast of the San-shui was a dismantled stone battery, capable of mounting eighteen guns. Above this the river trends in a westerly direction, several considerable villages lining its banks, the country on both sides being hilly; the range on the right bank gradually becoming mountainous, the river narrowing to 400 or 500 yards. Twenty-five miles above

* See Publications of Hydrographic Office. China, No. 5.

San-shui the river cuts its way right through the range, creating a magnificent pass or gorge some three miles in length, the bare and rocky faces of the hills on either side running perpendicularly down to the water. The breadth of the pass must be three-quarters of a mile, but appears much less. We found no bottom with the hand-lead at 18 fathoms. The opening of the pass is very similar to that of Balaclava harbour, but on a grander scale. Small Buddhist temples are erected at both openings, and a small three-storied pagoda commands the pass at its upper end. The hills were of the usual character in this (the Kwang-tung) province, viz., sandstone lying on granite. Issuing from the pass, on our way upwards, the river considerably broadened, opening into a fertile and well-cultivated hilly country, the surrounding hills crowned with seven and nine-storied pagodas. At 6:30 P.M., on Sunday, we anchored off the walled city Shan-king, or, as it is called in the provincial dialect, Shoo-king, the ancient capital of the Kwang-tung province. The point we had now reached was 30 miles above San-shui, and 80 from where we had entered, in all 130 from the mouth, supposing the part near Macao to be so called, the river still preserving its depth and altering but slightly in breadth, the water beautifully clear and pure. On Monday forenoon the mandarins came off to call upon our authorities and welcome us to the town. They complained very much of the misery brought on the people and the surrounding country by the attacks and depredations of the rebels, who were scattered around in all directions. The mandarins were received with their proper salute, three guns. In the afternoon the whole force landed, and marched through the city and a few miles into the country, returning in the evening. On Tuesday morning the General, Captain M'Cleverty, and three light-draught gunboats, proceeded higher up the river, leaving the troops, &c., behind at Shan-king. Here we remained until their return on Saturday afternoon. The troops and naval brigade daily marched out into the country 4 or 5 miles, in different directions, taking their provisions with them, coming back to their vessels before night. Shan-king presents the appearance of once having been a city of considerable importance and power, now sinking into decay. Several of the old mandarin residences or yamuns, once noble buildings, are now falling to ruins, and the resort of beggars. The pagodas are all very ancient, and crumbling away. There are few signs of trade. The only signs of anything being done beyond what is necessary for their own use, are in the manufactures of fans and marble ornaments. There are the usual vegetables, ducks, pigs, &c. Bullocks from a little distance out, supply our market in the Canton River. The city walls are rather more than 2 miles in circuit, built of the usual blue clay brick, based upon granite; their height is about 20 feet. Here and there are a few embrasures, but only one gun is mounted, and that one of our old 32's. The garrison consists of two thousand men, who take their guards at the different gates for the purpose of repelling any chance incursions from the rebels. They are miserably armed, with gingalls and bows and arrows of the worst description. The roads are better kept and broader than in most parts of China, although even here they frequently are barely wide enough for one person. At the back of Shan-king there is a very remarkable group of limestone rocks, thrown up perpendicularly from the level to a height of 300 to 400 feet. Buddhist priests have built or hewn themselves cells all over the faces of the rocks, reaching them by steps cut out from the solid marble. Their temples are at the base, one of them containing some very valuable and curious bronze josses. In the largest of these rocks is a very extraordinary cave, running right through the mass, in one place forming for itself a species of dome nearly 100 feet in height, with beautiful pending stalactites. The priests were proud of their cave, and delighted in showing us all its peculiarities, echoes, &c. I happened to have a hammer at hand, with which I detached some pieces of the rock. The marble varies from a pure white, somewhat similar to the Pentelican, to a grey-blue, sometimes veined with red. That there is a great deal of marble about is evident, from the

fact that all the sides and bases of the temples, and the principal portions of the yamuns, are composed of it; the sacred vessels in the temples also, that elsewhere are usually iron or bronze, are here all marble. The hills and surrounding country are composed of granite, quartz, and sandstone, the soil bearing that peculiar reddish hue, caused by iron and decomposed granite, so common to the islands of the African coast and in the Eastern Archipelago. Rice and sugar-cane were in cultivation, and the papaw, lychee, and peach-trees in blossom. The river at Shan-king is almost free from the influence of tides, they having at times just sufficient power to counteract the down current, and cause slack water. From the appearance of the banks I should say that the river during the rains must rise over 6 feet. The river's bed is of sand and gravel, and somewhat rocky. On Saturday, 26th, the surveying expedition came back. Lieutenant Bullock informed me that they were enabled, with some trouble, to reach the first class walled city Wu-chou, situated on the left bank, 76 miles above Shan-king. At this point they had only 5 feet water.

Extract from Hydrographic Notice; China, No. 5.

"*Shao-king to Wu-chau-fu.*—On the 22nd February the *Watchful*, *Janus*, and *Woodcock* started for Wu-chau. There the river winds through a continuously hilly country of sandstone and granite, chiefly in northerly and westerly directions. The hills, varying from 100 to 1500 feet in height, are in general densely wooded, and many highly cultivated. Near Shao-king limestone hills appear in rugged and picturesque groups; one crops out on the river of a most picturesque form, and is called by the Chinese Kai-yik-kwan, or the Cock's Comb, which it strongly resembles. A group also lies 2 miles north of Shao-king, to which they give the name of the Seven Stars, after the beautiful constellation of the Great Bear.

"At 50 miles above Shao-king, and on the left or north shore of the river, a single mass of granite (in the form of a thumb) rises perpendicularly some 300 feet out of a range of hills of 1500 to 1800 feet elevation. Its local name is Kum-kwoh-shek, but it is also called Fa-piu, or the flowery tablet, and it is the most remarkable object in the river. After passing this, the navigation becomes dangerous, and the river-bed studded with rocks.

"The district city Wu-chau or Ng-chau is 75 miles above Shao-king. Its latitude by observation is $23^{\circ} 28' N.$ (22 miles north of Canton), and its longitude, approximately, $112^{\circ} 14' E.$ The breadth of the river here is about three cables between the sandbanks, and nearly a mile from shore to shore, but it is with difficulty navigable by junks higher up at this season; the first rapids being (by report) about 12 miles above Wu-chau.

"Wu-chau-fu stands at the confluence of the stream on which is Kwei-ling, the capital of Kwang-si. This communication was open, though the intermediate country was in the hands of the rebels. It had the appearance, observed from the heights, of being easily navigable by gunboats."

Wu-chou is one of the most considerable cities in the Kwang-si province, and in peaceable times carries on a great trade. On the right bank, 30 miles above us, was the walled city Tih-king. The bed of the river all the way became more and more rocky and difficult to navigate, knolls here and there jutting out with few feet water on them. But they found that there was a good, safe passage for vessels of the class of H.M.S. *Furious*, not drawing over 15 feet, as high as Tih-king. Above this the river became only fit for handy, light-draught steamers. One hundred and eighty miles up there are rapids. Its trend as far as Wu-chou was nearly due west, slightly northing. From Shan-king up the hills became better wooded, and near Wu-chou were well clothed with trees. Timber was a principal article of trade. More limestone rocks were seen; those in the river were a sort of sandstone. At Wu-chou they were in daily expectation of an attack from the rebels, and had a force of over 6000 men within the walls.

On Sunday, the 27th, we weighed and proceeded back, calling at San-shui, Shan-tuk, and Sha-wan on our way, reaching Whampoa on the 3rd March. San-shui is situated on a broad creek running out from the Western River, and connecting that city with Fatshan and Canton: the passage is shallow, and barely navigable for gunboats. Shan-tuk, or Ty-loong, is situated about half-way between the Western and Canton rivers, on the passage by which we entered. It stands about 4 miles back from the water, at the rear of some low hills.

We expected to find some difficulty in entering the city, for it had always held warlike pretensions, and was well walled and garrisoned. However, we marched in on Tuesday forenoon, and were well received. We halted in the principal yamun, where the mandarins had prepared a good tiffin à la Chinoise for the officers, as well as tea and large quantities of oranges for the troops. This city, within the walls, was over 2 miles in circumference, and densely populated. The suburbs were of still greater extent. A creek, with sufficient water for pinnaces, ran through the heart of these suburbs, and was spanned with two well-built granite bridges of three and five arches. There were many good shops, and several handsome yamuns. Shan-tuk presented a good contrast to those cities we had previously visited, from its greater cleanliness and activity. Here, too, I saw double walls running through the town, for the purpose of arresting the progress of fire. The city walls averaged 25 feet in height, with no embrasures: their thickness at the base, including facing and earth-work, was not less than 20 feet. After the interview with the mandarins, our proclamations announcing our peaceable intentions, &c. &c. were posted about the town, and we returned to the ships, our salute to the mandarins at Shan-king being returned here. The city Sha-wan is thickly populated, as all other Chinese towns, but is not of much importance. It was near Shan-tuk that I saw the mulberry in cultivation, but I did not see any silk manufactories in the town.

The result of this expedition must be highly gratifying to all who are anxious for the extension of trade and of geographical knowledge. It has shown the entire navigable length of a very noble river, and accustomed the Western Chinese to our friendly presence, also to our power. Now that China is daily becoming more open to our enterprise, there is every reason to believe that this river will be of great importance to us, opening, as it does, such a communication with the Western provinces. At present the only trade appears to be timber, sugar, and bamboo, the latter supplying the paper manufactories near Canton; but this want of activity can well be accounted for by the harassing presence of the rebels, who, by seizing the crops and detaining the junks, throw a blight over the whole face of the country. This conflict between the Celestials and Imperialists promises to be of so long a duration, and probably eventually to the detriment of the present dynasty, that it is impossible to hope, for very many years, for any alleviation to this distress. From the appearance of the men in the cities and villages we visited, I should argue a more general freedom from disease than is met with elsewhere. Diseases of the skin are not so common, and the standard of stature is higher. This, I suppose, is partly due to the purity of the water, and to the fact of there being less ground used for rice-fields. From Tib-king to the river's mouth, a distance of nearly 160 miles, the deep-water passage is almost entirely on the left bank. That part of the river below Shan-king is called by the Chinese Shan-kiang, or mountain river.

P.S.—A hurried survey of the river's mouth was taken by the expedition in 1857, and they reported that on the bar near Macao there was not more than 13 feet at high water. If this be correct, the best entrance will be from the Canton River by the passage we took.

4. *Geological Notes of a Journey in South Australia from Cape Jervis to Mount Serle.* By ALFRED R. C. SELWYN, Government Geologist, Victoria.

HAVING been invited by the South Australian Government to visit that colony for the purpose of examining into and reporting on the geological evidence of the probable extent and character of its gold-bearing rocks, as also on any indications of the existence of workable coal-fields, and the applicability of the Artesian principle for securing a permanent supply of water in the northern districts, and generally on its geological structure, it was with much pleasure that I embraced the opportunity thus afforded of instituting a comparison by personal examination between the rock formations of Victoria and those of supposed similar age in the sister colony.

On the receipt of the invitation, therefore, I immediately applied for leave of absence from my official duties in Victoria for a period of two months. This was at once granted by the Chief Secretary, to whom a communication on the subject had also been made by the South Australian Government.

I arrived at Adelaide on Sunday, the 1st of May, 1859. On Monday, the 2nd of May, I communicated with the Hon. F. Dutton, the Commissioner of Crown Lands, for the purpose of making such arrangements as would enable me to commence my examination without delay, and extend it over as large an area as possible in the limited time at my disposal.

From the rapid way in which I passed over the country, and the consequent very cursory examination I was able to make of any one locality, it will be impossible for me, in this Report, to enter into any minute geological and lithological details. I propose, therefore, in the first place, simply to give extracts from my rough notes as they were written from day to day, in order to indicate the general line of route followed, and at the same time to show, to some extent, the opinion formed of each locality at the time it was examined. I shall then briefly state, in conclusion, the opinion I have now arrived at regarding the main points to which my attention was directed.

Since my return to Melbourne, I have read Mr. Babbage's Reports, made in 1856, to the Chairman of the Gold Search Committee, and regret exceedingly that I had not an opportunity of seeing them before commencing my examination, as I now find that much of the country I traversed had previously been examined by Mr. Babbage; and that, amongst much interesting geological information, he mentions the occurrence of rocks that quite escaped my observation.

(Here follow, in the original Report, several pages of extracts from Mr. Selwyn's notes; the conclusions at which he arrived are thus stated:)

It is much to be regretted, and I was greatly disappointed, that I did not find the smallest trace of organic remains in any of the older rocks of the South Australian chain, though carefully looked for from Cape Jervis to Mount Serle; unless indeed the peculiar circular and oval-shaped markings in the quartzose sandstones west of Port Augusta are annelide tracks. In order to ascertain this, it would be advisable that a number of them should be collected for examination. In the absence of such fossil evidence, and without a much more minute and extended survey than I was able to make in the limited time at my disposal, and in the rapid manner in which I traversed the country, it is almost premature to express any opinion, either as to the probable age, or even super-position, of the various rock masses forming the central mountain chain of South Australia. I am, however, inclined to think that they may eventually be grouped under three distinct and unconformable formations. Whether all of them are members of the Cambrian and Silurian series, or whether they extend up to the Devonian and Old Red, it is quite impossible to

decide until fossiliferous beds are found ; by which a fixed starting-point can be determined.

Taking them in their descending order, they are :—

1st. Those beds which occupy, in great anticlinal and synclinal undulations, the whole of the country north to Mount Serle, from a line drawn from the head of the Willochra north-easterly to the head of the Siccus River, consisting chiefly of the upper quartzose sandstone and quartz-rock series ; which, commencing with the summit of Mount Remarkable, extends through all the peculiar flat-topped and tent-shaped hills west of Port Augusta, and forms generally the summits of all the higher peaks and ranges as far north as Mount Serle, including the singular and picturesque Pound Ranges at Wilpena and Warraweena.

2nd. The beds that occupy the whole of the country south from the above-mentioned line to Cape Jervis, consisting chiefly of slates, shales, and sandstones of various textures and colours, with intercalated bands of gneissose, eurtic, and micaceous schists, bands of quartz-rock, and crystalline limestone, associated in certain localities, from the Gawler River south to Cape Jervis and Port Elliot, with eruptive granitic and hornblendic rocks.

3rd. A series of beds, certainly the lowest in geological position in the whole of the central chain, but occupying a comparatively small area, chiefly confined to the watershed of the Onkaparinga. On these the only profitable gold-field hitherto discovered in South Australia is situated, and it is, I think, along the axis of these lower beds only, that any important extension of the already known auriferous area can be expected.

It is just possible that no such natural divisions exist in the rocks of the South Australian chain as are here sketched out, and that the difference in general mineral and lithological characters observed, between the northern and southern rocks, is entirely due to the metamorphic influence of the granitic axis that, at Cape Jervis, extends in a north-easterly direction, showing itself at intervals on the surface to Angaston, and then seems to break through the chain and continue its course to the north-east, passing under the great tertiary flats of the Murray basin ; and, in all probability, again re-appearing in the Barrier or Stanley Ranges.

The only locality in which the rocks of the South Australian central chain bear any decided resemblance in mineral and physical structure to the auriferous Silurian rocks of Victoria is in the valley of the Onkaparinga.

I do not think that there are any rocks whatever in those portions of the colony that I examined, that would indicate the presence of a carboniferous formation either of palæozoic or oolitic age. The supposed coal found near Adelaide is a tertiary lignite, which I have no doubt abounds in many parts of the extensive unexplored tertiary basins of South Australia, as it does in rocks of the same age in Victoria.

Though thus apparently deficient in rich deposits of the precious metal, so lavishly distributed in Victoria, South Australia possesses many other great natural resources on which she may safely rely for future prosperity. Her iron ores are rich and abundant ; as also her copper and lead mines, which, I have no doubt, will go on steadily increasing in number and importance ; as also her vineyards and corn-fields, that are capable of producing grain of the finest quality, and wines that may be expected to vie with the best that are grown in Europe. At Pewsey Vale, Mr. Gilbert already grows wine that is little, if at all, inferior to the highest class of continental wine of a similar description ; and I have no doubt that, with greater experience in the manufacture, and labour less costly, a corresponding improvement in quality, as well as reduction in cost, will be effected.

In the north, the fine, open, available agricultural lands are very extensive ; and though, on account of the dryness of the soil and the great heat, they may not be well adapted for the growth of wheat, they would, I have no

doubt, produce fine crops of maize, sorgham, millet, gram, and other products, that are successfully cultivated in somewhat similar soils and climates in other countries. It is a mistake to suppose that the soil generally on the northern plains is poor and sandy : with sufficient moisture it would, I believe, be exceedingly fertile ; it consists almost everywhere of a very fine red calcareous loam, so dry as easily to be mistaken for sand, unless closely examined. With the exception, however, of this deficiency in moisture, there is little difference between it and some of the richest soils of the Adelaide and Gawler plains.

With respect to the water supply, I think that any efforts made to obtain this should be directed, with certain local exceptions, towards constructing reservoirs for retaining surface water, for which the physical outline of many parts of the country is eminently adapted, rather than to boring for Artesian springs, for which the requisite geological conditions do not generally exist, and which are farther rendered inadvisable on account of the so commonly saline character of the underground waters in all those tertiary areas within which the required conditions might possibly be found.

I regret that I have not been able to give a more favourable account of the prospects of South Australia either as a gold or coal producing country. Respecting the former, I would, however, distinctly point out, that in the southern districts (or the country lying south of the coloured line drawn on the accompanying map, from near Mount Remarkable, north-east to the head of the Siccus River), beyond a generally unfavourable impression, I have no very good reason to adduce, why some of the numerous quartz veins, that are there found associated with the slaty and arenaceous rocks, should not be auriferous, especially supposing those rocks to be of Silurian age. This is a very important point, and one on which, as yet, unfortunately, we have no reliable information : as it is, however, very desirable that it should, if possible, be determined, and as this can only be effected by the discovery of organic remains, I would suggest that, in future, all the Government Assistant Surveyors should be directed to search carefully for such fossil evidence in the rocks of every district in which they are employed.

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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.



VOL. VI.

SESSION 1861-62.

Nos. I. to V.

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

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ELECTED 26TH MAY, 1862.

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PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1861-62.

First Meeting, Monday, November 11th, 1861.

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

PRESENTATIONS.—*Lieutenant-Colonel George P. Evelyn; Alexander Grant; and A. Adam Reilly, Esqrs., were presented upon their Election.*

ELECTIONS.—*The Rev. R. Wheeler Bush, M.A.; the Hon. A. Gough Calthorpe; Sir John Kirkland; the Earl of Longford; Lieutenant-Colonel George H. Money; Lord George Quin; the Hon. Thomas J. Hovel Thurlow; and James Begbie; John Cheetham, Jun.; J. Sparrow Crowley, C.E.; J. Lewis Franklin; Joseph Goolden; George Hopcraft; J. Anderson Rose; John Thrupp, and Andrew Walls, Esqrs., were elected Fellows.*

ACCESSIONS.—The Accessions to the Library and Map-rooms since the former meeting were numerous. Among the more important were the following:—United States Reports of Explorations and Surveys; Geology of Arkansas; Hind's 'Canadian Red River Expedition;' Krapf's 'Eastern Africa;' Hutchinson's 'Wanderings among the Ethiopians;' Tyndall's 'Glaciers of the Alps;' Jackson's 'What to Observe,' re-edited by Dr. Shaw; Forbes' 'Norway and its Glaciers;' Marryat's 'Jutland and the Danish Isles;' Burton's 'City of the Saints;' Cleghorn's 'Forests and Gardens of South India;' Bosworth's King Alfred's 'Description of Europe,' &c.; the Transactions of various Home and Foreign Scientific Societies; Russian Maps of the Government of Tver; Imray's Charts of the China Sea; Philip's Family and Popular Atlas of Physical Geography; Stanford's Seat of War in America; Mouat's Map of the Andaman Isles; Vce. Bandeira's Map of the Zambesi; Ethnological Map of Finland; continuation of Dufour's Map of Switzerland, Carnbee's Atlas, Ordnance Maps and Admiralty Charts, &c. &c.; and several valuable instruments presented by Walter Ewer, Esq.,

F.R.G.S.

VOL. VI.

B

The Papers read were—

1. *Expedition up the Yang-tse-kiang.* By Lieutenant-Colonel SAREL, 17th Lancers, F.R.G.S.

THE party composing this expedition left Shanghae on February 11, 1861, with the intention of proceeding up the Yang-tse-kiang, crossing the province of Se-chuen to Lassa, and thence reaching India over the chain of the Himalayas. However, the first part of their intended journey was alone accomplished, as a state of rebellion and war in the far-west made it utterly impossible to procure boats, land-transport, or even attendants, further than Ping-shan, a small town situated a few miles beyond Su-chow, which itself is in N. lat. $28^{\circ} 46'$, E. long. $105^{\circ} 7'$.

The expedition consisted of Lieut.-Colonel Sarel, 17th Lancers; Captain Blakiston, R.A.; Dr. Barton; and the Rev. S. Schreschewsky, of the American mission. The official report of the journey by Lieut.-Colonel Sarel is printed as a Supplement to the 'Calcutta Gazette' of September 11, 1861; an elaborate chart of the river has been prepared by Captain Blakiston from his surveys; and collections of minerals, plants, and insects, have been despatched to England.

They started in company with the naval expedition under Sir Hope Grant, who steamed as far as Yo-chow. Here they were left on their own resources, and proceeded up stream in native boats.

The general features of the river above Shanghae are, that it is about 1000 yards wide, flowing through a flat country, with a depth of from 4 to 17 fathoms in main channel, and perfectly navigable as far as I-chang, N. lat. $30^{\circ} 41'$, E. long. $111^{\circ} 3'$. Here the river issues through a contracted channel in a mountainous country, and the boats of the lower Yang-tse do not ascend further. For 78 geographical miles, between I-chang and Quai-chow, the river is narrowed even to 150 yards, and is of great depth and swiftness; here and there rushing into rapids. Boats of 120 feet in length, are tracked up this part of its course with severe exertion, but float down with scant pilotage and without danger in mid-stream. After Quai-chow the river again becomes navigable, but less freely than in its lower course, for its stream is narrower and swifter, and its channel more obstructed with rocks; however there are rarely less than 8 fathoms in mid-channel. It receives the Ho-chow river, an important navigable tributary, at Chung-king, and two smaller ones further west, and ceases to be navigable for large vessels at Su-chow, though boats may ascend it further.

The river has an immense rise and fall, the difference between its extreme levels being 27 feet at Han-kow, where its breadth is fully a mile, and 50 feet in the neighbourhood of I-chang, where it is only a quarter of a mile broad. In the latter place it begins to rise about the beginning of April, continues rising till June, maintains its height till the end of September, and is at its lowest in December. The time of easiest navigation would be before the river has risen so high as to inundate its banks, and make its main-channel difficult to find.

The political state of the country became exceedingly unsettled from Quai-chow upwards. The English treaty was nowhere posted, and at one town it had not even been seen. The Prefect of Quai-chow called it the treaty of Prince Kung. At Su-chow the rebels were described as overrunning the neighbourhood, while headless bodies, with their hands tied behind their backs, floating at all hours down the stream, verified the Chinese statements. At Ping-shan, the furthest point reached by the expedition, there was an actual siege and night attack.

The rebels were not the Tai-pings, nor in any way connected with them. They were called "Tu-feh," or local robbers; there were also plundered peasantry, who took to robbing others for their own subsistence. The rebels were resisted by the inhabitants of the villages, who banded themselves together, and numerous troops had been despatched and were seen on their way against them.

As to the products of the country;—in addition to other crops, the poppy was largely cultivated above Quai-chow: for many miles it was the universal crop, and its quantity was such as might well interfere with a foreign market. There are numerous gold-washings, apparently very unproductive, for none but the commonest people were seen employed upon them. Coal is found in many places, but not of very good quality; it is small and dull-looking. The best coal, and also the most abundant district, is just above Su-chow, where it is quarried high up on the cliffs, and sent down to the river in baskets, sliding on stout bamboo ropes, one full basket pulling up an empty one. This coal could be boated down to Han-kow in twenty days, and to I-chang in ten.

Native Christians numbered from 2000 to 3000 at Chung-king, out of a population of 200,000, according to the account of the French missionaries who are established there. Besides the Christians, there are 500 Mussulman families.

The places which hold out the greatest inducement to Europeans to form trading stations, are I-chang and Chung-king. Steamers could reach I-chang with perfect ease, but thence the rapids and eddies

form an obstruction that would require some knowledge of the river, and boats built for the purpose, to surmount in safety.

No serious difficulty was experienced by the expedition on their way except at Chung-king, where the prefect was exceedingly disobliging, and the soldiers threatened to murder them. A bold bearing and show of resistance overcame all this, and the prefect's manner changed to great civility.

The CHAIRMAN said, that about two months ago he received the following letter from Sir H. Robinson, the Governor of Hong-Kong, forwarding the substance of a letter just received from one of the French missionary establishments in the interior of China:—

“You will no doubt be glad to hear the latest accounts of Major Sarel and his party, who are trying to make their way to Calcutta (*via* Lassa) overland from Hankow: I therefore send you the substance of a letter just received here from Monseigneur Desflèches, Vicar-Apostolic of Eastern Sechuen, dated from Chung-king, 15th May last.

“The English caravan (travelling party) arrived at Chung-king the 28th April. Monseigneur Desflèches was absent in the country. M. Vincot received them. On Tuesday (30th April) Monseigneur Desflèches returned, and invited them to dinner. The city was in such commotion, and its people, who had never seen Europeans in their costume before, were so threatening, that Dr. Barton and the other gentleman remained on board to guard their property, with the four sepoys; and Major Sarel and Captain Blakiston accepted the Bishop's invitation. These gentlemen also saw the mandarins of the place, who at first refused, but afterwards granted them chairs (*des palanquins*). They carried on their boat the flag of an ambassador, being so directed by the authorities at Hankow. They left for Chingtu, the capital of the province, on the 4th or 5th May, expecting to reach the Himalayas about September or October. They were to travel by water to the capital, the land route swarming with rebels, and Monseigneur Desflèches had doubts of their making their way. M. Vincot gives a deplorable account of the state of Sechuen, and calculates the number of the rebels in those parts at over 300,000. The Government troops, he says, are as great ruffians as the rebels, and invariably finish the work of plunder that the latter have begun.

“Monseigneur de Narula died in his flight before the rebels on the 6th May, aged 75 years, 42 of which were spent in China.”

“These, I think, are the only points which would interest you in Monseigneur Desflèches' letter.

“By the latest accounts from the Yangtse the navigation of that river has been rendered very difficult in consequence of the rapid rise; the river having risen 36 feet at Hankow and 21 at Nanking. This, however, does not appear anything more than must be looked for every summer.”

These, continued the Chairman, were merely illustrations of the difficulties with which our travellers had to contend, and showed the reasons why they were compelled to abandon their adventurous expedition. They, however, had accomplished much, and the geographical and other information which they had obtained was very valuable. He knew the meeting would agree with him, when he said that the gentleman who had communicated the paper was entitled to their best thanks.

2. *The Caucasus.* By Captain DUNCAN CAMERON, F.R.G.S., late H.B.M. Vice-Consul at Redout Kaleh, and now Consul at Abyssinia.

IN this paper, after a recapitulation of the mythical marvels of the Caucasus, such as the Golden Fleece, the Amazons, and Prometheus, to which some still existing legends bear distant affinity, the author treated upon its more recent history, the geographical features of the country, and the peculiarities of its tribes.

The tribes are exceedingly numerous, diverse, and hardly admitting of classification. For example: the Cossacks, who occupy the northern face of the Caucasus, date some centuries back, when large bodies of that restless race moved down from their own plains to those of the Dnieper and Don, and thence to the Terek, where, carrying off the daughters of the inhabitants in a Sabine marriage, they formed a mixed race, which has been continually recruited from the Don or Ukraine. Disposed in regiments along the military lines, they vie with the original inhabitants, whose customs they have in great measure adopted, in their bold bearing, showy accoutrements, and daring deeds of partisan warfare; and they furnish an imposing complement to the regular army of the Caucasus. Beyond these are Tartars, originally settled by the sea of Azof, whose history shows four migrations in two centuries.

In selecting one of the numerous races touched upon by Captain Cameron, as characteristic of the more truly aboriginal inhabitants, we may take the Tcherkess. Their constitution is strictly feudal. Society is divided into several classes of nobles, the principal of whom are of Arab descent, intermediate classes of freemen, and into serfs. As in Europe during the middle ages, every freeman is expected to be under the protection of a seigneur. The young Tcherkess is not educated at home, but is entrusted to a neighbour, under whom he is perfected in gentle bearing, eloquence, and martial exercises. Each great noble is attended by a sort of squire of the inferior nobility, whose duty is to fight by his side. The Tcherkess thus form a regular and numerous Moslem chivalry. They are turbulent, but brave, and lovers of liberty; they have popular assemblies, where the interests of the community are freely discussed both by the princes and the better class of elder peasants; for a great respect is shown to age. The Tcherkess country is still a seat of the slave-trade, for which it has been noted since the days of Herodotus, and its influence has sunk so deeply into the institutions of the people, that the chief privilege of a seigneur over the peasants of the lower class, is the right of disposing of their issue. Neither the Tcherkess nor many others of the Caucasian tribes

were devoted to Schamyl; on the contrary, they looked on his leveling system of government with suspicion and dislike. "It was a rule of priests," they said, "and they were princes." It was only among the democratic tribes that Schamyl had great power.

The paper concludes with a short account of the exports and imports of the Caucasus. Among the curiosities of the latter is found the well known "poudre de Perse" for killing insects, which has vastly increased in demand. In imports, the cotton goods of Switzerland rival those of England. Petroleum is an abundant natural production, but it is not brought into the market to such an extent as its importance appears to demand. The total average export of the Caucasus is 192,777*l.*, and import 662,684*l.* This, however, gives an incomplete idea of the movement of its commerce, for the Caucasus is a world in itself, and there is a large exchange of products between different provinces, towns, and villages, each of which has frequently its own speciality.

The CHAIRMAN said, his friend Captain Cameron had made an attempt to do that which he (the Chairman) ventured to tell him it was impossible to accomplish, namely, to combine in one short paper the mythology, history, geography, and ethnology of a vast and very diversified country. The paper, however, contained much of a valuable and interesting character, and he begged to thank Captain Cameron for his contributions. The Chairman then called upon Sir Henry Rawlinson and Mr. Danby Seymour, who were acquainted with the region, to address the Society.

SIR HENRY RAWLINSON, K.C.B., said, that during the last two years, in his journey to and from Persia, he had had the opportunity of passing and repassing the Trans-Caucasian provinces. Their geographical features could be described in a few words. There was, in the first place, a rich alluvial plain on the shores of the Black Sea—the ancient Colchis, watered by the Phasis and its tributaries, and covered for the most part with dense forest and luxuriant vegetation. At the distance of 40 or 50 miles from the sea, a chain of hills run down from the Caucasus towards Ararat, and from the summit of these hills the plateau sloped gradually down for 500 or 600 miles to the Caspian. This plateau was generally of a stern and barren character, but the valley of the Cyrus river was well cultivated throughout, and there was a certain belt of forest running through the country in a north-west and south-east direction, of extraordinary beauty. The southern slopes again, of the great range of Caucasus, broken into innumerable valleys, and studded with villages and vineyards, presented a landscape of surprising loveliness. The range of hills running south from the Caucasus to Akhaltzik, beyond Kotais, were especially remarkable for their beauty: he had never indeed seen or heard of mountain scenery elsewhere of a more magnificent or picturesque character. Ethnologists found many subjects of interest in that country, but it was especially a school in which they might learn caution, for there were many languages spoken in it which they were wholly unable to affiliate. The descent of the greater part of the Caucasian tribes was a subject of the utmost difficulty, into which he could not now enter; but he might mention a fact he had observed in reference to one of them, the Imeretians, as indicating their ancestry—it was the peculiarly thick and rough character of their hair. He believed it testified to their African descent, as asserted by Herodotus, and showed that two or three thousand years had not sufficed to comb straight the woolly hair of the negro. This

appearance of their hair was quite unmistakeable when attention had been directed to it; it struck the gentlemen who were travelling with him quite as forcibly as himself. The hair, however, was the only negro characteristic about them; their features were in no way negro. As to Mingrelia, he considered it to be the finest country in the world, both in the physical features of the land and in the remarkable beauty of its inhabitants. It was a paradise of beauty; neither a plain woman nor a plain man were ever to be seen in it. He recommended those who wished for a pleasant trip to go to the Black Sea and take a run in the Caucasus. They might depend on it they would enjoy the excursion far more than a season spent among the German baths.

After some remarks by Mr. DANBY SEYMOUR, M.P.,

The CHAIRMAN, before adjourning the meeting, wished to announce with respect to China that another expedition was contemplated, and he read the following letter he had received from Mr. Baring, dated Aug. 3, 1861:—

“With respect to your letter of the 17th of November last, submitting for favourable consideration a proposal from Captain E. Smyth, of the Bengal army, to conduct an exploring expedition into Chinese Tartary, I am directed by Sir Charles Wood to inform you that the Government of India have sanctioned—subject to the reply which may be received to a letter addressed by them to Mr. Bruce, Her Majesty’s plenipotentiary in China—the proposed expedition, under the conduct of Captain Smyth; and that they have placed under him Lieutenant Jackson of the Bengal Engineers, Dr. J. L. Stewart, an accomplished botanist, and Mr. Joseph Medicote of the Geological Survey.

“The Asiatic Society of England has been requested to furnish any information, and to offer any suggestions that may be serviceable to the expedition; and I am directed by Sir Charles Wood to add, that any suggestions which the Royal Geographical Society may have to offer, will be forwarded to the Government of India, to be communicated to Captain Smyth, in the event of the reply from Mr. Bruce being satisfactory,* and the exploring party not having started at the time of their receipt.”

In addition to that letter he had received one from Mr. Medicote, the geologist of the expedition, entering more fully into their proposed route, and stating that, while they awaited an answer from Mr. Bruce, they should be very glad of suggestions or other information from people of science in this country.

The CHAIRMAN then drew attention to recent maps of Russia, which were lying on the table, and concluded by stating that the Grand Duke Constantine, who was also the President of the Imperial Geographical Society of St. Petersburg, and was now in England, had given him authority to state that no part of the geography of Russia which was known to H. I. Highness should remain unknown to the geographers of England. He also mentioned that Lütke, the aide-de-camp of the Grand Duke and son of Admiral Lütke, was present.

The meeting was then adjourned to November 25th.

Second Meeting, November 25th, 1861.

The EARL DE GREY AND RIPON in the Chair.

PRESENTATIONS.—*The Rev. S. F. Creswell; Sir John Kirkland; Major Alexander Strange; Jonathan S. Crowley, C.E.; and John Thrupp, Esqrs., were presented upon their election.*

ELECTIONS.—*Capt. Frederick Campbell, R.N.; the Earl Cawdor; Capt.*

* Intelligence has reached the Society that Mr. Bruce’s answer is unfavourable.—ED.

H. Christian, R.N. ; Sir Charles Clifford ; Major-Gen. A. F. Cunynghame, C.B. ; Capt. Charles Dick ; the Earl of Donoughmore ; Rev. William Ellis ; Capt. Robert J. Hendry ; Commr. A. Hiley Hoskins, R.N. ; Sir James J. Randall Mackenzie, Bart. ; Capt. Rochfort Maguire, R.N. ; Lord Rollo ; Don M. F. Paz Soldan ; Lord Talbot de Malahide ; Viscount Templeton ; William C. Baldwin ; James Bishop ; Henry Blanshard ; Julius Brencchley ; William Burges ; Herbert Davies, M.D. ; E. Brown Fitton ; Julian Goldsmid ; F. Gover ; Daniel Grant ; D. Clewin Griffith ; John Heugh ; Deane J. Hoare ; John Hollingsworth ; John Holms ; William Johnson, R.N. ; J. Pryce Jones ; Edward Lane ; John W. Maclure ; Richard Mann ; William S. F. Mayers ; Joseph Milligan ; Frederick J. Mouat, M.D. ; Robert Owen ; George H. Pinckard ; David Reid ; James Searight ; William J. Sharpe ; Jervoise Smith ; R. J. Spiers ; Markham Spofforth ; Joseph W. Tayler ; William Ursher ; Edward H. Walker ; J. William Walker ; J. Harrison Watson ; Charles J. Wingfield, and James A. Youl, Esqrs., were elected Fellows.

The Papers read were—

1. *Exploration of Central Australia.* By J. MACDOUALL STUART, F.R.G.S., and Gold Medallist.

MR. STUART left Chambers' Creek on the 1st of January, 1861, with eleven men and forty-nine horses. The first part of his journey was tedious and difficult, owing to the dryness of the country, of which he complains severely. He says, at the Finke's Springs on March 3rd, "I am now in daily expectation of the equinoctial rains, and then I hope to be enabled to push on without further loss of time. The last month has been dreadful slow work; but it has proved the country passable at any season." The first shower fell on March 16th, at the Hugh Springs, and on the 20th his party began to be embarrassed by heavy rains and the consequent boggi-ness of the ground. He passed Mount Centre on the 6th of April, and reached Attack Creek (the place where he was attacked and repulsed by the natives in his previous journey) on the 25th of April: thenceforward his exploration of new country fairly commenced.

On the 29th of April he arrived at a fine grassy creek with abundance of water, which he called Tomkinson Creek. It formed a station, whence he subsequently made three attempts, in different directions, to reach the northern coast, and where, on the present occasion, he left two of his tired horses to recruit, until the time of his homeward journey.

Four days of travel onwards, brought him to the commencement of large open plains, stretching out of sight to the north, and bounded on the east by a ridge of hills, running also to the north-

ward. The former of these he called Sturt's Plains, after his old leader in Australian exploration, and the latter Ashburton Range, after the President of the Royal Geographical Society. It was at this point of his journey where all his difficulties commenced.

The plains were fissured and water-worn by long previous inundations, but now matted over with thick grass, which concealed the crevices and made them exceedingly dangerous to the horses to cross. There was not the slightest appearance of surface-water. He afterwards mentions his belief that Sturt's Plains are a continuation of some he had met with beyond Mount Centre, and that they might continue to the banks of the Victoria River, the features of the country being nearly the same.

He therefore travelled to Ashburton Range and ascended it, in order to gain a view of the country before him. To the north lay an extensive open plain, with scarcely a tree on it, and no distant hills were visible, where water might be expected, except some slightly rising ground in the north-west: to which, on the second day after his return to camp, he made his way.

He reached it after a difficult and toilsome journey. The horses were constantly falling into the fissures before mentioned, which were concealed by grass, at great risk of serious accident. On arriving he found it to be the bank of a former fresh-water lake, now wholly dried: numbers of old shells lay about it, worn to the thinness of paper by the combined action of the sun and atmosphere. There was not the slightest indication of water in its neighbourhood, nor anything visible in the distance to hold out hope, excepting one hill-top, too far away in the west for him to attempt; so he was compelled to turn back to the watering-place he had last left. He thence started afresh in a westerly direction, straight towards the hill-top he had observed from the bank of the dried-up lake. He reached it, and found it to consist of red, waterless sand-hills, 200 feet high, and thickly covered with scrub. The view from their top was exceedingly discouraging. He could see for fully twenty-five miles a-head, and there was no appearance of a change, while entire want of water compelled him to return without delay.

For the third time he started on an altered course, now making directly for the north, over stony and sandy rises, very thick with scrub and trees, and discovered water on May 14th in what he called Lawson Creek, in lat. $17^{\circ} 15'$; whence he had hopes of out-flanking the range of sand-hills reached on his previous journey, and of thus reaching the Victoria by a more northern parallel. He was, however, disappointed in his end, for, on travelling to the

west, he came amongst stony rises, covered with scrub so dense that it was impossible to penetrate it. It was the thickest scrub he had ever had to contend against; the horses would not face it, and he was in danger of losing them, for, even at two or three yards' distance, they were wholly screened from sight. His hands and face were lacerated, his clothes and saddle-bags torn to pieces. If the party had gone further they would have lost everything off the horses.

These scrub-covered ridges on the one hand, and the fissured waterless plains on the other, placed a bar to further progress to the north-west; that is to say, in the direction of the Victoria River. They were, as Mr. Stuart says, as complete an impediment as if an inland sea or a wall had been in his way.

Returning to Lawson's Creek, he now made a fourth attempt, but in this case to the north-east, in the direction of Carpentaria. However, he was repulsed by a continuation of the waterless Sturt's Plains, to the aridity of which was superadded the further difficulty of belts of nearly impassable forest.

A fifth attempt to the westward of north, on May 24th, was, in the first instance, much more promising. At a distance of only 14 miles from Lawson's Creek he fell upon a splendid creek of water, in lat. $17^{\circ} 30'$, and long. $133^{\circ} 41'$. He saw a large flock of pelicans, and there were mussels and periwinkles in the water, of which the natives must consume a large quantity, judging from the shells on the banks. He called it Newcastle Water, and says it is certainly the gem of Sturt's Plains.

The lagoon proved to be above 9 miles long, 150 yards wide, and 17 feet deep in the middle. It ended towards the north-east in a chain of ponds. Here he was attacked by natives, whom he repelled. He examined the neighbourhood of this water, and on the 30th of May reached even to within 100 miles of Mr. Gregory's last station on the Camfield, but was turned back as before, by the fearfully dense scrub and the want of water.

Again he started from Newcastle Water on the 10th of June, and came on a still thicker scrub than on the former occasion. There was not the least appearance of rising ground, or a change in the country; nothing but the same dreary, dismal forest throughout, which, he says, may in all probability continue to Mr. Gregory's last camp on the Camfield.

He would have dug wells had his party been large enough, when divided into sections, to resist native attacks, and had he possessed means of conveying water to those who would be engaged in sinking the wells. He had not the least doubt but that water could

be obtained at a moderate depth, and believed that three or four wells would suffice to carry a party through to the sources of the Camfield.

Lastly, his rations being reduced to four pounds of flour and one pound of dried meat per man per week, he made a push from Newcastle Water, across Sturt's Plains, eastwards towards Carpentaria, but was again driven back by want of water. The ground was dark and dusty, and had wholly swallowed the rain that had fallen upon it.

Mr. Stuart then fell back several stages to Tomkinson Creek, and expended his last efforts in two vain expeditions—one towards the Victoria, where he met with no scrub of serious thickness, but was repulsed by want of water; the second towards Carpentaria, over plains like Sturt's Plains, and equally impracticable for want of water; and the third towards the Victoria River. Finally, on July 12th, he returned towards Adelaide, with exhausted horses and a bare sufficiency of food.

2. *Letters from the Governor of West Australia and the Bishop of Perth, accompanying the Journal of an Expedition undertaken by the Brothers DEMPSTER, Messrs. CLARKSON and HARPER.*

His Excellency's letter is as follows:—

“I ENCLOSE the journal of a small affair undertaken by some young gentlemen who have been my companions in kangaroo-hunting. From a local point of view their discovery is highly interesting, inasmuch as it was believed to be impossible to penetrate far to the northward and eastward of the settled districts of ‘Northam,’ by reason of dense thickets, which turned Mr. Roe back many years ago. This expedition is, I hope, the forerunner of other and more important discoveries in the same direction; and care will be in future taken to send some scientific observers with the party, which I regret was not the case in the late instance.

“You will observe that the information relative to white men having perished in this locality ten or twelve years ago, is very loose and unreliable. I have questioned the explorers, who can add nothing to what they have stated in their journal, namely, native *hearsay*. The alleged fact of their having horses proves that they could not have been shipwrecked sailors, and I think it highly improbable that any of Leichhardt's party could have reached such a point.

“I begin to look for some tidings of Mr. Frank Gregory's expe-

dition with some anxiety, but without any apprehension, having full confidence in his ability and prudence.

"As our means and prosperity are rapidly on the increase, our settlers will doubtless, ere long, look for more available sheep-land in the unknown waste around us."

THE BISHOP OF PERTH wrote in praise of the members of the Expedition. He corroborated their account of intense cold by his own experience in this unusual season.

Journal of the Expedition.

Messrs. C. E. Dempster, A. Dempster, B. Clarkson, C. Harper, and a native servant, left Northam on July 3, 1861, and travelled in a pretty straight course to the E.N.E. Every one of the party had two horses, and carried his own provisions of eighty pounds of flour, twenty-two pounds of pork, sixteen pounds of sugar, and three pounds of tea.

Each day's work is described in their printed account, which occupies five columns of a West Australian Journal, the "Independent," of September 13th. The country they passed through, has the rapid alternations usual in Australian scenery, of scrub, grass, and lagoon; but the scrub was never so dense as seriously to embarrass them. The grass was sufficient for their wants, though not overabundant, and they camped by water on nearly every occasion. The only serious discomfort they endured was owing to persistent hard frost.

Their furthest point was a hill, the most considerable they had seen, which they called Mount Kennedy. They reached it on July 24th, and they place it, by dead reckoning, in s. lat. $30^{\circ} 28'$, and e. long. $121^{\circ} 16'$. Here they turned back, because the country was not inviting enough to tempt them further. There were numerous native fires in sight, and the onward route appears to have been as practicable as that which they had already passed over.

The only remarkable feature on their route to Mount Kennedy was an extensive chain of lakes, passing out of sight to the east when viewed from a neighbouring hill. By the side of this hill was a spring, apparently of petroleum. It was situated at about two-thirds of the way between Northam and Mount Kennedy. Their return journey was made by a different route, and they reached home, without loss, on August 23rd. They had been guided by a native, and heard a story from him, which was afterwards corroborated by other natives, that long ago three white men with horses, had reached a large salt water far to the east, and, after travelling about its shores, had turned back and perished.

3. *Official Report of the Settlement of Port Denison.* By
MR. ELPHINSTONE DALRYMPLE.

MR. DALRYMPLE gives a most satisfactory account of the successful establishment of the new settlement at Port Denison, in Queensland, Australia. He arrived there safely on the 10th of April, in command of the overland expedition, and found the party sent by sea, already encamped in tents along the shore. A flagstaff was then hoisted; the township survey was commenced, and progressed rapidly; fences and buildings quickly rose; order was kept by the native mounted police and others; and Mr. Dalrymple writes, on the 24th of April, "It is now most deeply gratifying to me to see the British flag flying over the spot which we found a wilderness; to see a small, but happy and orderly, population of men, women, and children, quietly settled, where a few days ago the wild aboriginal held undisputed sway; cattle and horses feeding over the rich virgin pastures, and the sounds of industry and civilization, marking the advance of another great wave of Anglo-Australian energy, from south to north." The route traversed by the expedition lay over a fine pastoral, hilly, and well-watered territory; and to the path left by the 140 horses and 121 cattle that composed it, is now added an excellently-marked "tree-line" of 130 miles from Port Denison to Fort Cooper.

Sir George Bowen, in forwarding this despatch, reports to the Duke of Newcastle that applications have already been made, chiefly by settlers from Victoria and New South Wales, for licences to occupy nearly the whole of the recently proclaimed pastoral district of Kennedy. This, alone, embraces a territory exceeding the area of England and Wales, and reaches within 300 miles of the Gulf of Carpentaria. He further adds, that it will probably be shortly his duty to open another extensive territory, lying to the west of Queensland.

After some remarks by COUNT STRZELECKI,

COLONEL GAWLER said it was quite refreshing to hear such a combination of facts accumulating in reference to long-despaired-of Australia. He would not occupy the time of the meeting by entering into collateral circumstances, but would proceed at once to those which had arisen since he personally visited Australia, when it became the object of his very ardent hopes—the opening of a line of communication from the south-east provinces to the north-west coast, by the way of the head of Spencer's Gulf. He thought that all who glanced at the map, and looked at the direction of the line of communication, and the wealthy countries beyond it, would see the great importance of the opening of that line, and, thanks to that fine fellow, that persevering fellow, Mr. Stuart, it might now really be considered as opened. It was to be remembered that the part of the country which proved an obstacle to Mr. Stuart's success in reaching the Victoria River was not more than 90 miles in width.

It was a dense forest, it was true; but while a dense forest was an obstacle to Australian travellers, it was no obstacle to backwoodsmen or the splitters of Australia. Half a dozen of those men would soon clear away masses of the 90 miles of the dense forest, supposing it continued the whole of the way, which was not likely. He believed they would cut a road at the rate of 3 or 4 miles a day, and, with a few well-diggers with them, they would be enabled to procure an abundance of water. Mr. Stuart estimated that three or four wells would be sufficient to make the way open to the Victoria. The difficulties of the southern part of the route were thought nothing of, and had been overcome with ease, so that they might fairly consider that the whole of the important line from the head of Spencer's Gulf to the north-western coast was open. They had, too, the satisfaction of considering that it was opening out a well grassed country. Of course, there were tracts of desert, where there were difficulties to be encountered—some there had been in England itself, such as the moorland between London and the South coast; but, altogether, the accounts were very extraordinary as to the beauty of the soil, the density of the grass, and the abundance of water. There could not be a more convincing evidence of the traversable nature of the country than the success which had already attended the efforts recently made to explore it. Mr. Stuart, starting at 18° 30', reached 28° 30' in 50 days, a distance of 10 degrees in 50 days, which would average about 15 miles a day for his tired and worn out horses, and men who had long been reduced to four pounds of flour and one pound of dried meat a week. He attached peculiar importance to the exploration of a route that should connect Spencer's Gulf with the north-west of Australia, inasmuch as it lay directly in the line towards our Asiatic possessions, and abutted on excellent harbours. The speaker then recommended the careful perusal of Mr. Stuart's Journal, and expressed a hope that now that such progress had been made in exploring Australia, the British Government would step in and assist those who went to the country, by granting them titles and leases of the land which had been discovered, and give the white men as well as the black men some protection. He concluded by drawing attention to the activity which had been displayed by the Duke of Newcastle in forwarding the medal awarded to Mr. Stuart. It met him on his recent return to Adelaide, and not only stimulated him, but also the Government and the settlers, so that they were fitting him out with all activity, to enable him to proceed again to the north, to break through the last barrier which existed.

MR. BAKER said that Mr. Stuart had discovered a new country, which was superior to anything which he had passed through before, and had established the fact that the country was well supplied with water in every direction; in fact, he stated that the country could be travelled over at any time, and in any place, without the want of water or of feed for his horses. Mr. Stuart was going to start again, and he had such confidence in the country, that he was about to take 500 horses to the Gulf of Carpentaria, having found the country so well watered, and the grass in such abundance, as to be capable of sustaining them. He hoped, if any new colony should be established there after the arrival of Mr. Stuart, that the British Government would give him, as a reward for his services to the country, a large tract of the land, so that it might be handed down to future generations, to show that he, and those who had co-operated with him, were the discoverers of the country for the purposes of the Anglo-Saxon race. He also expressed a hope that the people who might be discovered inhabiting the land would not be forgotten, and that some successful missionary effort would be made to secure them from the calamities which would otherwise come upon them.

MR. CRAWFORD said that Mr. Stuart's accounts of his discoveries were beyond all praise. He did not know how the Society was to reward him.

Mr. Stuart had received their medal, and, if there were precedent for it, he thought he should have it again. Mr. Stuart was a bold, enterprising man, full of sound judgment and great discretion, otherwise he could not have so succeeded. Australia was a very valuable country. The fact that it produced five or six millions sterling worth of wool showed its importance, but the production of wool would have its limits—beyond a certain degree from the equator the sheep could not thrive. Australia was excellent for the production of wool, and for gold, but the gold was diminishing, and, he must say, he agreed with those who preferred New Zealand to Australia for the purpose of colonisation.

The CHAIRMAN then congratulated the Meeting on the interesting nature of the papers read, and the discussions upon them. He pointed out the great progress which had already taken place in Australia, and trusted that their acquaintance with its vast territory would be followed by its occupation by a large population, the extension of civilization, and advance of the arts of peace.

The Meeting was then adjourned to Dec. 9th.

Third Meeting, Monday, December 9th, 1861.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*The Rev. Charles J. Armistead; Lieut. Langham Rokeby, R.N.; Don Ramon de Silva Ferro; E. Brown Fitton; Edward Lane; J. Harrison Watson; and James A. Youl, Esqrs., were presented upon their election.*

ELECTIONS.—*Lord Claude Hamilton; Captain G. Towers Hilliard; Sir Christopher Rawlinson; the Rev. Edward J. Shepherd; Douglas Henty; Thomas Hood Hood; Edward Lawrence; Robert Low; William Macpherson; Henry Martin; David Ricardo; and C. Douglas Shepherd, Surg. R.N., Esqrs., were elected Fellows.*

EXHIBITIONS.—Logarithmic tables belonging to Mungo Park, accompanied by MS. calculations lately procured on the Niger, and presented by the Foreign Office. Several photographs of ‘Boobies,’—the original inhabitants of Fernando Po,—taken by two Spanish officers, and forwarded by Captain Bedingfeld, R.N., F.R.G.S., were also exhibited.

The PRESIDENT called attention to the remarkable care with which Mungo Park’s astronomical tables had been preserved by the Africans into whose hands they had fallen. The scraps of calculations and manuscript had been compared with a volume of Mungo Park’s MSS. in the possession of Mr. Murray, the publisher, and the handwriting had been identified.

The Papers read were—

1. *The British Settlements in Western Africa.* By Colonel LUKE SMYTH O’CONNOR, C.B., F.R.G.S., late Governor of the Gambia.

THIS was a short and slight sketch of the rise and progress of the Gambia, Sierra Leone, and Cape Coast settlements, accompanied by

many anecdotes illustrative of African character. As to the Gambia, which was a noble river, navigable to vessels of 300 tons for a distance of 300 miles from its mouth, little more was known of it beyond the falls of Baraconda than what travellers had told us two-and-a-half centuries ago. Neither did the author consider this to be wondered at, for the nature of the country, its climate, and especially the jealousy and suspicion of the natives, presented almost insuperable barriers to the advance of the white man. "Aye, aye, Sir," said an old chief, "thankee, thankee; your words are sweet and your presents good, but, God be praised, we do not want to learn the white man's knowledge. The cities, the people, the fields, flocks, herds, rivers, forests, are *now* all ours, but once let you get your hand into our nation and you will take the dust from under our feet."

Speaking of the unscrupulous desire to make money, so common to Africans, he said, a negro trader asked his master why he left his own good land and risked his life in Africa? The white man replied, "To make money." "Good," said the black trader; "you are a wise man; but suppose you die, then whom do you make money for?" "For my child," answered the white man. "Ah!" exclaimed the African, "why not sell your child and make money of him?"

The PRESIDENT said he had listened to the paper with great interest, but at the same time with much pain; for, while they all knew how large a part of the anarchy and misery just alluded to was caused by the misdeeds of our ancestors, it was not so obvious from Col. O'Connor's paper that our settlements on the W. African coast had much tended to mitigate the wrongs we had inflicted. These settlements had been in our power for many years; we had lost able men, good servants of the public, in maintaining them; we now wanted to learn what good had arisen from them. It was a question on which he sought information from travellers then in the room. He, the President, had served on a Committee of the House of Lords some years since, when the then Governor of Sierra Leone was under examination. He had asked him, "What is the condition of the Africans that are taken and set free in your colony?" and was answered, "They are orderly, well conducted people; they do all the work of the colony: we could not get on without them." Again, he (the President) asked, "You have schools, and very good schools: what is the state of the children turned out of those schools?" The Governor replied, "Those children do not work; they are vagabonds, and without the immigration of the liberated Africans we could not get on at all." He, the President, did not take upon himself to say this was a just statement of the case; he hoped it was not, and therefore sought testimony to the contrary.

Referring to Dr. Livingstone's endeavour to civilise Africans by first obtaining an influence over them before beginning to preach the truths of religion, the President quoted the advice given by Loyola's successor on the course to be pursued in converting back to Catholicism the then Protestant city of Bologna. He said, "We will send missionaries to Bologna, but they shall not say one word about religion. They shall begin first by attending the hospitals, by attending the sick, by attaining influence over them, and establishing their repute as good men. Then let them begin to preach their religion, and they will be listened to."

Finally, the President called upon Mr. Freeman, the lately appointed Governor of the new British settlement of Lagos, to address the meeting.

MR. FREEMAN said that hitherto he had never visited Western Africa, but that he had resided for some years in Northern Africa, and there in Tunis and Tripoli, and especially in Ghadames, had seen a great deal of the commerce of Central Africa. He could not but be aware of the great importance of Lagos, in offering a new opening to that commerce. Until lately by far the greater part of it had been carried across the Sahara, a distance of five or six months' journey; too long to be remunerative, unless combined with a trade in slaves. But the slave-trade being now abolished in Northern Africa, the traffic across the Sahara was rapidly diminishing, and the commerce of the Soudan was consequently seeking a new outlet in some part of the western coast. Lagos was eminently suited to be that outlet, owing to its neighbourhood to the mouths of the Niger, and means of overland access to the confluence of the Benué and Chadde. Thence Kano, the chief emporium of Central Africa, might be reached in a fortnight, and both Sokoto and Timbuctu were accessible. He thoroughly agreed with the President on the importance of gaining an influence over the Africans before attempting to convert them, and he believed that by opening a trade from Lagos we should obtain that influence.

2. *Recent African Explorations*;—*Proceedings of* (a) SPEKE, (b) PETHERICK, (c) LEJEAN, (d) PENEY, and (e) LIVINGSTONE.

(a) *Extracts from a Letter by Captain SPEKE to Lieut.-Col. RIGBY, H.B.M.'s Consul at Zanzibar, dated Khoko in Western Ugogo, 12th December, 1860.*

"We are now scarcely knowing what to do. Before us is the desert of M'Gunda M'Kali, and beyond that again the country of Tura—all famished, and without a grain of food to sell us; yet these are not a quarter of the difficulties we have to contend against. Our Kirangozi and nearly all the porters have run away, and our Mozigos are lying on the ground. The rains too are very severe, worse even than an Indian monsoon. Our losses in the rough amount to nine mules, twenty-five slaves of the Sultan, and eighty Wanyamwesi, so you may imagine our dilemma. But we are not out of spirits. Grant is a very dear friend, and being a good sportsman we get through our days wonderfully. At this place alone I have killed two rhinoceroses and three buffaloes, and Grant, a little further back, killed a giraffe. In addition to these, we have killed numbers and many varieties of antelopes, zebras, pigs, and hyenas.

"We often think of you and the great service you have rendered to the expedition by giving us Baraka and the others of your crew; they are the life of the camp. As to Baraka, he is the 'father' of his race, and a general of great distinction among the serviles. I do not know what we should have done without him. Bombay, with all his honesty and kind fellow-feeling, has not half

the power of command that Baraka has. Would that I had listened to Bombay when at Zanzibar, and had engaged double the number of his 'free men,' for they do all the work, and do it as an enlightened and disciplined people—so very different from the Sultan's slaves, in whom there is no trust whatever. Many of the Sultan's men I liberated from slavery, and gave them muskets as an earnest of good faith, at the same time telling them they should eventually receive the same amount of wages as all the other 'free men;' but they have deserted me, carrying off their weapons, and so reducing my number of guns.

"Travelling here is much like marching up the grand trunk road in Bengal; the only things we want are a few laws to prevent desertion, and all would be easy. We are moving to-day with ten days' rations, but only in half-marches, sending the men back from each camp, to bring up the remainder of the loads. It is a tiresome business. At Tura I shall leave many things behind, and push on to Kazeh, to hire more men to fetch them up."

(b) PETHERICK.

Mr. Petherick's last communication is dated Korosko, August 9th, 1861. He was then engaged in sending his effects across the Nubian desert, by the overland route to Khartum, and was in daily expectation of the arrival of his new boat from Cairo, together with two members of his party who had not yet joined him.

(c) LEJEAN.

One if not both of the expeditions that had preceded Mr. Petherick to explore the White Nile, have come to a premature termination. M. Lejean penetrated no further than the Barri country, whence he returned, wearied with the people and suffering from ill-health; and Dr. Peney, after adding materially to our knowledge of the neighbourhood of Gondakoro, has unhappily died.

(d) PENEY.

The last two letters that were written by Dr. Peney are now just published in the '*Nouvelles Annales des Voyages*.' They were addressed to M. Jomard. The first of them is dated Gondakoro, February 20th, 1861. He states that he had returned from a journey due West to the district of Mourou, in the province of Niam-barra. He was eight days in reaching it, but only thirty-one hours of actual travel. He therefore places Mourou on the same parallel of latitude as Gondakoro, and one degree of longitude more to the westward.

There he arrived at the river Itiéy, running to the N.W. It was

described to him as continuing the same course through the province of Niam-barra, then through the tribe of the Allah, next bounding the Niam-Niam-Maharaka, then penetrating the Djour country, and finally reaching the Bahr el Ghazal, of which it was one of the principal affluents.

Upwards from Mourou, at a distance of 20 leagues s.e., the river passed through Monda; but of the country above Monda no satisfactory information could be obtained.

Dr. Peney's last letter is dated May 20th, 1861, and is written after his return from a preparatory journey, partly in boats and partly on foot, up and beyond the cataracts of Makedo. His boats had received damage at the commencement of his voyage, and he lost so many ropes and spars as to render them useless for the moment; but he found small lateral arms of the main river, up which he felt assured he could navigate them on a future journey. The natives reported that beyond the limit of his journey, the river spread out into a broad sheet of water, of great depth, but sluggish current. Animated by this account, he was preparing for a second boat expedition southwards in the month of July, as soon as the rising Nile should have made the navigation more practicable, when his plans were cut short by death. His furthest limit was close upon that of Galuffi, and he places it on the same meridian as Gondakoro, and one degree to the south of it. M. Debono was associated with him at the time of his death, but we have no knowledge at present of Debono's movements.

MR. GALTON said that Dr. Peney, in his first journey, seemed to have fallen upon the southernmost portion of Mr. Petherick's route, at a distance of only 60 miles from Gondakoro. Although Mr. Petherick's name does not appear in Dr. Peney's account, which might have been written in entire ignorance of what Mr. Petherick had published, there could be little doubt that the district explored by the two travellers was the same, the tribes' names Mourou and Monda, Niam Niam, and Djour, in addition to the account of the river, being common to both narratives. If this were the case it would involve an enormous amount of rectification of Mr. Petherick's positions, both in actual distance travelled and in the direction of his course from the Bahr el Ghazal. Neither of these corrections surpass the bounds of possibility: for Mr. Petherick's reckoning of 19 miles' journey per diem, in a straight line, is double what other travellers under similar circumstances are found to accomplish; and as to the direction of his route, not only do the rough compass-bearings, on which alone he depended, admit of that large error, but there is the following additional reason to believe in its existence; namely, that the rough map by the brothers Poncet, compiled from various cross routes of traders, places the Djour and Niam Niam countries closely in the position assigned to them by Dr. Peney, and far more eastwards than in the map of Mr. Petherick. Now that the latter traveller has returned to the Soudan, well provided with astronomical instruments and instructed in their use, we may hope for a corresponding degree of accuracy in the geographical data that his future explorations may afford to us.

(e) LIVINGSTONE.

The last news of Dr. Livingstone is dated April 9th, 1861. Extracts of the letter are given as follows, the Doctor having himself written it in the third person :—

“On the 9th of April last, Dr. Livingstone’s expedition arrived at Pomony Bay in the island of Johanna, from the river Rovuma.* They had ascended the river only 30 miles, when, halting to wood their ship, a mark made on a tree showed that the water was falling at the rate of 6 or 7 inches a day. They had found some parts carrying no more than 5 or 6 feet of water, and, as they drew nearly 5 feet, they had to return, lest they should be left fixtures till the flood of next year. The cause of this unsuccessful termination is to be attributed to various delays suffered by the *Pioneer* in the voyage out, making her at last quite two months behind the time for a successful trip up the river. After coaling, they left for the Zambesi, intending to go up the Shiré, and then make a road past Murchison Cataract on that river to Lake Nyassa. The distance is only 35 miles, and it is hoped that they will carry a boat up above the cataracts, and by that means explore the lake.

“It is also in contemplation to settle the point whether the Rovuma comes out of Nyassa, as asserted by all the people they met, before going in the *Pioneer* again to that river. The Oxford and Cambridge Mission accompany the expedition up the Shiré, and it is proposed to place these gentlemen on the plateau of 4000 feet above the sea, on which stands Mount Zomba. There they are likely to enjoy good health while pursuing their enterprise. They have had a good deal of fever, but no mortality. The healthy season begins in May.

“The Rovuma will probably turn out to be the best entrance into Eastern Africa. It must, however, be navigated with a vessel of light draught, and with the same skill as is required in the above-bridge Londor passenger-boats. On the question whether it actually derives its waters from Nyassa, the Doctor thinks that it cannot come out of the Nyassa he discovered, but from some other lake. The reasons he adduces are : the Nyassa is already known to give off one large river, the Shiré. This river never rises nor falls more than 3 feet, nor is its water ever discoloured. The Rovuma rises and falls 6 or more feet, becomes very muddy, and no instance is known of one lake giving off two large rivers. The probability, therefore, is, that if the Rovuma does come out of a Nyassa or Nyanza (lake, or piece of water), it is some other than that dis-

* See also *The Rovuma River* (p. 36) in “Additional Notices.”

covered by the expedition. It is well known that lakes having no outlets become brackish in the course of ages. This is the case with Shirwa, but Nyassa and Tanganyika are sweet. The former owes its sweetness to the Shiré flowing out of it. Does Tanganyika owe its sweetness to the Rovuma?"

MR. RAVENSTEIN said he was inclined to believe that the lake generally referred to as Nyassa or Nyanja was not identical with the Nyassa of Livingstone, but that on proceeding for about 70 miles to the north of the debouchure of the Shiré, having the Maravi on the left, we should enter a very narrow channel with a strong current, which, gradually widening, led, in a north-westerly direction, into the upper lake—the great Nyanja. At Zandenge (say in $13^{\circ} 15' \text{ s. lat.}, 35^{\circ} 10' \text{ e. long.}$) the width of this channel was very inconsiderable, for people on opposite banks could hail each other. To explain his views with more precision, he would state the assumed latitudes and longitudes of the places he was about to name. Thus, at Mjenga ($13^{\circ} 5' \text{ s. lat.}$) it was at most two miles; under $12^{\circ} 55' \text{ s. lat.}, 34^{\circ} 5' \text{ e. long.}$, there was a mountainous island, inserted on the Missionary map, and mentioned by Candido and Dr. Barth's Arab merchant. Three days' journey to the north of this island was the ferry (Gnombo) Nussewa ($12^{\circ} 35' \text{ s. lat.}, 34^{\circ} 30' \text{ e. long.}$), where, according to Dr. Roscher, the opposite shore could be seen only on a clear day. Boats crossed the lake here in a day and a half, probably in a south-west direction. Still further north the opposite shore was not discernible at all, and nothing reliable was known regarding the termination of the lake in that direction. It had been suggested that Gnombo and Mjenga were situated somewhere near the debouchure of the Shiré, but the great distance from Kilwa, and the shape of the southern extremity of Livingstone's Nyassa, were unfavourable to such a supposition.

There existed apparently great discrepancies in the various itineraries leading to the lake from Kilwa, but all bore internal evidence of leading to neighbouring localities on the same lake: they crossed the river Rovuma about midway, climbed the Njesa mountains before reaching the lake, and in two instances led through Lukelingo (Keringo), the capital of Hiao. The time occupied on the journey was 60 days according to Mr. Cooley; 56 days according to Baron von Decken; 30 days according to the missionaries. Dr. Roscher had actually made the journey in about 50 days, and one of his caravans in 25 days. Great differences in the length of a day's journey were by no means rare in Africa; and Gamitto, on going from Tetté to Lucenda, had made only $2\frac{1}{2}$ miles' actual progress a day, but $7\frac{1}{2}$ miles on his return. In the present instance Baron von Decken's journey into the interior, to within 9 days of the Rovuma river, enabled us to estimate the distance from Kilwa to Gnombo, and approximately to fix its position. The latter was controlled by the route of a Senhor Candido, who had travelled from Tetté in a N.N.W. direction, through the country of the Maravi, had come upon the lake in the country of the Shiva, after 45 days, and crossed it (probably in the direction of Gnombo) in 36 hours. According to the position assumed, Candido must have travelled at the rate of 5 miles a day. Another itinerary led to the lake from Mozambique.

The following facts spoke in favour of the northern Nyanja being connected through a narrow channel with a lake further south. Both Gamitto and Dr. Roscher spoke of a strong current which flowed in that direction. Candido was positively assured on the upper Nyanja that the Shiré flowed from it; and the Rev. J. Erhardt told us that the Wamuera, dwelling on the western shore of the lake, three days to the south of Mjenga, came to that ferry to be put across. There was no conclusive evidence of the Rovuma river coming

from this lake. Where the routes from Kilwa crossed that river it flowed north and south. It might, however, owe its origin to a lake, which Dr. Krapf placed at 10 days' journey west of Kilwa.

The third Paper read was—

3. *Despatch from Dr. Baikie, Commander of the Niger Expedition, to Earl Russell, dated Lukoja, September 10th, 1861. Communicated by the FOREIGN OFFICE.*

"MY LORD,—The *Sunbeam* arrived on the afternoon of the 31st of August, and by her I received letters and despatches, being the first since 2nd March, 1860. Among them was your Lordship's despatch of June, 1860, recalling the expedition; but, after great consideration, I have ventured to defer my return to England until I can again communicate with your Lordship, and this I have done for the following reasons:—

"1st. Your Lordship has not yet been informed of the present state of affairs here, nor of what has been done here during the past year.

"2nd. My supplies being limited, and my horses having all died, I was prevented from making any lengthened journey; but as I could not be idle, I tried to take advantage of a seemingly favourable state of affairs, and accordingly made a settlement at this spot.

"3rd. The King of Núpe, the most powerful next to the Sultan of Sokoto, being desirous of seeing a market for European produce here, entered into relations with us, and undertook to open various roads for the passage of caravans, traders, and canoes to this place, which promise he has faithfully performed; I on my part, on the strength of the general tenor of my instructions, and faith in Mr. Laird's intentions, giving him to understand that it was the desire of H.M.'s Government to have a trading station here.

"4th. During our late distressed state, the King of Núpe behaved most kindly and liberally towards us, and, besides frequent presents, lent us cowries for our current expenses, so that I am now in his debt 70*l.* or thereabouts; and during the very limited stay of the steamer here, eleven days and a-half, it was totally impossible to communicate with and pay the king, and it would have been a most ungracious and impolitic act, after his extreme kindness, to have left the place in his debt, and one which I feel assured your Lordship would not have approved of.

"5th. Because, having secured a position here, and the place promising so well, I hardly feel justified in giving it up without first communicating with your Lordship.

"Both the Rev. Mr. Crowther and Captain Walker, agent for the late Mr. Laird's executors, have expressed themselves most favourably impressed with the condition of the place, with its value as a central position and place for trade, and with the importance of keeping it up; and Mr. Crowther will send his views at length to England. I have reduced my staff as much as possible. Mr. Dalton is going to England; I have sent one servant to Sierra Leone, one to Lagos, and another is only prevented from also going by his being at Bida, and the leaving of the steamer before he can possibly reach it; and I am remaining with only two young men and my native followers. I have started a regular market here, and have established the recognition of Sunday as a non-trading day, and the exclusion of slaves from our market. Already traders come to us from Kabbi, Kano, and other parts of Hausa, and we hope, ere long, to see regular caravans with ivory and other produce. I have arranged with the Rev. Mr. Crowther again to try to open a road to Lagos by Ibádan, and at the end of this month I shall send off a messenger by this route to meet Mr. Crowther at Abbeokuta, and to return with other people.

"The step I am taking is, I can assure your Lordship, not lightly adopted. After a prolonged absence from England, to stay another season here without any Europeans, with only a faint prospect of speedy communication, and after all my experience of hunger and difficulty last year, is by no means an inviting prospect. But what I look to are the securing for England a commanding position in Central Africa, and the necessity for making a commencement. I have consulted with the Rev. Mr. Crowther, and that gentleman agrees with me in the expediency of what I am about to do, and in consequence of my determination he has left one of his followers with his family in charge of his mission station at the town of Gbébe on the opposite shore. But I would respectfully request that, should your Lordship see fit to recall me, another may be appointed in my place who should have Consular authority, and whom I might personally introduce as my successor, and who would alike represent England here, and at the same time protect the many people who have trusted the white men, and who have gathered round me."

The meeting was then adjourned to January 13th, 1862.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Extract of a Letter on Queensland and New Zealand, from THOMAS HOOD HOOD, F.R.G.S., Member of the Legislative Council of Queensland, to LORD ASHBURTON, President R.G.S.*

I HAVE been travelling a good deal lately over the Australian and New Zealand Colonies, and have just returned from a trip with Sir Charles Nicholson to Port Denison, a new settlement we have established in latitude 20°, which will be the shipping port of a large district of tropical Queensland. We are using our best efforts to introduce coolies from India for the purpose of growing cotton, for which there can be no doubt that this colony is well adapted, so far as soil and climate are concerned.

I saw that at a recent meeting of the Royal Geographical Society a gentleman stated that it was very doubtful whether Queensland would produce good wool on account of the latitude. This is a great misapprehension: the value of that article exported last season from the colony was considerable, and in quality it is finer than that grown in the southern colonies. It is now proved that some of the finest pastoral districts lie to the north of the tropic of Capricorn, and before many years elapse it seems highly probable that from some harbour in the Gulf of Carpentaria will be shipped the produce of flocks depastured on Leichhardt's Plains of Promise. We hope shortly to know more of the geography and capabilities of these regions on the return of the various exploring expeditions now out, or about to start, more especially from the two fitted out by the colony of Victoria (with some assistance from Queensland), for the purpose of searching for Mr. Burke and his companions. It is very doubtful whether the ostensible object of the expeditions will be accomplished; several of the camels taken by the missing explorers have returned to the out stations of South Australia; and if his party have not perished, they are sure to reach some of the settlements belonging to Queensland before relief can be afforded them. The Colonial war steamer *Victoria* and a transport left Moreton Bay two days ago, with Mr. Landsborough, and a party of 6 men, with 25 horses, to be landed at the Albert River on the north coast, whence they will travel along the eastern borders of the desert country of the interior; another party, consisting of *Aboriginal* police, under the leadership of a very experienced bushman, Mr. Walker, starts from the settlement of Rockhampton on the FitzRoy River, and makes a course to meet Mr. Landsborough. Should it be found that a large extent of good country exists inland from the gulf, to the west of Gregory's and Leichhardt's tracks, stock will be driven out at once, and the foundation laid of a new colony; which, from its proximity to the populous countries of Asia, would possess great advantages, and rapidly progress, more especially if commenced as an Imperial one.

I may mention, knowing the interest you take in those matters, that I passed over lately in New Zealand extensive tracts of country in the southern portions of the Middle Island, which are likely to prove highly auriferous, from the geological indications. It is to be regretted should these gold-fields be developed and prove attractive at present; for the small population in the colony will be diverted from more legitimate occupations, and the healthy

tone which pervades the settlers of these provinces, and promised to make New Zealand the England of the southern hemisphere, will be changed to the feverish, discontented one which characterizes the population of a gold country.

It may be interesting to you to know that I discovered at the Antipodes the remains of what I deem to be a species of fossil lizard closely resembling the *Plesiosaurus* of the Lias. I have sent the fossils to Professor Owen. There is said to be a possibility that the British Museum may still be adorned by a *Dinornis*: the footsteps of a gigantic bird, it is stated, were seen by a surveyor's party; they were 14 inches long, and 11 inches wide on the spread, and they had been impressed during the night over the tracks of the men made on the previous day. All the wingless birds existing in New Zealand are nocturnal in their habits, and the general impression from Maori tradition is, that the Moa was a gigantic *Apteryx*. The district is exceedingly rocky, and full of caves, in some of which it is just possible that a surviving individual may find its hiding places. Exertions are being made (the last steamer's mail brings us intelligence) to ascertain the truth of the report, and if correct, thoroughly to search the wild and unsettled districts where it is said to be. Certainly this will be a most interesting event to naturalists should the search prove successful. I must say I feel somewhat sanguine on the subject, as once, when in that part of the Middle Island, I heard of a very circumstantial account given by a man, who stated that he had seen a great bird go down into a rocky glen one morning at daybreak, but the story was not credited. The surveyor who now makes the statement is understood to be a man of character.

2. *Report on the Natural Products and Capabilities of the Shiré and Lower Zambesi Valleys.* By JOHN KIRK, Botanist to the Livingstone Expedition. Dated Senna, Dec. 28th, 1860.

I beg to offer the following Report concerning the capabilities of the regions explored by the expedition under your command for the growth of such articles as are in demand in Europe:—

The countries examined have been those bordering the Zambesi from the east coast to Sesheke, a Makololo town, situated in the centre of the African continent; likewise the valley of a tributary river, the Shiré, from Lake Nyassa to its confluence with the Zambesi near Moramballa Hill. The highlands of the Batoka and Manganja countries have also been visited. The area thus included extends over 11° of longitude and 5° of latitude; the greatest height above the sea level being 8000 feet.

The Zambesi forms a large Delta, commencing 60 miles from its mouth; the coast for about 8 miles inland is muddy, wooded with mangrove, *avicennia*, and other trees peculiar to such places within the tropics; the remainder of the Delta consists of rich flat alluvial lands, intersected by many branches of the river. This great tract is covered almost exclusively with gigantic grasses, which keep down all other forms of vegetation, only *borassus* palms, with a few figs, *acacias*, or *lignum vitæ* trees, being able to resist the fires which sweep over these plains during the dry season. The people at present inhabiting the Delta are for the most part fugitives; the slave trade and war have combined to desolate this rich country, which once produced corn, vegetables, and fruits in abundance. Near the coast cotton of an inch staple is found growing wild, having sprung up from seed accidentally scattered; this equals in value much of the Egyptian. Climate and soil are admirably suited, seeing that the plant succeeds so well without cultivation, surrounded by weeds. In the more inland districts it could not raise its head above the

dense luxuriance of the other vegetation. The labour required to cultivate cotton here is very small, and the Delta might be made a vast cotton field by encouraging the natives to industry. Many parts of these lands are also suited for the growth of the sugar cane; a little is now raised near the coast, and succeeds well; and it might be raised in most parts even without irrigation. Besides sorghum, pennisetum, maize, setaria, eleusine, and various other sorts of native corn, the Delta also yields wheat during the cold season. Rice of good quality is also cultivated. Tropical fruits succeed well, and near the coast mangos, pine-apples, guavas, cashews, lemons, oranges, and cocoa-nuts are still found where Portuguese settlements had existed in former times.

The climate of the Delta is mild, presenting neither the excessive heat nor cold of the interior; the atmosphere is much moister, and heavy dews are frequent; the prevalence of a sea breeze renders the parts near the coast more healthy than those within the mangroves. The malaria, although an obstacle to the settlement of Europeans, is by no means so intense as that of the west coast; and we have not found a case which resisted treatment, while a cure is commonly effected on the third day. To those passing through or remaining for a short time, there seems to be no danger. But in order that this might become an extensive source of cotton, the permanent residence of Europeans is not necessary; if it were raised by the natives and purchased from them by agents, a steady supply might be depended on; but time would be needed, even under a wise government, to bring the Delta back to a flourishing state.

The valley of the Zambesi, from the Delta to where the river enters the Batoka Hills, presents a very uniform vegetation; that of the valleys and adjacent plains differing from that of the hills, which frequently cross the river. In its course it is joined by the Loangwa and Kafué from the north, and several smaller streams from the south. The forests which clothe this region abound in valuable woods. Lignum vitae and ebony are both common, so much so that in the region between Tetté and Shupanga we have frequently consumed a ton per day of these alone—the only difficulty experienced being to obtain them of sufficiently small size to enter the badly constructed furnace. There are also many timber trees suitable for machinery and ship-building. A species of *Pterocarpus* (the “Malompe”), from its lightness and strength, is well adapted for making oars, and is used by the people of the interior for their paddles. The forests, inland from Shupanga, contain the “gunda,” from single trees of which, canoes capable of carrying 3 tons are hollowed out.

The hilly regions, especially those between Senna and Tetté, contain the buaze, but it is found in the hills of Mburuma and of the Batoka also. This is the best fibre in the country, being durable when exposed to wet; it is invariably used for fishing-nets, and exists so abundantly that no attempt has been made to cultivate it. The seed also yields a large amount of a drying oil. Between the river bank and the hills there are many wide plains of the richest soil, which in ordinary seasons yield abundant crops, but are liable to suffer from droughts by which the corn crops are cut off, but do not affect the cotton to such an amount. In the damp valleys sugar-cane and wheat are raised, but irrigation would be required to render these crops general. The district to the north of Tetté is the only part in which sugar is manufactured: this is performed in a very rude manner by the natives.

Cotton seems to be the crop best suited for these parts; it is grown in small quantities everywhere; it is a perennial shrub, and springs up the following season even after being burned down; the quality varies very much. That of Kebrabassa is good, also that found beyond the Kafué, but in the intermediate space that chiefly cultivated is of the Kaja or native sort. And the plantations are very small: this is to be accounted for by their distance from the coast, and the very unsettled state of the population, who have been impoverished by successive bands of the Matebele. Above Kebrabassa there are hundreds of miles of the best cotton lands, but until these rapids shall have been shown

to be navigable at flood, there exists a considerable land carriage which could not be undertaken unless these parts were in the hands of an active and powerful government.

The valley of the Zambesi, beyond the Victoria Falls, is so far removed from the navigable part leading to the east coast, that its vegetable produce is of comparatively little importance in a commercial point of view; it is also very unhealthy; otherwise it is a very rich country, inhabited by the finest races we have met, both for physical and mental development; they seem free of the suspicion with which a foreigner is regarded in other parts, and are anxious to obtain European articles, of which they see the advantage. In the north, beyond the part reached by us, the sugar-cane is said to be grown, while near Sesheke the cotton-plant attains a size not observed elsewhere; a single plant sometimes covering a space of 12 feet diameter, and forming a stem 8 inches thick. A plantation of such bushes would require only to be kept clean to continue for a lifetime. This had been a season of unusual drought, but there had been a heavy crop of cotton, which was allowed to rot on the ground.

The Batoka highlands, to which attention has been drawn as the first discovered in these latitudes possessing a healthy climate, are situated to the north of the Zambesi, between it and the Kafué. The valley of the Zambesi is there 1000 feet above the sea; the southern slopes are steep, and come down near to the river; the highlands themselves form a vast undulating plain, varying from 3000 to 4000 feet high; they are covered with grass suitable for cattle, and open forests abounding in game; in most parts they are well watered by streams which might be made to irrigate the surrounding parts. The climate is cool and healthy, and during the cold season there are frosts at night. Near the Victoria Falls various native fruit trees have been cultivated by the natives; a thing almost unknown in other parts of Southern Africa. Cotton is said to be grown in the north, and the parts visited by us, which had been deserted by the inhabitants, seemed in every respect well suited for it. If these regions were more accessible, their value could not be over-estimated, as a European settlement would exercise a most beneficial influence over the interior, and prevent those desolating wars which have stayed the advancement of the people. The whole of this country is free of the Tsetse fly, which is so common in the Zambesi valley; thus cattle and horses might be kept, and an industrious population would soon congregate around any one who could secure to them peace. The obstacles which stand in the way are the difficulties of communication with the coast.

Turning to the valley of the river Shiré, which joins the Zambesi, 80 miles from the coast, near the Hill of Moramballa, we meet a fertile region in immediate communication with the coast, forming the pathway to another still richer, possessing highlands superior in point of position to those of the Batoka, thickly peopled by an industrious race, already extensively engaged in the growth of cotton. The people are of one race and language, but governed by many chiefs, each supreme in his own district. These regions possess the advantages of easy access, and of not having had intercourse with the Portuguese settlements. Previous to our visit Europeans had never been seen by the people, and we were invariably well treated, unless when coming in contact with slave-trading parties from the coast. The first hundred miles of this valley takes a northerly course, the river being deep and navigable the whole way; beyond this, a mountainous region, involving a transport of 35 miles, intervenes between the lower and upper valley, in which the Shiré is again navigable to Lake Nyassa, in latitude s. 14° 30'.

The trade of the interior, on its way to the different coast towns, passes to the south of the lake, crossing the river Shiré. The chiefs in these parts, possessed of neither ivory nor copper, must sell their people if they would purchase foreign goods, and excuses are easily found for such a course. By

the present path of trade they are so far removed from the coast that cotton could not repay the carriage, but, by the establishment of commerce on the Shiré, the production of cotton and sugar would open to them a more profitable means of employing labour, and direct the people to industry and the growth of such things as are required in Europe, being advantageous to both parties.

The Lower Shiré valley is 100 miles in length and 20 miles average width, with hills on either side; it is raised only a few feet above the river level, which is much more constant throughout the year than that of the Zambesi. The soil is of the richest description, producing a luxuriant vegetation much like that of the Delta, but possessing more trees, including lignum vitae and ebony. Near the river the motsakiri tree, whose seed yields oil, is abundant, and there are large spaces occupied by the borassus palm. In the southern part rice is grown extensively, and the crops do not suffer from want of rain. In the northern, bananas, sugar-cane, cassava, and sweet potatoes are cultivated; while every village has large plantations of cotton; the quality being superior to that seen elsewhere. The natives grow it for the manufacture of cloths, a most tedious process when performed without machinery; the picking and spinning are done by hand, and all engage in it from the chief to the poor people. They have never had an opportunity of selling cotton, but seemed delighted with the idea, and would readily enter into its growth on a large scale if they knew that it would be purchased in exchange for cloth and beads. The whole valley is admirably suited for the growth of cotton, while some parts possessing a large amount of salt, which appears on the surface during the dry months, may yield the Sea Island variety, so much esteemed from the great length of its fibre. The only experiment made with this variety of cotton was at Tetté, where it grew from seed brought by the expedition, and continues still, although in a very unfavourable situation. This yielded $1\frac{1}{2}$ inch staple. The other varieties of seed brought were inferior to what is now in the country.

The Upper Shiré valley is continuous with the southern end of Lake Nyassa, and about 1000 feet above the sea level. The range of hills separating it from Lake Shirwa is distant from 5 to 10 miles. The extent of plain on the west seemed to be much greater. Although not free from fever, this is a much more healthy situation than the Lower Shiré valley; the soil is equally rich, and suitable for sugar-cane and cotton; the latter is a universal accompaniment of every village, some fields being an acre in extent. From its proximity to the highlands this is a promising tract, as it possesses the river leading south to the Zambesi and north to Lake Nyassa.

The highlands of the Manganja country are placed between the river Shiré and Lake Shirwa; they are part of that elevated ridge which extends far along the eastern side of the African continent; their altitude varies from 3000 to 4000 feet, but there are single mountains in the range much exceeding that, the highest being "Zomba," which reaches 8000 feet. The western slopes to the Shiré are steeper than those on the east, which go down to Lake Shirwa, nearly 2000 feet above the sea level. These undulating highlands are watered by many streams which continue flowing the whole year. The climate is cool and pleasant, and in our experience quite free of malaria; those who had suffered when in the valley, feeling a sudden change on ascending the hills.

The cotton of these elevated regions is an annual, from 3 to 4 feet high; it is gathered in August and September, at which season there is no danger of the crop being injured through rain. Sugar-cane is grown in many parts, and would succeed well almost any where, from the abundance of moisture in the soil, and the facilities offered for irrigation by the many perennial streams. European vegetables and fruits, also wheat, could be raised during the cold season. Magnetic iron ore is abundant near the schist rocks which compose

the mountain chain, with the exception of the higher peaks; from it the natives manufacture implements of agriculture and war.

Of all the regions explored, the Manganja highlands are the best suited for a settlement conducted by Europeans: possessing a good soil and climate, they command both Upper and Lower Shiré valleys, and lead through Lake Nyassa to the countries far north and west, which now supply most of the ivory, copper, and slaves taken to the coast between Quillimane and Rovuma. It is of easy access from the south, through the Zambesi and Shiré, and possibly another path may be found to it from the north. A vessel of 4 feet might pass at once up the river Shiré at all seasons, as the Zambesi below the confluence is free of the many sand banks which encumber it further up, and render its navigation difficult during the latter months of the dry season.

The flora of the highlands differs entirely from that of the valleys, but bears a resemblance to that of the Batoka country. The grass is in general short compared with that of the plains; there is an abundance of fine trees, and several sorts of fruits. Many orders of plants, scarcely known below, are here abundant, such as Ranunculaceæ, Proteaceæ, Balsamineæ, Melastomaceæ, Geraniaceæ, Rosaceæ, Piperaceæ, Iridaceæ, &c., while the many ferns show a humid climate compared with the Zambesi valley, where that order of plants is almost absent.

The tsetse fly is unknown among the hills, and very rare in the Upper Shiré valley on the eastern side. In the lower valley, however, it is the natural accompaniment of the large herds of elephants which inhabit the grass plains and marshes.

The expedition has thus shown unlimited tracts of land adapted for cotton, and others suited for sugar-cane; the best for both being near the coast, and enjoying a healthy climate, thickly peopled by a race already engaged in the growth of cotton, all that is required being to develop further a branch of industry now existing, in doing which the slave-trade would be broken and the victims of it turned to industry at home. The only obstruction now standing in the way is the restriction to the free navigation of the Zambesi, which, while closed to others, is not in use by the Portuguese, who have only employed it occasionally for the shipment of slaves, but never for trade. A large supply of lignum vitæ, ebony, buaze fibre, and Indian rubber has also been pointed out, while the abundance of wild indigo seems to indicate a country adapted for its production.

Special Notice of a few of the more important Vegetable Productions.

COTTON.—There are two species of the cotton plant cultivated in the countries explored: one of these, known as *Tonje Kaja*, has been in existence for a very long time, and may be indigenous; no trace of its introduction can be found; it is found everywhere, but is being replaced by a better sort named *Tonje Manga*, which signifies foreign cotton, and is of modern introduction, having come from the various towns on the east coast. A variety of the *Tonje Manga* is met with in the interior of the continent, but not found much further east on the Zambesi than the confluence of the Kafué. This may have been introduced from the west coast.

The *Tonje Kaja* is, according to situation, either perennial or annual; on the Manganja Hills it is an annual from 2 to 4 feet high, sown in March and gathered in August. In the valleys it forms a shrub, remaining several years in the soil. It is readily known from the other sort by leaf and seed. The cotton is of very short staple, seldom exceeding half an inch; it very much resembles wool, and adheres strongly to the seed, from which it cannot be entirely removed: this renders it much more troublesome to pick, and an iron roller is employed to facilitate the separation.

The plant is much less prolific than the other, and the only good quality

possessed by it is superior strength, on which account some still prefer it. It is the most universally distributed, being seen everywhere from the coast to the valley above the Victoria Falls and along the course of the Shiré. In the region shut off from the coast by Lake Shirwa, it becomes the only sort grown; but the foreign kind is advancing from both north and south, and fast displacing it.

Tonje Manga, the sort of recent introduction, is, like the other, annual or perennial; it is superior in every respect, and attains a much greater size. The staple varies from half an inch to an inch and a quarter, has great lustre, and separates from the seed, which has a clean black coat. What is now produced on the Zambesi and Shiré equals much of the Egyptian, and might be improved by the judicious selection of seed. But there is no necessity for the introduction of new seed, what is now grown on the Shiré being of good quality and very prolific. The variety of Tonje Manga found in the central African valley above the Victoria Falls and as far down as the confluence of the Kafué, differs in the cohesion of the seeds of each cell which form a mass, from the exterior of which the cotton separates easily. The plant attains a great size, and continues seemingly for an indefinite time. Among the ruins of the old town of Sesheke a single plant was measured with a woody stem 8 inches diameter, and covering a space of 12 feet. This year it had yielded an abundant crop of cotton $\frac{3}{4}$ of an inch in fibre.

Having found cotton throughout the whole extent of country explored, we know what quality may certainly be obtained, while much more may be expected from careful cultivation. The only cotton seed brought by us, superior to that already in the country, was the Sea Island variety: this yielded excellent cotton $1\frac{1}{2}$ inch long when grown under the most disadvantageous circumstances, and the plant still continues at Tetté, although uncared for. Nowhere have we seen cotton which would not be worth exportation, but the best is that of the Manganja country, where the people have given it much attention; thence it might also be exported with least expense, while Europeans, settled in the neighbouring highlands, could direct and superintend the natives of the valleys.

The Delta is excellent cotton ground, but unfit for Europeans, and the present population is very thin and unsettled. Beyond Kebrabassa the Zambesi valley both below and above the Victoria Falls, with the Batoka highlands, might produce a vast supply, and the Batoka hills present a healthy station for residents; but the difficulties at present connected with the rapids of Kebrabassa render this an inferior position in which to commence such an undertaking, which is to be regretted, as the people of the interior seem more disposed to industry than those of the coast.

The specimens of cotton contained in the collection sent to the Royal Gardens at Kew exhibit fully the different qualities found on the Lower Zambesi and on the Shiré. Since then, others have been added from the interior, showing that the cotton grown there is but little inferior.

SUGAR-CANE.—The want of moisture and occurrence of droughts in certain seasons limit the amount of soil adapted for the growth of the sugar-cane. Nevertheless, the greater part of the Delta, the Shiré Valley, the Manganja Hills, with spots near the Zambesi, where joined by tributary streams, are capable of producing it abundantly. In each of these parts we have found it in cultivation, but in small amount. Near the Portuguese settlement of Tetté alone is sugar manufactured, but the process is so rude that it always possesses a bad flavour. The Manganja Hills and tablelands are certainly the regions best suited for its growth, being conducted by Europeans. There the many perennial springs, sources of streams, irrigating the whole country, prevent the failure of crops, and would supply sources of water-power. The only drawback to the Lower Shiré Valley and the Delta is the prevalence of fever; in other respects it is perhaps the best situation for the cane.

The Portuguese have paid as little attention to sugar as they have to cotton : that made at Tetté is not much used by the Europeans.

OILS.—The groundnut succeeds well, and is universally cultivated by the natives; from it oil is expressed, which they use with food, but it has not been made an article of commerce; and the machinery used even at Tetté is of the rudest description.

The Sesamum is also grown from the coast to the Batoka country. Different species of Cucurbitaceous plants yield a pure oil from their seeds, which is employed in cookery.

The Motsakiri tree, of the order Meliaceæ, grows abundantly near the river banks both of the Zambesi and Shiré in all parts; from its wide distribution this might be obtained in considerable quantity; it separates under exposure to cold into a solid and fluid portion.

Other oils are obtained from the seeds of the Sterculia, and the "Boma" nut (grown extensively at the Victoria Falls) yields a large amount of a pure oil. This is the produce of a large tree which had neither leaf nor flower at the time of our visit to the interior.

INDIAN RUBBER.—Caoutchouc is obtained near Shupanga, from a climbing shrub of the order Apocynaceæ, sub order Carisseæ, the fruit of which is eatable. The stem, sometimes six inches diameter, is covered with a rough bark; the plant exists abundantly in the forests of Shiringoma, and produces, with little trouble, a large amount of the substance; a little is collected by the natives for domestic uses, but it has not been made an article of export. The process employed is very simple: the outer rough bark being removed, a few punctures are made in the inner, and the milky juice, as it issues, is applied to the skin; by successive applications a ball is soon formed, to the surface of which new layers are added. The many uses to which this substance is now applied, render every additional source of importance.

COFFEE.—This was introduced at an early period, but has become nearly extinct; at Senna and Tetté there still exist a few plants.

The country near the Portuguese settlements is too dry for coffee to succeed well, but in the Manganja country it would thrive, and probably become naturalized if once introduced into the forests on the hill slopes.

WOODS AND TIMBER.—The *Lignum Vitæ* of this country, produced by a tree of the order Combretaceæ, exactly resembles in all its physical properties that now in use; the woody layers presenting the same decussation of the fibres. It may be obtained in unlimited amount from the regions between Shupanga and Tetté; it exists abundantly on the Shiré, and on the Zambesi as far as the Batoka Hills. The trunk is most commonly 18 inches diameter, but met with as much as 4 feet, forming one of the largest of the forest trees. The trees attaining great dimensions are, however, frequently unsound.

Ebony is the produce of a small tree of the Leguminosæ, abundant throughout the Zambesi and Shiré Valleys. The trees, when they exceed 6 inches diameter in the black heart wood, are frequently rotten in the heart. Ebony of moderate dimensions may be had in abundance; the places where it is most common are near Senna, Shupanga, and Zumbo.

The "Mopane," which forms extensive forests, to the exclusion of other trees, yields a wood named here "Iron wood;" it may be had in long pieces of 8 inches diameter; it is extremely hard and durable, but difficult to work: being proof against the white ant, it is useful for house-building.

The "Malompe," a *Pterocarpus* yielding a gum similar to kino, produces the wood used up country for the long paddles of the canoes: from its elasticity and lightness it is well adapted for machinery, and for oars seems to be superior to anything now in use. It is most abundant on the hills, but exists at Shupanga. In making paddles the natives split it up with wedges to secure an even grain.

DYE STUFFS.—*Indigo* is a native of the country, found wild near the

Zambesi from the Delta to the Batoka country. The plant is often very luxuriant, reaching 6 feet high in the Shiré valley near Lake Nyassa; at Tetté, on the stony ground near the town, it does not exceed 1 to 2 feet. Judging from small experiments made at Shupanga, where it is particularly abundant, the indigo produced from this species seems to be of good quality.

It is singular that the art of dyeing by means of it should be quite unknown among the natives, nor is it practised among the Portuguese.

Orchilla weed may be gathered from the bark of trees in the Delta near the coast, being frequent near the Luabo mouth.

Fustic.—A climbing shrub, a species of *Maclurea* with eatable fruit, exists in the Zambesi valley both above and below Kebrabassa. It seldom, however, attains a sufficient size to form much of the heart wood which contains the colouring matter. If this should be found in sufficient quantity, it would be of value, as the colour is permanent and good.

CEREALS.—There are many cereals now in use among the people: of these, Sorghum, Pennisetum, Eleusine, Setaria, maize, rice, and wheat are the principal; of these the last three are of most importance to Europeans. The Delta and Lower Shiré valley are the best rice grounds, while wheat requires a constant supply of moisture during the cold season. Thus, without irrigation (which has not been practised since the time of the Jesuits) it can only be grown in the damp hollows, which are under water part of the year; in such places it is raised in the Delta and near Tetté; but the Manganja highlands are the best suited for it, being cool and more abundantly watered than any other part.

3. *On the Batoka Country.* By Mr. CHARLES LIVINGSTONE. Dated “Kongoni mouth of the Zambesi, Jan. 14, 1861.”

Read April 22, 1861.

THE country of the Batoka, in Central Africa, lies between the 25th and 29th degrees of east longitude and the 16th and 18th of south latitude. It has the river Kafué on the north, the Zambesi on the east and south, and extends west till it touches the low fever-plains of the river Majeela, near Sesheke.

A mountain range running N.E. and S.W. rises abruptly about 15 miles north of the Zambesi, and spreads north and west in a vast undulating table-land, 3000 to 5000 feet above the level of the sea, with extensive grassy plains, through which wind several perennial streams, as the Kalomo, Likone, Ungnesi, &c.

Between this elevated land and the Zambesi, as far west as Thabacheu, the Tetté sandstone is the prevailing rock, while limestone, beds of shale, and seams of coal crop out from the banks of some of the small streams which flow into the Zambesi. North and west of this, granite resembling the Aberdeen variety abounds, and especially so on the Kalomo; while near the Victoria Falls of Mosioatunya, basalt, of apparently recent origin, is the common rock. These broad, elevated lands have a fine healthy climate, well adapted to the European constitution. Fever is unknown. In winter the thermometer sinks during the night as low as 30° Fahr., when thin ice is formed, and during the day the temperature rises to about 68°.

But a few years since these extensive, healthy highlands were well peopled by the Batoka; numerous herds of cattle furnished abundance of milk, and the rich soil largely repaid the labour of the husbandman. Now enormous herds of buffaloes, elephants, antelopes, zebras, &c., fatten on the excellent pasture which formerly supported multitudes of cattle, and not a human being is to be seen. We travelled from Monday morning till late in the Saturday afternoon (from Thabacheu to within 20 miles of Mosioatunya) without

meeting a single person, though constantly passing the ruined sites of Batoka villages. These people were driven out of this, the choicest portion of their noble country, by the invasion of Sebituané. Many were killed, and the survivors, except those around the Falls, plundered of their cattle, fled to the banks of the Zambesi and to the rugged hills of Mataba. Scarcely, however, had the conquerors settled down to enjoy their ill-gotten riches when they themselves were attacked by small-pox; and, as soon as its ravages had ceased, the fighting Matibélé compelled them to abandon the country, and seek refuge amidst the fever-swamps of Linyanti.

The Batoka have a mild and pleasant expression of countenance, and are easily distinguished from the other Africans by the singular fashion of wearing no upper front teeth, all persons of both sexes having them knocked out in early life. They seem never to have been a fighting race, but to have lived at peace among themselves, and on good terms with their neighbours. While passing through their country we observed one day a large cairn. Our guide favoured us with the following account of it:—"Once on a time the ancients were going to fight another tribe; they halted here and sat down. After a long consultation they came to the unanimous conclusion that, instead of proceeding to fight and kill their neighbours, and perchance getting themselves killed, it would be more like men to raise this heap of stones as their earnest protest against what the other tribe had done, which they accordingly did, and then returned quietly home again."

But, although the Batoka appear never to have had much stomach for fighting with men, they are remarkably brave hunters of buffaloes and elephants. They rush fearlessly close up to these formidable animals, and kill them with their heavy spears. The Banyai, who have long levied black-mail from all Portuguese traders, were amazed at the daring bravery of the Batoka in coming at once to close quarters with the elephant and despatching him. They had never seen the like before. Does it require one kind of bravery to fight with men, and another and different sort to fight with the fiercest animals? It seems that men may have the one kind in an eminent degree, and yet be without the other.

The Batoka having lived at peace for ages, had evidently attained to a degree of civilization very much in advance of any other tribe we have yet discovered. They *planted and cultivated fruit-trees*. Nowhere else has this been the case, not even among the tribes which have been in contact with the Portuguese for two hundred years, and have seen and tasted mangoes, oranges, &c. &c. The natives round Senna and Tetté will on no account plant the stone of a mango. They are firm believers in a superstition that "if any one plants a mango, he will die soon afterwards."

In and around the Batoka villages some of the most valuable timber-trees have been allowed to stand, but every worthless tree has been cut down and rooted out, and the best of the various fruit-trees of the country have been carefully planted and preserved, and also a few trees from whose seeds they extracted oil. We saw fruit-trees which had been planted in regular rows, the trunks being about 3 feet in diameter, and also grand old Motsakiri fruit-trees still bearing abundantly, which had certainly seen a hundred summers.

Two of the ancient Batoka once travelled as far as the river Loangwa. There they saw the massan-tree in fruit, carried some all the way back to the Great Falls, and planted them. Two of the trees are still standing, the only ones of the kind in all that region.

They made a near approach to the custom of even the most refined nations in having permanent graveyards, either on the sides of sacred hills, or under the shady fig-trees near the villages. They revered the tombs of their ancestors, and erected monuments of the costliest ivory at the head of the grave, and often even entirely enclosed it with the choicest ivory. Other tribes on the Zambesi throw the body into the river, to be devoured by alligators;

or, sewing it in a mat, place it on the branches of the baobab, or cast it in some gloomy, solitary spot overgrown with thorns and noxious weeds, to be devoured by the foul hyena. But the Batoka reverently buried their dead, and regarded the ground as sacred to their memories. Near the confluence of the Kafué, the chief, accompanied by some of his head men, came to our sleeping-place with a present; their foreheads were marked with white flour, and there was an unusual seriousness in their demeanour.

We were informed that shortly before our arrival they had been accused of witchcraft. Conscious of innocence they accepted the terrible ordeal, or offered to drink the poisoned muavi. For this purpose they made a journey to the sacred hill where reposed the bodies of their ancestors, and, after a solemn appeal to the unseen spirits of their fathers to judge of the innocence of these their children, drank the muavi, vomited, and were therefore declared to be "Not guilty." They believed in the immortality of the soul, and that the souls of their ancestors knew what they were doing, and were pleased or not accordingly. The owners of a large canoe refused to sell it because it belonged to the spirits of their fathers, who helped them in killing the hippopotamus.

Some of the Batoka chiefs must have had a good deal of enterprise. The lands of one in the western part of the country lay on the Zambesi, which protected him on the south; on the east and north was an impassable reedy marsh, filled with water all the year round, leaving only his west border unprotected and open to invasion. He conceived the bold project of digging a broad and deep canal, nearly a mile in length, from the west end of the reedy river to the Zambesi, and actually carried it into execution; thus forming a large island, on which his cattle grazed in safety, and his corn ripened from year to year secure from all marauders.

Another chief, who died a number of years ago, believed that he had discovered a remedy for tsetse bitten cattle. His son showed us the plant, which was new to our botanist, and likewise told us how the medicine was prepared. The bark of the root is dried, and—what will be specially palatable to our homœopathist friends—a dozen tsetse are caught, dried, and ground with the bark to a fine powder. The mixture is administered internally, and the cattle are also smoked, by burning the rest of the plant under them. The treatment is continued some weeks, as often as symptoms of the poison show themselves. This, he frankly said, will not cure all the bitten cattle, for cattle, and men too, die in spite of medicine; but should a herd by accident stray into a tsetse district and get bitten, by this medicine of Kampakampa, his father, some of them could be saved, while without it all would be sure to die.

A remarkably prominent feature in the Batoka character is their enlarged hospitality. No stranger is ever allowed to suffer hunger. They invariably sent to our sleeping-places large presents of the finest white meal, with fat capons "to give it a relish," and great pots of beer to comfort our hearts, with pumpkins, beans, and tobacco; so that, as they said, we "should not sleep hungry nor thirsty."

In travelling from the Kafué to Sinamanes, we often passed several villages in the course of a day's march. In the evening, deputations arrived from those villages at which we could not sleep, with liberal presents of food. It evidently pained them to have strangers pass without partaking of their hospitality. Repeatedly were we hailed from huts, asked to wait a moment and drink a little beer, which they brought with alacrity.

When we halted for the night, it was no uncommon thing for these people to prepare our camp. Entirely of their own accord, some with their hoes quickly smoothed the ground for our beds; others brought bundles of grass and spread it carefully over the spot; some with their small axes speedily made a brush-fence round to shield us from the wind; and if, as occasionally happened, the water was a little distant, others hastened and brought a pot or two of water to cook our food with, and also firewood. They are an industrious people, and very

fond of agriculture. For hours at a time have we marched through unbroken corn-fields of nearly a mile in width. They erect numerous granaries for the reception of the grain, which give their villages the appearance of being unusually large; and when the water of the Zambesi has subsided they place the grain, tied up in bundles of grass, well plastered over with clay, on low sand islands, as a protection against the attacks of marauding mice and men.

Owing to the ravages of the weevil, the native corn can hardly be preserved until the following crop comes in. However largely they may cultivate, and abundant the harvest, it must all be consumed the same year in which it is grown. This may account for their making so much of it into beer. The beer they brew is not the sour and intoxicating kind found among other tribes, but sweet, and highly nutritious, with only a slight degree of acidity to render it a pleasant drink. We never saw a single case of intoxication among them, though all drank great quantities of beer. They were all plump, and in good condition.

Both men and boys were eager to work for very small pay. Our men could hire any number of them to carry their burdens for a few beads a-day or a bit of cloth. The miserly and extra-dirty cook had an old pair of trowsers some of us had given him, and which he had long worn himself: with one of the decayed legs of his trowsers he hired a man to carry his heavy load a whole day; a second man carried it the next day for the other leg; and what remained of the old trowsers, minus the buttons, procured the labour of another man for the third day.

They have their wandering minstrels. One of these, apparently a genuine poet, attached himself to our company for several days, and, whenever we halted, sang our praise to the villagers, in harmonious numbers of 4 and 5 feet respectively. Another, though less gifted son of song, belonged to the Batoka of our own party. Every evening, while the others were talking or sleeping, he played on his sansah and rehearsed his songs. In composing extempore he was never at a loss: if the words refused to come, he halted not, but eked out the measure with a h—m, h—m, h—m. We did not observe many musical instruments among them: perhaps since their exile from the finest portion of their country, like the Jewish captives by the rivers of Babylon, they have hung their harps upon the willows.

A peculiar order of men is established among them, the order of the Endah Pézés (Go-Nakeds). The badge of this order, as the name suggests, consists in the entire absence of the slightest shred of clothing. They are in the state in which Adam is reported to have been before his invention of the fig-leaf apparel. We began to see members of this order about two days above the junction of the Kafué; two or three might be seen in a village. The numbers steadily increased, until in a short time every man and boy wore the badge of the Endah Pézés. The chief of one of the first villages, a noble, generous fellow, was one, as were likewise two or three of his men. In the afternoon he visited us in the full dress of his order, viz., a tobacco-pipe, nothing else whatever, the stem about 2 feet long, wound round with polished iron. He gave us a liberal present. Early next morning he came, accompanied by his wife and daughter, with two large pots of beer, in order that we might refresh ourselves before starting. Both the women, as comely and modest-looking as we have seen in Africa, were well clothed and adorned.

The women, in fact, are all well clothed, and have many ornaments. Some wear tin ear-rings all round the ear, no fewer than nine often in each ear. There was nothing to indicate that they had the slightest idea of there being anything peculiar in the no-dress-at-all style of their order. They rub their bodies with red ochre. Some plait a fillet two inches wide, of the inner bark of trees, shave the wool off the lower part of the head to an inch above the ears, tie this fillet on, having rubbed it and the wool which is left with the red ochre mixed in oil. It gives them the appearance of having on a neat forage-

cap. This, with some strings of beads, a little polished iron wire round the arms, the never-failing pipe, and a small pair of iron tongs to lift up a coal to light it with, constitute all the clothing the most dandified Endah Pérez ever wears.

They raise immense quantities of tobacco on the banks of the Zambesi in the winter months, and are, perhaps, the most inveterate smokers in the world. The pipe is seldom out of their hands. They are as polite smokers as any ever found in a railway carriage. When they came with a present, although it was their own country, before lighting their pipes they asked if we had any objections to their smoking beside us, which of course, contrary to railway travellers, we never had. They have invented a novel mode of smoking, which may interest those who are fond of the weed at home. They take a whiff, puff out the grosser smoke, then by a sudden inhalation before all is out contrive to catch, as they say, and swallow the pure spirit of the tobacco, its real essence, which common smokers lose entirely. Their tobacco is said to be very strong; it is certainly very cheap; a few strings of beads will purchase as much as will last any reasonable smoker half a year. Their government, whatever it may have been formerly, is now that of separate and independent chiefs. The language is a dialect of that which is spoken by the natives on the Zambesi below them, and particularly marked by the characteristic use of the letter *r*, to the apparently total exclusion of the letter *l*. They have not been visited by any regular trader for many a day until shortly after we passed. A party of trading slaves, belonging to the two half-caste Portuguese who last year, with 400 slaves armed with the old Sepoy flint muskets, so treacherously assassinated the chief and 20 of his men near Zumba, and then took possession of all his lands on the Zambesi and Loangwa, followed in our spoor, and bought large quantities of ivory and a number of young slave-girls for a few beads. They also purchased 10 large new canoes for 6 strings of coarse white or red beads a-piece, or 2 fathoms of American calico. As traders are now sure to go to them with beads and cloth, the order of the Endah Pérezes will in a short time be numbered among the things that were; for it is to be regretted that these traders belong to a nation whose subjects buy and sell slaves, and are the guilty agents for carrying on the slave-trade in all this part of Eastern Africa.

4. *The River Rovuma.* Extract from "Pilotage remarks" of D. J. MAY, R.N., in charge of the *Pioneer*, Dr. Livingstone's Expedition.

THE river Rovuma is about 12 miles north-westward of Cape Delgado, in lat. $10^{\circ} 28' \text{ S.}$, long. $40^{\circ} 30' \text{ E.}$; the entrance is 1 mile in breadth, situated on the south side of a bay 6 miles in length and 3 in breadth, formed by Rovuma Point on the south, and the island of Nizambari on the north.

In rounding Rovuma Point, the entrance of the river is not easily made out until it bears S.W. (there being many other smaller openings to the north and south of it), on which bearing a vessel may anchor in 5 or 7 fathoms. During the time the *Pioneer* was here she anchored for a fortnight off the entrance, when the ebb-tide made out of the river the whole time, overcoming the flood-tide, which in springs rises to 18 feet, and in neaps to 5 feet.

The navigable entrance to the river is only $\frac{1}{2}$ of a mile, owing to projecting sand-banks on both sides; and, although there is no bar, it is dangerous for boats to attempt the entrance between half-flood and half-ebb, on account of the over-falls caused by the sudden change in the depth from 3 to 17 fathoms.

About 2 miles inside the entrance commence a series of sand-banks, which obstruct the channel, rendering the navigation very intricate, by a narrow passage which runs from one side of the river abruptly to the other, with a depth of only 5 or 6 feet in many places.

At the beginning of March, 1861, the river Rovuma was at its maximum height of the season. It subsided, and then rose again towards the close of the month to nearly its original height, and it was between these periods that our examination was made. We reached 30 miles up the river, and, as the water began to fall rapidly, it was thought best to return to the entrance to clear the shoal patches, over which we barely carried 5 feet. At the point of our turning there appeared no more difficulty to our further progress, but the falling tide would not permit it.

The navigation of the river is not only intricate, but it has a down-current of 3 knots per hour, and near the mouth a pulling boat could not stem it. Wood for steaming purposes is easily procurable, especially near the sea. The inhabitants were few: they were shy and timid, and could only give us a scanty supply of provisions. The water of the river on our first using it affected every one on board, but it ceased doing so when we became accustomed to it. Comparing the Rovuma with the Niger, as to their qualities as rivers, and comparing also the people and productions about them, the Rovuma is most markedly inferior; but it may yet be shown that we have much more to learn about it.

I do not think it very unhealthy, although, on our return to the mouth, nearly every person on board the *Pioneer* became ill. I attribute the sickness to exposure and to the hard work we had just experienced, and to our being anchored off a foul mud-creek, close to a mangrove forest, for convenience of wooding.

A comparison of the rivers Shiré and Rovuma will incline to the conclusion that they do not proceed from the same source. The Shiré is deep, clear, and subject to little variation of rise or fall; the Rovuma is shallow, muddy, and, according to Krapf, was but a small stream when he passed its mouth.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1861-62.

Fourth Meeting, Monday, January 13th, 1862.

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

PRESENTATIONS.—*Lord Rollo; Deane J. Hoare; John Holmes; and W. Johnson, R.N., Esqrs., were presented upon their Election.*

ELECTIONS.—*Commr. Richard Charles Mayne, R.N.; Rev. Jordan Palmer, M.A.; Sir Joshua Rowe, C.B.; Colonel H. Dalrymple White, C.B.; George F. Banks, Surg., R.N.; Alfred Barton; Latimer Clark; James Goddard, Jun.; James M' Cosh, M.D.; Thomas Martin; Henry Nourse; George D. Ramsay; Augustus Thorne; and William F. Webb, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map-rooms since the former meeting were—Ravenstein's 'Russians on the Amur;' Abstracts of the Principal Lines of Spirit Levelling in Scotland, by the Ordnance Survey; Haast's 'Report on the Nelson Province of New Zealand;' Sykes' 'Notes on Progress of Trade of England with China;' Davidson's 'Directory for Pacific Coast of the United States;' 'Description de l'Afrique,' by Dapper; Mouat's 'Rough Notes of a Trip to Reunion, the Mauritius, and Ceylon;' Transactions of various Scientific Societies at home and abroad; complete suit of a Japanese Warrior, from Consul Pemberton Hodgson, &c. &c.

EXHIBITIONS.—Several Photographs taken in the Andaman Islands, and various bows and arrows, nets and drinking-vessels, used by the Aborigines of these islands, were exhibited.

The CHAIRMAN, in opening the meeting, said it was his duty to announce that the Council of the Society had forwarded to the Secretary of State for presentation to Her Majesty, the following Address of Condolence on the death of the late Prince Consort, which had been duly acknowledged by H.M. Secretary of State for the Home Department:—

“ MAY IT PLEASE YOUR MAJESTY,

“ WE, the President and Council of the Royal Geographical Society, respectfully tender the expression of our heartfelt condolence to your Majesty on the mournful occasion of the decease of your illustrious Consort.

“ Profoundly grieved as the heart of the nation has been by this sad calamity, we, uniting with the multitude of His Royal Highness's admirers, urgently desire to testify our deep sense of the irreparable loss which science and art have sustained by the death of our gifted and enlightened Vice-Patron.

“ As men enabled from the nature of our pursuits to take a wide retrospect of the many good deeds of His Royal Highness, we specially advert to the well-known and gratefully acknowledged facts that your Majesty's lamented Consort largely promoted and diffused scientific knowledge both by precept and example; and, to the great advantage of your people, successfully applied such knowledge to the improvement of the various industries of Britain and her Colonies.

“ Representing a scientific Society of which your Majesty is the gracious Patron, we repeat the expression of our profound sympathy, and earnestly pray that, with the aid of Divine Providence, your Majesty may be enabled so to sustain your heavy bereavement as long to continue to be a blessing to your faithful and loyal people.

“ *January 4th, 1862.*”

The Chairman, in continuation, greatly regretted that their President was prevented by illness from attending the meeting and taking the chair, as it was Lord Ashburton's especial wish to address the Society upon this mournful subject. His Lordship would, however, take the opportunity of doing so on a future occasion, and would doubtless expatiate fully thereon at the ensuing anniversary.

ANNOUNCEMENTS.—The Chairman announced to the meeting two very important geographical facts, which would probably be the subjects of future papers read before the Society. 1st. A letter from Sir Henry Barkly, Governor of Victoria, stating that Messrs. Burke and Wills had crossed the Australian Continent to the Gulf of Carpentaria, and returned to Cooper's Creek, where they had miserably perished from starvation (see pp. 53 and 68). 2ndly. That a letter had been received from Mr. Thornton, who accompanied Baron von der Decken, stating that they had returned to Mombas, after reaching and partly ascending Kilimanjaro; whose top was covered with snow, and whose height was trigonometrically measured to be about 20,000 feet (see p. 47).

The Papers read were—

1. *Brief Narrative of an Expedition to the Andaman Islands, in 1857.*
By F. J. MOUAT, M.D., of the Bengal Army, F.R.G.S., &c.

A COMMISSION was appointed by the Governor-General of India, in 1857, to examine the Andaman Islands, with a view of selecting a suitable spot for a penal settlement. The mutineers of the great Indian Rebellion were to be sent there, and the islands were ultimately to form a station for the reception of all felons who were sentenced to transportation from India. Dr. Mouat was appointed the chief of the commission; his associates were Dr. George Playfair, to whom the medical and scientific duties were assigned, and Lieut. Heathcote, who undertook the hydrography.

Very little recent intelligence was procurable about these islands, though part of their coasts had been carefully surveyed by Lieut. Blair, in 1789, and a penal settlement had actually been established upon them at the same date, but abandoned, in 1795, on account of its unhealthiness. Col. Colebrook, afterwards Surveyor-General of India, had visited the Andamans, and published a short vocabulary of the language of the natives. Others also had published short accounts in the beginning of this century; but of late years no information whatever had been obtained about the Andamans, except through the narratives of shipwrecked persons, who invariably represented the aborigines as exceedingly savage and hostile. Dr. Helps endeavoured to explore the islands in 1840, but he was murdered shortly after his arrival. The Andamaners were usually reputed cannibals.

Dr. Mouat's commission was accompanied by a large escort, including a useful body of Burmese convicts sent to aid them in pioneering. They sailed to their destination in a steamer of light draught, and ultimately proceeded in making a thorough examina-

tion of the coasts of the Andamans, except where the abundance of coral reefs made safe navigation and useful harbours an impossibility. The natives were found to be exceedingly numerous and hostile, and their stealthy habits made it necessary for the exploring party to proceed with exceeding vigilance; especially as the island was covered by a dense vegetation, which seriously embarrassed the movements of the travellers, and hid the advances of the natives. The entire islands, up to the very hill tops, which reached 2000 feet in altitude, were clothed by a forest-growth of such remarkable thickness that no eminence could be climbed without cutting a pathway. No spots were found sufficiently open to admit of safe encampment, and, in consequence, the party were obliged to return every night to their ships, and to content themselves with a limited range of exploration from the coast.

Several good harbours were found. Port Cornwallis, the site of the old settlement, is a magnificent one: it is land-locked and picturesque; but a bank of mud, uncovered at low-water, was there to account for its unhealthiness.

The botanical features of the Andaman Islands somewhat resemble those of Sumatra: fine timber-trees were found in the forest. As regards animals, the only mammal seen was a small black hog of a peculiar species. Rats and monkeys were said to exist. A harmless green snake was the only discovered reptile. Scorpions and centipedes were found in abundance. Birds were neither numerous nor varied in species.

Numerous efforts were made to communicate in a friendly way with the natives, but all failed utterly. The Sepoys who have latterly escaped from the penal settlement into the bush—for the station has been established since Dr. Mouat's visit—have been equally unsuccessful: they have usually been murdered, and those who returned can hardly account for their good fortune in being permitted to do so. One intelligent Hindoo informant, who lived upwards of a year among the natives, brought back a full and very interesting account of their social habits. He agrees with others in his description of their habitual hatred and ferocity to strangers, but adds that, to one another, they were kindly disposed. He wholly repudiates the charge of cannibalism brought against them. In the many huts Dr. Mouat examined, which had just before been quitted by their inhabitants, he could find no traces whatever of such a practice. Yet they have customs which seem sufficient to have suggested this charge; they prize the bones of their deceased relatives, and, as they are remarkably migratory, they always carry the bones with them. The dead are buried in a sitting posture; and, months after-

wards, the bones are exhumed, wept over, and divided amongst the relatives. The chief mourner wears the skull, hung from his neck, upon his back, and carries it for more than a year.

A native was captured during an attack upon Dr. Mouat's expedition, and was brought by him to Calcutta. Though exceedingly ferocious at the time of his capture, it was remarkable how completely and quickly his ferocity left him. He became attached to the sailors, and they to him. He showed himself remarkably docile and imitative, and adopted dress and civilised habits with readiness and constancy.

Dr. Mouat considers the whole of the Andaman group to be inhabited by one single race of men. They are diminutive, but perfectly shaped; they bear no discoverable resemblance to any other race of men. He estimates their number, partly from facts adduced by the Indian Sepoys above mentioned, and corroborated by what he saw, as perhaps attaining to 15,000.

2. *On the Trade between the Eastern Archipelago and New Guinea and its Islands.* By A. RUSSELL WALLACE, F.R.G.S.

THE portion of New Guinea with which trade is regularly maintained from the Eastern Archipelago, includes Geelvink Bay and the north-western part of the island, on both coasts, as far as the 137th degree of longitude. It also includes the adjacent islands of Jobie, Waigaiou, &c., and the more distant ones of Ké and Aru. The entrepot, whence the trade is directly carried on, is a small island, called Kilwaru, scarcely 50 yards across, between Ceram Laut and Keffing, which has a good anchorage on both sides of it.

The only articles of commercial value procured from the interior of New Guinea, are Mussoi bark—which gives an aromatic oil used in Java to rub over the skin—and wild nutmegs. From the coasts and islands come bêche-de-mer, mother-of-pearl, and tortoiseshell, in abundance. There are also pearls, birds of paradise, sago, raw and in cakes, and rice in the husk. Few of these articles go to Europe. The Chinese are the only consumers of bêche-de-mer; the Philippine Islands take the tortoiseshells, and even the pearls and birds of paradise mostly go to China. The goods with which they are all bought, are bar-iron, calico, cheap German knives, &c., and the trade is mainly carried on in native prahus.

Of all this New Guinea district the Aru Islands are the most important. There is a great competition of trade in them; and calicos and handkerchiefs may be obtained even cheaper there than

in the towns where they are actually produced. Fifteen large prahus, carrying a cargo worth 15,000*l.*, and about one hundred small ones, were seen at the Aru Islands at one time, in 1857, when the author visited them. The Ké islanders are the boat-builders of the far East. The Goram group are inhabited by traders.

The staff of life in these islands is sago. A good sized sago-palm will give 1800 cakes of three to the lb., of which five are the ordinary quantity consumed by a man in a day. Hence a single tree may be considered equal to the support of a man throughout the year. The labour to prepare the food is as follows:—Two men, working moderately, will finish a tree in five days, and two women will bake the whole in about five days more; so we may estimate that, with ten days' labour, a man may produce food for a whole year. This is, if he possesses trees of his own; for all the sago-palms are become private property, and cost about 9*s.* each. Again, the cost of labour being 4*d.* a-day, and the cost of the tree 9*s.*, the expense of one year's food for a man is only 12*s.*

PROFESSOR OWEN said the uniform accounts that had reached him of the diminutive stature and low animal life of the natives of the Andaman Islands, had made him peculiarly desirous to acquire the means of comparing their physical characters with those of other forms of the human race. It was therefore with great pleasure that he received for the purpose of examination, he believed, the first skeleton of a male Andamaner which had ever reached Europe. It was through the thoughtfulness for the needs of science manifested by Dr. Mouat, that the specimen was secured which had been submitted to him by that gentleman, and which he had liberally presented to the British Museum. Professor Owen said that the specimen closely accorded with the attribute of the diminutive stature of the Andamaners. The bones were those of a man to all appearance in the prime of life, who evidently did not exceed four feet ten inches in height. As to the character of the bones, he might say he never saw any in texture or in the development of their processes or ridges, or in any of those characteristics which indicated the complete mastery of the frame by a healthy individual—so strongly marked as in those of the little man whose skeleton he had received from Dr. Mouat. His first attention was directed to the ankle, the feet, and that most characteristic member the great toe; and he found all that related to the power of maintaining an upright posture was as well and as perfectly marked in the small skeleton as in one of the highest specimens of the human race. The next point to be considered was the character of the cranium; because the first questions which had been mooted by ethnologists with regard to those little, low-placed savages, as the Andamaners were called, were,—Whence did they come?—with what other race of the human species were they allied? There had been a conjecture that they might possibly have been derived from the negroes imported for slave labour by the Portuguese—that they might have got stranded on the island owing to the wreck of some vessel while bringing them from Africa. Another opinion, founded upon the mere analogy of their dark colour, was that they might be an offshoot of the Papuans that inhabited New Guinea and Australasia. And, thirdly, it had been conjectured that the Andaman Islands might have been peopled by immigrants from the Burmese coast of the continent of Asia. He found, however, that the skull of the

skeleton he had examined decidedly showed that it was not the cranium of the black West-African negro, or of the dark Papuan. In comparing the skull with the Papuans, he found it had not the same lowness and flatness of the brow, nor the frontal ridge overhanging the sunken origin of the nasals, nor the prominence of the cheek bones, nor the degree of prognathism of the jaws, nor the thickness of the cranium, nor the large proportional size of the molars; there was nothing, in fact, in its family character which resembled the skull of the Papuan. Still more decided were the evidences that the Andamaner was no member of the race of the typical negroes: least of all those western negroes from whom the Portuguese and the other slave-importers had derived their slaves. Neither did the cranium, as a whole, exhibit marks of close or special affinity to the Malay or the Mongolian. There was nothing osteological to lead him to infer that the Andamaners had been derived from the Burmese or from any people now inhabiting the continent of Asia. The skull of the present Mincopie was well shaped, neither too long nor too short: its walls were not thicker than those of Europeans. The capacity of the cranium was certainly small, the skull being proportioned to the stature, and the forehead was neither high nor broad; but the bones of the face were developed in a medium degree, with the exception of a slight projection of the upper jaw, such as he had seen developed in some of the lower Europeans, and which might be connected in some degree with protracted suckling of the infant by the mothers, and by the habitual use of the incisors in feeding, which was common to uncivilized people. These were the chief facts he had derived from the study of the skeleton of the Andamaner. They, of course, suggested certain ideas to his mind. The first was this:—Why should ethnologists, when they came to study the natives of an insulated group of people like the Andamaners, deem it necessary to determine to what contemporaneous people they were allied, on the assumption that they had been derived from some existing and neighbouring land? Geological science had established the fact of continuous and progressive, though extremely slow, mutations of land and sea; and had taught them that the continents of modern geography were only the last phases of those mutations. How long the human species had existed, and how far they had been contemporaneous with such mutations, were the preliminary questions which presented themselves in grappling with the problem suggested by a peculiar insular race like the Mincopies. Certain it was, that geologists had conceived that the islands on the south of the present great continent of Asia might be remnants of some antecedent very distinct group of land; and naturalists—and he would more especially mention Sir J. Emerson Tennent, who had paid so great attention to the fauna of Ceylon—had brought to their knowledge a host of facts confirmatory of the idea that Ceylon was not a dismemberment of India, but part of a distinct and antecedent continent. In confirmation of that idea, they had the result of the geological researches of Cautley, Faulkner and others in India, which seemed to show that the Himalayas had risen, lifting up the fossiliferous beds on their present slopes, within comparatively recent geographical time; proving that India had been the site of one of the latest of those great systems of upheaving forces that resulted in the formation of new continents. Was it not, then, possible that the Andamaners might have come from *nowhere*—that was to say, from no actual contiguous and separate land, but might be the representatives of an old race belonging to a former continent that had almost disappeared? He would add, that the Adamaners were true men, showing no special affinity to any lower form of the animal kingdom. They were active, bold, plucky little fellows; and they had as much wit as their notions of daily and annual happiness required. Their islands yielded a sufficiency of food in the form of quadrupeds, such as an indigenous species of wild hog, of fishes, of shell-fish, and various indigenous fruits: their arts had progressed in the degree requisite to enable them to obtain that food.

As climbers, as swimmers, as runners, as leapers, they appeared to exhibit how admirably the human frame was adapted for mastery over the earth, in whatever limit and kind of sphere the bimanous species might become placed.

MR. CRAWFORD agreed entirely with Professor Owen with respect to the physical and intellectual appearance of the Andamans. They were small, compact, and well put together; and, for the purposes of savage life, he did not think they were deficient. Upon the whole, the Andamans were an ingenious people, as far as their means extended. He thought they were a great deal superior to the people of Australia: for the Australians were unable to make a boat; they were ignorant of navigation, and they had never invented the bow and arrow.

The meeting was then adjourned to Monday, Jan. 27th.

Fifth Meeting, Monday, January 27th, 1862.

CAPTAIN R. COLLINSON, R.N., VICE-PRESIDENT, in the Chair.

PRESENTATIONS.—*Rev. Jordan Palmer, M.A.; Sir Christopher Rawlinson; Sir Joshua Rowe; Douglas Henty; Henry Martin; and Thomas Martin, Esqrs., were presented upon their election.*

ELECTIONS.—*Lieut.-Commander W. Digby Mackworth Dolben, R.N.; Captain Horace Mantagu; Lieut.-Colonel A. Park; the Earl of Pomfret; Major Charles S. Showers; Edwin Adams; James Hiscutt Crossman; Alfred Head; J. Binny Key; Clement Davidson Leggatt; George Lumsden; Colin J. Mackenzie; Robert Russell Notman; John Samuel Phené; Robert Priso Roupell, Q.C.; Henry Ayshford Sanford; Franklin Travers; John Wardlaw; and John Watney, Junr., Esqrs., were elected Fellows.*

ACCESSIONS.—Among the accessions to the Library and Map-Rooms since the former Meeting were—Waugh's 'Report on the Survey of India, 1858-59;' Casalis's 'Basutos;' Murray's 'Pitcairn;' Thomson's Plan of the Province of Otago; Sketch-map of the Ogun River, by Captains Bedingfield and Burton; Admiralty Plan of Shanghai; Ordnance Maps; Admiralty Charts, &c. &c.

EXHIBITIONS.—A photograph of the Tuapeka Gold-Fields in New Zealand; Danish Plan of the River Volta; and Maury's Map of the United States, were exhibited at the Meeting.

ANNOUNCEMENTS.—McDouall Stuart. The CHAIRMAN desired the following extracts to be read from a letter addressed by Messrs. Chambers and Fincke to Lord Ashburton, dated October 26th, 1861:—

"We again take the liberty to address you, to give particulars of our progress in fitting out the present party, under the command of Mr. Stuart, to complete the crossing of our continent from south to north. On the 22nd instant, Mr. Keckwick (second in command)

and Mr. Woodforde started for Chambers's Creek with four of our horses. And on their arrival they will at once commence preparing the food necessary for the party; and we expect that by the time this is done the whole party will be there assembled, and at once make their final start for the Newcastle water.

Yesterday five men, with thirty horses, took their departure, who will travel by easy stages to the north till they are joined by Mr. Stuart and Mr. Waterhouse (the naturalist). The entire strength of the party will be eleven men, with seventy horses. They are fitted out most liberally with every necessary. They carry with them water-bottles that will hold 70 gallons, and by this means Mr. Stuart will be able to form depôts ahead; and we now entertain no doubt of his making his way through the last 80 miles which he has yet to accomplish.

The Papers read were—

1. *Expedition to Kilimanjaro (in company with the Baron von der Decken).*
By R. THORNTON, F.R.G.S., late Geologist to the Zambesi Expedition.

THE letter from which the following extracts are made contains the only information that has yet reached the Society on the successful issue of their journey. The extracts contain all that is purely geographical in the letter, but there are in addition minute notes on the geology of the district visited.

“Our route lay from Mombas to the south-west over the Shimba, thence north-west to the Kadiaro, then south-west to the Pare, then north to the Lake Yipe, thence through Dafeta to Kilema, where we made one attempt to ascend the Kilimanjaro, but had to turn back at about 8000 feet. We then went round by the foot of the mountain to Madjami; thence we returned by Dafeta, Lake Yipe, Pare, and the north foot of Usambara, to Wanga on the coast, which we reached on the 101st day from Mombas. We have made a tolerable map of our journey, the country through which we passed being very favourable for triangulation; though, from not being allowed to ascend the mountains of Pare and Usambara, and the want of two or three stations which circumstances prevented our taking, the map is not nearly so complete as I could wish it to be. The triangulation is checked by several latitudes and a lunar distance at Kilema. I have not yet plotted out the whole of the map, but I hope to complete and send it shortly.

“Our journey, on the whole, has been tolerably successful. We did not succeed in reaching the top of Kilimanjaro; but I have its altitude from six different stations, connected by tolerable triangles, at

distances varying from 15 to 50 miles. From these I believe the height of the Kilimanjaro to be about 20,000 feet. Its shape varies much, as seen from different points of view; but, from all places we have seen it, its base rises very gradually from a great plane. The outline of the top, as seen from Madjami, is a great dome (but this face is nearly flat): as seen from the east, it is conical, with the apex cut off, forming a little plane, sloping a little to the north. The southern slope of this cone is much steeper than the northern. Several miles to the north-east of the top a great conical peak rises to about 17,000 feet; and about 50 miles to the west of Kilimanjaro a great conical mountain, named Meru, rises from the great plain of the Massai to perhaps 18,000 feet.

“As seen from the east, the snow forms only a thick cap to the Kilimanjaro, with a broad tongue creeping down the south slope; and, when the sun is high, several long streaks of snow are seen lying in small ravines descending from the cap. As seen from Madjami, the snow partially covers the south-west face of the dome (about a quarter the height of the mountain), but several large bare patches of rock show out above the snow. The snow here seems to lie at its steepest possible angle, so that fresh snow falling on this side must at once slip down to the foot of the face of the dome. In one evening, at Madjami, we saw three such slips of snow in about an hour's time. On the eastern peak a few patches of snow are seen when the sun is high.

“All parts of the mountain we saw are composed of lava of subariel origin. From not reaching the top, and having seen only the south-east, south, and south-west parts of the mountain, I cannot speak with certainty of its structure; but I think that the Kilimanjaro is the north-eastern part of an old subariel volcano, the south-western and larger part having sunk down several thousand feet, and been partially broken up by faults. The great fault separating these two parts lies about north-west and south-east, and forms a very steep, long, flat south-west face to the mountain; and a high, very rugged mountain mass, lying a few miles to the north of Madjami, may be the relics of the top of the original mountain.

“We have not reached the axis of structure of Eastern Africa; but very far to the south-west from Kilema are seen, on a clear day, three very high rugged mountains (as high as the Meru mountain), with conical tops, which, if not volcanic—and I think their sides are too steep and shapes too irregular for ordinary volcanoes—may be composed of the axial granite.

The Lake Ype is shallow, and rapidly filling up. You will see size and position best when I send you our map. On its north side

it receives the River Loomi (of Rebmann), and at its west end sends out a river which, after joining the Jagga river, flows south through the plain lying between the Ugono and Anusha ranges to the river of Pangani. Between the Kilimanjaro and Anusha ranges is a small watershed, which sends the rivers of Western Madjani to the west.

“Mr. Rebmann’s map and description, as given in the first volume of the ‘Missionary Intelligencer,’ give a very fair idea of the country, and, considering he had no instruments, his map is very accurate.”

2. *Ascent of the Ogun, or Abbeokuta River.* By Captain RICHARD BURTON, F.R.G.S., H. M. Consul at Fernando Po, with Captain BEDINGFIELD, R.N., F.R.G.S., and Dr. EALES, R.N.

CAPTAIN BURTON’S characteristic letter will be found printed at length at p. 64. It is therefore unnecessary to do more here than shortly allude to it. He visited Abbeokuta; and his remarks show that, while impressed with the cotton-producing powers of the soil, he takes a less favourable view than is usual, of the civilized progress to which the inhabitants have actually attained. He points out that the new colony of Lagos is deficient in a sanatorium, which should be sought in the mountainous country of the Cameroons. A minute survey of the River Ogun, by himself and Captain Bedingfield, accompanies the letter.

3. *Journal of the Proceedings of H. M. S. ‘Bloodhound’ up the River Volta, West Coast of Africa,* under Commander DOLBEN, R.N., F.R.G.S.

THE author, conveying his Excellency the Governor of Cape Coast Castle, steamed to the mouth of the Volta, a river near Lagos, with a view of ascending it,—a feat that had never before been accomplished by white men. A rapid survey of the bar proved it was not that impassable barrier it had always been reputed, and that its features had become exceedingly different from those described in the sailing directory. An expedition of four well-armed boats, manned by thirty-nine men, then proceeded to enter the river. They crossed the bar without difficulty on October 28th, 1861, in 11 feet water. The *Bloodhound* herself could have been taken across it.

Partly sailing and partly rowing, the expedition ascended the river for 120 miles without difficulty or molestation, when their voyage was brought to an abrupt close by rapids. Though impracticable to ship’s boats, the rapids are not absolutely impassable, for the small strong native canoes can be forced through them to

Pong, a town which is situated at their head, 5 miles above the furthest point reached by the expedition. Above Pong the Volta is again navigable. Its stream was considerable. Immediately below the rapids it had a depth of 10 feet right across from bank to bank and a width of three-quarters of a mile. The natives were a fine race of men. The climate appeared healthy; for none of the party suffered during the five days they were in the river, notwithstanding exposure and severe work. The principal products were cotton, palm-oil, Indian-corn, and cassava. The water of the river was palatable, and fish abundant.

The CHAIRMAN said the first paper which had been read had reference to one of those important geographical problems which they must all rejoice to learn had been solved. It was not indeed that elaborate account, accompanied by a map, which they hoped to have communicated to them by the authority of the leader of the expedition, the Baron von der Decken, but it was a private letter from his associate, the geologist Mr. Thornton. The letter was nevertheless so ably written, and treated of such exceedingly interesting topics, that it was felt best to submit it to the Society without further delay. There was not now any doubt in the world that Kilimanjaro was really and truly a snow-capped mountain, and that its height, if not 20,000 feet, was something very nigh to it. He regretted that Sir R. Murchison was unable to be present, for he would have done justice to the important geological facts communicated by Mr. Thornton. He (the Chairman) felt no doubt that the information now received on the physical structure of the district of Kilimanjaro would materially influence our speculations on the position of the eastern affluents of the White Nile.

MAJOR-GEN. SIR HENRY RAWLINSON, K.C.B., said it was most satisfactory to have the problem of Kilimanjaro at last solved. They must remember that for a long period it had been a question of doubt amongst geographers whether the mountain really existed at all, and, if it did, whether it was of the height it was stated to be. For a long time it was supposed that the white top that was seen was simply quartz or dolomite which glittered in the sun, and was mistaken for snow. However the evidence now received fully verified the statement of Mr. Rebmann; for to him belonged—and he (Sir Henry Rawlinson) hoped would be attributed, without any sort of jealousy on the part of England—the honours of that discovery. The note he had in his hand was from Lieut.-Col. Pelly, who had succeeded Col. Rigby as the agent of the British Government at Zanzibar. He was a gentleman of considerable geographical experience (having recently performed a very interesting journey from Teheran through Afghanistan to India), and was anxious to further as far as he could, both officially and privately, the exploration of central Africa. Sir H. Rawlinson then proceeded to read the following communication:—

“MY DEAR SIR HENRY,

Zanzibar, 23 Nov., 1861.

“I arrived here on the 16th ult., having coasted along the African shore from the Mozambique to Zanzibar, touching at Iboo, and the other ports *en route*.

“Since arrival here I have been in the *Ariel* up to the equator, touching at Mombas and Lamoo. The country is finer, and the climate better than I had expected to find them.

“Baron von der Decken, just returned from the mountain of Kilimanjaro, dined with me last evening. He is much pleased with his African excursion. Kilimanjaro has perpetual snow on it, though close to the line; and he estimates its height by triangulation at 20,000 feet.

"I am becoming much interested in the line of the Ozi River, and I cannot help fancying that explorations taken along it to the ranges on its N.W. would be the most worth of all, and might also discover the real sources of the Nile."

COL. SYKES said they really owed the solution of the problem to which reference had been made, to Baron von der Decken, who, out of his own means and his love of research, had undertaken to travel in Africa. The Baron's original object was not the discovery of which they now heard, but an expedition in another part of Eastern Africa, whence he was driven back under circumstances of considerable personal danger; but, nothing daunted, he renewed his explorations, and this time in the direction of Kilimanjaro. The existence of that mountain had been pooh-poohed in England, where it was looked upon as a myth. It was said by some that the supposed snow was quartz, and by others that it was a thing *in nubibus*; but they now found that the snow-capped mountain was a real fact. He was very glad that the problem had been solved by one who undertook the research from his own resources; the more so as he had taken a personal interest in the discoveries of Krapf and Rebmann, the German missionaries, and had brought them to the notice of the Society, in his paper upon Zanzibar. He congratulated the Baron heartily upon his success, and desired to render unmitigated homage to the zeal of a foreigner.

MR. GALTON would add a few words supplementary to the remarks of Col. Sykes. The Baron von der Decken visited England for a few days previous to sailing to Africa; but it was at a time of the year when there were no evening meetings of the Society, and consequently few of its members had the opportunity of making his acquaintance. Baron von der Decken was a Hanoverian gentleman of rank, who had been an ardent Algerian sportsman-traveller; but having scientific tastes, and becoming desirous of a wider field of travel, selected the east coast of Africa as the place of his future explorations. The Baron had hoped that Dr. Röscher, who was then exploring those districts, would have associated himself with him; but learnt, on his arrival at Zanzibar, that Röscher had been murdered near the Nyassa. Baron von der Decken then followed his steps, to secure his papers, but was ultimately driven back by the hostility of the natives. Subsequently, on his return to Zanzibar, he fell in with Mr. Thornton, who had originally been attached as geologist to Dr. Livingstone's expedition, but had latterly thrown up his appointment, and he induced Mr. Thornton to accompany him. He (Mr. Galton) was glad to believe that as this was not the first expedition of Baron von der Decken, so it would not be his last; for Dr. Barth, with whom the Baron was in regular communication, had been asked to write to England to procure a portable boat, by which an exploration might be carried on of the lakes mentioned in Mr. Thornton's paper.

It was not to be thought that Kilimanjaro was the sole object of interest in that portion of Africa. Even as a mountain Kilimanjaro was by no means, of necessity, the most important, although it was the one of which most had been heard. Mr. Thornton mentioned no less than five other mountains that he had seen, ranging between 17,000 and 18,000 feet, and his views did not extend to either Kenia or Doengo Engai.

In reference to the letter read by Sir H. Rawlinson on the Ozi River, he might say that when he himself was exploring Africa eleven years ago, he had an English sailor-boy in his service, who had been one of the crew of a small trading schooner which had ascended the Ozi for twenty-five days. The boy had been greatly impressed by the size of the river, and, making allowance for the inaccurate and exaggerated recollections of non-educated persons who did not test their estimates of size by measurement, or at least by considerate examination, he had carried away a strong belief in the importance of that river.

The CHAIRMAN then invited discussion on the second and third papers.

After a few remarks by MR. TAYLOR, Consul at Abbeokuta,

COMMANDER STRICKLAND, R.N., described the natives of Abbeokuta, whom he had seen at Sierra Leone, on their own coast, and in the Brazils, stating that they exhibited extraordinary aptitude for trade. They were, in fact, called the Jews of Africa. Many of them had been taken as slaves, and when they were landed at Sierra Leone they were given a mere subsistence for six months, and then were left to shift for themselves; but after a few years spent in cultivating the soil and selling the produce, many of these Abbeokutans improved their position, and at last they so prospered as to have small shops and to rank among the chief people engaged in the retail trade of the colony. Not a few of them had gone so far as to establish commercial relations with England, importing English goods for sale to the Mahomedan traders who came from the interior. He believed that Abbeokuta afforded an excellent field for promoting civilization amongst the Africans. In the Brazils they formed a separate community of free blacks.

In reply to questions from MR. CRAWFORD,

CONSUL TAYLOR said he could not state that he had any great hopes that they could at this moment procure a large supply of cotton from Africa; but he believed the natives of Africa had every capacity and facility for providing an increased supply. In the case of palm-oil there had been a very large addition to the quantity exported, and he did not see why the produce of cotton should not also be increased.

COMMANDER STRICKLAND, R.N., thought now they had taken possession of Lagos, they should proclaim peace. If they wanted cotton they must stop all war. If they declared in Lagos their intention to punish those who made war, he believed they would secure peace, and would soon have abundant cotton from that country. He earnestly urged the duty of the white nations to give peace to these black races whom they had taught to sell each other into bondage, and whose original state of civilization they had been the cause of destroying. He quoted, from the journals of early voyagers, descriptions of the flourishing state of this part of Africa before the slave hunts for foreign exportation were got up through the white man's influence.

The meeting was then adjourned to Monday, February 10th.

Sixth Meeting, February 10th, 1862.

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

ELECTIONS.—*Dr. F. L. G. Gunn; Dr. S. Day Goss, M.D.; Capt. Edward Whitby; Charles Buxton, M.P.; Thomas Brookes; James Hall; Robert Hanbury, M.P.; John Jerdein; James Levick; William Marshall; Robert Deane Parker; and Arthur Roberts, Esqrs., were elected Fellows.*

ACCESSIONS.—The following were among the accessions to the Library and Map-rooms since the former meeting:—‘Bombay Magnetical and Meteorological Observations for 1859;’ Waugh’s ‘Instructions for Topographical Surveying;’ Colton’s Map of the United States; Transactions of the Pesth Academy of Sciences, &c.

EXHIBITIONS.—Geological Specimens from Charles Harper’s and the Dempsters’ Exploring Expedition to the East of York, West Australia; and some “Nardoo” seeds, taken from the patch on

which Burke died, at Cooper's Creek; as also a specimen of the Nardoo plant, were exhibited.

The Papers read were—

1. *Despatch from His Excellency SIR HENRY BARCLAY, Governor of Victoria, on the Expedition which, under the late MR. R. O'HARA BURKE and MR. W. J. WILLS, with MESSRS. GREY and KING, succeeded in crossing the Australian Continent from Melbourne to the Gulf of Carpentaria.**

[Communicated by His Grace the DUKE OF NEWCASTLE.]

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2. *Journals of the Expedition, with the Astronomical Observations of MR. W. J. WILLS.*

[Communicated by GOVERNOR BARKLY to SIR RODERICK I. MURCHISON.]

THE sad intelligence reached Melbourne on the 2nd of November, that Messrs. Burke and Wills, the leaders of the Victoria Camel Expedition, had perished of starvation at Cooper's Creek, after having successfully accomplished the object of their mission by opening a road across the continent to the Gulf of Carpentaria.

On arriving at Cooper's Creek, they found the small depôt they had left there had been abandoned the same morning, and that the large relief party they expected from the Darling had never arrived. One of the two men who travelled with them, alone survives: the journal and route-map have been saved. The geographical results of the expedition are as follows:—

The distance from Menindee on the Darling to Torowato Swamp, lat. $30^{\circ} 2'$, long. $142^{\circ} 36'$, was about 200 miles, and the road lay through a fine grazing country. There was no difficulty about water, as creeks or water-holes, many of them important ones, were found at distances never exceeding 20 miles.

From Torowato to Wright's Creek (lat. $28^{\circ} 48'$, long. $142^{\circ} 53'$) the road was good; thence to Cooper's Creek it was stony, but not impracticable. The feed on Cooper's Creek was satisfactory; but the flies, mosquitos, and rats which abounded there, made it a very disagreeable residence. Wills has no doubt but that Wright's Creek was the lower part of the Warrego River. Burke considered that the road from the Darling to Cooper's Creek ought to be established more to the westward than the line he followed.

Four excursions were made without success from the easterly part of Cooper's Creek, to discover a practicable route due northward, according to instructions. On one occasion Mr. Wills travelled

* The principal part of this despatch is printed in p. 68.

90 miles without finding water. The whole country had a deplorably arid appearance.

Mr. Burke's account of the journey from Cooper's Creek to Carpentaria, which he buried in a bottle on his return, is: "We have discovered a practicable route to Carpentaria, the principal portion of which lies in the 140th meridian of east longitude. Between this and the Stony Desert there is some good country. From thence to the tropic the country is dry and stony. Between the tropic and Carpentaria a considerable portion is rangy (*i. e.* hilly), but it is well watered and richly grassed." Mr. Wills' more detailed report fully bears out this description.

The longitudes of four points in the route have been worked out carefully at the William's Town Observatory, from Mr. Wills' records of lunar distances and eclipses of Jupiter's satellites. These careful reductions are based on Greenwich observations, and modify Wills' approximate determinations, which were, of course, calculated from the 'Nautical Almanack' data. They are as follows:—

Latitude.		Longitude.	
17° 54'	.. ..	No observation.	
18° 12'	.. ..	140° 59'	
18° 16'	.. ..	141° 28'	
18° 22'	.. ..	141° 15'	
19° 14'	.. ..	140° 55'	

By correcting Mr. Wills' route-map according to these more accurate results, we have probably an exact knowledge of the path taken by the expedition. His latitudes are numerous.

The third Paper read was—

3. *Proceedings of the Exploring Party, under MR. F. T. GREGORY, in North West Australia.*

MR. F. GREGORY sailed to Nickol Bay, on the north-west coast of Australia, and commenced his explorations on June 11th, a considerably later period than he had desired. He travelled till October 21st, passing over more than 2000 miles in consecutive expeditions from the coast, following the courses of different rivers, but on no one occasion penetrating very far into the interior. His results are the discovery of numerous periodical rivers and a vast amount of grazing country within the tropics, of which not less than 2 or 3 million acres lay within the limits of his route. The physical features of the land present a succession of terraces rising inland for nearly 200 miles, more or less broken by volcanic hills

near the coast. The highest elevation seen was nearly 4000 feet. The maximum October temperature in Nickol Bay during October was 92° , and the minimum 70° : the heat was not inconveniently felt during the journey. Mr. F. Gregory's map has not yet been completed and forwarded; but the report that has been received, bears evidence to a careful survey of the country examined by him.

The fourth Paper read was—

4. *Letter from CAPT. CADELL to SIR RODERICK I. MURCHISON, on the Country to the East and North of the Grey and Stanley Ranges.*

"I do myself the honour of herewith forwarding a rough tracing of some new 'features' which are found to exist to the eastward and north-eastward of the Grey and Stanley ranges.

"The most noticeable feature in the tracing is the Booro Pooro or Gonnewarra, which, from its magnitude, we imagine to be identical with the Neville of Sir Thomas Mitchell. In August last its breadth, twenty miles from Mount Vision, was about 30 yards, with a depth of about 11 feet. It eventually appears to expend itself on the plains. It will now be seen that this region is much better watered than the respected Sturt was led to expect from the natives; and in a few years, when stock shall have trodden down and formed the topsoil, which at present acts but as a sponge to absorb the rains as they fall, it will really be a fairly watered country and decidedly favourable for pastoral purposes. And I should not be surprised to see nature cutting fresh watercourses, notwithstanding that those at present existing are deep and well defined.

"'Country' has been taken up largely both on the Paroo and Warrego. The Grey and Stanley ranges are under tender, and runs have been applied for on and in the neighbourhood of the Gonnewarra. The tracing was made from information I received when on the Darling the other day; and I account for the longitudes not agreeing with those of Wills, as that observer in his maps was very considerably to the eastward of Sturt's positions. When out at the back of the Anna branch a short time ago with my friend Mr. Haverfield, we found that the "backwaters" of the Darling had at some time and during great floods extended nearly if not over the South Australian boundary line (141st meridian). Lake Cawndilla overflowing fills Lake Tondour, which in its turn sends its waters

down through a depressed line of flooded country to a lake (or lakes) of vast extent, which have not been filled for many years.

“I may add that all our western flowing rivers seem to carry down uniformly larger volumes of water than they did in former years.”

MR. LAUCHLAN MACKINNON having been called upon by the President, said that it was many years ago—as far back, indeed, as 1839—that he was engaged in an expedition into the interior of Australia that might, in a manner, be considered an exploring one, though its main object was of a commercial character. At the time of which he spoke there was nothing so exciting to youthful enterprise in that country as the overland journey from Sydney to the then newly formed colony of South Australia, of which Adelaide was the capital. At that time South Australia had an immense extent of unoccupied pasture-lands of the finest quality ready for the reception of flocks and herds. The first sheep, cattle, and horses had to be imported by sea from England, Tasmania, and New South Wales. The obvious disadvantages of this expensive and tedious mode of stocking the lands of the new colony stimulated the enterprise of Bonny, Hawdon, Eyre, and others, and the result was that a practicable route for stock was discovered, along the Morumbidgee and Murray Rivers, from New South Wales to South Australia. He himself was the leader of one of the earliest parties who traversed that route. The party started from Sydney in the middle of 1839, and arrived in safety at Adelaide in about three months. At that time a great portion of the country was quite unknown. He met large tribes of natives, but he succeeded in passing through them without much difficulty. He, however, found one thing to be necessary in order to carry out the work he had undertaken to a successful issue, and that was, not to separate himself from his commissariat; and he believed that if, in Messrs. Burke and Wills' expedition, the same principle had been adhered to, they would not now have had to mourn over the loss of those gallant men. There was no problem in social science so extraordinary as that which was in process of development in Australia. It was but seventy-four years since the first settlers arrived in Sydney and formed a colony that had since become the parent of other magnificent colonies. On the shores of Port Jackson, where seventy-five years ago the native savages were the only occupants, stood the fine city of Sydney, with an Anglo-Saxon population numbering some 60,000 or 70,000. As late as 1836 the colony of Victoria was a mere run for kangaroos and savages, but now it was the habitation of civilised men. He believed that there were results in that colony which were quite unparalleled in the history of colonisation. It was in the year 1837 that the first land was sold in Victoria. When he arrived in Melbourne, in 1840, its population numbered about 150, while that of the whole district of Port Phillip, as it was then called, did not exceed 3000. Melbourne itself was then but a hamlet in the midst of a forest, yet the energy and enterprise of its inhabitants had rendered it, within the short period that had intervened, one of the finest and most prosperous cities in the world. When he left Melbourne in 1857, just seventeen years after he had first arrived there, its population had risen to 95,000, while that of the whole colony had increased to nearly 600,000. The city itself had become one of extreme beauty from the substantial and tastefully ornamented character of its buildings. The streets were wide and handsome, macadamized in the centres, and paved at the sides with flagging taken out at great cost from the north of Scotland. The entire city was lighted with gas. Works, constructed on the best principles known to modern science, at a cost of 800,000*l.*, supplied the town most abundantly with water. The rapid increase of material prosperity

in Victoria was so remarkable that he could not refrain from giving them a few more statistical facts, which would speak for themselves. When he went to Victoria in 1840, its whole public revenue, from all sources, was about 10,000*l.* a year; the value of its exports was about 70,000*l.* a year: when he left in 1857, its public revenue was 3,330,000*l.* a year, and its exports had reached to nearly 15,000,000*l.* sterling. The greater part of this amount was made up of gold, the produce of the rich mines which abounded in Victoria. But, independently of the gold, the resources of Australia in agriculture and in her flocks and herds had been such as to render these colonies highly prosperous and affluent before the advent of the golden era. As regarded the government of the colonies, there were matters which had not been satisfactory. It was yet to be seen how far democratic institutions were consistent with constitutional government. He trusted that problem would be worked out satisfactorily. As regarded the unfortunate expedition of Burke and Wills, every one must deplore the melancholy fate of the gallant and persevering men. He was glad to see that the countrymen of Wills, in the town of Totness, Devonshire, were about to pay a mark of respect to his memory, by raising a monument; and he hoped that every one who felt an interest in the progress of discovery in Australia would seek an opportunity of adding their mite towards raising a monument to so worthy a man. He considered that before Burke and Wills left Cooper's Creek, they ought to have established a large dépôt at that place, to ensure sufficient food upon which they might fall back; but, instead of that, their enthusiasm led them to go ahead of their party, imagining that those they were leaving in charge would be able to reach Cooper's Creek in time, but the sub-leaders were not equal to the task, and hence the melancholy result of that successful, yet disastrous, expedition.

CAPTAIN BAGOT said, they once had the impression that Australia, generally speaking, was a desert—that it was a country presenting but few spots which might be turned to account. This idea which was entertained in England was not surprising, because he could bear witness to the fact that it was held by those living in Australia itself, until the people there became better acquainted with the country. His friend, Mr. Mackinnon, had stated elsewhere that, when taking cattle across the portion of country over which he had travelled, they had to traverse a salt-bush desert. The cattle which were with him even declared it to be a desert, for they would not touch the bush, and many were lost because they had nothing to feed upon. He thought it was two years after Mr. Mackinnon traversed the country that his son went into it. He was travelling until his provision-wallet was exhausted; he was tired and hungry, and had nothing to depend upon but his rifle for subsistence, and he was looking for something which he might deprive of life to preserve his own life; he saw a bullock, shot it, and found it exceedingly fat. After he had feasted upon the animal he had the good sense to examine its stomach, for the purpose of seeing on what food it had become so fat. He opened the stomach, and found nothing but salt-bush in it. His son returned to Adelaide immediately, arranged with the Government for a large tract of land, and he now had on it 7000 or 8000 as fine beasts as could be seen, and they had been all fed upon the salt-bush. His friend, Mr. Eyre, had passed into that country, to the north of Spencer's Gulf, and, on his return, declared that he believed it to be a land which was perfectly useless: yet upon that very country there were now something like 2,000,000 of sheep. It was believed that even the plains of Adelaide were useless brickfields, but upon those plains enough breadstuffs were now raised, not only to feed the population of South Australia, but also to supply a large proportion of the gold-diggers in Victoria. South Australia has for many years exported as much breadstuffs each year as would supply her own con-

sumption for two years. He thought these few facts would serve to show that, whatever may have been the opinions formed on a first cursory glance at it, the land of Australia, as far as it is known, is not a desert; while the recent explorations of Burke and Wills and of Stuart remove the preconceived opinion of the desert condition of the vast interior of that mighty continent.

After some remarks by MR. MARSH, M.P.,

MR. SAUNDERS expressed his belief that the coast of Carpentaria, owing to its peculiar local advantages, would attain to a more flourishing position than any other part of Australia; and he urged the necessity of establishing there a new settlement as a means of creating a very beneficial influence upon commercial operations, especially throughout the adjacent archipelago.

MR. HENRY AYSHFORD SANFORD, on being called on by the Chairman, spoke in reference to the resources of Western Australia, and to the causes of its present inferiority to the other colonies on that continent. He said that the colony was established in 1829, when the Government officials received large tracts of the best land then known in the colony, a great part of which, from want of capital and labour, are still lying untenanted. Again, the land was divided amongst the original colonists in proportion to the cost of the articles—whatever might have been their usefulness—brought by each from home; and in 1830 upwards of 2000 persons, with property amounting to the value of 100,000*l.*, arrived in the colony; but, from the impossibility of apportioning the different tracts of land to the various applicants (there being then but a Surveyor-General and an Assistant-Surveyor in the colony) and from want of labour, the country was not able to be cultivated to any great extent; and at one time the colonists were reduced to nearly a state of starvation. From that time the colony underwent various vicissitudes till 1850, when the introduction of convicts (then rejected by the other Australian colonies) supplied to a certain extent the defects of the want of labour; and the employment of these, under the moral force system (which has been attended with the greatest success), first raised the prospects of the colony. To show the success of the system, in 1859, 21 convictions at the sessions were as follows:—11 free-men, and but 3 conditional-pardon men and 7 ticket-of-leave men, out of a population of about 15,000 souls. A further advance has been made by the new Land Regulations; and he, Mr. Sanford, could state, from his own knowledge, that where, in 1857, scarcely 400 acres were under cultivation, a district not less than 12 miles long by from 2 to 3 miles wide was, in 1861, one succession of corn-fields.

He added that the southern part of the colony produced in large quantities the jarrah wood, most excellent for buildings, railway purposes, &c. &c., being capable of resisting the attacks of the white ant, as also so much esteemed for ships, piles, and all water purposes (resisting the attacks of the *Teredo navalis*), that at this moment it is being imported to England for the purpose of being used in the royal navy yards. Copper and lead ore were found in great abundance, with an extraordinarily rich percentage of ore, within an easy distance of good and safe ports. Coal has also been discovered, and there exists but little doubt that there are extensive coal-fields also within a short distance of the sea. He referred them to the Exhibition of this year, where they would have the opportunity of seeing and testing the accuracy of his statements as to the great natural advantages of the country. He thought that a great part of the meeting were doubtless well aware that to the exploring energy, perseverance, and skill of the Messrs. Gregory the colonists were in a great measure indebted for their knowledge of the agricultural and mineral resources of their adopted country; and the report that had been read that evening of Mr. Frank Gregory's last successful explorations in the north-west opened new and extensive fields to the settlers for the extension of their flocks and herds, and very possibly for the cultivation of the cotton-plant.

Messrs. Dempsters, Clarkson, and Harper had also discovered, 300 miles east of York, large tracts of land, with plenty of water, and well adapted for pastoral purposes; but the principal interest attached to their trip was the intelligence they had obtained of what might prove a clue to the fate of the Leichardt expedition, and he had been informed it was the intention of the Colonial Government to prosecute further inquiries in the ensuing wet season. He believed the colony only required *labour*, and he trusted that Government would persevere in sending out convicts, and, if so, he believed sufficient capital would speedily be introduced to work the mineral and other resources of the country; and Western Australia would yet rank among one of the most prosperous colonies of that wonderful continent.

The meeting was then adjourned to the 24th of February.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Abstract of Capt. Duncan Cameron's Paper on the Ethnology of the Caucasus.* By W. SPOTTISWOODE, Esq.

THE establishment of Cossacks in the Caucasus dates some centuries back, when large bodies of them moved down from their own plains to the Dnieper and the Don, and thence to the Terek, where they formed a mixed race, which, however, has been continually recruited from the Don or the Ukraine. These were systematically augmented by Peter the Great and his successors. Catharine the Great, in particular, transferred thither the turbulent Zaporogue Cossacks. Continually recruited by desperadoes from the surrounding states, they rendered themselves at one time seriously formidable, frequently carrying devastation into Russia and Poland, Turkey and the Crimean Khanships. In 1775 their government was suppressed by Catharine II. They were subsequently allowed to serve against Turkey, and, as a reward for their exploits, they were granted in 1789 the territory which they now occupy on the Black Sea.

The Cossacks of the Caucasian line still retain some vestiges of the self-government which distinguished their rude, free communities. They have no nobles, and acknowledge no difference between families, except distinction gained in the field or military rank. Disposed in regiments along the different military lines, they furnish an imposing complement to the regular army of the Caucasus. Their artillery, with that of the Don Cossacks, is reckoned the best in Russia. Some of their early settlements have become the nuclei of important towns. Thus Kizliar, established in 1715, numbers 9305 inhabitants; Mozdok, established in 1777, 10,970; Stavropol, established the same year, 14,368.

Beyond the Cossacks are the Nogai Tatars, a widely different race, whose history, however, is no less characteristic. At the beginning of the seventeenth century they passed from the Sea of Azov to the north-east of the Caspian, between Tobolsk and the Jaik. Pressed by the Kalmuks, they afterwards submitted to Russian sway, pitching their tents for a time near Astrakhan.

At the beginning of the last century we find them crossing the Dnieper, and placing themselves under Turkey, but returning in 1770 to their old camping-grounds in Russian territory.

The Nogais are divided into the Trans-Kuban and the Kumyk hordes. The Trans-Kuban Nogais occupy the left and part of the right banks of the Kuban, from the post-station, Batalpashinsk, to the mouth of the Laba, as well as the tract at the foot of Beshtau, near Piatigorsk. The Kumyk Nogais live between the Sulak and Terek rivers; some of them are nomadic, others cultivate rice, madder, and the vine, and are rich in flocks and herds. Besides these there are the Karatchai Tatars, the Urustpievs at the sources of the Baksan, and the Malka. The total Tatar population here is 45,000.

Passing to the mountaineers, the Tcherkess, Abkhasian, Suanetian, Ossetian, and Immerian, and after them the Tchetchen and Lesghian groups, claim our attention. A great diversity of race and language not only separates these people from one another, but renders their classification difficult.

The Tcherkess were called Zukoi by Greek geographers, and placed by them in the Crimea and Western Caucasus. In the time of George Interiano, who wrote in the year 1702, the Tcherkess country included the whole of the eastern shore of the Palus Mæotis, from the Don to the Cimmerian Bosphorus, whence however they were expelled by the Muscovites and Tatars.

The Tcherkess call themselves Adigh. They at present occupy the northern face of the Caucasus and the Kuban to the fortress of Anapa, and thence southwards, along the eastern shore of the Black Sea, from the mouth of the Kuban to the river Bayb or Kobosh. They are divided into communities, of which the principal are the Natochuadj, Schapsukhs, Ubykhs, Temirgois, and Kabardians. The constitution of the Tcherkess is strictly feudal. Their country is still a seat of the slave-trade, and its influence has sunk so deeply into their institutions that the chief privilege of the seigneurs over the peasants is the right of selling their issue. Among the higher orders, however, the custom of disposing of their female relatives to strangers takes something of the form of a family alliance. The Sultans formerly availed themselves largely of this usage to strengthen their influence among the Tcherkess. Thus the Abadsekhs always call the reigning Sultan their cousin, on account of their numerous contributions to Imperial harims.

The main body of the Tcherkess group is still opposed to Russian domination, which has, however, sufficiently established itself in Kabarda and along the coast. Their total population is fixed at 290,540.

To the south of the Tcherkess are the Abkhasians, a people resembling them in many of their usages, but different in personal appearance, and far more wild and lawless. Their tongue is harsh and barbarous in the extreme. It is told that a Sultan once sent a certain learned Effendi to the Caucasus to collect information regarding languages. He brought back vocabularies of many; but on being asked about Abkhasian, produced a bag of pebbles which he rattled. "That," he said, "is the Abkhasian."

They are divided into the Abkhasians proper, subjects of the reigning Prince of Abkhasia, under Russian protection, the Ssadds, Besselbeis, and other smaller communities, all distinguished by their passion for rapine, murder and blood-revenge. The total population of the Abkhasian group is 144,346.

Next come the Suaneti, the "gens Suanarum" of Pliny and Procopius; a wild, unruly people, but whose country, strewn with remnants of Greek architecture, attests an order and civilization long since passed away. These occupy the mountain territory between Mingrelia and Abkhasia, on the south-west, and Kabarda on the north-east. Their language is said to be cognate with the Persian.* The Suaneti have long been hermetically sealed to external influence

* It is a branch of the Georgian.—W. S.

by the wild character of their country; and it was by a Prince of their race that the last Governor-General of Imeritia, was openly assassinated at Kutais, in 1857. A road is, however, being pierced by the Russians through their territory, which is said to be rich in metals. Their population is about 11,000.

The Ossetes, bordering on these, occupy part of the mountain territory, between Kutais, Tiflis and Vladikavkas. They constitute one of the most interesting people in the Caucasus. Their language has been pronounced by Klaproth to be Indo-Germanic. Their manners bear a striking resemblance to those of the Germanic race, and the furniture of their houses struck Haxthausen as singularly resembling that of the peasants in Westphalia. They are believed to be a fragment of the Alani of the middle ages, who, according to Moses of Choren, and others, were originally located near the Caucasus, and are classed by Procopius among the Gothic tribes; and, supposing this to be true, they thus become directly linked with our European history. They call themselves Tagiran, and the Alani also called themselves Iran.

The Ossetes are a handsome race; gifted with great eloquence and ability; proud, true to their word, and hospitable, but great robbers, as their proverb, "Whatever is found on the high road is God's gift," sufficiently testifies. Their form of society is aristocratic, but based on family clanships. Their religion consists of a mixture of Heathenism, Christianity, and Islam. The prophet Elijah plays a great part in their religious observances; and they offer pagan sacrifices at certain caves which he is said to have inhabited, as well as on old altars the relics of their former faith, which seems to have extended throughout the Caucasus. If an Ossete is injured by another he slays a cat, a dog, or an ass, on the grave of the wrongdoer's ancestors, believing that, unless he is satisfied, their souls will be degraded to occupy the animal slain.

Beyond these are the Khevsur, a Christian people, an offshoot of the old Georgian race, inhabiting the mountain tract about the sources of the Argun, and they have long formed a barrier to the fanatic Mussulman tribes of Daghestan and Upper Georgia.

The Christianity of the Khevsur is of a loose kind, and tinged with paganism. But his faith in the sign of the cross is unbounded; he crosses himself at sight of a church, crosses himself when he sneezes, crosses himself when he lights a lucifer in a strong wind, and wears the cross as a badge on his coat of mail. The population of the Khevsurs, with that of their kindred tribes of Pschaves and Tuschetes, amounts to 11,546.

Lastly, we arrive at the Tchetchians and Lesghians, two separate people, speaking different languages, inhabiting Daghestan and the adjacent mountain country towards Vladikavkas. They differ from the Tcherkess in eschewing aristocratic government; every man among them being free, equal, and noble. Until Shamil's time they were broken up into small democratic communities, keeping themselves so jealously apart that their language has been split into innumerable dialects. Blood-revenge is common, and the males of a family are often exterminated by this desperate substitute for regular law.

Of the races to the south of the Caucasus, namely, the Georgians and Armenians, little need be said. Among the former society is based on a feudality as complicated as that of any European state in the middle ages; kings, nobles, and clergy, forming a regular hierarchy, not unlike that of the old Germanic empire. Society in Georgia is still divided into nobles and serfs. The existence, indeed, of serfdom is one of the greatest drawbacks to the development of the resources of the country. The Georgians were at one time masters of a large, wealthy, and powerful kingdom, but the invasion of Tamerlane overthrew this, and it never recovered the shock. Its remnants, gathered together for a brief period, were again formally divided by Alexander II., in

1442. From that period the Georgian race sank into an anarchy, only broken at the close of last century by the establishment of Russian domination.

[The following population-table of the Caucasus is taken from Russian sources :—

Tribes.	No. of Souls.
Abkhasians	144,552
Svaneth	1,639
Adigh	290,549
Ubykh	25,000
Turkish tribes	44,989
Ossetes	27,339
Tchetchians	117,080
Tumenes	4,719
Pshavs	4,232
Khevsurs	2,505
Lesghians and Daghestans	397,761
	<hr/> 1,060,365 <hr/>

The languages of the Caucasus have been but little investigated ; but it has been ascertained that, with one exception, they belong to what is called the Turanian, *i. e.* neither to the Semitic nor to the Indo-Germanic family. The exception is the Ossete (Tren or Tronen), a distinctly Indo-Germanic language, a full grammar and vocabulary of which was published by Sjögren at St. Petersburg in 1844. An excellent sketch of a classification of the Caucasian languages is to be found in Prof. Max Müller's ' Languages of the Seat of War,' 1855.—W. SPOTTISWOODE.]

2. *Memorandum—Earthquake of Erzerum, June, 1859.* By ROBERT A. O. DALYELL, Esq., F.R.G.S., H.B.M. Consul at Erzerum.

THE first shock took place on the 1st June, about 8 A.M. : it was very sensibly felt, but did very little damage.*

On the 2nd June, about 10·30 A.M., another shock occurred, lasting about 8 seconds; and was followed about 11·30 A.M. by another, but of shorter duration.

The vibrations were horizontal ; but, during the more violent shocks, a slight vertical motion is stated by some persons to have been perceptible. The direction of the shock appears to have been nearly from south-west to north-east.

On the 4th June a severe shock was felt at Tabreez, in Persia, which, however, did no damage to the town.

Schamaki, a town in the Caucasus, near the Caspian, has suffered very severely by a shock which occurred there within a day or two after the shock here ; but the Russian Consul informs me that his letters make no mention of the shock as having been felt in other parts of the Caucasus.

I have been unable to obtain accurate information as to how far the shock of the 2nd instant was felt at intermediate points towards the north and north-east, but it does not appear to have been felt at any great distance to the southward. The shocks of the 1st and 2nd were felt in various villages in the plain of Erzerum ; but, so far as I can ascertain, were not perceptible in the district of Tortoum. On the days of the shocks mentioned, the weather

* Erzerum is situated in latitude 39° 55' 20", and longitude 41° 18' 31". Height above the sea 6114 feet ; geological formations resembling those of the Caucasus ; mountains apparently metalliferous ; population about 35,000.

was sultry and lowering; but not, however, it is said, very much different from that usually prevailing at this season.

At a village, called Souk Tchermik,* in the neighbourhood, a mineral spring, the water of which is usually of a blue colour, became darkened in colour, and retained such colour for two days.

The sense of disquietude mentioned by Humboldt, as affecting the lower animals during similar phenomenon, was very remarkable in the barking, on the occasion even of slight shocks, of the numerous dogs with which the town abounds.

For considerably more than a month, after the 2nd June, slight shocks continued to occur about once in the twenty-four hours: one or two were rather severe, but did not occasion any damage.

Slight shocks appear to be of frequent occurrence at Erzerum: they are not confined to a particular period of the year, but seem to be most frequent in spring.

The following is the official return of casualties furnished to the Pacha:— Killed, four hundred and sixty Mussulmans; eleven Gregorian Armenian Christians; one Catholic Armenian Christian; two Greek Christians.

The Turkish quarters of the town were those which suffered most severely. Four thousand five hundred houses were quite destroyed, or very seriously damaged; twelve mosques suffered more or less; nine minarets were quite destroyed; seven Turkish schools were completely destroyed; five baths, many of the fountains, and eight hundred and fifty shops were rendered useless. The khans, in which merchandize is deposited, being usually vaulted, have suffered very little.

The loss of life is probably not overstated: it would have been much greater had not the 2nd June been a great festival (the Ascension). Few, comparatively, of the population, either Mussulmans or Christians, were in the bazaars, and many of the latter were absent from their houses.

The very solidly built walls of the fortress, the palace of the Pacha, the Austrian, British, Persian, and Russian Consulates, all among the most solidly constructed buildings of the town, have sustained much damage.

The pyramidal top of the Lalé Pacha minaret was, by one shock, moved a considerable distance on the column, of which it forms the summit; and, by another shock, was brought back to its original position.

The Central Government has afforded some assistance to the poorer inhabitants in rebuilding, and a commissioner has arrived from Constantinople.

At about an hour's distance from Erzerum to the south, there is a point in the mountains surrounding the plain, which would appear to be the crater of an extinct volcano; † and a mountain of the range, forming the plain of Erzerum to the south, is easily recognizable by its form as an ancient crater. ‡

There are traditions in the country of a great earthquake which occurred about one hundred years ago, and by which, though the damage at Erzerum was not great, the villages in the plain of Passim, about twelve miles from Erzerum to the east, suffered severely.

It is said in the country that the lake of Tortoum§ was, up to that date, much smaller than it is at present, and was then deepened by the falling of a mountain, which altered the course of the Tortoum Chai.

* At many points in the plain of Erzerum there are hot mineral springs. Souk Tchermik is a cold spring, but its temperature is somewhat warmer in winter than in summer.

† See Hamilton's 'Researches in Asia Minor,' vol. 1, p. 178.

‡ It is described in Wagner's 'Reise nach Persien,' Leipsig, 1852, ch. vii.

§ For description of lake of Tortoum, see Kurzon's 'Armenia,' p. 155; and for description of remarkable geological formations, valley of Tortoum, see Hamilton's 'Researches in Asia Minor,' vol. 1, ch. xiii.

The appearance of the locality seems to me to confirm this tradition; and, although my want of geological knowledge does not enable me to form any accurate opinion, I should consider that the whole country to the north-east of the lake of Tortoum bears evident traces of volcanic disturbances. The walls of two churches, the one at Ishkirt, the other at Vank (near the lake of Tortoum), are cracked in the manner I should be inclined to attribute to the action of an earthquake; and I would mention a remarkable rift known in the country by the name of the Dunya Buzurgu (Greatness of the World): this rift splits the mountain from top to bottom, and is about fifteen feet broad at the entrance. It took me from twenty minutes to half an hour to ride through it. The strata on the opposite sides correspond; and, though a small stream flows through it, I should think, from its depth, the chasm can hardly have been formed by the action of water.

After careful inquiry on the spot I was unable to ascertain that shocks have, within memory, been felt in the valley of Tortoum, or on the districts to the north-east; and I am inclined to believe that the slight shocks which I have above mentioned as a frequent occurrence are (except as they may form part of a wider system) confined to the town and plain of Erzerum; and I am disposed to think are scarcely felt in that part of the plain which lies to the north of the branch of the Euphrates, which divides it into two portions.

I have, however, ascertained that within the last two years shocks, but apparently slighter in character than those experienced in this neighbourhood, have been felt at many points in the area, which would be bounded by lines drawn between Erzerum, Tiflis, Van, and Bayazid; but I am unable to collect sufficient information to connect the dates or directions of such shocks with the dates or directions of those experienced here.

In conclusion, I may state that many buildings of solid construction have, for instance, at Van and its neighbourhood (about 200 years ago), at Bayazid, about sixty or seventy (?) years since, been destroyed, or have severely suffered by earthquakes; although the shocks experienced of late appear, in this part of Turkey, to have been most severe in this immediate vicinity.*

3. *Letter from Capt. RICHARD BURTON, F.R.G.S., H.M. Consul to Fernando Po, to Dr. NORTON SHAW.*

ENCLOSED is a compass-sketch of the Ogun or Abeokuta river, which has not yet been regularly surveyed.

Captain Bedingfield, Dr. Eales of the *Prometheus*, and I left Lagos on the 29th October, in the first and second gigs, manned by Krumen.

Our line was across the large lagoon called in maps the Cradoo Waters: the word should be written Koradu, and the name is derived from a well-known market-town opposite Lagos. After two hours' rowing we entered the Agboi Creek, a short cut running nearly northwards. You will find it roughly laid down in Lieut. Glover's map, whereas the Ogun river sweeps round to the east.

On our return we came out by the mouth of the Ogun, which was nearly choked with grass. These rivers have no influents in their lower courses, and the soppy, muddy nature of their deltas, combined with want of waterfall, makes them shrink in volume as they near the sea.

After three hours' paddling up the fetid Agbai, and encountering a sharp tornado on the way, we entered the main river, a goodly stream, about 100

* Monsieur Abich, a distinguished Russian Seisologist, has published an account of the earthquake at Erzerum, of June 1859, and the earthquake at Schamake of the same period.

yards broad, belted on both sides with an immense growth of forest and little affected by the tide. After sunset we neared the village Igáon, which, in the dry season, is the terminus of the boat traffic : a path leads from it to Abeokuta, the main road being on the other side, viz. the west of the Ogun river.

The next day took us to a miserable mass of huts on the left bank, Mabban—a fine specimen of maritime Africa—all mud, miasma, and mosquitos.

Our third night was spent at Takpana, a large hamlet surrounded by well-cultivated fields; maize, manioc, and sweet potatoes. The aspect of the country had improved; the walls of dense vegetation upon the banks had yielded to the Guinea-grass, and the stream had become shallow, and showed sandbanks and boulders. My companion compared it to the upper part of the Zambezi river.

At 11 A.M., on the 1st November, we landed at Agbarneya, the southern "port" of Abeokuta, distant about 8 miles from Ake, our destination.

The river is navigable for boats as far as Aro, some 6 miles higher up; above that point a ridge of rocks crosses the bed and forms an impassable rapid. Small canoes can thread it for a short distance in the upper waters; but the general style of ferry is a large calabash, which the traveller takes to his bosom. At Agbarneya we were met by Messrs. Wilcoxon and Roper, of the Church Missionary Society, who obligingly escorted us up to the town of Ake, from which the alake or chief derives his title, and we found quarters in the hospitable home of Dr. Harrison.

Our stay at Abeokuta lasted a week, from the 1st to the 8th November. It was consumed in "palaver" touching the war with Ibadan, kidnapping, slaving, and human sacrifice. A revolting case of sacrifice had just occurred, and hardly had we returned to Lagos than we were informed of another. The Egbas, or people of Abeokuta, are one of the weak semi-monarchical African tribes; "every man," as their proverb says, "is king in his own house." The chiefs are influential and refractory as the sheiks of a Bedouin tribe; and the alake, though aspiring to regal title, has not half the power nor a quarter of the state of the pettiest Indian rajah. Abeokuta has been so often described that I shall say little about it. The population has apparently been underestimated by travellers and limited to 100,000; I should prefer 150,000. The extreme circumference of the walls is about 27 miles. Most of the interior, however, is granite knob and field; and in point of uncleanness it beats anything I ever saw. The frontispiece to 'Sunrise within the Tropics' should be called "what Abeokuta ought to be." Like the little book itself, it is all *couleur de rose*—Africa, with an Italian tint.

There is no mistake, however, about cotton-growing in these regions. It can be carried out all over Yoruba; a kingdom once extending from the Volta river to the Niger, and including Benin and Dahomy: but, to give it due extension, wars must cease and treaties must be made with the several chiefs. I would here correct a mistake, universally made by those who have written upon the subject. The land is not, as stated by Mr. Campbell and others, common property, nor will the people allow strangers to take it. Litigation upon the subject is quite as general as in England; and if, as Sir Culling Eardley proposes, free negroes and mulattos were sent here from America, there would follow the agrarian wars and troubles of New Zealand. Even in the towns a stranger cannot obtain building-ground, except it be granted with the understanding that it is not alienated in perpetuity, but shall revert, when no longer in use, to the original proprietor.

If you want a colony in West Africa, send it to me, near the Cameroons. At some future time I will (D. V.) enter fully into the subject. Suffice it to say for the present that Lagos requires a sanatorium—the nearest now being Teneriffe and Ascension; and the Oil rivers want a key, after losing Fernando Po. At Abeokuta the cotton is grown in the farms. I was shown the green seed or upland (short staple), and the black seed or long staple. There is,

moreover, a very valuable kind, called "akashe," soft as silk. Eight seeds are sold for a penny. Before the war, the export was doubling every year; since then it has declined. The Cotton Association of Manchester exported 20,000 bales in 1839-60, and received only 3447. With the return of peace it will revive. The wars are conducted in the usual African style. Seventeen thousand men meet, blaze away with "long Danes" from the hip all the day, retire and advance, as if by mutual consent, and separate with the loss of half-a-dozen killed and wounded: and this stuff they call fighting! It is serious only to the allies, who, being weaker than those who assist them, are sold off by way of commissariat. The Egbas of Abeokuta are nominally fighting to defend their friends the Ijáyes against a common foe, the Ibádans. It is generally asserted that the unhappy Ijáyes have at this time lost 20,000 of their number by famine and the slave-market. The real *casus belli* lies deep; the Abeokutans are determined to monopolize transit-dues by keeping the northern people from the coast. Every African tribe knows that it cannot prosper without seaboard, and then the war began.

We were informed that the King of Dahomy was busy sacrificing before beginning his annual slave-hunt. It is the practice of this amiable monarch, as of his predecessors, to muster his forces, arm, drill, train them, and march them round the capital till the spirit moves him to rush in a particular direction and drive and harry the land.

Concerning Dahomy, however, I must warn you that there is a vast amount of fabling, which originates with certain slave-dealers, who think to alarm strangers by spreading abroad all manner of horrible tales. To this category belongs the report that his Majesty sadly wants to catch an English officer, to be used as a stirrup when mounting his charger. The Amazons may be reduced from 6000 to 2000. Messrs. Duncan and Forbes were, I believe, imposed upon by seeing the warlike dames marching out of one gate and in to another. A similar story is told concerning commissariat bullocks in the good old times of India. I have no doubt that the Amazons, like the tender begums of Oude and Hyderabad, are mighty contemptible troops; and I should like to have a chance of seeing them tackled by an equal number of stout English charwomen, armed with the British broomstick. After taking leave of the alake, we left Abeokuta on the 8th November, and on the 9th I found myself once more under the comfortable roof of my excellent friend the Acting Governor of Lagos, Mr. McCoskry. The trip has led me to doubt that sunrise has yet taken place within the tropics, though not to question that it can take place.

On the 21st ult. I left Lagos in H. M. S. *Bloodhound*, Lieut.-Commander Mackworth Dolben, which Captain Bedingfield kindly detached for the purpose of visiting the Oil rivers. We entered the Nun river on the 24th November, passed through the Akassa Creek, whose waters saw for the first time a man-of-war; visited Brass and Fish towns, and we are now proposing to sound the bar of St. Nicholas river.

You will probably hear from me by the next mail, unless I happen to be on the top of Cameron's Mountain.

4. *A Missionary Journey up the Cavalha River, and the Report of a large River flowing near the Source of the former.* By the Rev. C. C. HOFFMAN.

Communicated by Mr. JOHN MARSHALL of Cape Palmas, West Africa.

AT your request I furnish you, with pleasure, with a few particulars of a missionary tour I made to the interior last July. On the 9th of July we left Cavalla, the station of Bishop Payne, and reached the Cavalha river after a

walk of an hour and a half. That afternoon we ascended the river about 5 miles to Burbo. On the 10th we made 25 or 30 miles, and on the 11th about the same number, when we reached our landing-place, Kekre in Webbo, say 70 miles from the mouth of the river. The river varied in depth from $2\frac{1}{2}$ to $4\frac{1}{2}$ fathoms. Numerous towns, belonging to eight or ten tribes, whose territory extends on both sides of the river, are on its banks. In three of the tribes we have mission-stations, in charge of native catechists. The language is similar and understood by each other. We were always kindly received. Krekre is only a short distance from the rapids, which extend a mile or two below the falls. The river is divided by islands, making three falls, the highest about twelve feet. Above this, for a couple of days' journey, the river is obstructed by rapids, and there are in all five falls, beyond which the river runs for a long distance in a north-easterly direction. The land becomes hilly; hills are seen in all directions. For ourselves, we left the river at Krekre, and proceeded to our mission-station at Bohlem, 3 miles from the river, where we passed the night. Bohlem is finely situated on a hill surrounded by hills. The weather was cool and pleasant. On Friday, the 12th July, the thermometer stood at 63° at 6 A.M. We had a good fire in the stove to make ourselves comfortable. Saturday, we started at 6 A.M., in a north-easterly direction. Walking was laborious over hills covered with a fine growth of timber, the roots of which impeded our progress. We passed many streams; the ground was rich, and the rice was standing in the farms 5 feet high. At night we reached the Diebo tribe, having travelled about 25 miles during the day. By this people, who occupy four towns, we were kindly received; very few of them had ever seen the face of a white man. We rested on Sunday the 14th, except to visit two towns for preaching. The Greybo language had here to be translated into that which the people spoke; it was similar to the Greybo, but not sufficiently alike for the people to hear well. We learned from our guide that there were twelve tribes beyond us, under the jurisdiction of one man who lived two days' journey from us.

We were obliged to return to Cape Palmas, being unable to proceed further; we met with no hindrances from the natives. One important fact, however, I learned from one of the natives with whom I conversed about the country towards the interior. It was this: that near the source of the Cavalha river another river flows from the hills, by which the natives receive English goods, cloths, salt, guns, &c., from vessels at its mouth. This river they call *Niga*. The natives in the interior make cotton cloths, some of which I saw. I have very little doubt, but that one of the sources of the Niger will be found a few weeks' travel east of Cape Palmas, and that this is the river to which the native referred. Our journey home was speedily made, taking but one day on the river.

5. *Excursion from Queensland towards the Interior of Australia.* By E. B. CORNISH, Esq.

Communicated by F. WALKER, Esq.

THE following is the extract from the letter of my correspondent in Queensland, Australia, which I promised to send. It appears to me valuable, as showing how near the enterprise of the squatters in Queensland has approached to the line of march of Burke, Wills, and Grey, in their recent and fatal passage to the Gulf of Carpentaria.

"You are aware that I was going, when I last wrote, to look at some country William Landsborough had discovered to the westward. On the 24th June five of us started from Broadsound. As I was in haste, and as Landsborough did not wish more fuss than was necessary to be made (the district in

which it is situated not being yet proclaimed), we parted on Peek Downs,—Landsborough and Kemmis made for Fort Cooper: Buchanan (who jointly with Landsborough discovered the country), I, and a black fellow started for the westward.

Never was there a party better equipped for a short exploring trip. We had 16 picked horses, 5 of them carrying packs. Our provisions consisted of 40 lbs. of prime dried beef, cured with sugar, 120 lbs. of flour, and tea and sugar in abundance. On the 1st July we camped on Phillip's Creek, near the Mount of that name, crossed the range at Shepherd's Awl, and steered by compass west by south; crossed the Belyando on the fourth day, and when 20 miles west of it saw Mount *Narrien*, which bore from us east by south, and we estimated its distance to be about 45 miles. About 20 miles further on we crossed the watershed of a large river (not laid down in the maps), which we supposed to be the Cape of Leichardt. From that river to the river which we named the Landsborough (*quere* the Thomson of Mitchell)—or rather to the good country which commences about 30 miles from it, a distance of 130 to 160 miles—we crossed no creeks of any consequence, and the chief part of the country produced nothing but desert-grass. We were generally lucky, however, in getting nice spots to camp on, and we kept our horses in good condition. I must say, with regard to this good country, that, notwithstanding the distance was 100 miles further from the Belyando than it was thought to be, it was quite up to what had been said of it. In fact, I never saw it equalled in Australia, take its position and distance from a shipping port out of consideration. The river runs south-west, has in places a great number of channels, and is evidently subject to very high floods. The position of this country at its centre we found to be E. long. $143^{\circ} 40'$, S. lat. $22^{\circ} 30'$. On our return we travelled 50 miles on one of the main branches or tributaries of the river, the country of which was well watered and at places very fine; but after leaving this creek we did not cross a watercourse of any description for 90 miles, and the country was almost entirely covered with desert-grass until we approached the Cape. We were lucky, however, in getting water at times in puddles, and, although our horses were pulled down, we ourselves did not suffer. We reached Fort Cooper on our return in 35 days from our starting at Broadsound.

6. *Extracts from a Despatch from Governor SIR H. BARKLY to the DUKE OF NEWCASTLE, on BURKE's Expedition.*

THE mystery in which the fate of the Victorian Exploring Expedition was shrouded, when I lately alluded to it, was soon afterwards dispelled on the arrival of Mr. Brahe on the relief party under Mr. Howitt, with intelligence that King, the sole survivor, had been found living among the natives on Cooper's Creek: his companions Burke, Wills, and Grey, having perished from exhaustion on returning from the Gulf of Carpentaria, which it now appears they reached in safety in the month of February last.

How thoroughly indeed the gallant band accomplished their perilous mission will be seen from the journals and charts of their leaders, which are fortunately preserved to us, and serve incontestably to prove that, without detracting from the credit due to McDonall Stuart, whose route was unknown to them and far distant from that they followed, to Burke and Wills exclusively belongs the honour of first crossing the Australian continent from sea to sea.

The details of their discoveries and of their sufferings will be best learned from the simple and touching narrative which poor Wills left behind him, coupled with the statement of King, which has been taken down by Mr. Howitt. But I will continue, for your Grace's information, the brief sketch of the history of the expedition begun in my despatch of the 20th July, No. 64.

I then mentioned that Mr. Burke had quitted the dépôt on Cooper's Creek on the 16th December last, with half his party, leaving the other half there under Mr. Brahe, whom he promoted to the rank of petty officer on the occasion, but with the expectation that the command would almost immediately be assumed by Mr. Wright, whom he had directed to join him as soon as possible with the stores left behind at the Darling. I described also how Mr. Brahe, after waiting beyond the time Mr. Burke had anticipated being absent, and hearing nothing either of his or Wright's party, abandoned the dépôt on the afternoon of the 21st April, first burying such provisions as he could spare, after retaining enough to carry him to the Darling.

It now appears that on the evening of that very day, by a strange fatality which seems thenceforth to have prevailed to the end, Burke, Wills, and King (Grey having died four days before), reached the dépôt in far too weak and exhausted a state to follow the retreating party with the slightest hope of overtaking them, though that night they slept only 14 miles off.

They found the food that had been left for them, and, after remaining some days to recruit, resolved, most unfortunately, instead of returning the way they had come, to try and reach the out-settlements of South Australia, not above 150 miles distant. Had they taken the route to Menindie, they would have almost immediately met Mr. Wright's advancing party. Depositing a letter, therefore, to this effect in a bottle, which they replaced in the "cache," but again, by fatal mischance, neglecting to alter the inscription which Mr. Brahe had left on an adjacent tree, or to leave any outward sign of their visit, they pursued on a south-west course. But misfortune pursued their steps; one of the two camels which survived got bogged inextricably, and the other became so weak that they thought it best to kill it for food; and, after wandering on till their limbs would carry them no further, they decided to return, at a point where, though they knew it not, scarce 50 miles remained to be accomplished, and just as Mount Hopeless would have appeared above the horizon had they continued their route for even another day.

Meanwhile Brahe, as described in my previous despatch, revisited the dépôt in company with Wright, whom he had met some days after leaving it; but, perceiving no change, they, as a climax to this sad chapter of accidents, resumed their final journey to the Darling without opening the cache or discovering the letter which Burke had substituted for theirs in the bottle.

Thus left to perish in the wilderness, the hapless explorers determined, as a last resource, to seek succour from the aborigines, whom they had at first viewed with suspicion. This was freely and generously afforded so far as it was in their power to give it; but the season was now mid-winter, the clothes of the unfortunates were in rags, and the scanty diet of fish and "nardoo" (the spores of a species of marsillea, which the natives make into bread) was too innutritious to restore frames weakened by previous over-exertion and want of nourishment, and with minds depressed by disappointment and despair, both Burke and Wills gradually sank under their privations, dying about the end of June, whilst we in Melbourne were still ignorant of the abandonment of the dépôt, as well as of the obstacles which so long delayed Mr. Wright's arrival at it.

So fell two as gallant spirits as ever sacrificed life for the extension of science or the cause of mankind! Both were in their prime; both resigned comfort and competency to embark in an enterprize by which they hoped to render their names glorious; both died without a murmur, evincing their loyalty and devotion to their country to the last.

How far the sufferings of these devoted men arose from preventible causes, and in what degree any person or persons are to blame for the disastrous termination of a scheme apparently so carefully devised, and which up to a certain point was eminently successful, are questions still to be determined,

and regarding which I express no opinion, because a commission has been appointed by this Government to investigate the whole matter.

The liveliest sympathy was manifested by the entire community on receipt of the glorious though disastrous news; both Houses of Parliament passing resolutions expressive of profound regret at the death of the explorers and of an earnest desire that every mark of respect should be shown to their memory. And it has since been settled, in pursuance of these resolutions, that Mr. Howitt shall be commissioned to send down their remains for a public funeral, and that a monument shall be erected to record an achievement of which Victoria may well feel proud.

Apart, indeed, from the interest which must ever attach to the melancholy fate of these brave men, the results obtained by the expedition are of the very highest importance, both to geographical science and to the progress of civilisation in Australia. The limits of the Stony Desert are proved to extend very little farther north than the point to which Sturt penetrated so many years ago, whilst the country beyond is even more adapted for settlement than that which McDouall Stuart has discovered to the westward of it. According to the summary which poor Burke himself deposited on his return to the depôt, "there is a practicable route to Carpentaria, chiefly along the 140th meridian of east longitude. There is some good country between Cooper's Creek and the Stony Desert, thence to the tropic all is dry and barren; but between the Desert and the Gulf a considerable portion, though rangy (*i. e.* hilly) is well watered and richly grassed."

It has been remarked, too, by the transcriber of Wills's field-book, that "the expedition, except when actually crossing the Desert, never passed a day in which they did not traverse the banks of, or cross, a creek or other water-course."

Such, in fact, is the impression made on the squatters by the accounts received, that the occupation of "Burke's Land" with stock is already seriously contemplated; and there seems little reason to doubt that in the course of a few years the journey from Melbourne to Carpentaria will be performed with comparative facility by passing from station to station. To show the rapidity with which this sort of settlement proceeds in Australia, I may mention that much of the country between the Darling and Cooper's Creek, which the several parties from Victoria have traversed, is already taken up, so that not only sheep but cattle are now depastured within 25 miles of Mount Bulloo, not far from which Burke's expedition struck the creek in question, stretching thence easterly along the Queensland boundary in an almost unbroken chain. To the westward also the country towards the South Australian settlements is likely to be occupied ere long.

I hope to be able to enclose a tracing of the entire route of the Burke and Wills expedition; but the Surveyor-General has, of course, experienced some difficulty in connecting the various rough charts and checking the calculations as to longitude, &c. A fuller description of some parts of the country may also be obtainable when King can be further examined; and there can be little doubt that our knowledge of the portion bordering on the Gulf of Carpentaria will be much extended by the labours of the surveyors on board Her Majesty's corvette or colonial steamer *Victoria*, as well as by the party likewise despatched for the relief of Burke overland from Queensland.

It seems, indeed, not improbable that one or other of these parties, on discovering the record left by the explorers at the mouth of the Flinders River (not the "Albert," as they conjectured), and supposing them never to have got back to their depôt on Cooper's Creek, may pursue their tracks to the southward until themselves in danger; and it has been deemed advisable, in order to guard against any casualty of this sort, as well as for the purpose of connecting Burke's tropical discoveries with the depôt by the best practicable route, to instruct Mr. Howitt to establish his headquarters for the summer there, making

short excursions in every direction around, which, without exposing his men to serious risk, will be better for them than idleness or inactivity.

Some time may thus elapse before the full value and extent of these discoveries can be ascertained; but meanwhile it may be asserted, without fear of contradiction, that to the liberality and enterprise of one of her youngest colonial offshoots, backed by the heroic self-devotion of Burke and Wills, Great Britain owes the acquisition of millions of available acres, destined at no distant day to swell her imports and afford fresh markets for her manufactures.

7. *On the Gold-Fields of Tuapeka, in New Zealand.*

By J. THOMPSON, Esq.

HEREWITH I have the pleasure of sending a photograph of the gully or valley in which so much gold has been found in this province. The gully is called "Gabriel's," after J. Gabriel Read, the discoverer. It is situated 35 miles west from Dunedin, and 30 north from the mouth of Clutha River, Otago Province. When I was there, a month ago, 6000 people were employed in digging. The photograph will require a lens to analyze the picture; as the naked eye will not discover all the figures represented. I also enclose a small map of the province, lithographed in my office, which will show you the Tuapeka gold-field. I have marked in yellow other spots where gold has been found, but which are not yet worked. I would have sent information to the Society before, but was desirous of seeing the rush over before spreading the news. Much misery is entailed by these blindfold rushes that take place in Australia. The advance of the gold-field will now, however, rest on its own merits, as the excitement has cooled down. The escort brings gold down to Dunedin once a fortnight, and on the last two occasions brought down 12,000 and 16,000 ounces respectively; the digging population being about 6000 to 8000. What I am desirous of laying before the Society is a sketch of the formations of the province, from which its eminent members will be able to anticipate the results of the discovery to this small but interesting colony of Scotchmen.

I may premise that Mr. Ligur, now Surveyor-General of Victoria, was the first to discover gold in this province; since which time it has been detected by various parties, myself included: but no field of enticing richness was found out till Gabriel Read published his discovery. I visited the field when it was first worked, and afterwards when it was in full operation.

The province, which I have traversed in all directions, has great sameness of formation, the mountains consisting of schists and clay-slates. Granites, amygdaloids, and porphyries are found at the Bluff and in the mountains due north from that harbour; I have seen them nowhere else. The seaboard and river-valleys consist of sedimentary formations; such as sand-beds, conglomerates of quartz, pebbles, limestones, coal (rather lignite), and clay-beds. Here and there very frequently basalt, trap, and metamorphic rocks protrude, often in hexagonal prisms. The quartz conglomerates are very abundant, and consist of rounded quartz, cemented by an iron cement; in places taking the appearance of burnt earth. The limestones appear very modern (geologically speaking); I have found recent shells, vertebræ of the *Moa*, bones of small birds, beak included, in this formation. The prevailing formation, however, is schistose, and is almost universally traversed by small veins of quartz, or else nodules of quartz; and the débris of this formation is found in the river-beds, consisting of rounded quartz or flakes of schist. The quartz veins are generally ferruginous. Quartz reefs have not yet been found to my know-

ledge, though I have seen blocks of pure quartz 20 feet cube in size. However, quartz pebbles are very abundant everywhere, especially on the sea-coast between the Bluff Harbour and the Watnara. Inland of this, hills actually covered with quartz pebbles are found.

The gold has been found in the gravel and shales of the valleys, 2 to 15 feet from the surface; but much dry digging is going on over the adjacent hills, which pays fair wages, that is, 10s. to 20s. per diem. The largest nugget that I have seen weighed 2 oz. 2 dwts. The gold is generally small and scaly. In the deep sinkings now going on (20 to 30 feet), quartz boulders are said to be arrived at, but I have not seen them. This summer will give the field a fair trial, as fully 20,000 diggers will be at work in all directions.

In this map you will observe that the interior lakes have been delineated: this summer they are to be actually surveyed. The scenery about them is very rugged and grand. I explored the northern lakes during 1858, along the base of the Southern Alps. Mount Cook, 13,000 feet in height, is a glorious giant. It would be difficult to ascend, being conical, and covered with snow in Midsummer down to 6000 feet elevation. The upper valley of the Waitaki, which I traversed *alone* to near the base of Mount Cook, was wild and sterile in the extreme. The waters of the Pukaki Lake are as white as milk. Mount Aspiring and Mount Stokes are also splendid features. The country which I then surveyed was unoccupied; now every portion is taken up for pastoral purposes.

It will be noticed that a new province has been detached from Otago, and named Smithland. If Mr. Tucket were to come back he would be convinced that they can grow wheat without covering the shocks with tarpaulins. The old whalers told him this to prevent a settlement being formed near them, and led to his very unfavourable report in the Society's Journal.

More satisfactory information will, I hope, soon be given by Dr. Hector, a geologist engaged by the Otago Government to explore its resources.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1861-62.

Seventh Meeting, Monday, February 24th, 1862.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Rev. Robert Wheeler Bush ; Lord George Quin ; Major Charles S. Showers ; Capt. Edward Whitby ; George F. Chambers ; Samuel Day Goss, M.D. ; and Edward Lawrence, Esqrs., were presented upon their election.*

ELECTIONS.—*Lieutenant-Colonel R. Stuart Baynes ; Sir William Holmes ; Lieutenant-General W. T. Knollys ; Sir Charles Edward Trevelyan, K.C.B. ; Lieutenant Arthur Wing, R.N. ; A. Grooss Duff, M.D. ; Harry Emanuel ; James Alexander Guthrie ; Henry Wilkes Trotman ; Spencer St. John, H.M. Consul-General, Haiti ; Henry Bridgeman Simpson ; and Harrington Tuke, M.D., Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map-rooms since the former meeting were—M'Cosh's 'Advice to Officers in India;' Kennedy's 'Ethnological and Linguistic Essays;' General Atlas by Visscher; American Atlas, by Jeffreys; Admiralty Charts, &c., &c., &c.

EXHIBITIONS.—Several Photographs of Mendoza, after the late earthquake, were exhibited by Mr. Hinchliff; and diagrams illustrating Commander Bedford Pim's proposed Transit-Route across Central America were also laid on the table.

The Noble PRESIDENT wished, before the Papers were read, to refer to the deep regret he had felt at his inability, owing to indisposition, to attend the meetings of the Society during the present year, and more especially the first of those meetings. When he had taken leave of them at the close of the past year, he had expressed a hope that when they next reassembled they should do so in peace. At that time the only dark cloud that apparently loomed in their horizon lay upon America, but by the time the Society met again a deep and irreparable loss had befallen them. He believed there was not one of those then assembled who did not feel that the greatest patron of science had been lost to the country by the death of his Royal Highness the Prince Consort, and it was the duty of their President to give utterance to feelings

which they all entertained. However, the time for doing so had now passed by, and he could only once more express his regret that he was unable to be present on that occasion.

The Papers read were—

1. *Report on the Brazilian Province of the Paraná.* By the Hon. H. P. VEREKER, H.B.M. Consul at Rio Grande do Sul.

THE Brazilian province of the Paraná is thinly peopled, and has been much neglected. It lies between the Atlantic and the province of Uruguay, and between the S. latitudes 22° and 28°. Its surface rises gradually, in well-wooded and well-watered districts, from the seaboard to the heights of the Serra do Mar and the hills of St. Paul. Thence to the westward lies a large diversified plain, containing the capital, Curityba, and other towns, the furthest of which is Guarapuava, at the extreme limits of civilization. Beyond are immense unexplored forests, reaching to the confines of the province on the Paraná and Uruguay. They are intersected by numerous rivers, which are, for the most part, little known, but will doubtless afford routes for future commerce. As yet there are no ports upon any of them. The only considerable harbour on the Atlantic is Paranagua, which has never been regularly surveyed. It is an immense sheet of water, apparently deep and navigable throughout.

A description is given in the paper of nine small colonies that are established in different parts of the country. One of the most interesting and the most fertile is that of South Theresa, founded in 1847 by the late Dr. Faivre, a Frenchman, and consisting in 1850 of 180 Brazilians and 20 French. In addition to these are many small settlements of Germans and others, and their number is on the increase.

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2. *A Sketch of Nicaragua.* By GERALD RAOUL PERRY, Esq., H.B.M. Vice-Consul for that State.

NICARAGUA, one of the five sovereign states of Central America, is about half the area of Great Britain, but contains a population of only a quarter of a million, of whom nearly a half reside in towns. The country is mostly a dead level, covered with perennial forest, growing on a soil of apparently extreme fertility. Its climate has two marked seasons—the wet and the dry—of which the former is called the winter, on account of its chilliness, though the sun is at that time vertical. The whole territory is eminently volcanic, such hills as there are being either active or extinct volcanoes. The chief exports of Nicaragua are hides (about 50,000 annually) and various woods. One-half of its population are pure Indians, and the rest, excepting very few pure Spaniards, are of intermixed races.

Nearly the whole are Roman Catholics and speak Spanish. They are exceedingly illiterate; even the Chief Justice doubted whether or no London was a town in England. Nicaragua has been chiefly famous for its civil wars. Its Government—as those in the four neighbouring Central American republics—consists of a President, elected for four years, and a Senate, and a House of Representatives.

3. *Proposed Transit-Route across Central America, from a new Harbour in Nicaragua.* By COMMANDER BEDFORD PIM, R.N., F.R.G.S.

THE author was stationed in H.M.S. *Gorgon*, on the Atlantic seaboard of America, from 1859 to 1861, having surveyed the Pacific coasts of the same isthmus on a previous occasion. He argues from the history, the politics, and the geography of Central America, that no line of transit can promise greater advantages than one through Nicaragua. Hitherto, Greytown has been the only known harbour on its Atlantic coast. Greytown was the terminus of the Nicaraguan river and lake route, which formerly competed with the Panama transit; but at the present moment, as established by the author's survey, there are only 11 feet of water above its bar, and the entire harbour is rapidly silting up, so that in a few years it will be transformed into an enclosed lagoon, like that of Blewfields.

This difficulty of access to Nicaragua is cleared away by Commander Pim's discovery of an excellent bay immediately to the south of Monkey Point, previously unknown as a harbour, and even unnamed. He calls it "Gorgon Bay," and proposes it as the terminus of a railway, to abut on Lake Nicaragua, at San Miguelito, whence passengers would cross the lake by steamers (two of which, belonging to the old abandoned enterprise, are now lying there in good order), and would finally pass through a shallow canal, to be dug either to San Juan del Sur, or to Salinas Bay, across the neck of land, 12 miles broad, which separates the Lake Nicaragua from the Pacific.

As a commencement to this undertaking, Commander Pim has bought the entire shore of Gorgon Bay, and some small islands opposite, from the King of Mosquito, whom he describes as an intelligent Indian, of ancient descent, well-educated at Jamaica, and speaking English as his own language.

Commander Pim travelled by canoe up the river San Juan and across the lake of Nicaragua to Managua, to communicate with Sir C. Wyke, the British Plenipotentiary, and, both going and returning, he visited San Miguelito. He was unable to make more than a cursory survey of its harbour, owing to a fear of exciting suspicion among the natives, but he satisfied himself of its fitness

for the lake terminus of his proposed route. A survey of the country between San Miguelito and Gorgon Bay, of which no description is given in this paper, might be made during the next dry season, and the necessary concession from the Nicaraguan Government for constructing a railroad could be obtained on the same occasion.

Commander Pim insists on the necessity of a route being established across Central America, which should be free from the predominant influence of the United States, and considers that a railway would be as advantageous to commerce as a canal.

The old Nicaraguan water-line, after conveying thousands across the isthmus, was abandoned, owing to political troubles, and consequent insecurity of life and property, during the sojourn of the filibuster Walker in the country, and also, as reported, to an arrangement with the Panama line, by which competition was to be withdrawn. The present state of Greytown Harbour has made it impossible to restore the old line of traffic at any future time, without enormous cost (see p. 112).

SIR R. I. MURCHISON said, that though he had no observations to offer with reference to the subject of the paper, he thought he ought not to sit on his Lordship's left hand without stating that he himself occupied the chair at the time when the news reached England that Commander Pim had, by his journey across the ice, been the means of enabling Sir Robert M'Clure to return to England. They should also recollect that it was Commander Pim who offered to traverse Siberia; indeed he (Sir R. Murchison) himself was the individual who went to Earl Russell with a view of inducing his Lordship to support Commander Pim in that proposed expedition in search of Sir John Franklin. To the honour of Earl Russell it should be borne in mind that his Lordship, then First Lord of the Treasury, advanced 500*l.* in aid of the project, which failed on account of the difficulty pointed out by the Russian Government in supplying the wants of any expedition in those scantily peopled regions. Then Commander Pim distinguished himself in the Russian war, when he submitted a plan and volunteered his services for an attack upon Kronstadt; and, lastly, he was engaged and severely wounded in China, where he was ultimately promoted to the rank of Commander. He was delighted to find that Commander Pim had exhibited the same zeal in dealing with the subject of Central America that he had displayed on many previous occasions.

ADMIRAL SIR EDWARD BELCHER, after relating his experience of Nicaragua in 1837-9, observed that no reliable data had been given by Commander Pim in regard to the scheme propounded by him. His visits to the northern villages on Lake Managua, as well as that to Gorgon Bay, afforded nothing to guide the engineer; while the mountains seen from the towns of Matiares and Managua, which cannot be seen from any part of the northern side of the lake to which his visit was confined, running apparently across his proposed line of railroad, had yet to be examined. In addition to these, the difficulties which well-tried men had found far from imaginary in the arduous prosecution of the Atrato and Honduras schemes, independently of fever and possibly volcanic difficulties, might destroy many valuable lives before even a road could be cleared. They had heard of the difficulties at Panama in finding men to work in that comparatively healthy climate; and when they came to those regions where Nelson and Collingwood thought "no Christians should be

sent," he feared the chances were much against success. It had been his (Sir E. Belcher's) lot to work very much in equatorial climates, but the fact which had made the strongest impression on his mind was the clearing of a site for a fort at Pasangan, on the island of Basilan, in a beautiful climate, near the equator, in the Eastern Archipelago. The forest was well cleared by fire, and the fort was built, yet malaria seized the troops, and the supply of water, which was originally abundant, suddenly failed. He was disposed to support every new and feasible improvement either in roads or railways, and most heartily did he wish success to all such projectors. But the loss of life, loss of capital, inadequate return for the outlay, and, lastly, the instability of any guarantees in those Central American countries, rendered him very suspicious as to the propriety of investment in such a scheme as that of Commander Pim's. First, there was the railroad—that line has to be made healthy; next the Lake crossing, with very doubtful security for landing; then a canal to the sea, to what could not be properly termed a *port*, for in 1838 no vessel could embark cargo there—this canal would have to be locked down to the sea from at least 80 feet above it; lastly, they came to a point not discussed by Commander Pim—the lake at times was deficient in water. Indeed, the Nicaragua route has failed from this cause. Will the State consent to drain it by a canal?

He felt some surprise that no effort had yet been made to cut a railway from Vera Cruz to the queen of ports, Acapulco, and to continue the packet-service thence to San Francisco and British Columbia. So soon as the troubles of Mexico ceased, and she began to make use of her former sources of wealth, might we not expect this idea to be realized? Money she has in abundance: cotton she may produce, and send eastward to compete with the Americans. Messrs. Barron and Forbes at Tepic introduced the Lowell girls from Boston, constructed mills, and produced cloths quite equal to British and paid 15 per cent. the first year! Looking to the millions of coined specie which are annually transported to San Blas, to be shipped to Panama or round Cape Horn, with her other immense resources, Mexico has the means, when treasure paid as it now does 15 per cent., to remunerate any undertaking of this nature.

Panama must still engross the trade of Valparaiso and of the ports nearest to it. But what has it done, even with its beautiful harbour, to develop the trading resources of the Pacific since 1837?

MR. GERSTENBERG said, that Commander Pim was in error in stating that all idea of gaining the Atlantic and Pacific Oceans by a canal had been abandoned. It is true the French had given up the scheme of the Nicaraguan Canal, owing to the insuperable difficulties presented by the rapids and the very high elevations. Humboldt's favourite plan of the Atrato route had also been abandoned, chiefly on account of the long and difficult river navigation it involved. But another route, also recommended by Humboldt, and repeatedly explored by various travellers, namely, that from Caledonia Bay to the Gulf of San Miguel, has been taken up afresh by some French gentlemen. Two expeditions had already been sent out, headed by the engineers Messrs. Bourdiol and De Champeville, and the geologist Mr. De Puydl. The second expedition was accompanied by the Abbé Amodru, who was well received by the Indians, a number of whom brought to him their children for baptism. The accounts of a practicable passage were so encouraging that a third expedition was in course of preparation, which, like the previous ones, was to enjoy the benefit of the protection of a French vessel of war. A gentleman actively interested in that grand enterprise had informed him that the leaders of this third expedition were to visit London on their way to the Gulf of San Miguel; and they would be most happy to submit to the Royal Geographical Society the results of their former explorations, and their plans for the future.

He was not himself disinclined to entertain favourably the Nicaraguan rail-

way scheme of Commander Pim, if satisfactory information should be given him to show that it would be a good commercial speculation. Commander Pim had not given him the requisite information on that point. It would be a question whether the railway scheme would pay; but before he said more upon that point he, as a commercial man, would tell Commander Pim that he was not correct in stating that the idea of a canal must be abandoned in favour of a railway because at present they required only quickness in conveying the traffic, and not cheapness. The quickness in the conveying traffic was at present effected by the Panama line: they could travel nearly as quickly by that route as by the Nicaraguan line. But the chief consideration at present was the cutting off of the immense sea voyage. There were hundreds of thousands of tons of goods shipped from England to China and other parts of the world, and cutting off the sea voyage was the great desideratum. At present no goods could be sent except those of considerable value, as the charges were so excessive that they would considerably exceed the value of the goods themselves. Even articles of tolerable value, such as tobacco, which had occasionally been sent from Western America, had produced loss, in consequence of the cost of sending them by the Panama Railway. It was now stated that if another line were to be made the cost would be reduced; but they must not forget that the line of Panama was only 47 miles. The Nicaraguan line would be considerably longer; there would be great ascents, and the cost would be large. It was doubtful, therefore, whether capitalists would undertake Commander Pim's scheme as a commercial speculation; for they must not forget that, notwithstanding its high charge, the Panama line had only produced 15 per cent., which was not so high a percentage as was obtained from some of the French undertakings. He was, however, of opinion that if capital could be found for the Nicaraguan line, it was likely to give such a stimulus as would tend to the development of the resources of the country, and that ultimately the greatly increased value of the land, and worth of its productions, would amply repay any expenditure which might have been incurred. He quite thought that it was desirable that a transit route should be independent of any political influence—that it should be secured as a free transit for all the world. Now it had been stated that the Panama Railway was the property of the Americans, but that was not correct; British subjects had a direct interest in the railway. The American Government paid a certain sum to the Granada Government, and the Granada Government owed money to England; and they had apportioned part of that which they received from America in liquidation of the debt. The Granada Government had not yet paid what they had undertaken to pay; but it was said that their neglect was due to the supineness of England in this respect. The Foreign Office had sent an expedition to Mexico, not to collect debts, but for something very similar; and he thought that if it should suit the English Government, as on a recent occasion, not to show the white feather in matters relating to America, it might then be found very convenient, at some future occasion, to recollect that British bondholders had a lien upon the Panama Railway which entitled them to the protection of their Government.

COMMANDER PIM, in reply, said that there was little to add to that which he had already brought before the Society. He was earnestly desirous that his country should reap the great commercial and political advantages which must result from the possession of an independent highway across Central America. The proposed line would be about 130 miles in length; the Panama Railway was stated to pay 12 per cent., he thought it paid more; however, be that as it may, the promoters of his proposed line would have a valuable precedent to guide and cheer them. He had not stated that the Nicaraguan Canal scheme was abandoned, he merely said it could not succeed, because the Atlantic Harbour had silted up so much that the cost of deepening it must be enormous. Without a good harbour at each end, he thought every one would admit that no transit project was practicable. As regards Grey-

town, seven years ago there were 24 feet on the bar, but now there were only 11 feet. As to Gorgon Bay, there was no impediment whatever to its navigation by day or night. He was astonished at the remarks which had fallen from Sir Edward Belcher. Some of the obstacles and dangers enumerated by him existed, in a great measure, only in that officer's imagination; and he, Commander Pim, was happy to inform the Society that he had himself overcome them without difficulty. He hoped to see vessels of the *Great Eastern* class, on either side of his proposed route, connecting England with Australia, New Zealand, Japan, and British Columbia. Such a project, he thought, would be befitting a nation like Great Britain; which ought clearly to possess a sure and rapid means of access to her distant colonies and possessions, independent of any political disturbance.

The meeting was then adjourned to March 10th.

Eighth Meeting, Monday, March 10th, 1862.

LORD ASHBURTON, PRESIDENT, in the Chair.

ELECTIONS.—*Lieut. James Murray Grant; H. B. H. Birchill; Frederick Elliot Blackstone; John F. Laurie; William Leslie, M.P.; John Thomas Quin; James Rae; Joseph Rigby; Russell Morland Skinner; Henry Arthur Dillon Surridge; and William Wells, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map-rooms since the former Meeting were—Rosser's 'Notes on the South Atlantic'; Map of Peru, showing the deposit of Nitrate of Soda; Sheets 6, 12, and 14 of Philip's Imperial Atlas, &c., &c.

EXHIBITIONS.—Maps, Plans, and Views, illustrating the Paper by M. Mouhot, were exhibited at the Meeting.

The PRESIDENT announced that a letter had been received from Mr. Consul Petherick, alluding to a serious affray in which he and his large party had been engaged, and referring for further particulars to a communication previously sent to Sir R. Murchison, which has not yet reached its destination. Mr. Petherick enclosed a copy of the following letter, which he had sent to Captain Speke:—

"Khartoum, 15th Nov., 1861.

"MY DEAR SPEKE,—I pray God this may be delivered safely to you by my agent, Abd el Majid, who with a strong party, consisting of some seventy men, well armed and equipped, will proceed in search of you the moment he arrives at Gondokoro.

"We—that is to say, my wife and self, accompanied by a medical man and photographer—after a tedious journey up the Nile and a vexatious delay of six weeks at Korosko, owing to a deficiency of camels necessary for crossing the desert of Aboo Hamad, arrived here a month ago.

"Had it not been for a serious illness from which I am now recovering, we should have left at the same time as Abd el Majid to attempt a meeting.

"The latter also has been detained by the unheard of rise of the Nile this season, and the consequent backwardness of the north winds and cool season.

"Abd el Majid's instructions are to proceed to meet you from Gondokoro via

my establishment at Niambara, on the west bank of the Nile, some four to five days' journey in the interior, where he will reinforce himself with some thirty men, in addition to the forty he proceeds with from here; and, unless he meets you in the neighbourhood of Gondokoro, he is to continue due south in the direction of the Lake Nyanza, which, as he proceeds, he is to inquire for, until my wife and self come up with him.

"Should Abd el Majid effect a happy meeting with you, prior to my arrival, he is to place himself and men at your disposal, return and conduct you to the boats, and make them over to you for your disposal.

"The bearer has in charge some provisions, quinine—which latter I trust you will not require—and clothing for your immediate requirements; and hoping that all may go well, with my best wishes to Grant and yourself,

"Believe me, my dear Speke,

"Yours ever sincerely,

"JOHN PETHERICK.

"P.S. Papers and magazines for your amusement are sent with the bearer; but the letters and Proceedings of the Royal Geographical Society, according to you their gold medal, I prefer for greater safety conveying to you myself.

"God bless you both.

"J. P."

The PRESIDENT said the first paper that would be read would give an account, by a French gentleman, of Cambodia. Cambodia was not like Borneo or any other wild district, of whose past history we knew little, and which had comparatively little interest for us in the future: it was at the present moment the scene of a struggle between the French and the natives, and there was a prospect of a French empire being ultimately established in that country. Cambodia has been the scene of a remarkable civilisation. We have the relation of a Chinese envoy to Cambodia, at the end of the thirteenth century, who gives an account of the wonders of the capital, of which the ruins still exist;—great ruins of a city with five double gates, displaying not only masses of masonry with large carvings, but many monuments of interest. When the Portuguese arrived in that country, Cambodia was still a seat of empire. Unfortunately, towards the end of the last century, a disputed succession took place. Siam on the one hand, and the Annamites, who are the opponents of the French on the other, divided the country between them; and the whole land has been made desolate, the population has decreased, and in every way it has fallen below its former state of prosperity. In 1860 the French made demonstrations against Cambodia. In 1861 they took its capital Saigon; and there was every prospect of their extending their conquests and establishing themselves permanently in the land.

The Papers read were—

1. *Travels in Cambodia.* By M. MOUHOT.

M. MOUHOT traversed Cambodia from east to west, and also ascended the Mékon River to the frontier of Laos. He returned to the coast by crossing the waterparting between it and the basin of the Menam River, and descending to Bangkok.

The Mékon is a vast melancholy-looking river, three miles broad, covered with islands, and flowing with the rapidity of a torrent: its shores are covered with aquatic birds, but its waters are almost deserted by canoes. A plain, covered with coarse herbage, separates

it from the forest by which Cambodia is overspread, and which can rarely be traversed except by cutting a way. That forest is exceedingly unhealthy. M. Mouhot reached Brelum, a village in lat. $11^{\circ} 58'$, long. $107^{\circ} 12'$, inhabited by a secluded race of wild people, whose customs are minutely described, differing in features from the Cambodians and Laos tribes, and forming one of a series of similar groups widely distributed in the less accessible parts of Cochin-China, Cambodia, and Burmah. They are believed by M. Mouhot to be aborigines of the land. Two Catholic missionaries were resident at Brelum.

Subsequently the author visited the large Buddhist ruins of Ongior, of which he has brought back numerous sketches. He speaks of the mineral wealth of Cambodia; its iron, gold, lead, and copper. In the islands of Phu-Quoc or Koh-Tron, belonging to Cochin-China, and near to Kom-pot, there are rich mines of coal, similar to our canal coal, from which ornaments are made. Several extinct volcanoes exist in Petchaburi, of heights not exceeding 2000 feet above the sea-level, and there are two active ones in an island called Ko-mun, lat. $12^{\circ} 30'$, long. $101^{\circ} 50'$, in the Gulf of Siam.

DR. HODGKIN stated that besides the two letters, portions of which had been read, and the drawings and charts, M. Mouhot had likewise sent an elaborate description of the ruins which he found at Ongior and in its vicinity. The plans on the table would give some idea of the magnitude of these ruins. A great part of the manuscript which accompanied them described their structure and workmanship. They were constructed chiefly of granite, and many of the stones were not only of very large size, but were elaborately carved. The workmanship of some of them was described as exquisite, and the designs were not so deficient in artistic taste as one might suppose. Many of them represented imaginary animals, such as serpents with many heads; others represented beasts of burden, horses, elephants, and bullocks. These temples were situated in a district which was now completely embedded in a forest very difficult of access, and were so much in ruins that trees were growing upon the roofs, and many of the galleries were in a state of great decay. The base and a large portion of the elevation were constructed of a ferruginous rock; but for the upper part blocks of granite were used, so exquisitely cut as to require no mortar to fill the interstices, and carved with reliefs relating to mythological subjects, indicative of Buddhism. M. Mouhot had copied some of the inscriptions, which, from their antiquity, the natives who accompanied him were unable to read. The characters so nearly resembled the Siamese, that Dr. H. had no doubt that a skilful archæologist would have very little difficulty in deciphering them. He believed that the remains in question would be found equal in value to those which had been recently explored in Central America; and he felt convinced that when the descriptions were published, M. Mouhot would be thought deserving of great respect.

MR. CRAWFORD said it was about forty years since he visited the country, but his recollection of it continued vivid to this day. Most people knew very little about Cambodia; its very name was only familiar to us in that of its product, gamboge, which word was nothing else than a corruption of Cambodia. It was one of five or six States lying between India and China, whose inhabitants had lived under a second or third rate civilisation, at all times—never equal,

whether physically, morally, or intellectually, to the Chinese or even to the Hindoos. At the present time Cambodia was a poor little State, having been encroached upon by the Siamese to the north, and by the people of Annam, the inhabitants of Tonquin, and of Cochin-China to the south. M. Mouhot had given us an account of a country that no European had ever visited before. With respect to that gentleman's belief that certain wild tribes, whom he described, had descended from Thibet, he, Mr. Crawford, rather thought that his ethnology was at fault. For his part he believed these wild people to be no other than natives of the country, mere mountaineers, who had escaped from the bondage and hence from the civilisation of the plains. Such people existed in Hindostan, in Siam, in the Burmese empire, in Cochin-China, and in China itself: in fact, they were of no distinct origin, but simply the natives of the country in a rude, savage, uncivilised state.

With respect to the French, he did not know on what grounds they had gone to Cambodia. They had obtained possession of one spot which was eminently fitted for a settlement. The finest river in all India, so far as European shipping was concerned, was the river at Saigon, which he had himself ascended about fourteen miles, and found it navigable even for an old "seventy-four." He believed it was the intention of the French to attempt the conquest of the whole of Cochin-China. If they effected it and occupied it, they would find it a monstrous difficulty. It would prove another Algeria, with the additional disadvantage of being 15,000 miles off instead of 500, and within the torrid instead of the temperate zone. The climate was very hot; the country was covered with forests; the malaria and the heat rendered it unsuitable for the European constitution. If they made an advance upon the Cochin-Chinese capital, they would find the enterprise one of great difficulty. From Saigon to the northern confines of Cochin-China the distance is 1500 miles, and the capital itself could not be less than seven or eight hundred miles from Saigon, situated on a small river navigable only for large boats, with a narrow mouth and two considerable fortresses, one on each side, at its mouth. When they arrived they would find one of the largest and most regular fortifications in the East. He believed it was the most regular after Fort William in Bengal, and a great deal larger than Fort William. It was constructed by the French, and now they will have considerable difficulty in conquering their own work. The French had a perfect right to be in Cochin-China, and being there would not only do us no harm but even good, however questionable the benefit to themselves; for their presence amounted to the substitution of a friendly and civilized government for a rude and inhospitable one.

The drawings on the table were exceedingly curious and interesting. They were admirably done, and they exhibited representations of some remarkable monuments, evidently of Bhuddist origin. They reminded him very much, though inferior in quality and beauty, of the monuments of the island of Java.

He never heard of volcanoes when he was in Cambodia; but he had no doubt that M. Mouhot's information was correct, though it appeared he did not describe them from his own personal experience.

He would add a word upon the alphabets which were upon the table. The Cambodians had invented a written phonetic character, which they used at the present time; therefore there could be no difficulty in understanding a Cambodian manuscript. But there were several of those now exhibited which were of more or less antiquity. One of them seemed to be the alphabet which was used by the Cambodians in their religious rites. The figure of Bhudda showed that the Cambodians were worshippers of Bhudda.

2. *Route from Toangoo to the Shan States.* By EDWARD O'REILY, Esq.

THE Commissioners of Pegu gave instructions to open a road of 70 miles, from Toangoo, in Burmah, to the fertile Shan states on the other side of the Pounng Loung ranges, immediately adjacent to the eastward of them. Mr. O'Reily was despatched on this mission. His party consisted of a few Burmese, and four elephants; and he travelled in short stages of two, three, or four miles, with occasional long halts, while the natives pioneered a road in front of him. The way lay across five ridges, of which the highest rose 7425 feet above the sea-level, and over a large amount of elevated and rugged land, inhabited by Karens, the aborigines of these regions; they are generally wild, though many of them are Christianized by Baptist missionaries. The journey was successfully accomplished, and the road is now open.

MR. CRAWFURD said he had letters from Colonel Phayre, the Lieutenant-Governor of Pegu, stating that these Karens were coming over to us in great numbers, and that upon one occasion he had gone out for the express purpose of receiving into British territory five thousand of them. A great number of them were converted to Christianity, and he was happy to think that the good work was commenced by a personal friend of his own, the late Rev. Dr. Judson, an American Baptist minister, who accompanied him when he went on a mission to the Burmese capital thirty-five years ago. Colonel Phayre was about to send descriptions of the numerous tribes that inhabited the territory under his administration, accompanied by correct photographs.

 3. *On the N. W. Coast of Borneo.* By SPENCER ST. JOHN, F.R.G.S., late Consul-General for Borneo.

THE north-west provinces of Borneo contain the harbour of Sapangar, the best of any in the island, and also the mountain of Kina Balu, the highest of any in the Archipelago. It is 13,700 feet above the sea-level, according to Sir E. Belcher's trigonometrical measurement, which recent ascents corroborate, though the barometers of those who made them, were broken before the actual top was reached. There are no navigable rivers in the north-west of Borneo, neither are there roads leading over the hills, though it would be easy to make them. The tribes who live in the interior are therefore beyond the present reach of commerce; so much so that those who reside on the Lake of Kina Balu are never visited by people from the coast. The aborigines are essentially agriculturists, and raise rice, sweet potatoes, yams, maize, sugar-cane, tobacco, and cotton; but their mode of cultivation is confined to merely scratching the ground. The tenure of land on the plains is

as well established as in much more civilized countries. The manufactures of the people are trifling. They consist of salt, made from the ashes of a palm, and cloth, woven from native cotton. The natives have earned a good character for honesty.

MR. CRAWFURD said his friend Mr. St. John had been fifteen years in Borneo, and no Englishman knew so much of it as he did, unless it were Sir James Brooke. It would be interesting to mention the striking influences produced by the difference in the geological formation of the islands in the east. Here was Borneo, a country of primary formation, peopled by a hundred different tribes, the majority of whom were savage like the Dyaks. The only people of the island who had attained any amount of civilisation were strangers to the country, Malays and Chinese. From one to two millions would be the utmost population of this monster island, which was about eight times the size of Ireland. Compare it for a moment with a country of volcanic formation, the island of Java. Java contained, not one million, but twelve millions of people in comfortable circumstances—a result greatly due to its geological formation, which was nearly throughout volcanic, with many high mountains furnishing perennial supplies of water. There were two small islands a little further to the east, which, together, were about one-eightieth part of the size of Borneo; and yet their population was almost as great, amounting to upwards of a million. We ought, therefore, to be careful in judging of the value of a country by the mere size of it. Yet he must say that Borneo possessed a value which the other more fertile islands had not: it promised to be a country productive in minerals. He believed there were some 100,000 Chinese working the gold-mines of Borneo, just as they were working the gold-mines of California and Australia. It contained a great deal of mineral wealth, gold and antimony—nearly all the antimony that was consumed in this country in the manufacture of printers' type came from Borneo—and it might be that it contained other metals besides.

The PRESIDENT regretted that the late hour of the evening rendered it necessary to bring the discussion to a close.

The meeting was then adjourned to March 24.

Ninth Meeting, Monday, March 24th, 1862.

LORD ASHBURTON, PRESIDENT, in the Chair.

PRESENTATIONS.—*Lieutenant-General W. T. Knollys; Herbert Davies, M.D.; John Thomas Quin; Arthur Roberts; and Russell Morland Skinner, Esqrs., were presented upon their election.*

ELECTIONS.—*Lord Ebury; Rear-Admiral Charles Eden, C.B.; Mr. Alderman Thomas Quested Finnis; Lieutenant-Colonel W. W. H. Greathed, C.B.; Lieutenant Edmund Hope Verney, R.N.; Colonel C. P. Beauchamp Walker, C.B.; John Bowie; William Caward; Archibald Hamilton; F. J. Sargood; John Todd; Francis Fox Tuckett; and Edward Bean Underhill, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the accessions to the Library and Map-rooms since the former Meeting were—'King's Campaigning in Kaffirland;' 'Mercantile Navy List,' 1862; General Fraser's Map of

Ceylon, by Mr. Arrowsmith; Dolben's Map of the River Volta; Admiralty and Ordnance Maps, &c., &c.

EXHIBITIONS. — Several Views on the Yang-tse-kiang, by Dr. Barton; and numerous Chinese Sketches by Lieutenant Oliver, R.A., were exhibited.

The Papers read were—

1. *Notes on the Country to the West of Canton.* By LIEUTENANT OLIVER, R.A.

LIEUTENANT OLIVER joined a party who ascended the Canton River for 93 miles. His description of the journey is contained in a collection of private family letters, illustrated with numerous pen-and-ink etchings. Several of his larger drawings in outline were also exhibited to the Society. His short voyage is chiefly interesting in showing the respect with which foreigners are now treated in China, as compared with the comparatively recent insolence of the Canton mob. His furthest point was Shin-king, a town in whose immediate neighbourhood lie the Ten-foo mountains, famous in Chinese literature for their beauty. The travellers visited them, and were delighted with the varied foliage of the woods that clothed them, and with the ornate character of their general scenery.

They visited a Buddhist monastery and a large stalactite cave, and had interviews with different officials, and finally returned to Canton, after eight days' absence on a very agreeable expedition.

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2. *On the Exploring Expedition to the Western Borders of China, and the Upper Waters of the Yang-tse-kiang.* By DR. A. BARTON, F.R.G.S.

AN account of this journey, written from China by Lieut.-Colonel Sarel, was read before the Society on November 11th, and will be found reported in abstract, at p. 2 of the present volume of the Proceedings. Since then, Dr. Barton and Captain Blakiston, members of the same joint expedition, have returned to England; and a second paper, by Dr. Barton, was submitted to the Society, accompanied by his own sketches, and by Captain Blakiston's elaborate survey of nine hundred miles of the river. It relates to a country that cannot be described as previously unknown, because the Jesuits had mapped it in the olden times before the persecution, and Catholic missionaries have continued to penetrate the country in native disguise; but nothing approaching to a scientific or even a satisfactory description of the upper waters of the Yang-tse-kiang existed previously to the present time.

Dr. Barton describes the deplorable condition of the towns of the lower portions of the river since the invasion of the rebels. Ching-kiang-foo formerly contained 600,000 inhabitants, and was one of the most flourishing cities; it is now mostly a heap of ruins, and contains but 2000 imperial soldiers. At Nankin there was even greater distress and misery, nine-tenths of that great city has become a mass of jungle and ruins. At Woo-hoo he walked through two miles of brick-bats, three feet deep, the remains of a once populous suburb; and people were seen on all sides starving, and others recently dead from want. The scenes he witnessed were too horrible to describe. After passing An-king, the highest point in possession of the rebels, the contrast was marked and cheering, the country on both banks was green, with young wheat; populous villages skirted the water's edge; the people were well fed, fat, and healthy; the old women were working at the loom, buffalo and oxen were at the plough, the labourer was everywhere seen in the fields; and farms and hamlets, surrounded with stacks of corn, dotted the undulating country. At the picturesque city of Yo-chow, situated on the great Sung-ting lake, the party, which thus far had availed themselves of the kind permission of Admiral Sir James Hope to accompany his naval expedition, were left on their own resources. They found the upper Yang-tse, where it entered the lake, to be considerably narrower than the river below; and they began their slow and arduous journey of from 12 to 20 miles per day, by means of sailing, tracking, poling from the bank, and sculling, according to circumstances, and making fast to the muddy walls of the shore at night. The natives were invariably civil and ready to barter; it was only from the soldiers that any trouble was experienced, though the whole population crowded and jostled to see the strangers. The river passes through a level country, with a tortuous course, between high mud walls, which are flooded during the inundations; and on either side of it rose embankments of great age and strength, maintained in good order by the Government, to confine inundations. They are about 100 yards in width at the base, and 30 at the top; the deposits, from successive floods, have raised the land on the river side to near their summits, while on the other side they rise 40 feet above the plain. The embankments cease above Kin-chow, where the country becomes undulating, and distant hills are seen against the western horizon: these are reached at Ichang, where the river issues from a deep and narrow gorge after a series of violent rapids. Here the boats of the lower river have to be changed for smaller ones, fitted to be dragged up the rapids; whose difficulties lie, not in hidden rocks

or shoal water, but simply in the violence of the contracted stream. As the party entered the gorge, the contrast was great to what they had witnessed during the past two months. They had hitherto ascended a wide and quiet stream passing through an open country, and now it suddenly narrowed from 1000 to 250 yards, and rushed impetuously through a gloomy narrow gorge between perpendicular banks of 500 feet in height, with narrow chasms on either hand, and cascades pouring down them. The scenery varied at every turn; sometimes the gorge was filled with mist, and the water was like a boiling cauldron. Lama hermits occupied caverns high up, which were reached from the water by a chain or a rope. Occasionally there was a small hamlet with terraces of cultivation, and temples were perched on the rocks, which were worn in the strangest forms. The tracking of the vessel up the rapids is a most toilsome business, but managed with great dexterity, and accidents rarely happen. The entire length of obstructed navigation, during which the river passes through other gorges like those of Ichang, is 78 geographical miles; then Quai-chow is reached, and the country opens out, and the river becomes more easily navigable. Here the poppy begins to be cultivated largely, and for two hundred miles in succession the river-banks produced little else than that drug and tobacco. Dr. Barton never witnessed any bad effects from its moderate use: it is extensively smoked by men, women, and children.

Above Wan, and before arriving at a village called Ku-lin, three Chinese visited the boat with great respect, saying they were Christians and belonged to a large Christian community, and rejoiced in the coming of holy men from the Western Ocean; and that they hoped henceforth their religion would cease to be persecuted, now Christian Englishmen travelled without disguise. On reaching the village, the banks were lined with the people, and every hospitality was shown to the travellers. The church was a miserable building, containing the usual Romish decorations: they were told there was formerly a larger church, which the mandarins had pulled down. Dr. Barton pays a high tribute to the zeal and self-sacrifice of the Romish missionaries.

Chung-king was next reached, and is described as a vast city, divided in two parts by the river, and built on sand-cliffs in a most important position. Here were many Christians, and Monseigneur Desflèches, the Vicar-Apostolic of Eastern Sechuen resided in the place. They were indebted to his good offices in being warned of an intended attack from the soldiers of the place, which they were thus able to avoid by a little management. At Su-chow,

where large quantities of coal are obtained, the immediate neighbourhood of a vast rebellion was reached. Numbers of headless bodies continually floated past them down the stream. It had been the original intention of the party to leave the river long previously and to travel by land, but it was represented as an impossibility that they should do so, owing to the disturbed state of the country. They therefore adhered to the river, hoping ultimately to be able to force a way. Their hopes were finally disappointed at Ping-shan, where the rebels had moved down to the river-banks, and whilst the explorers were anchored off the town, it was actually attacked by the insurgents. After running considerable risk, and further progress being impossible, as no natives would accompany them farther, they were obliged to return, and they accomplished their downward voyage in safety. Their dates in ascending the river were as follows: they left Wu-chow on March 16; reached Ichang on April 1; and Ping-shan on May 25th.

The PRESIDENT thought it would facilitate the discussion if he touched upon the points where more information was required. In the first place, as to whence the Taeping insurrection had arisen, and how it was that anarchy was extending so widely throughout the oldest existing Government in the world—whether it proceeded from national decay or from the weakness of the hands of Government; lastly, they would like to hear more about the Jesuit settlements in China. As geographers, they were particularly indebted to the Jesuits. All that they knew of Chinese history and of the interior of the country came from them. It was wonderful how much they had accomplished. He believed if the Jesuits and Jansenists had not quarrelled at Rome, China might have been almost, if not altogether, Christianised.

MR. CONSUL PARKES, on being called upon by the President, said it was a very great pleasure to him to find himself again in the rooms of the Geographical Society; and if it was in his power to contribute to their information for a few minutes, that would be an additional gratification. He was exceedingly glad to be in the position of a second to his friend Dr. Barton on this occasion, because he had the privilege of being a companion of his for part of the way in that voyage which he had described. It was with no ordinary feelings of emotion that he saw the little junk with the four men on board who undertook that voyage part company from the expedition under Admiral Hope at Hankow. He was sure they received a very hearty cheer from all those who saw them thus go forth; and he was exceedingly happy to meet his friend Dr. Barton in that place, and to welcome him back from the very interesting voyage he had made. He (Mr. Parkes) thought himself, whatever his opinion might be worth, that this exploration was one of the most interesting that had been heard of for some time. As Dr. Barton summed it up, they had navigated a river for 1800 miles, 900 miles of which were perfectly new, never having been traversed by any European before, unless by some Jesuit in disguise. In our quarter of the world a journey of 900 or 1800 miles is no great difficulty: but in China it is a very great novelty to have accomplished, especially on new ground; because our relations with China have hitherto been such that we were forbidden by our treaties to penetrate the interior of that country. Many Englishmen, especially those who had lived there some time and who were interested in the country by a knowledge of the language and other circumstances, have often

wished for the opportunity of exploring this inner land; but they were not allowed to do so. The treaties forbade them to go more than 30 miles from the ports on the coast: they had five ports on the coast, and they were limited to 30 or 40 miles from those ports. That was the greatest distance to which an Englishman could legally attain. Therefore whenever a man did penetrate 100 miles or so into the interior, it was thought he had achieved a very great thing. Now those rules are changed, and here at once they saw their friends going 1800 miles on a stretch—starting on the extreme east on the one side, and not stopping till they got almost to the extreme west of the empire on the other side.

The object of that exploration, he believed, was to try to reach India. He did not know whether any of the gentlemen themselves felt any disappointment at not reaching India, but he thought they had achieved a greater service to commerce and to science by keeping to the river as far as Ping-shan instead of deviating to India: for they had been the means of making known to us nearly the whole length of the Yang-tse-Kiang as far as it could be made practically available. Through their exertions we have now a practical and intimate knowledge of the whole of that great river, so far as, either on account of the natural obstacles or on account of political difficulties, it is at present navigable. The importance of the Yang-tse-Kiang will be in the course of a few years far better known to Englishmen than it is now. It will be one of the greatest arteries of English commerce with China; and, although some of the names upon its banks were strange to us now, they might in a very few years become as familiar as the names of places in Europe. A change has come over the times, and now the Englishman and the foreigner can travel throughout the length and breadth of China without let or hindrance, except such as may arise from the disordered state of the country, and which it was hoped might in the end be mended.

As regards the Taepings, he must say Dr. Barton had not exaggerated the condition of the country when his party first commenced the ascent of the river. He described the states of Chin-Kiang, Nankin, and Woo-hoo, three cities which only ten years ago had enormous populations. These cities are now little more than ruinous heaps, and the same desolation extends also to the great provinces of which they are the chief *entrepôts*. The rebellion rose in 1849 in the out-of-the-way province of Kwangse. Kwangse is a wild and mountainous province, one of the rudest in the empire. There the rebellion, or disorder, or brigandage, or whatever they might choose to call it, festered and ranked for three or four years, until, having acquired a sufficient number of supporters to enable greater enterprises to be undertaken, the insurgents descended on the Hoo-nan plains, and were carried along by the Seang river to the Tung-ting lake and the Yang-tse-Kiang. Favoured by the broad and rapid current of that great river, they met with little to impede their progress until they arrived at Nankin, which, on account of old associations as the former capital of China, and being still at that time the next place in political importance to Peking itself, they seized and fixed upon as their head-quarters. Although on their way to Nankin, or at various times since its capture, they overran the seven central provinces of China, they at present remain in only three of these, viz., Ngan-hwuy, Keangsoo, and Chehkeang, not occupying, however, the whole of the three, but probably about half of each, or say an area of 66,000 square miles; the population of which, before they were overrun, numbered, according to the usually received census, 49,000,000 souls. It would be very difficult to form an estimate of the population of those provinces now; but in Ngan-hwuy, which was formerly said to support 34,000,000, the rebels, according to their own statement, were now unable to obtain supplies sufficient for their own subsistence.

Dr. Barton said the rebels held 180 miles of the river. They did so at the time the expedition passed up, but now they are reduced to about 60 or

70 miles. Indeed it cannot be said that they hold the waters of the Yang-tse-Kiang at all. They do not possess any navy or flotilla, so that they cannot impede the navigation of the river by foreign vessels. As an earnest of what the commerce of that great river will eventually be, he might tell them that from the 1st of April to the 10th of December last year, during the eight months that the river had been open, 152 foreign vessels passed up from Shanghai to Hankow, some of them performing two trips; besides 170 junks in foreign employ. And the estimate for the trade which is expected to be done on that river alone in 1862 is 10,000,000*l*. They might hope great good would result to China from such a traffic. Anybody travelling over the districts now laid desolate would see that a warm stream of commerce poured through that main artery of the empire is just what is wanted to revive them, and that nothing would be more likely to check the rebellion than giving employment to starving multitudes.

The question may arise, "How is it that such hordes of rebels are heard of?" It is not difficult to account for, when they considered the population of those provinces that have just been mentioned. In China, in most of the provinces—certainly in all those on the coast and on the main rivers—the population presses very severely upon production. There is a very dense population and the means taken by the Government to meet the wants of that population are notoriously insufficient. There is no Poor-law in China; there is nothing that is worthy of the name of police. Now, if they imagined England—where they considered themselves pretty well-behaved—without a Poor-law and without police, they could easily understand that the Chartists, and men of that ilk, would stand a much better chance than they did now. It was not difficult, therefore, when any bold fellow or unscrupulous man had gathered around him some few hundreds, not to say a few thousands, of companions, to run the gauntlet through the finest provinces of the empire, and hold his own for a long time against the Government or any power they could bring to bear against him. On the other hand, while these rebels do nothing but destroy and plunder wherever they go, the Imperialists, or Government, do very little indeed to protect their own people. They have been accustomed to rule their country very much by moral suasion. They are fond of a paper executive: not only in the sense of having an army on paper, but by the issuing of pompous proclamations on large sheets of paper, daubed over with red ink, and commanding the people to "Respect this," "Tremble," "Honour," and "Obey," and all that sort of thing, which, so long as there is no trouble given, does very well. But the moment the Government receives a shock, these people cease to "tremble," "honour," and "obey," and begin to do that which is right in their own eyes. It was very discreditable to the Government that these rebels should have been able to hold their position so long in what the Chinese themselves call the very heart of the empire—to have pounced upon it in the first instance, and to have gained the footing they have. Unfortunately China, for the last few years, has been ruled by a petty clique of inert and inefficient mandarins; the consequence is that at Peking there has been a paralyzed state of affairs, which has spread through the provinces. Again, there was another thing to be remembered, and that is the absence of any national feeling among the Chinese, such as we understand by the term. A Chinaman in one province will care very little about what is going on in another province. There may be anarchy or rebellion elsewhere, and he will not stir a foot or trouble his head about it. And not only so with the common people, but with the authorities also. The authorities at Peking when they hear of trouble in any provincial Government are too much accustomed to say, "That is the business of the particular Vice-Roy; he must look to it. If he does not settle affairs, we will punish him. He has got into trouble, and must get out of it as well as he can." The consequence is that insurrections are very common in many parts of China. Dr. Barton has mentioned several that came under

his own observation. He (Mr. Parkes) recollected a memorial to the Emperor nine years ago, naming eight or ten rebellions that were then going on in different parts of the country. In fact it was difficult to find out a province in which some disturbance or other was not heard of. It should be remarked, however, at the same time, that, notwithstanding this terrible prevalence of disorder, there is not a single province in the whole eighteen in which the functions of the Imperial Government are entirely suspended: so he could not quite agree with the conclusion of Dr. Barton, that there was no Imperial rule in China. There was Imperial rule all over China, but it was weak and imperfect, according to our notions. All this was intelligible when they considered what China was. It was ruled by a stationary despotism which had long put a stop to all progress, and for probably as much as 1200 years the political condition of the country had not advanced. No doubt its isolation from the rest of the world has had a great deal to do with that result; and had it not been invaded at various times by the Tartar race,—and thus for a time obtained from those wild tribes a certain amount of vigour, although of a rude kind,—in all probability the Empire of China would have been broken up before now, and would no longer be the great whole it still is. There is no doubt that China at the present day is in a very similar condition to that which marked the end of the previous dynasty. The previous dynasty was a Chinese dynasty,—the Ming dynasty. Misrule, or weak government, had caused at that time the same or a greater spread of disorder than that which we now see. Some six or eight rebel armies were in the field, fighting against the Government or among themselves. At last one of their armies got up to Peking, and the usual result followed—torpor was succeeded by despair, the Emperor killed himself, and his generals called to their aid the Manchoo Tartars, who quickly responded to the invitation, but when they had reconquered the country kept it for themselves. And so, at the present time, the Chinese are quite ripe for invasion. No doubt, a band of strong invaders would be able to establish themselves in the country, just as easily as the Manchoo Tartars did 219 years ago. But he did not see at present where that invasion was to come from, and he trusted we might never see it. China in the mean time has become differently situated with respect to other nations; it has now entered into relations with the West. Two centuries ago it knew nothing of the Western people: a few Jesuits were settled in the country, but it had no political or commercial relations with Europe. It is to be hoped that the Chinese will now be disposed to learn something from the Western nations, notwithstanding their conceit and prejudice against foreigners. The vigour they want in their administration might be obtained by the aid of those foreigners, whom they have hitherto been accustomed to despise, and who are placed by the late treaty in a favourable position for giving information of the kind the Chinese require.

Many have found difficulty in understanding how it was the English have often had differences with China. One reason was that they have never, until lately, been able to get to the head-quarters of the Government of China. If they sustained a grievance or anything went wrong, they could seldom obtain redress, because the local authorities knew perfectly well that as complaints could not reach the supreme Government at Peking, they might be neglected with impunity. The consequence was, that foreigners had to adopt the law of reprisals, and reprisals lead to serious collisions.

One thing in Dr. Barton's paper will have struck their attention. When travelling on the upper Yang-tse, he saw fields upon fields, miles in extent, of poppy-cultivation. Many have hitherto thought that England was poisoning China with opium, that China got all its opium from India, and that opium was the cause of one of the collisions referred to just now. This statement of Dr. Barton will, however, show that the Chinese knew perfectly well what opium was before the English took it to them, and that they have

long grown opium themselves. At Hankow, one of the ports recently opened, native opium is so cheap that it will not pay to import foreign opium. In fact, the English importation of opium into China is what the importation of French brandy is into England. The Indian opium is of a superior quality to the Chinese opium, and is preferred by the Chinese, much in the same way that Englishmen prefer Cognac to brandy of home manufacture. These facts served to dispel one popular fallacy, which was that the first time we went to war it was in order to make the Chinese smoke opium. They smoked opium long before we had any commerce with China; and, although it suited Commissioner Lin to represent the English in very black colours at the time, as being importers of opium, it is doubtful whether the Government acted in good faith in taking no steps to prevent the cultivation of opium in their own country. It mattered little whether foreigners imported at that time 25,000 or 30,000 chests, when the Chinese had in the very heart of their own country hundreds of miles under poppy-cultivation. Besides, we know the quantity of opium we import; and that that quantity forms the supply of only about three millions of smokers,—a very small proportion, indeed, out of the whole population. It might not, therefore, be too much to say, that for one Chinaman who smokes foreign opium, eight or nine will smoke opium of their own manufacture.

The Yang-tse-Kiang is a most important river. A river which can be navigated to Hankow, 640 miles, by vessels drawing 20 feet of water, and having never less than $3\frac{1}{2}$ fathoms as far as Ichang, 360 miles further on, is no mean river. There is probably no other river in the world possessing such facilities for commerce. Our doubts as to the difficulties of the navigation have been dispelled, because those vessels which run now between Shanghai and Hankow, do so with little difficulty, and do not experience that necessity for numerous pilots that was at one time feared would be required. There is no doubt about it, that if vessels suited to river-navigation are sent out,—not heavy sea-going vessels, but vessels specially built for the purpose,—the river will admit of easy navigation.

As to whether the present Government gives some hope of a stronger rule, and of more security to life and property; it may be said they do so, as far as good words go. At the same time it is scarcely fair to judge of them, because their opportunity of improvement has been so limited. They came into power on the 8th of last November only. China is a slow-going country, and we must not expect to hear much of them for a few months to come. But if good words, an earnest wish to listen and to be informed of the true state of affairs, and an inquiring mind, are some proofs of a will to work out reforms, then Prince Kung in his communications with our minister, Mr. Bruce, has shown that disposition. One remarkable instance which denotes a change of feeling as bearing upon our affairs may be alluded to. It is that when Prince Kung came into power the other day—by seizing upon his opponents, the other party in power, and putting them completely out of the way in the manner he did—one of the first charges brought against them for high treason to their own country was their treacherous behaviour on a certain occasion in 1861, when they seized foreign officers, and thus degraded China in the eyes of the whole world. It is very extraordinary to hear such language from the lips of a Chinese minister, or to find mandarins willing to admit that China can be degraded in the eyes of the world, or to feel any scruples of conscience upon an act of that kind.

Dr. Barton has told a very touching incident that occurred to him, when, upon arriving at a distant part of his journey, he met with some native Christians who received and welcomed him as a brother Christian. An occurrence of that kind, taking place in a remote quarter of the world, would speak most directly to our best and innermost feelings. Too much cannot be said in favour of these Jesuit missionaries, who thus with

their lives in their hands have continued to go to the innermost parts of that country, and maintain their churches in the way they have done. At the same time, it should be remembered that the Roman Catholics have long been established in China, and that they had a splendid start there. They first reached China in the sixteenth century, and actually established themselves at Canton, as early as 1581. Then they gradually worked their way up to Peking, where they were received into favour and employed at Court. Probably in no part of the world did missionaries ever make converts of the same high class, or were they so aided by their converts, as in China. They held their own and more than their own until the Tartar rebellion, when the country became in the distracted state, or worse than that, in which it is now. At that time, some of the Romish missionaries sided with the Tartars and some sided with the Chinese. They were to be found everywhere; there was not a province in which they were not located. And when the Tartar dynasty established themselves they still continued to be employed, suffering persecutions occasionally; for one can never be certain what the Chinese will do—they are a capricious people, doing one thing one day and the contrary the next. Still the Jesuits were employed on all sorts of services. They were ready to undertake anything, from reforming the Imperial calendar to casting cannon, with that ready adaptiveness for which Jesuit priests are distinguished. But in an unhappy moment they went a point too far; they split upon that rock, of which we have seen instances elsewhere, not stopping nighly short of that line where spiritual power ceases and temporal power begins; they undertook to determine what the Chinese should and should not do in respect of some of their political institutions. To mention one among other instances, one party among them prevailed on the Pope to decree that the Chinese should not worship their ancestors: the severest test probably that they could have imposed, for all the religious feeling that a Chinese can be said to have, appears to centre in the great respect which he has for his ancestors. Well, the Pope issued a Bull putting a stop to that and other ceremonies. The Emperor met the Bull with a counter edict, because he thought it infringed upon his own authority, and the consequence was a decree of expulsion. All the missionaries forfeited their position, and they were ordered to leave the country, and some of them were treated severely. That occurred in 1723. They have never recovered their position, and from that time to this they have had to conduct their religious services underhand. It is astonishing with what fidelity their converts clung to them still; affording them safe concealment in recesses, cottages, and small out-of-the-way places, and how, mainly through the fidelity of these converts, the Church has been kept up to its present numbers of, I believe, 400,000 souls. I think a late Propaganda return gives, as the Romish strength in China, fifteen bishops, seven or eight coadjutors, eighty foreign missionaries, ninety native priests, and about 400,000 converts; and the funds sent for the support of these men from the Propaganda are about 400,000 francs, or say 16,000*l.* a year.

That is a short outline of the proceedings of the Romish missionaries. But we should not depreciate the endeavours that Protestant missionaries have also been making during a much shorter period and under greater disadvantages. It is true that the Romish missionaries by much self-denial and sacrifice have continued to remain with their flocks in the interior of the country; and fresh recruits, as they are sent out from time to time, are passed on into the interior. When our first missionaries came out, they were very few in number until the first treaty was made with China. By that treaty it was rendered penal for any Englishman to travel further into the country than 30 or 40 miles from the ports. It may be thought that zeal might have carried the missionaries beyond these bounds; but it would have been at the risk of being brought back again and handed over to the consuls for punishment: I believe there must have been many a struggle in the breast of a zealous missionary at

that time, between what zeal prompted him to do and what the ordinance required him to abstain from. At the same time, though the missionaries remained at the ports, there had hitherto been work enough and more than enough for such numbers as had always gone out. But now that China has been thrown open to all Englishmen, whether merchant or missionary, it is probable they will penetrate into the interior as far as where they find their Romish brethren already established.

He ought to mention that he had only a day or two ago seen a letter from a gentleman belonging to the missionary body, and a Fellow of this society,—Dr. Lockhart,—from which he would read a short extract. It is interesting, not only as showing what a single missionary can do and is doing, but also as denoting an improvement in our position generally in China. Dr. Lockhart left England last summer and reached Peking in October. He was allowed by Mr. Bruce to open a hospital there. He is a lay missionary. In respect of the matter of hospitals, Protestant missionaries have certainly done more than the Romish missionaries. At the ports they were in a legal position and could do their work in public and could open hospitals; whereas the Romish missionary, living in disguise in the country, could not open hospitals. The hospitals have certainly succeeded. It is a subject to which Missionary Societies should give their attention, and thus strengthen their labours in China in particular, by as many medical societies as they can afford to support. Practical as the Chinaman is, and this not being the age of miracles, we must work with human means. And there is no more tangible way of appealing to his understanding than by doing some bodily good to him; by showing him in the first instance that we are willing to take care of his body as well as of his soul. Dr. Lockhart writes under date 21st December, 1861, to this effect:—

“This is a fine sphere for work. You would be amused to see the broad street at my door. There is plenty of room, as the Imperial Canal runs along the street, and the road on my side is 40 feet wide. This space is filled with carriages and carts, and patients and their friends; and numerous itinerant cooks set up their kitchens all round, giving the place the look of a fair. And if by chance I go near the door, a cry is raised of “There is the Ta foo, Lo Ta foo” (*i.e.* the great doctor, the great doctor Lo).

“For five days this week I attended to 600 patients a day, and on one day to 800. To-day I have had 621 in all, 212 being women. Among them there were some most respectable people; one, the son of the President of the Board of Punishments, a very high officer; also a Mongol princess, who is blind, on whom I am going to perform an operation. She is a tall, handsome woman, very pleasing in manner. At first she came in a common cart with two women, all plainly dressed; but now she comes in her own carriage with attendants and out-riders, all in full dress. She is a princess by birth and also by marriage. Many of the women come in full dress, especially the Tartar women, who are a much finer race than the Chinese. Besides the crowd of patients, I have every day quite a levée of officials, their wives and children. I have never before had patients in China of the rank that come to me here. One lady, wife of the officer in charge of the Examination Hall, from whom I have removed a tumour, lives in my outer quadrangle, and will go home in a day or two, when she shall have recovered from the operation.”

One feature that is particularly satisfactory is the circumstance of so many people of rank coming to Dr. Lockhart. There has been no want of attendants at the hospitals previously established at the different ports: but they have generally been the halt, the maimed, and the blind; people from hedges, ditches, and bye-ways, who are always very numerous in China. But, hitherto, it has been very seldom that people of the higher classes have so far laid aside their prejudices as to be ready to accept assistance from foreign physicians. We may now see in Peking what is to be hoped will prove a return to the old state of things, a foreign physician attended by people of the highest

as well as the lowest rank—a circumstance which gives promise that missionaries of all classes, not only medical and clerical, but Protestant as well as Romish, may soon be occupying the same position of respect and influence in China that their Jesuit brethren held before they were expelled.

The PRESIDENT introduced Captain Blakiston, another member of the Expedition.

CAPTAIN BLAKISTON, R.A., said, it had been thought by some that the Yang-tse-Kiang was probably navigable above Pingshan, as far as Batang, and that ultimately there might be communication between China and India. He considered that very unlikely indeed. He had heard of falls on the river some 100 li above Pingshan, which was to be expected, as the country is very mountainous. Between Batang and Sudya which is actually on the Brahmapootra, intervenes a distance of over 200 miles; and 200 miles of land transport is a great obstacle to commerce. With regard to the lower portion of the river, it can be navigated with vessels fit to sail round the Cape of Good Hope, as far as Ichang, about a thousand miles from Shanghai. But above that, the river narrows suddenly from half a mile to 250 yards. There it rushes through gorges in the mountains; and in those gorges there are rapids. The Expedition never found any want of water in these rapids, but they found the current exceedingly strong; so strong that no river steamer in China could get 12 miles above Ichang. Not until they employed steamers like those on the Upper Mississippi, with disconnected wheels, one capable of turning one way and the other the contrary way, would they see steamers go far above Ichang. The current of this contracted part of the river is from 5 to 6 knots an hour, and in many places it runs 10 and 12. Steamers might be pulled up with ropes, but there would be considerable labour in that. There would be no difficulty about coal; it would be found as far as Pingshan. It appears to be of much the same formation throughout. There is a sandstone, and every now and then limestone crops out with coal. At present, however, coal can be brought cheaper through the Tung-ting lake. The rivers which run into that lake supply Hankow.

The PRESIDENT desired to ask Captain Blakiston, as he had travelled over part of the route of the French missionary Huc, whether he found the particulars contained in his work correct?

CAPTAIN BLAKISTON replied it had always been supposed that the Abbé Huc's descriptions were imaginary. He found them to be quite the reverse. In every point of which he had an opportunity of judging, he found Huc perfectly correct, except with respect to the amount of populations, and everybody knows how difficult it is to estimate that. If you ask a Chinaman how many people there are in a city he will say, "some myriads." With regard to the geography of the river, he (Captain Blakiston) mapped it for about 900 miles above where they left the Admiral; and the position of the river has come out pretty much as it is placed in the ordinary maps of China, which are based on those which were drawn up by the Jesuit missionaries. He found very slight errors, indeed. With reference to the naval survey between Hankow and Yo-chow, a distance of 140 miles, the survey had been carried on by "dead reckoning." Commander Ward went to Yo-chow without having been able to obtain any astronomical observation. He (Capt. Blakiston) found that in 140 miles of survey by dead reckoning there were only two miles of error, and was glad to record it in proof of the accuracy of which naval surveying is capable in skilful hands.

The meeting was then adjourned to April 14th.

Tenth Meeting, Monday, April 14th, 1862.

LORD ASHBURTON, PRESIDENT, in the Chair.

ELECTIONS.—*Commander E. John Pollard, R.N.; Colonel C. Palmer Rigby; Isaac Braithwaite; Richard Cockerton; James V. H. Irwin; John Jones; Charles P. Pauli; and James T. White, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map-rooms since the former meeting were—Pugh's 'Queensland Almanack,' with Map; Sheet No. 8 of Dufour's Atlas of Switzerland; seventeen sheets of the Topographical Map of the Netherlands; Maps of Savoy and Piedmont; Canton of Glarus; Pontine Marshes; Gulf of Japan, by Malte-Brun; Ordnance Maps; Admiralty Charts, &c., &c.

EXHIBITIONS.—Views of the Fiji Islands, and specimens of their natural productions; Panoramic View of the Kashmir Mountains; and Ziegler's Geological Map of the World, were exhibited.

The Papers read were:—

1. *The Fiji Islands, their Commercial Resources, &c.* By Mr. BENSUSAN.

2. *Remarks on the late Government Mission to the Fiji Islands.* By BERTHOLD SEEMANN, Ph. Dr.

DR. SEEMANN was a member of the Commission sent under Colonel Smythe, R.A., to investigate circumstances connected with the proffered cession of the Fiji islands to the British Crown. The islands are now visited by traders from many nations; and the object of their inhabitants in appealing to England, was to extricate themselves from political embarrassments which were becoming fastened upon them.

The report of the Commission was favourable to the bonâ fide nature of the proposal and also to the value of the islands as fertile, healthy, and convenient stopping places for the traffic to Australia by way of Panama. The question of the acceptance of their sovereignty was under the consideration of the British Government.

The Fiji group owe their origin to a volcanic uprising and to the growth of corals; the islands are usually hilly, and present an unbroken mass of trees on their southern side, while their northern slopes are grassy and watered by streams descending from the central highlands, whose ridges condense the vapour of the trade-winds.

A great variety of vegetation is found in the islands: its predominant appearance is tropical. The mangrove-swamps are confined to the deltas of the rivers, and the islands are singularly exempt from malignant fever.

Their fertility may be estimated from the fact that, though partially and imperfectly cultivated, they support a population of 200,000, and supply provisions to foreign vessels and yield an immense export of cocoanut-oil, obtained by a wasteful process. Their fertility appears still more remarkable on considering the variety of their vegetable productions useful to man. Sugar, coffee, tamarinds, and tobacco are cultivated with success; so are four oil-yielding and five starch-yielding plants; four different spices; twelve edible roots; eleven potherbs; thirty-six edible fruits; and a vast number of medicinal, fibrous, scent-yielding, and ornamental plants, besides a long list of first-class timber-trees. It was the abundance of sandal-wood that first attracted Europeans to their shores.

They promise an excellent field for the best qualities of cotton; the undulating ground, the neighbourhood of the sea, and the absence of frost being cogent reasons in favour of its growth: the inhabitants are also beginning to work for wages. Experiments in raising cotton have already been tried with remarkable success, both by the author and by others.

Dr. Seemann bears witness to the laudable influence of the Wesleyan missionaries over the islanders, who recently were savage cannibals. He considers the religion which Christianity is beginning to supplant, as well worthy of philosophical study. Their belief is in a Supreme Deity, and in future rewards and punishments. They worship their ancestors. The chiefs are a taller, better developed, and in every respect a more able caste of men than the rest; it follows from this that mere height of stature in a stranger is an important claim upon the consideration of the islanders.

Mr. Bensusan's paper was chiefly an elaborate compilation from recent authorities on the Fiji group. While he acknowledges the extreme fertility of the islands and the skill of the natives in agriculture and rude mechanical arts, he doubts whether labour can be procured for extensive cotton-culture. He says the natives will positively not work; that they have no wants. The spontaneous supply of food far exceeds what they are in need of. They make their own scanty dresses, build their own houses, make their own canoes, their own mats to lie upon, their own pottery utensils for cooking, and are independent of the white man, though they fear him and respect his ingenuity. Printed cottons, hardware, groceries,

and other articles, which are wholly unsaleable elsewhere, are shipped to Fiji. Many persons are already engaged in trade, and there is room for more.

After the Papers had been read,

The Rev. GEORGE PRITCHARD (formerly Her Majesty's Consul at Tahiti) said, having occasionally visited the Fiji group during the thirty-three years that he had spent on the islands in the Pacific, he could bear testimony to the truthfulness of the statements made in the papers which had just been read. The beauty of the scenery must be seen to be appreciated. Of the many descriptions by voyagers, he had seen none that in his opinion had done justice to those "gems" of the Pacific Ocean. They were remarkably fertile, and most of them possessed valuable seaports, which ships of any draught could enter without difficulty, and anchor in safety between the coral-reef and the shore.

With reference to the cession of the Fiji islands, he thought it most desirable, both on political and commercial grounds, that the proposition should be favourably entertained by the Government of this country. In a political point of view, it would be good policy on the part of Great Britain to possess themselves of the Fiji group, in order to arrest the extension of French influence in the Pacific, which, with the possession of Tahiti and New Caledonia already in their hands, would be attended with serious inconvenience to us in case of war with that power.

Commercially, the possession of these islands by Great Britain was exceedingly important. In view of the difficulty of obtaining cotton from the United States, it is very desirable that we should have independent sources of supply. If properly cultivated, the Fiji islands were capable of producing an immense quantity of excellent cotton, equal in quality to the best of that grown in the United States; and not only on the Fijian islands, but it could also be largely produced in the other groups of islands, where he had seen it growing luxuriantly, at all times. One remarkable circumstance connected with the growth of cotton in the Pacific was this: in the United States, he was informed, the cotton-seed was planted annually, and bore only one crop; on the South Sea islands the seed, when once planted, would continue to bear perpetually for from ten to fifteen years.

There was another important point connected with this subject, which deserved the consideration of shipowners. At present, ships carrying out cargoes to Australia had the greatest difficulty in obtaining return cargoes, and many of them, he was assured, came back in ballast. He had known ships himself to go 4000 miles in search of a cargo. Now, if cotton were grown on the Fiji islands, vessels returning by way of Cape Horn could easily call at these islands, load with cotton, and bring it home at a moderate freight. The islands possessed admirable harbours, in some of which ships of any burden could enter without difficulty, with plenty of room to beat in and out even in a contrary wind.

Then, the islands produced immense quantities of cocoa-nut oil, arrow-root, *bêche-de-la-mer*, timber suitable for ship-building, and fancy woods for furniture; so that a valuable commerce could be carried on. He was delighted to see in the *Times* the other day an article, stating that during the last year our commerce with the South Sea islands was treble what it was in the preceding year. This showed how commerce was extending, and if our Government would accept the cession of the islands, he believed it would result in opening up a large and valuable commercial intercourse with this country.

The PRESIDENT wished to ask Dr. Seemann a few questions bearing upon the growth of cotton. In the first place, he should like to know what the tenure of land was in the islands, because if the land was altogether occupied by the

natives, and we were to take possession of the islands, we should find ourselves very much in the same position that we found ourselves in New Zealand, where quarrels soon broke out. Therefore he would ask whether there were any unoccupied lands which our colonists could take possession of? Secondly, as we were told the natives would not labour, he should like to know whether there was a prospect of obtaining labour from the neighbouring islands, instead of sending for Coolies?

DR. SEEMANN said land in the Fiji islands was owned by a class of gentry, who seemed to have a perfect right to dispose of their land with the consent of their chief. A great deal of land had been disposed of by these people at good prices, with which all parties appeared perfectly satisfied. Generally, after a bargain, they went to the British or American Consul and registered the sale. He did not think any disputes had arisen about the selling of the land. With respect to labour, he believed it could be procured without difficulty. The Fijians were agriculturists and cultivated a number of plants, taking great pains with them. Besides, the neighbouring islands would furnish labourers. It was found that the Polynesians would work better when removed from their native to other islands. The Fijian islands contained a great many Polynesians. There was a cocoa-nut establishment, employing sixty men or more, all active fellows. They were well paid, and were cheerful and contented. He did not think there would be any difficulty at all about the labour; in fact, he had gone into that question in his official report.

THE PRESIDENT: Would you state what facilities there are for the cultivation of cotton?

DR. SEEMANN stated that cotton grew very rapidly indeed. There were six different kinds of cotton already naturalised in the islands, which had been brought there by traders. The cotton grew wild, and produced a very good crop. He had himself established a plantation which, after the first three months, began to yield. It was New Orleans cotton, quite equal to the best American cotton. It was certainly true, as the Rev. G. Pritchard stated, that the seed, when once planted, would produce crops for several years. The plant was never killed by frost.

MR. CRAWFORD said he differed very considerably from the two gentlemen who had addressed the meeting. He would first point out what might be called Oriental Negroland. It commenced in New Guinea or Papua, at the Equator exactly,—ran down very nearly to the tropic of Capricorn, and then ran up to the north-east, terminating at these very islands of Fiji. The people were here all negroes; but negroes of distinct races, differing in language, in person, and in intellectual qualities.

The negroes of Papua or New Guinea were a very powerful, stalwart race. Some of them he had seen, bore a considerable resemblance to African negroes, but they were a totally different race from them. The negroes of the Fiji islands were of the same general description, with many minor differences. Between these two principal branches of the negro race there were others of a very inferior class. He believed the Fijians, one and all, were, or had been, cannibals; such at least as had not been converted by those bold, intrepid, conscientious men, the missionaries, who had been doing a world of good among them, and had eradicated the practice in many places. In Captain Erskine's book, written some years ago, there was an account of thirteen captives who were brought in, and before the missionaries or their wives could interfere, ten out of the thirteen were roasted and eaten: the remaining three were spared through the intercession of the wives of the missionaries. He believed also, on the authority of Captain Erskine, that the immolation of parents still continued.

There were some curious differences between these people and the Polynesians, or brown-complexioned race of the islands of the Pacific. The Polynesians, for example, could never pronounce an English or any other European word.

Every word with them must end with a vowel; indeed, every syllable also: whereas the negroes, on the other hand, could pronounce English perfectly, for they had an abundance of consonants. The Polynesians, who were a fair race, had not above half-a-dozen, or at most eight or nine consonants.

Then there was another distinction which Captain Cook drew, and which was true still. The Polynesians, the fairer race, were all thieves—dexterous thieves; the negroes were all honest, and Captain Erskine said that, notwithstanding their many vices, referring to cannibalism and the immolation of their parents, they were upon the whole a most energetic race, and he had higher hopes of them than of any other in the whole of the Pacific Ocean.

To come to the cotton question, he could not conceive anything more at fault than the statements of the previous speakers. These islands, if they could all produce cotton, would not yield a week's consumption for this kingdom. There was a very small proportion of the land of that country capable of growing cotton. The mountains were not; nor were the mountain sides; nor was the sea-shore, as was shown by the vast quantity of cocoa-nuts produced there. Cocoa-nuts grew in the sand; cotton would not grow in the sand. The cocoa-nut grew best close to the sea-shore, and would not thrive at any great distance from it; and the greater the quantity of cocoa-nut grown on these islands, the less the quantity of cotton that could be grown. The whole area of these islands was said to contain about 20,000 square miles. He could only make it 5500, and that would never suffice for an abundant supply of cotton even if the entire surface were cultivated with that plant. It might produce very fine cotton, equal to Sea Island cotton; but as to producing 800 lbs. per acre, that is what no cotton ever did. He had paid considerable attention to South Carolina and Georgia cotton, which was what was called Sea Island cotton, as it must be grown near the sea-side; and the average produce was 150 lbs. per acre, whereas the average of the inland cotton was nearer 300 lbs.

With respect to the cession to this country, he believed Her Majesty's Government had not the slightest intention to take the Fiji islands. He hoped they never would. The islands would be totally useless to us, and a burden; indeed, we already had too many of this class of colonies.

SIR EDWARD BELCHER said he really hoped with all his heart that the British Government would accept this cession. We required some port in those seas to enable our vessels to refit as well as enable us to watch our enemies in time of war. He was quite sure that the Americans would be too glad to take the islands if we rejected them. They were situated on the line leading to China. Any vessel wishing to make a rapid passage, if she fetched the Fijis, could complete her water and make a clean run outside the Phillippine islands to China.

With respect to cotton, he thought Mr. Crawford was greatly in error. He was inclined to take the part of the other two gentlemen. He had visited nearly all the islands in the South Seas, as well as the western intertropical coasts of America, and he found that cotton grew luxuriantly in every part. In the Sandwich islands Captain Charlton, our consul there, persuaded the natives to cultivate a very large portion of ground. The cotton was of the finest quality, and the Americans who had settled there declared it as fine as they had ever seen produced in America. But a change came over the mind of the American missionaries. Whether they were jealous of cotton being grown there or not, they persuaded the natives that it was impious to grow cotton, when the land produced them food enough without. They compelled the natives to root up every tree and destroyed the whole of the cotton in the Sandwich islands. That happened in 1825 or 1826. At Tahiti, about the same time, they found cotton also under cultivation in small patches in gardens: it produced very large pods and very fine staple. He had also travelled through the cotton-growing countries of America, particularly about New Orleans and Texas. He found there, although the temperature sometimes fell as low as 12°, that

the staple was as fine as it was in any other part of America. He felt perfectly confident that, better than bringing home a cargo of timber or coming home in ballast, it would be a very great advantage if our merchant vessels coming home from Australia could pick up a cargo of cotton.

There were many other articles grown in the Fiji, of interest to us, besides cotton. The islands abounded in fruit and in cocoa-nuts. Indeed, the natives planted cocoa-nuts because they had nothing else to plant for export. In seven years every cocoa-nut planted was valued at four shillings sterling; consequently, where they had only the cocoa-nut tree to plant and could allow nature to rear them up, it was not worth their while to cultivate the ground. But if we could make it an object with them to cultivate the land, he had no doubt they would produce good cotton, and, with care, equal to any that we got from America.

The islands also produced fancy woods and fair timber. With respect to timber, there were no good spars produced, after leaving Australia, until you reach the Fijis. None of the timber of the other islands for spars was worth a farthing, being very porous and not possessing the requisite density and elasticity; therefore, should a vessel lose her spars, the timber of the Fiji islands would be found very serviceable.

SIR RODERICK MURCHISON announced that Dr. Seemann was about to publish, at his own expense and risk, an account, not only of the expedition, but describing in detail and with illustrations all the plants of these remarkable islands. There were many varieties of genera and species of plants which had hitherto been wholly unknown to the botanists and naturalists of Europe. He therefore hoped there were many gentlemen present, who, with the noble Lord in the chair and himself, would support the laudable publication of the 'Flora Vitiensis' by Dr. Berthold Seemann.

Eleventh Meeting, Monday, 28th April, 1862.

MAJOR-GENERAL PORTLOCK, VICE-PRESIDENT, in the Chair.

PRESENTATIONS.—*Isaac Braithwaite and F. J. Sargood, Esqrs., were presented upon their election.*

ELECTIONS.—*Sir Daniel Cooper; Captain R. J. Henry; Lieut.-Colonel Sir John Stephen Robinson, Bart.; the Rev. Thomas Scott; George Arbuthnot; Peter Bicker-Caarten; Charles Brett; G. Willoughby Hemans, C.E.; Henry T. Parker; Berthold Seemann, PH. DR.; Henry Sprigg; Henry Sterry; George Tyler, and R. Dobie Wilson, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the accessions to the Library and Map-rooms since the former meeting were—Vol. ii. of Messrs. Schlagintweit's 'India and High Asia,' with Atlas; Part xiii. of the 'Imperial Dictionary of Universal Biography,' Admiralty Chart of Shanghai and Environs; four sheets of Carnbée's Atlas of Netherlands India; Part ii. of Philip's Imperial Library Atlas, &c. &c.

The Papers read were :—

1. *The Surface Currents in the Bay of Bengal, during the South-west Monsoon.* By Lieutenant J. A. HEATHCOTE, I.N.

THE currents of the Bay of Bengal have not hitherto been accurately determined. Horsburgh gives a short general account, but his con-

clusions are based on analogy rather than on fact; and Lieutenant Fergusson's charts of the Indian and China seas are drawn on a small scale, and are inaccurate for the Bay of Bengal.

The materials from which the present paper has been compiled were mainly gathered from the log-books of a large number of the old East India Company's traders, which have been carefully scrutinised by Lieutenant Heathcote. They have a value exceeding any that is obtainable in the present day, now that improved methods of astronomical determination make "dead reckoning" (or the calculation of a vessel's position from the simple data of her course and speed) of minor importance. Currents are estimated by comparing the true position of a ship, whether determined astronomically or by sight of land, with her expected position as calculated by dead reckoning: it is obvious that these comparisons are of value in those cases alone where both elements are given with scrupulous accuracy.

The author's investigations are limited, at present, to the currents of the South-west Monsoon; but that season is the one in which the greatest dangers present themselves, and a trustworthy knowledge of currents is of the most importance.

Copious extracts from the paper are given at p. 114, in "Additional Notices."

MR. CRAWFURD said the paper appeared to him to be a most able and judicious one, and the author deserved their most hearty thanks. The question was of prodigious importance in relation to our commerce in those seas. He believed the exports and imports to Bombay amounted to about ninety millions annually; the commerce of Calcutta was about the same; and the commerce of the Straits of Malacca amounted to from ten to twelve millions. In short, we had close upon two hundred millions sterling of British property passing up and down this gulf.

MR. GEORGE DUNCAN said he felt very ill qualified to address the meeting, but he was not quite prepared to agree with all the statements contained in the paper. He had made six consecutive voyages to Calcutta, and had traversed the Bay of Bengal, and, therefore, he had obtained some experience in the matter. In the south-west monsoon the currents varied very much. In the early part of the south-west monsoon there was a strong current passing up on the west side of the Bay of Bengal; but in the later part of the south-west monsoon there was a strong current setting in the opposite direction. The north-east monsoon, having blown for six months nearly, has blown the water below the level; and therefore during the latter part of the north-east monsoon he had been carried along the coast of Coromandel by a north-easterly current at least 60 or 70 miles a day; and during the first part of the south-westerly winds, he had beat down on the west side, in the month of August, and had been carried 50 miles with a current setting to the south-westward. So that to say that throughout the south-west monsoon a certain definite current prevailed in the Bay of Bengal would be a great mistake. After the rains had fallen in India, and the rivers had been swelled, a great quantity of water was thrown into the upper part of the Bay of Bengal. The surface of the water was pressed upon by the south-west monsoon, and not allowed to find its way readily to the southward again, it therefore formed a current

along the shore. Ships leaving the river Hooghly in the latter part of July and the beginning of August regularly made it a point to keep close to the west shore, where they got, not only good smooth water, but a strong current setting southward. It was, therefore, a mistake to suppose that during the south-west monsoon a steady current set in in the direction indicated.

MR. R. SAUNDERS considered Lieut. Heathcote's paper to be framed more on imaginary views than on sound practical data. So well understood were the currents in the Bay of Bengal, that few shipwrecks happen on its shores; and when they had occurred, in his experience since 1829, he never remembered an instance in which fault was traceable to undefined currents.

DR. HODGKIN thought it would interest the meeting to be reminded, that it was the mutual action of large oceanic currents, in the Eastern Seas, that led the late Dr. Young to the explanation of the phenomena due to interferences of the undulations of light. He considered there was some reason to doubt an opinion of the gentlemen who had addressed them, that the large rivers flowing into the head of the Bay of Bengal exercised an important influence on its currents. In illustration of his objection, he would remark that a friend of his had an idea, many years ago, that it would be possible to propel vessels through the sea by forcing a stream of water from their sterns, on the same simple principle that rockets are propelled through the air. His friend tried the experiment; but found the method wholly unsuccessful, in consequence of an immediate diffusion of the expelled current of water through that in which the vessel floated. Now it appeared to him that a diffusion of the same nature would very likely take place, when a river poured its waters into the sea, and that no defined current of any considerable length was likely to be caused by it.

LIEUT. HEATHCOTE, in reply, doubted if his statement had been clearly understood either by Mr. Duncan or Mr. Saunders.

3. *Notes of a Visit to the Elburz Mountains and ascent of Demavend.*

By R. G. WATSON, Esq.

ON July 23rd, the party consisting of the Prussian minister at Teheran; Dr. Brüggese, the secretary to the mission; Dr. Dolmaye, of the Teheran college; and three other gentlemen including the author, with six guides, started on this expedition. They left the neighbourhood of Teheran, and reached Abigarm, the last village on the way to the mountain, on the evening of the 26th, where they met Captain Nicholas and another French officer, who had recently attempted an ascent. M. Nicholas considered he had arrived within 300 or 400 feet of the crater. They encamped on the 24th in the valley of the Lar, where one of the party caught 199 trout after eight hours' fishing. On the 27th they pitched their tents at the termination of the regular path towards Demavend, at a place where herdsmen have piled stones in circles, and where water boiled at 189° when the air was at 60°. The valley through which they had passed was clothed with magnificent scarlet poppies and thistles, and other plants not so familiar to English eyes. A day was lost at the encampment in a vain endeavour to repair an injured barometer, and on the 29th the ascent began. The horses had to be left after an hour, when the first snow was reached; then

came two hours of loose stones; then (apparently) one and a half hour of bare rock, too steep for the snow to lie on; and here, within twenty minutes of a cliff of rock, which shut out further view, they found many matches and pieces of paper, and a guide told them that it was the highest point to which M. Nicholas had ascended. On reaching the cliff of rock, the guides wished to make them believe they were close to the summit, and that it was impossible, at that early season of the year, to proceed higher: and they were nearly returning, as M. Nicholas did, under that belief. However, Dr. Dolmaye pushed forward across an incline of snow to the left, where he fell, but checked himself after a few yards of descent with the help of his alpenstock. Five of the party with five guides crossed the incline safely; the remaining gentleman could not proceed further, and was left with a guide. Then came a still steeper snow slope, up which they had to scramble, and for which ropes ought to have been provided, for there was one especially awkward corner which had to be turned, and there was no visible termination, through the mists below, to the steep incline of snow, over which they had to pass. An hour after, another mass of snow was crossed, then the clouds were surmounted and the lovely peak of Demavend stood clearly above in full sunshine, giving to the sulphur, with which it was covered, the appearance of pale gold. They pushed on quickly through the snow and sulphur, and reached the edge of the crater which forms the summit of the mountain. The crater appeared about 40 or 50 feet in diameter; it was thickly covered with snow, and of no great depth. The cold was so great, and the view so entirely obscured with clouds, that they contented themselves with a very short stay, and went to a cave 50 or 60 feet below the summit, where they tried to light a fire in order to take the temperature of boiling water, for they had no barometer. It was then half-past twelve o'clock. They had been seven and a half hours from their starting point, in reaching the summit of the mountain, and had walked for nearly three hours from the spot where M. Nicholas had been told that he was within 400 feet of the crater. The ground outside the little cavern was so hot from volcanic heat, that it was necessary to change seats every few minutes; and it was impossible not to expect that some day the mountain might pour forth its smothered flames.

The cave was filled with fumes of sulphur, and it took the party an hour and a half to make the water boil, though paper, matches, cotton, wood, charcoal, and spirits of wine were used in abundance. [The results are, as might be expected, discordant. The average of six observations was $177^{\circ}.3$ Fahr., and the interval between the extremes was $4^{\circ}.5$, representing more than 2000 feet of altitude; but if the *highest* observed temperature be taken, viz. $179^{\circ}.8$, as probably

the only case in which the water was boiling satisfactorily, the results are nearly accordant with the triangulated measurements (see Anniversary Address, 1861, p. 194). The temperature of the external air was 41° , and assuming the sea-level temperature at 74° , and the sea-level barometer at 30.00, we obtain the altitude of 18,865 feet for the summit of Demavend, against the 18,550 of the Russian survey.—F. G.] The party returned with great speed, glissading down the snow, and reached their tents in two hours.

MR. MARSHALL said he was not acquainted immediately with the country of which this paper treated, but he had travelled in the neighbouring country of Daghestan, which formed the most eastern portion of the Caucasian range. At the foot of it lay the eastern part of Georgia, where some of the finest wine in the world was grown. There was no country where the people drank such quantities of it. He never saw such a drunken country in his life. It was quite impossible for any stranger to go there and hold his own among the people, unless he set to and drank hard like everybody else. The ladies assisted at these drinking bouts, though they did not drink themselves. Rising above the plain of Georgia were the Caucasus Mountains. They were well-wooded, ranging at what he would roughly estimate at 10,000 feet in height. Comparing them with Switzerland, which was perhaps the best-known mountainous country to Englishmen, instead of pines they were clothed with birch, beech, and such like forest-trees, which gave to the mountains a much more varied and picturesque appearance than the pines. They differ from the mountains of Switzerland in other respects, and especially in the rarity of glaciers, which was partly due to the formation of the mountains not admitting of hollow slopes for the snow to repose in. The inhabitants of the country were rude and uncivilised and still very savage in their habits. It was only some three or four years since that Schamyl—for this was his country—was taken prisoner. The men were not handsome, and the women were decidedly the reverse. As an instance of the way in which they conduct their quarrels, he stated that it was the custom when a man was murdered to erect over his grave a kind of flagstaff, where it remained until his murder had been avenged by his friends, and in almost every village graveyard he saw poles of this kind standing. Before he reached the country he was told he should have the greatest difficulty in penetrating it, owing to the jealousy of Russian officials. So far from this being the case, he was bound to acknowledge that he should not have been able to travel in the country but for the escorts and horses provided by the Russians, from whom he experienced the greatest courtesy and civility.

GENERAL MONTEITH said Mount Ararat still held its position as the highest mountain in that part of Asia. It was close upon 19,000 feet high, and had a direct rise of 16,000 feet from the plain in which it stood, presenting a magnificent appearance from the unintercepted view which the spectator had of it. He attempted the ascent when he was there, but failed in consequence of coming upon some glaciers 50 or 60 feet high, and abounding in fissures which it was useless attempting to cross.

THE CHAIRMAN, in closing the sitting, said they must not judge of the value or interest of the paper on Demavend, by the comparative absence of remarks made upon it. It was only very recently that this chain of mountains had come under their special observation. They had records of it many years ago, but the close observation now bestowed upon it was only of recent origin.

Twelfth Meeting, Monday, May 12th, 1862.

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

PRESENTATIONS.—*The Rev. Edwin Prodgers; Capt. E. Wynne Roberts; Charles P. Pauli, and W. Levering Salting, Esqrs., were presented upon their election.*

ELECTIONS.—*Captain Francis John Bolton; Colonel John L. Peyton; Frederick Palgrave Barlee; Thomas Jacomb, Junr.; George Mackenzie, and Richard Pelham Warren, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the accessions to the Library and Map-rooms since the former meeting were—Beardmore's 'Manual of Hydrology;' Stanford's Map of London; Ravenstein's Plan of Frankfurt; continuation of the Maps of the 'Dispatch' Atlas, &c., &c.

EXHIBITIONS.—A model of a stern-wheel Steamboat, adapted for the navigation of the Fraser River, was exhibited at the meeting by Mr. Kelly.

The Papers read were:—

1. *Description of the Ruins of Cassope.* By Lieutenant-Colonel T. B. COLLINSON, R.E.

CASSOPE occupies the summit of a mountain which overlooks the whole of the Gulf of Arta: the extent of its ruins and its commanding position testify to its having formerly been an important stronghold of the ancient Epirote nation. The crest of the mountain was occupied by the Acropolis; 150 feet below it lies a plateau of 1000 × 200 yards, closely covered with the foundations of ancient buildings, crammed into the only space which the natural features of the mountain made available to the townsmen. Colonel Collinson compares the probable density of its former population with that of the modern Corfu. Corfu, within the walls, is one-third greater in extent, and contains 16,000 inhabitants; hence the population of the ancient Cassope may be estimated at 12,000. The ruins have been visited and minutely described by Colonel Leake and by Mr. Hughes: the intention of the present paper is to add some details, and to correct others. One of the most remarkable of Colonel Collinson's observations is the discovery of an unmistakable specimen of a regular arch in these ancient buildings. It is the roof of an underground chamber or tomb, described by Colonel Leake, and named by him the "Vasilospito," or King's house. He had observed the roof, but ascribed its structure to horizontal courses

of stone, whereas Colonel Collinson finds it to consist of regular voussoirs of three or four to the span. It is possibly the oldest specimen of the true arch extant in Europe. There are other instances among the ruins, of spurious arches; namely, horizontal lintels of stone, whose under sides have been hewed away. One of these is found in the gallery leading to the Vasilospito, and another forms an entrance through the city walls. The walls consist of polygonal stones that average $3 \times 2 \times 1\frac{1}{4}$ feet in size, and are laid together without mortar. The theatres and other objects were minutely described by Colonel Collinson, who exhibited photographs of the ruins, taken at the time of his visit.

2. *Explorations in Vancouver Island.* By Commander RICHARD C. MAYNE, R.N., F.R.G.S.

ALBERNIE is a deep bay on the western coast of Vancouver Island, and lies in about the same latitude as Nanaimo and Namoose, on the eastern shore. No overland communication between them had been attempted previously to Captain Mayne's journey, which was set on foot in order to discover whether any overland route was possible.

Two prominent mountains, called Arrowsmith and Moriarty, stand on either side of the direct line of communication. It was satisfactorily ascertained during the journey that they were connected by a high snow-covered ridge, which made it out of the question to establish a road between them. The actual route followed by Captain Mayne, lay to the north of these mountains, and passed alongside a small lake; then it bent considerably to the south, in order to strike its eastern destination. There are no natural difficulties in this circuitous track, to interfere with the establishment of a road, if exception be made of the shores of the small lake, where further inspection appears advisable. The greater part of the way lies over level country well suited for settlement, and the highest pass need not exceed 700 feet.

3. *British Columbia.* By WILLIAM KELLY, Esq., F.R.G.S.

THE object of Mr. Kelly was to invite attention to the disadvantages under which British Columbia labours, owing to the expense and delay of communicating with the mother country. He described its climate and productions as closely corresponding to those of England, and eminently suited to British emigrants, who, however, as a class, were debarred from going there by the long voyage round Cape Horn, or by the shorter, though costly, route across Panama.

He also described its varied mineral products; and gave data, from which he estimated the yield of gold, since its first discovery in 1858, or during the last two and a half years, at 1,200,000*l*. He then showed that the direct line from Canada, mostly through British territory and through the Vermilion Pass, was of such a nature that, by using existing railroads and establishing an overland mail of the same character as those established elsewhere in America, twenty-five days would suffice for communicating between Portland on the Atlantic and New Westminster on the Pacific. The author looked forward to the time when a chain of settlements should connect Canada with the Rocky Mountains; through which emigrants with their cattle and family waggons could travel leisurely and securely, where wants could be recruited and accidents repaired, while a still poorer class of men might work their way, step by step, to their goal.

The CHAIRMAN said the subject of British Columbia had been brought before them on previous occasions by their medallist Palliser, and more particularly by Dr. Hector, who had especially pointed out the desirability of opening a passenger route over the Vermilion Pass. The subject was indeed worthy of the consideration of the Society. With regard to the development of gold, it seemed to him that this country was about to open out to us a complete new California, and that the very same ridge which had been found to be auriferous all through the chain of the Andes—not the Rocky mountains, but a chain considerably to the westward of it—had been found to be auriferous all the way northward, extending through British Columbia, and probably extending to Russian North America. Captain Mayne, in addition to his exploration of Vancouver Island, had also penetrated into the interior of British Columbia; and he would, therefore, call upon him to communicate what he had seen of the wealth and productions of this vast region.

CAPTAIN MAYNE said, as the road from the eastward across the Rocky Mountains had been referred to, he would make a few observations upon that topic. That route was by no means so practicable as people thought, and those companies who talked about driving four-horse spring waggons from the Lake of the Woods to British Columbia, would either starve the people they took or leave them in the Rocky Mountains, for they would certainly never get them over them. Dr. Hector, Palliser, or Blakiston, who had explored the country, would tell them they had the greatest difficulty in getting their horses through the passes. They had to stop and cut through fallen timber, and it took them many days, going about a mile an hour. Although ultimately this road might be made, yet at present we were much too sanguine about it; and emigrants who thought of going by that route would feel most grievously disappointed, that is, if they lived to be disappointed, which he rather doubted. The better-known way by Victoria had been frequently described. The emigrants could either go from New York by steamer to Panama, or by our own steamers from St. Thomas to Panama, then up by the American steamer to San Francisco, and thence on to Victoria. New York was the best point to start from, because they avoided being kept waiting at Panama, a circumstance which frequently occurred, by taking our West India mail-steamer. Having reached Victoria, the first start was to New Westminster by steamer. From New Westminster, to go to Cariboo, they went up the Fraser River and Harrison Lake to Fort Douglas, where they left the steamer. They then traversed a road, which waggons could be driven along with the greatest ease, constructed last year

by the Royal Engineers. He had himself walked 30 miles easily in the day, which showed that the road was pretty good. Then they crossed the Lillooet Lake, a distance of 15 miles to Pemberton. Here they came upon another trail for 25 miles up to Anderson Lake, which is 14 miles long. There were two lakes, Anderson and Seton, both of which are 14 miles long, separated from each other by a narrow neck of land of about a mile or a mile and a half. That brought them to Kayouth. This place Kayouth could also be reached by the Fraser River. Instead of going up to Fort Douglas, they could go to Fort Hope by the steamer, and possibly if the stream was not very rapid they could get to Yale. At Yale the rapids commenced, where the river rushed between immense perpendicular rocks so rapidly that no steamer could possibly get through them. Sometimes the current came down at 17 or 18 knots. He timed it at 16 knots, but the water was not then at its highest. From Yale to Lytton he found the trail excessively dangerous. At some parts he went round the face of the rocks on poles hung from the tops of the cliffs with deers' hide, and he hung over the cliff at an altitude of 300 feet perpendicular above the river below, and the only means of proceeding with safety was by pressing close against the face of the rock. That danger had since been avoided by the trail being cut at the back of the rock. They then crossed the river, and the trail was very good for some way farther. But on the whole that was not so easy a route as by Harrison Lake, on which all the work was done by horses and mules. From Kayouth they could either cross the river at once, or cross higher up and then keep the east bank to Fountain and Pavillon. From Pavillon there were two trails. One led up by the Fraser, passable only to foot passengers, to Alexandria, and then up to Fort St. George; and as the Hudson's Bay Company had constant communication with Fort James, Fort George and McLeod's Fort, no doubt the trail led up to them. The road by which the diggings were reached went east along the Pavillon Lake, till it met the Chapeau and Bonaparte and Bentinck River. It crossed them and went to the northward up the valley of the Bonaparte River, past several small lakes and rivers, to the Quesnelle Lake, and that brought you at once to the Cariboo country. Very rich diggings were worked the year before last on the Quesnelle Lake; but the diggings in Cariboo were found to be so much richer, that all the miners left for Cariboo, and rushed up to Swift River and the little streams in the neighbourhood.

With respect to the richness of the Cariboo diggings, he had no doubt the account of Mr. Fraser, the *Times* correspondent, was perfectly correct. Mr. Nind, the gold commissioner in that country, who was at present in England, told him the other day that he saw three men take up the sluices, which are the trays at the bottom of the troughs in which the gold is washed, after one day's work, and take out 195 ounces of gold—all but five dollars. It would give some idea of the size of the lumps of gold to hear that there was no quicksilver used at Cariboo, the fine gold being allowed to pass away. On one occasion some men realised 9000 dollars of gold as the result of three months' labour. They said they were getting 25 dollars a-day. Other men reported having got 73 ounces in a day, and that food and everything there were comparatively cheap. During the first winter the great difficulty was to get food. Two months before his arrival at Pavillon they were paying 75 cents per lb. for flour. That was before this route by Harrison Lake was opened.

It was a great question now in the colony whether some route would not be found to Cariboo easier than by going up the whole length of the Fraser River, which was very rapid even as far as it was navigable. It was thought by many that some route would be found from one of the inlets which indent the whole coast, which would afford a much shorter and easier way. With this object nearly all the inlets had been examined. The one which was at present engrossing the attention of the colony was the route from Bellhoola or Bell-whoala, at the head of the Bentinck arm. This was the route by which Sir Alexander Mackenzie crossed in 1789. He went up the West Road River, then

came down on the Bentinck arm at Bellhoola, to which he gave the name of Rascal's village. Last year Mr. Mackenzie, one of the Hudson's Bay officers, and Mr. Barnston, crossed from Alexandria to Bentinck arm in almost a direct line. They took eleven days to cross, and Mr. Barnston, in a letter to Mr. Nind, stated that the trail for the whole distance from Alexandria to the coast range was on a kind of table-land, which was studded in every direction with immense meadows. He said he thought the journey might be performed easily in ten days. Another route had been tried by Mr. Macdonald, coming down the Stuart River to Fort George, which promised some day to be the route to Cariboo, leaving out the Fraser altogether.

DR. RAE knew nothing of the country west of the Rocky Mountains; but with regard to the eastern country from Lake Winnipeg and Lake Superior to the Rocky Mountains, he had been over that part only so late as last year. As to the facilities of travelling over it, he could not agree with the author of the paper. Some years hence there might be roads and facilities similar to what Mr. Kelly contemplated; but at the present time they certainly did not exist. He would describe his own experience last year with a hunting party. They took four days from Toronto to St. Paul; from that to Red River occupied nine days. From Red River up west to the south Saskatchewan, travelling very hard, having excellent horses and two horses to each man, it took them from sixteen to eighteen days. They were then eight or ten days from the Rocky Mountains. They travelled at least double the rate that any party going with one horse could travel. Therefore he came to the conclusion that it would at least take ten weeks to reach the Rocky Mountains from England, in the present state of the country. Regarding the game in that country, the young gentlemen of the party were anxious to kill any and all kinds of game. They travelled over several hundred miles before they could kill an animal larger than a badger. They had the ablest hunters in the country, all picked men, the Red River half-breds, and their object was entirely to kill game. Yet that was the result of their hunting. They should have starved had they not carried plenty of provisions with them. Had they been a large party, such as that contemplating to go out there, they could not possibly have got provisions at the Hudson's Bay Company establishments. The buffalo are so peculiar in their migrations, that they travelled for hundreds of miles over one of the finest old buffalo prairies in that part of the world and did not see a single animal. The Indians were starving, could not get anything to eat, and were obliged to eat the skins. They travelled over a better route for game than emigrants would take. Going up to the Red River settlement, which is easily arrived at from Canada in twelve or fifteen days by steamer, the usual time from the settlement to the Rocky Mountains was from forty-five to fifty days with carts. One gentleman came from Edmonton, which was six or eight days from the Rocky Mountains, in nineteen days last year; but he had three relays of horses, with three horses to each man, and he travelled day and night. Therefore he agreed with Captain Mayne that it would be very dangerous indeed for any large body of men to attempt to reach the Fraser River by that route. He thought it would be attended with a sacrifice of life. In Canada last year the idea of opening up this route had excited a good deal of attention, and numerous letters had appeared on the subject. The advantage of going round by Victoria is that they can start at any season of the year. They can go in a vessel nearly the whole way, and they can take baggage and all that they want to the diggings. If they went by the Rocky Mountains and got to the diggings, they would have to obtain the articles that they wanted there, instead of taking them round in a vessel with them and going up the Fraser River. In saying this, he was only speaking of what he would do himself. Whether as a rich man or as a poor man, he would not in the present state of the country recommend a single individual to try the overland route.

After some remarks from the REV. J. GARRETT, urging the immediate value

of Columbia as a field for British emigration and the practicability of an over-land route to that colony, and on the value of Indian labour,

CAPTAIN MAYNE replied that Mr. Garrett entirely mistook both himself and Dr. Rae in supposing they were of opinion that the route across the Rocky Mountains would never be made. All that they said was that the parties who were advertising to send "four-horse spring waggons" by the Rocky Mountain route would starve the people whom they took. Mr. Garrett, in dealing with the question of emigration, had left out of consideration the expense of living after people reached the colony. It was an exceedingly expensive colony, and it would not do for the Government or for societies to send people, especially women, to British Columbia and drop them there. If they were now sent by sea round Cape Horn, they would land at Victoria in the middle of winter, and it would be impossible for them to get to the diggings till the spring; therefore, they would have to wait four or five months at Victoria doing nothing, and where they could not get a dinner under a dollar. The question of Indian labour was too large a question to be entered into. If anybody wanted to know anything about their character, he could not do better than look to the printed journals of Mr. Duncan, who was by far the most experienced missionary in that country. With respect to the country of the Saskatchewan River, Mr. Hind did not give a flourishing account of it as suitable for a roadway. Captain Palliser says of it in the Blue Book, that "it is too tedious, difficult, and expensive for the generality of settlers." A great deal of it would have to be piled, before anything like a good road could be made. This was another reason why emigrants should not be sent that way at present. Mr. Garrett was mistaken in thinking the Indians would ever work as miners. They got the coal at the pit's mouth and carried it down in little baskets to their canoes, that was all; and he knew the manager he referred to would never think of sending them into the pit to work out the coal, and their doing anything could never be depended on. Mr. Pemberton's evidence respecting the interior, he would receive with great caution, because it was well-known he had never travelled in the interior. He once went to Yale, sixty miles up the river, and he once made a short journey across the island; but as to the interior of the country, Mr. Pemberton knew it merely from hearsay or the same reports to which they all had access.

The CHAIRMAN, before adjourning the sitting, introduced M. Jules Gérard, the well-known "lion-slayer" of Algeria, and announced that on a future occasion that gentleman would bring under notice a project of his own for the formation of a Society (*Société Africaine*) connected with discoveries in the interior of Africa, and in furtherance of the objects of the Acclimatization Society of Paris.

The meeting was then adjourned to the Anniversary on the 26th of May.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1. *Extract from a Paper by Commander BEDFORD PIM, R.N., on a New Transit-Route through Central America.**

THE immediate coast-line extending from Cape Gracias à Dios to Navy Bay, Aspinwall, or Colon (by each of which names the Atlantic terminus of the Panama railway is known) is for the most part low and uninteresting, although in some places, even in Mosquito, a spur of the great central chain of mountains reaches quite to the sea-shore, and diversifies the otherwise monotonous aspect by slight, cliffy, projecting headlands. Numerous rivers of more or less volume intersect the country; but they all have a dangerous bar, and therefore none but light-draught vessels can be used for their navigation. From Cape Gracias as far south as Blewfields Lagoon many islands and coral-reefs are distributed at a greater or less distance from the shore, but from the latter place right round to Navy Bay the sea is singularly free from any impediment to navigation. The land is clothed to the water's edge with dense tropical vegetation, which gives to it a very uniform appearance; indeed for miles on either side of Greytown, or, as it is now called, San Juan de Nicaragua, the general aspect is so unvaried that it is often very difficult to distinguish the proper anchorage; and ships, however well navigated, frequently miss the entrance, and, falling to leeward, take days to beat up against the wind and currents.

There are only two harbours between the points I have mentioned; these are the Chirigui Lagoon and Greytown. The former is very spacious and commodious, comprising within itself many excellent anchorages; but as regards the latter, it will not be much longer worthy the name, as the detritus brought down by the river San Juan is rapidly silting it up. In April, 1860, I made a most careful survey of the port, and, after reducing my work to the same scale as the Admiralty chart constructed some years previously, I placed my own plan in red ink upon it, and the result was most startling. Indeed, I consider the rapid filling up of Greytown Harbour the most curious instance of the kind I have ever heard of. The sand-spit which forms the outer enclosure of the harbour has grown towards the mainland (and therefore narrowed the entrance) more than 100 feet; the deepest water I could obtain between the points was only 11 feet, which is the more remarkable when it is remembered that two years before, the frigate *Eurydice* sailed out of the port without the least inconvenience, taking a depth of at least four fathoms. In short, there is every reason to believe that Greytown Harbour will soon become a Lagoon, like Blewfields, Pearl Rey, and Cape Gracias Lagoon; the latter of which was a harbour, superior to Grey Town, when Lord Nelson was there in the latter part of the last century.

Gorgon Bay (the Atlantic Terminus of the New Route).—Leaving Blewfields, we ran down in a few hours to Gorgon Bay, and came to in this well-sheltered anchorage for two or three days. During our stay the master and myself sketched in the outlines of the land, and obtained some soundings, which upon a subsequent visit were verified. The fine bay included between Monkey Point and Little Monkey Point is completely sheltered from the Northerly, the only destructive winds on this coast; hurricanes are unknown. This large expanse, which comprises a distance of about 5 miles from point to point, and a depth of about 2 miles, is further increased by two islands off its outer point, the nearest $\frac{1}{2}$ mile, the next $\frac{1}{4}$ mile more dis-

* See p. 75.

tant from the mainland, which if joined to the point by a breakwater would make the most capacious and safe anchorage in this part of the world. The contour of the bay is broken into small indentations, from the headlands of which wooden piers might be thrown out for the convenience of loading and unloading small craft. As a site for a settlement the locality appears well suited; the land is rich, rising about 100 feet above the sea-level, with abundance of good wholesome water, but quite free from swamps or other lurking-places of fever: in fact it is drained by the peculiarity of its formation, and well ventilated by the prevalent N.E. trade-wind.

The undulation caused by the strong trade-wind rolls into the bay between Monkey Point and the islands, and therefore renders it prudent to anchor about $1\frac{1}{2}$ mile off shore in $4\frac{1}{2}$ fathoms, otherwise we could have gone much closer in. If a breakwater were made, ships could come quite close, as the bottom, of soft mud, shelves very gradually towards the beach, and rocks or shoals are unknown. There is stone in abundance, both on Monkey Point and the islands, well adapted for the construction of a breakwater; it could easily be quarried and the work completed in a short time, as the greatest depth of water is $4\frac{1}{2}$ fathoms.

A lighthouse on the outer island and a red light on the beach would render the roadstead easy of access in any weather or at any hour of the night.

I hope I have made it plain that the bay (which is without a name on our charts, but which I have designated Gorgon Bay) possesses capabilities and resources which eminently qualify it for a healthy and agreeable settlement, a convenient emporium for the trade of the interior, and a suitable terminus for a great transit-route; indeed the Royal Mail Packet Company have already directed their captains to anchor there instead of at Greytown Roadstead.

Corn Islands.—The "Corn Islands" are two in number, called Great and Little; they are both moderately high and very pretty. A coral-reef nearly surrounds each, and makes it necessary to approach with great care and caution. There is a very fair anchorage on the lee side of either island in about 5 fathoms water.

The great island—which, by the by, simply affords a pleasant walk all round it, and is not, therefore, very great—is peopled by about 200 Creoles and Negroes. Their language is English, and they have a small portion of land under cultivation; sufficient, however (such is the richness of the soil), not only to supply their own wants but to afford a large amount of stock to vessels calling. Bullocks, pigs, goats, fowls, ducks, turkeys, and a great variety of fruit and vegetables can always be procured. Cotton of the finest sort was at one time exported in considerable quantities; but since the emancipation of the negroes, which was effected here as summarily as elsewhere, all commercial enterprise has ceased, if a very small trade in cocoa-nuts be excepted.

Little Corn Island is chiefly grazing land, and affords excellent pasturage for herds of cattle, which, however, are not bred on the island but imported from Cape Gracias à Dios. The channel between the Great and Little Island is about 6 miles broad and is deep and safe. About 20 of the Great Corn Islanders generally live on the Little Island to look after the cattle, collect cocoa-nuts, and pick guava, of which great quantities grow wild on the south side, and prove excellent food for pigs. Its scenery is still more pretty than that of the Great Island, and its healthiness is proverbial; the few cases of sickness which occur may be traced to imprudent exposure to the weather. In short, I was much struck with the Corn Islands. Their proximity to Gorgon Bay, their salubrity and charming scenery, as well as the abundant supply of fresh meat, fruit, and vegetables, which can always be obtained, will make their vicinity to the future railway most valuable to those employed upon the works, whenever change and recreation may be deemed desirable. As a sanatorium, the Corn Islands will be invaluable, and I have already made certain arrangements to ensure their full usefulness.

2.—*Extracts from a Paper on the Surface Currents of the Bay of Bengal during the S.W. Monsoon.* By Lieut. J. A. HEATHCOTE, I.N. (See p. 101).

Ceylon.—From the s.w. corner of the peninsula of India, the current of the s.w. monsoon runs in a direction varying from s.e. to s.s.e., according to the distance from the land, and at the rate of $\frac{1}{2}$ to $1\frac{1}{2}$ mile per hour, until, about the latitude of Point de Galle, it is diverted into a more easterly course. On the line between Cape Comorin and Point de Galle, there is a strong set into the Gulf of Manaar, which begins from 30 to 35 miles outside this line and may prove a source of danger. Vessels from Bombay to the eastward should therefore be careful to keep within the limits of the favourable s.e. current. South of Ceylon, within 30 miles of the coast, the current runs strongly to the eastward from $\frac{1}{2}$ to 2 miles an hour; but farther south, that is, between the parallels of 4° and 5° , its direction is more southerly or about s.s.e. On the east coast of Ceylon a strong current exists to s.s.e. and s., taking more or less the direction of the land, and running at the rate of $\frac{1}{2}$ to $1\frac{1}{2}$ mile an hour, or as much as 40 miles a day.

The inaccuracy of a deduction of Horsburgh is here apparent. He states the current at this season to be here running in an entirely opposite direction, that is to the northward; for he argues that, as it runs to the southward in the n.e. monsoon, it must run in a contrary direction in the opposite monsoon. Such, however, is not the case. This southerly current is well established; not only are numerous instances of its effects on record, but the result of my own investigations has also been confirmed by the observation of officers very recently employed on the survey of the east coast of Ceylon. This current is felt from 40 to 50 miles off shore, and from its eastern limits a north-easterly set begins.* At the Basses Rocks it is met by that already described as setting eastward off the s. coast of the island; and they both together then take a north-easterly, and afterwards an east-north-easterly direction across the bay; except that in the vicinity of the parallel of 5° n. the set is less northerly, while s. of that parallel it becomes east-south-easterly.

Coromandel.—On the coast of Coromandel a north-easterly set prevails within 30 miles of the shore, as far n. as the parallel of 15° ; outside these limits it turns to the north-eastward. North of the parallel of 15° it takes the direction of the land as far as Gordeware Point, and thence trends in an easterly and afterwards a north-easterly direction across the bay. From False Point nearly to Vizagapatam we have a strong s.e. current of $\frac{1}{2}$ to $1\frac{1}{2}$ mile per hour, within 30 miles of the coast; but, farther to the eastward, it gradually succumbs to the influence of the wind and joins the general set, first in a north-easterly and then in an easterly direction across the bay.

Arakan.—On approaching the coast of Arakan it becomes more north-easterly, and finally is governed by the form of that land, and runs strongly to the north-north-westward. It thus becomes a very dangerous current for vessels making Akyar during the s.w. monsoon. In such cases it is frequently necessary to heave-to off the port during the night; and if the existence of this current be not known, and proper precaution be not taken to keep to the southward, the vessel may be drifted into dangerous proximity to the reefs to the eastward of the harbour. In some of the works on this subject all mention of this current is omitted, in others it is represented as running in a

* I think it very possible that future observations may prove that this current is a return of that which flows with great velocity round the s.e. corner of Ceylon to the n.e., a portion of which may be found to bend to the n.w.; for, under circumstances somewhat analogous, a return current of this description is found off Cape Guardafui in Africa.

contrary direction; it is therefore the more necessary to call attention to it, as either the want of information on the one hand, or the existence of erroneous information on the other, may lead to injury to the greatly increasing trade of Akyah.

Circulation of Currents and Tidal Wave.—This north-easterly current along the coast of Arakan may probably have a very intimate connection with the southerly current on the coast of Ganjam. They may both belong to the same system of circulation, the Arakan current finding its way to the westward along the sea face of the Sunderbunds, and becoming the southerly current at False Point, and being again thrown on the coast of Arakan as before described. But, if this be the case, any positive trace of the westerly movement is not to be discerned, or at least is most difficult to recognise in the peculiar rotatory tides which are found to seaward of the Sunderbunds. These tides set, at different periods of each tide, towards every point of the compass. The flood begins at w., at the first quarter it flows w.n.w., at half-flood it is about n., the last quarter being to e.n.e. The ebb begins at e., half-ebb runs about s., and the last quarter ebb w.s.w., thus forming a complete rotation. But although these rotatory tides go far to hide the current itself, its effects while working its way to the westward are observable in the configuration of the sand-banks off the mouths of the Ganges. The current would here exert its greatest force, and these sands are curved to the westward in a remarkable manner, their very form proving that they are under an influence stronger than that which bends the banks off the mouths of the Hooghly into their south-south-easterly position; the latter being due to the s.w. monsoon itself, while the former is the effect of the current of the same monsoon concentrated, as it were in a funnel, by the shores of Arakan. That the position of the banks off the mouths of the Ganges is *not* caused by the n.e. monsoon admits of but little doubt; for this portion of the sea is peculiarly sheltered from the n.e. winds, and they cannot be supposed to exert a force sufficient to affect the position of these sand-banks, as, were it so, the effects of this force would be apparent in a much greater degree to the westward, and the sands at the entrance to the Hooghly would lie in a south-westerly direction instead of their present south-easterly one.

S.E. Current.—A strong current to the south-eastward at the rate of $\frac{1}{2}$ to $1\frac{1}{2}$ mile per hour begins about lat. 18° and long. 90° , and flows down towards Preparis Island, and then turns more easterly into the Gulf of Martaban. There is, no doubt, an accumulation of waters in the n.e. portion of the bay caused by the steady blowing of the s.w. monsoon across the whole breadth of the sea; and this current seems to be the result of their waters attempting to find an exit. It may be of important advantage to ships from Calcutta bound to ports to the eastward, for it will materially help them in getting to the southward against the wind. From its eastern edge the currents turn off to the north-eastward, until near the coast of Pegu they become governed by the form of the land, and take a course to the north-north-westward, joining those on the coast of Arakan already described.

Andaman Islands.—The Andaman Islands, which have lately formed the subject of an interesting paper read before this Society, play an important part in the system of currents of the s.w. monsoon. They present an obstruction to the general set of the waters in the middle of the sea; and the same phenomena are observable in their vicinity as are to be seen wherever fluids in motion meet with an impediment under similar conditions. The currents rushing to the eastward round the n. and s. extremes of the islands meet at a short distance beyond them, and become confused and irregular, and throw up high rippings; while immediately under the shelter of the islands an eddy is found, running to the northward from $\frac{1}{2}$ to 1 mile per hour. That portion of the sea to the westward of the Andaman Islands is wisely avoided during the s.w. monsoon, the reefs lying to windward of the islands presenting dangers to

which every prudent mariner would gladly give a wide birth; and I have therefore been unable to find examples of actual experience of the currents to the w. of the Andamans. But it is more than probable that the north-easterly set extends close up to the islands; the waters becoming, in a certain measure, heaped up on their w. side, and making their way through them and round them wherever they find an opening. Evidence of this action is particularly observable at the eastern mouth of the narrow strait which separates the South and Middle Andaman. This strait was closely examined on the occasion of the expedition—of which Dr. Mouat was the head—appointed, towards the close of the Indian mutinies, to select a site for a penal settlement in these islands. I may remark, *en passant*, that the manuscript of the original survey of the Great Andaman by Lieutenant Blair, executed at different periods between 1788 and 1796, and drawn on a large scale, was in the hands of the expedition, and was found to be beautifully accurate in all its details. It was our sure guide in the intricacies of channels of which no other knowledge but that afforded by this chart was to be obtained; and in those few places where it is deficient in the representation of details, we found that they had not been passed over until it had been ascertained that they could be of no practical utility. The geographical position of these islands has also been determined so far satisfactorily, that though it may not be incapable of a still nearer approach to exact truth, yet it has, I believe attained already to a higher degree of accuracy than can be claimed for the positions at present assigned to many places of far higher commercial importance.

Middle Strait, Great Andaman.—The strait between the Middle and South Andaman is one of peculiar formation; it is for the most part a narrow deep crevice, between the mountains by which it is bounded on both sides, and which are in no part distant from it much more than 300 yards, while at places the rocks completely overhang it. The channel is thus narrowed at one or two points to about 80 yards, its general breadth being from 400 to 500 yards. Its depth varies, but it is mostly deepest where it is narrowest, 25 fathoms being found where the rocks abut immediately upon the channel, and 6 fathoms where they are more distant; a depth of from 12 to 14 fathoms is, however, very generally found throughout the narrow part of the strait, its western portion where it runs n. and s. being both broader and shallower. Its western entrance from the sea has now a depth of from 4 to 6 fathoms, it having been filled up to some extent during the last seventy years, while the interior of the strait has suffered scarcely any perceptible change. We found no variation in the depth, nor in the contour of the shore; even small islets of less than 50 yards in length appearing in precisely the same state both as to size, elevation, and position, as represented by the first surveyor. But while the depths before mentioned are found in the strait itself, its eastern mouth is almost closed by a bank of sand and mud, which has but from 6 to 10 feet water on it; and this, I believe, may be looked upon as the effect of the current of the s.w. monsoon, which being driven, as before described, upon the w. coast of the island, finds its way through this narrow strait, and deposits at its exit the sediment which it had taken up or set in motion on its passage. The area of drainage of this strait, though small, is sufficient to throw into it a considerable quantity of silt and sand; and the very form of this bank indicates that it has come out *from* the strait, and not that it has been thrown *into* the strait by any effort of the winds and currents of the n.e. monsoon; and, moreover, were this latter the case, some corresponding effects would surely be observable at some of the other openings on the same side of the island, such as Port Cornwallis, the entrances n. and s. of Sound Island, and Port Blair, at all which places instead of shoals we find deep water. The strait between North and Middle Andaman is completely closed; it is now no longer a strait, if it ever was one: and this is not at all certain, for Blair had

not the opportunity of surveying it; he probably found it impossible to enter even in a boat, as we did.

In the open sea between the Mergui Archipelago and the Andamans, the influence of the prevailing wind again shows itself in a north-easterly set of $\frac{1}{2}$ mile to $1\frac{1}{2}$ mile per hour.

A south-easterly and south-south-easterly current sets with considerable force down through the Mergui Archipelago and past the Seyer Islands; and from lat. 10° N. and long. 95° E., a strong current in the same direction sets, at the rate of $\frac{3}{4}$ to $1\frac{1}{2}$ mile per hour, into the entrance of the Malacca Strait. This current may probably be found some degrees farther to the eastward; but I have been unable to gather any facts in support of such a theory, though I know of nothing in opposition to it.

Sumatra.—On the N. coast of Sumatra the current of the s.w. monsoon follows the form of the land to the westward; but this portion of the sea is sheltered from the influence of the wind. A slight return current to the eastward may be experienced in about lat. $6\frac{1}{2}^{\circ}$ N.

Between Acheen Head and the Great Nicobar an extraordinary current is found running to the south-westward in the teeth of the monsoon at the rate of $\frac{3}{4}$ to $1\frac{1}{2}$ mile per hour; it extends to the parallel of 5° N., and nearly to the 92° meridian, when it turns to the S. and S.E. Where this current meets the ordinary north-easterly set strong rippings are observed. It may be taken advantage of by ships bound westward from the straits of Malacca, but it is at present but little known.

3.—*Extract from a Letter on Queensland from SIR CHARLES NICHOLSON, Bart., F.R.G.S., to Governor SIR G. F. BOWEN.*

Communicated by the DUKE OF NEWCASTLE, F.R.G.S.,

August 22, 1861.

“WITH fine weather and a good steamer, the trip from Rockhampton to Port Denison may be rendered both short and agreeable. The coast-line for the whole distance is bold and well-marked, and the hills with which it is backed often present bold and picturesque outlines. After leaving the broad expanse of Keppel Bay, and the secure shelter and anchorage it affords, the course of a vessel is an open sea-way, in which a few rocky and well-marked islets occur. These are sufficiently prominent to prevent any impediment to navigation by night. After reaching the Percy Islands, and from thence on to the entrance of Port Denison, a succession of islands, seemingly countless in number, and varying in size from a single rocky projection to areas of some square miles in extent, are scattered along the whole coast. They are generally clothed with grass and wood, the latter consisting apparently of the ‘*Araucaria Cooki*.’ The outlines they present are generally most striking. Occasionally with bold and rocky summits, some of which must be little short of 1000 feet in height, at other times presenting grassy slopes stretching up amongst the deep-wooded sides of hills, it is difficult to imagine anything more beautiful than the *tout ensemble* thus presented to the eye of the traveller whilst gliding through the waters of these Australian Cyclades. Some of them must have permanent water, as a small cascade may be seen in a ravine on one of the most striking of the group, which, if I recollect rightly, is known on the chart as ‘*Prudhoe Island*.’ Secure landing may be found in most of these islands, in the numerous little sandy beaches and bays with which their sides are environed.

“On approaching Port Denison the scenery becomes bolder on the coast. Mount Dryander attains an altitude of nearly 3000 feet. Cape Conway is an abrupt rocky promontory, and Gloucester Island, which faces one of the sides

of the bay, presents a long serrated ridge of granitic rocks, which at a distance seem destitute of all vegetation, and remind the traveller who has been in the Red Sea, of the mountains of the Sinaitic Peninsula, and of Aden. On rounding Gloucester Island the waters of Port Denison are reached, presenting a broad and nearly circular basin, the largest diameter of which is probably five or six miles. It is nearly land-locked, although exposed somewhat to the south-east. The point forming the north entrance is a peninsula, which at high water forms an island, with an abrupt cliff rising some four or five hundred feet towards the sea, and gradually sloping off towards the west into a bed of mangrove-swamps. The view from this promontory is very imposing. To the east the bold mural precipices of Gloucester Island, to the south the lofty isolated peak of Mount Roma; and, stretching to the far-west, a succession of hills and undulating plains. The bay of Port Denison is unfortunately shallow, its greatest depth in the centre not exceeding 25 feet. The shores are low and shelving, and some difficulty (in the absence of a jetty or pier) is encountered in landing except at high water. At other times boats are unable to reach the shore, and the only means of landing are, as far as passengers are concerned, the back and shoulders of a sturdy aboriginal black; or, in the case of goods, a bullock or horse-team, which has to be driven some 200 or 300 feet into the sea.

"The site of the future town (named after Governor Sir George Bowen) appears to be judiciously selected on a small ridge on the northern side of the bay. It is proposed to connect this with the peninsula forming the northern entrance of the bay by means of a causeway.

"The great drawback to the settlement appears to be a deficiency of fresh water. This all-essential article is at present supplied from some native wells. Such a source must evidently be limited and precarious. The River Don, which is within four miles, will, however, it is said, furnish if needed an adequate supply of water to the inhabitants, if the native wells fail.

"The country immediately adjacent to the township, and beyond the mangrove-swamps, consists of a rich, light, sandy soil, apparently well adapted for the growth of cotton, and other tropical vegetable productions. An extensive and fertile tract of country, consisting of open bush, is said to extend for a considerable distance inland, and to be well adapted for grazing purposes. A station has been already formed 40 miles from the township, and the natives have as yet given no serious trouble to the white population.

"From all that I can collect we may, I think, safely infer that the future town of Bowen will acquire considerable importance as the centre of a fertile country, and as an outlet for the pastoral districts of the Kennedy, for the wool and tallow which they will ere long produce. There are, however, I apprehend, some serious drawbacks to its prosperity. These will be chiefly found to consist in the insufficient supply of fresh water, in the shallowness of the basin of the harbour, the low shelving beach, and the difficulty and labour which now attend the landing of goods and passengers. These drawbacks are, however, capable of removal or mitigation.

"I believe that an important step has been taken in the occupation of this part of the coast of North-Eastern Australia. All credit and honour are due to Mr. Dalrymple, by whose zeal and energy this new locality has been opened up, and is now being settled upon what, I trust, will be a prosperous basis.

"Before leaving the settlement I met with several parties of young men, who had just returned from explorations to the north and north-west, in search of pastoral 'runs.' It is impossible not to be struck by the courage, enterprise, and endurance, of these pioneers of civilization in the Australian wilderness. One party, consisting of three Europeans and an aboriginal boy, had been absent in the bush for upwards of five months, during which interval they had never met with any white man and had been frequently menaced

by the blacks. For a considerable period prior to their return they had been living upon a diminished ration of flour and bacon, and were in a great degree dependent for subsistence upon fish and native animals. Their journey had extended as far as the basaltic table-land of Leichhardt, towards the sources of the Burdekin. They purpose occupying a large pastoral tract in this region, and were thinking of bringing stock from Melbourne by sea. The point they had fixed upon for stations was nearly abreast of Rockingham Bay.

“One important point connected with the progressive occupation of the north-east coast of Australia is the hastening of the period when steam communication with India and Europe will follow this route. Port Denison is only 600 miles from Cape York, and the latter not more than 1100 miles from Timor, from which a regular line of steam communication exists with the various Dutch East Indian settlements, and thence to Singapore. Some 1600 or 1700 miles is all that is really at present needed in steam communication to connect Queensland with the Old World. Why do we not supply the small link thus wanted to complete the golden chain that so nearly encircles the civilized world?”

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1861-62.

Thirteenth Meeting (ANNIVERSARY), 1 P.M., May 26th, 1862.

LORD ASHBURTON, PRESIDENT, in the Chair.

THE Minutes of the previous Meeting having been read and confirmed, and the regulations respecting the Anniversary Meetings having been read, the President appointed John Hogg and James Macqueen, Esqrs., Scrutineers for the Ballot.

Captain the Hon. James R. Drummond, R.N., C.B.; Lieutenant-Colonel Elkington; Captain Edward Donald Malcolm; Captain John Puget; Sir Henry Young; James Anderson; Samuel Bruce; Eugène Claude; John Baily Darvall; Henry Schuback Hood; Henry Lannoy Hunter; Frederick Isaac; Leonard Jaques; George Mitchell; William Parry; Mark Richardson; and William Whitmore, Esqrs., were proposed as Candidates for election at the next Meeting.

The Report of the Council, with the Balance Sheet for 1861, and the Estimate for 1862, was then read and adopted, and the motion,* as recommended by the Council at p. 6 of the Council Report, was carried.

The President then delivered the FOUNDER'S GOLD MEDAL to the Duke of Newcastle, on behalf of the late Richard O'Hara Burke, in remembrance of that gallant explorer, who, with his companion Wills, perished, after having traversed the continent of Australia from south to north—as also a GOLD WATCH on behalf of Mr. John King, the sole survivor of the expedition under Burke, as a recompense for his faithful and meritorious conduct; and the PATRON'S GOLD MEDAL to Captain Thomas Blakiston, of the Royal Artillery, for his survey of the Yang-tze-Kiang from Yo-chow to Ping-shan,

* “That the words The ‘two Secretaries of the Society shall be Honorary Secretaries,’ &c., be The ‘three Secretaries,’ &c.; and that Mr. William Spottiswoode be proposed as the new Honorary Secretary.”

extending nine hundred miles beyond the farthest point previously reached by Englishmen.

The Anniversary Address was next read, and a unanimous vote of thanks was passed, with a request that the President would allow it to be printed.

At the conclusion of the Ballot, the Scrutineers reported that the following changes, advised by the Council, had been adopted :— Lord Ashburton, the President, retiring at the expiration of his second year of office, to be succeeded by Sir Roderick I. Murchison ; and the vacancy among the Vice-Presidents, occasioned by the election of Sir Roderick I. Murchison, as President, to be filled by Lord Ashburton ; and the vacancies caused among the Ordinary Councillors occasioned by Mr. William Spottiswoode being made an additional Honorary Secretary, and by the retirement of Earl de Grey and Ripon ; Lieutenant-General C. R. Fox ; W. J. Hamilton ; Austen H. Layard, M.P. ; Major-General Sir Justin Sheil ; and Colonel W. H. Sykes, M.P., to be supplied by the Right Hon. H. U. Addington ; Earl Ducie ; Cyril C. Graham ; Clements R. Markham ; John Rae, M.D. ; E. Osborne Smith ; and John Walker, Esqrs.

Thanks having been voted to the President, Vice-Presidents, Members of Council, and Scrutineers, the President finally directed attention to the usual Anniversary Dinner, and the Meeting adjourned.

PRESENTATION
OF THE
GOLD MEDALS

TO THE REPRESENTATIVE OF THE LATE RICHARD O'HARA BURKE
AND TO CAPTAIN BLAKISTON, R.A.

THE PRESIDENT said—The first duty which I have to perform is to present the medals. But before I do so I may, perhaps, be allowed to remind you that these honours are not the gift of a society of private gentlemen, who have assumed to themselves the right of so distinguishing certain merits of their own selection, according to rules fixed by their own good pleasure; these medals are the gift of that supreme authority of this realm which is the source of all public honour and distinction. And just as peerages and knighthoods are given by the Crown, at the instance of the Prime Minister; just as Victoria Crosses are given by the Crown, at the instance of the Commander-in-Chief, so the Crown has selected the President and Council of the Royal Geographical Society to award the honours which it considers to be due to those who have most distinguished themselves by the furtherance of geographical science and discovery.

If you will look back to our records, you will see that this Royal trust has been fulfilled by the President and Council of the Royal Geographical Society with scrupulous fidelity; you will find no trace of political bias, or of personal favour, or of what is more difficult to resist, the influence of popular sympathies. Now it is this distinction, proceeding from the highest power of the realm, and assigned by the most competent and impartial judges, that I am about to present.

I will request Dr. Shaw to read the formal judicial decision, by which the Council of the Royal Geographical Society has awarded the Founder's premium for this year.

Dr. Shaw then read as follows:—"The Founder's Gold Medal has been awarded to the representative of the late Richard O'Hara Burke, in remembrance of that gallant explorer, who, with his com-

panion Wills, perished after having traversed the continent of Australia from south to north. The Council have also awarded to Mr. John King, the sole survivor of the expedition under Burke, a gold watch, with a suitable inscription, as a recompense for his faithful and meritorious conduct."

The President then addressed the Duke of Newcastle, her Majesty's Secretary of State for the Colonies, as follows :—

"MY LORD DUKE,—We rejoice to see you here within our walls, that we may have the opportunity of testifying to you our thanks for the cordial and liberal manner in which you have accepted the co-operation of this Society whenever we could in any way contribute to the public service. The colonies over which you preside must see in your presence this day new evidence of the interest taken by Her Majesty's Government in every event which bears upon their permanent welfare; and there have been few events within the history of our Australian colonies destined to have a more beneficial influence upon their progress than this passage from sea to sea by the expedition of the late Mr. Burke.

"I consign this medal to your hands, to be delivered to his nearest relative. Oh! that this posthumous tribute of a nation's gratitude could in any way assuage the sorrow and mitigate the bereavement of the many friends and admirers whom he has left to bewail his loss."

THE DUKE OF NEWCASTLE assured the meeting that he attended there in fulfilment of what he considered a public duty, at once painful and agreeable—painful because he received at the hands of the President this token of admiration of one of England's great men, for transmission not to him for whose merits it had been bestowed, and who was now cold on the shores of that great country on which he had conferred such great benefits, but to those relatives who, like the colony itself, must look back upon his memory with affectionate admiration. At the same time it was a pleasurable duty, because it showed that this Society, as well as the country at large, had not been insensible to the merits of the individual or the services he had rendered to science and civilization. These medals, as it had been correctly stated by the Chairman, were not conferred at the option of private individuals, but by the Crown, through the instrumentality of the President and Fellows of that Society; but the medals must bear an additional value when it was recollected that they were not bestowed upon any arbitrary principles, but by gentlemen eminent for their knowledge and experience, and who were well calculated to appreciate the merit they rewarded. Standing before them as he did, entrusted by Her Majesty with the seals of the Colonial Office, he felt bound to express his admiration of the colony of

Victoria in instituting this expedition. That was perhaps the one of the Australian colonies least interested in the result of Mr. Burke's expedition; at the same time it entered upon it with that public spirit which had actuated this country in similar expeditions—a desire to benefit science and to extend civilization throughout Australia, of which the colony of Victoria formed so important a part. But if credit was due to Victoria for this, it was also due to that colony to acknowledge that it set on foot other expeditions when the fate of Mr. Burke was held in the balance, and when it was hoped that expeditions might afford aid, or probably effect his rescue. It would be unnecessary to say much upon the individual merits of Mr. Burke, for most of those present had read that touching despatch of Sir Henry Barkly in which he narrated the circumstances of Mr. Burke's untimely fate. In him they had lost a man as eminent, as gallant, and as great as that intrepid brother who perished on the banks of the Danube. He felt certain that the Society had done well in awarding its medal to so distinguished an explorer. It would not be proper for him to pledge the Colonial Office to anything on such an occasion, but he would say that on all such matters as that the authorities of that office looked to the Royal Geographical Society as a guide and instructor, and, although it might not be always possible to follow what was suggested, it would always be with great deference that they received suggestions, and with great reluctance that they were unable to carry them out. On the part of the friends of Mr. Burke he thanked the Society, and assured them that the medal should be duly transmitted to them.

At the desire of the President, the terms of the award of the Patron's Gold Medal were then read as follows:—"The Patron's Gold Medal has been awarded to Captain Blakiston, of the Royal Artillery, for his survey of the river Yang-tze-Kiang, from Yochow to Ping-shan, extending nine hundred miles beyond the farthest point previously reached by Englishmen."

The PRESIDENT then said,—

"CAPTAIN BLAKISTON,—Having already had the pleasure of being associated with you in private life, I rejoice that it should be from my hands that you receive this honourable distinction, awarded you by the Council of the Royal Geographical Society."

CAPTAIN BLAKISTON, R.A., expressed his gratification at receiving the medal, but regretted that in a private expedition any distinction had to be made. He wished that it could be divided into four portions, so that each of his companions might receive a share; but

that not being possible, he should consider that he held it in trust for them.

He tendered his thanks to the President and Council for the award, and to the members present for their flattering reception, and concluded by saying that he should ever remember that the "Upper Yang-tze Expedition" had gained one of the highest honours accessible to geographers.

A D D R E S S
TO THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON;

Delivered at the Anniversary Meeting on the 26th May, 1862,

BY THE LORD ASHBURTON,
PRESIDENT.

OBITUARY.

IN the Report which has been read, you have heard of the increasing numbers of this Society—numbers which begin even to exceed the space which we can assign to them. But at the same time there is another review to make—the melancholy review of our losses. There have passed away from amongst us men of European reputations, lamented not only by the friends they loved, but by the public they have served; who have laboured in their day not only for the generation among whom they lived, but for all time and for all humanity. As the narrow circle of kindred within which a man has lived hasten with pious reverence to celebrate solemn obsequies over his tomb, so the wider circle within which he has worked find a pride and glory in recording the worth and recounting the actions of the fellow-labourer they deplore.

I begin our melancholy list by recording the death of our Royal Vice-Patron, the late Prince Consort. His vigilant eye was not confined to the science of geography alone; it extended to every science, every pursuit which could in any way contribute to the welfare of his fellow men. Our grief for the irreparable loss we have ourselves sustained has been still further intensified by our

sympathy with that great Lady, our Queen and Governor, in whom we glory, on whom we have concentrated all that we have of respect, admiration, and love.

The Prince alone could, from his universal and accurate knowledge, from his exalted position, carry out to their successful completion, a course of measures by which he hoped to secure for his adopted country an honourable supremacy in every department of science and of art. Such I believe to have been the determinate purpose of our great Patron. He has passed away from amongst us, and where shall we find his like? Where shall we find such power, such knowledge, such earnest zeal, such deliberate wisdom, such patient endurance of opposition?

Where shall we find a constancy inspired by love to us, and elevated by the aspirations of a noble mind for the advancement of mankind? On every public and private occasion he gave to men distinguished in art, science, or literature, that social position to which they were entitled. He exerted himself by every means in his power to enlarge the sphere of education.

He organized and completed the Great Exhibition of 1851. It was then, when we came into direct conflict with other nations, that our manufacturers found that for the higher branches of their respective arts they must have French designers, French painters, and Italian modellers. They became conscious of their inferiority in taste and workmanship; they found the want of such public institutions as had facilitated in foreign countries the cultivation of the artist and the mechanic.

Public opinion thus roused, enabled the Government to carry out the Prince's views, by the establishment of schools of art and science throughout the country.

Already in 1855, enlightened foreigners were struck by the progress which had been made in four short years. Eight more have now elapsed; improvement has been going on in an accelerated ratio. A measure of progress is applied this year, by the Exhibition of 1862, to test the success of the Prince's plans and labours; but the originator of them all is not there, to hear the universal voice of praise and gratitude. His far-seeing eye is closed, his fostering hand is cold. Science has lost her noblest patron, England her surest guide.

Thomas William ATKINSON, the Siberian traveller, was born of humble parents at Cawthorne, a village in the West-Riding of Yorkshire, on the 6th of March, 1799, and the only education he received was at its village-school. At the age of eight years he

followed the plough, at ten he began to earn his own livelihood as a bricklayer's labourer and quarryman, and afterwards worked in a stonemason's yard.

In 1819 he was employed as mason in rebuilding St. Mary's (the old) Church at Barnsley, where he distinguished himself by carving some unusually fine work, and showed so much talent that he was strongly recommended to try his fortune in a larger sphere.

In accordance with this advice he went to London, and in 1827 he established himself in Upper Stamford Street, Borough, as an architect. In 1842 he left England for Hamburgh, where he was engaged during 1845 in the reconstruction of the church of St. Nicholas, and where he obtained some patronage from the King of Prussia.

He next visited Egypt and Greece, and in 1846, by the advice of Baron Humboldt, went to Russia. He there formed the project of an artist's journey into Siberia; and the Emperor of Russia granted him the rare privilege of a *blank* pass throughout his Asiatic dominions. The crowning effort of Mr. Atkinson's life then commenced; he started on his journey through southern Siberia, the Kirghis Steppes, and parts of Central Asia.

On his return he wrote his *Travels*, entitled 'Oriental and Western Siberia,' in 1858, and 'The Upper and Lower Amoor,' &c. in 1860.

JAMES BRANT, C.B., was a gentleman well known to many travellers and tourists, from his long official connection with Eastern countries. He was appointed Vice-Consul at Trebizond, in 1830, and Consul at Erzeroum in 1836, where he remained till the close of the Russian war, and then was transferred to the Consulship of Damascus. He retired from the service in 1860, and died suddenly last year at the age of seventy.

Captain Walter Colquhoun GRANT, the author of an able and vivid description of Vancouver's Island, published in Vol. xxvii. of our Journal, died at Saugor, Central India, aged thirty-nine. He was the only son of the late chief of the intelligence department of the army commanded by the Duke of Wellington in the Peninsula. He did good service in the Crimean war, and again in India he assisted in the siege of Lucknow, and succeeded to the command of the regiment of irregular cavalry known as 1st Hodson's Horse. One of Captain Grant's last acts was to prepare and transmit to this Society a map and paper on Sikkim, which, however, have not yet reached their destination.

JAMES ORMISTON M'WILLIAM, M.D., F.R.S., was chief medical officer

to the disastrous expedition in 1841, under Captain Trotter, R.N., in which his name is familiar to all who are conversant with the history of Niger enterprise. During the return voyage of the afflicted party, when the survivors were mostly fever-stricken, Dr. M'William displayed an energy and devotion which demanded and obtained the most grateful acknowledgment. His experience gained on this fearful occasion has been of marked utility to after travellers, and is recorded in his well-known 'Medical History of the Niger Expedition.'

The Rev. Dr. Joseph WOLFF, whose name is so intimately associated with Eastern travel, was the son of a Rabbi, and was born at Weilersbach, in the year 1795. He was converted to Christianity through his acquaintance with the Count of Stolberg and Bishop Seiler, and was prevailed upon to enter the Monastery of the Redemptorists at Val-Saint, near Tribourg. Being unable to convince himself of the truth of Romanism as taught there, he left Val-Saint and came to London; and after studying the Oriental languages under Dr. Lee of Cambridge, and theology under the late Rev. Charles Simeon, commenced his travels for the purpose of proclaiming the Gospel to the Jews, Mohamedans, and Pagans. He travelled in Mesopotamia, Persia, Teflis, and the Crimea; incessantly preaching at every town and village he came to. From 1831 to 1834, Dr. Wolff proceeded to search for the Ten Tribes. A full account of all these wanderings and of his second journey to Bokhara, in order, if possible, to effect the liberation of Colonel Stoddart and Captain Conolly, as also of his visit to the United States, will be found in his works.

I have now recorded the sad list of those who have, by their labours, contributed to geographical science and discovery. There are others whose cheerful presence we miss, sedulous attendants of our meetings, contributors to our funds. But they came to learn, not to instruct; they came to enjoy the fruits which others, with toil and danger, had sown and reaped.

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 surveying parties, one-half of whom are employed on the

coasts of the United Kingdom; the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, Newfoundland, and Vancouver Island; and on the foreign coasts of Syria, Cyrenaica, in Banka Strait, China, and Japan.

England.—The Coast Survey of the British Isles is so nearly complete that the account of its advance from year to year must necessarily be made up of minor topographical details, which would be out of place in a general view of the progress of geography all over the globe, were it not for their important bearing on the safety of navigation, and their being of special interest to the numerous class connected with the vast commercial marine of the country. Beginning then with the south coast: the shores of the Solent, Southampton Water, and Portsmouth harbour have been re-examined by Mr. Scott Taylor, R.N., in order to insert the several changes that have been caused by the progress of the nation and the requirements of trade during the last sixteen years, when the former survey was made. Questions, too, connected with deep-water docks, and the extension of Portsmouth harbour, have led to a critical examination of the early surveys of this region—and apparently the depth of water on Portsmouth Bar is found to be precisely the same.

In the Channel Islands Mr. Richards, R.N., is continuing his re-examination, and, by patiently struggling against the rapid tides that prevail around that group, has succeeded in discovering many small rocks which might have wrecked a vessel. On the coast of Devon Captain Stokes, R.N., with his staff, has completed the survey of the Yealm river and the soundings in Bigbury Bay; and the chart of Plymouth Sound by Commander Cox, on the scale of 6 inches to a mile, has been published. In the Scilly Isles Captain George Williams has made much progress in the re-examination of that intricate group. In the Bristol Channel Commander Alldridge has continued the survey of the coast of Glamorganshire, and sounded over 180 square miles of ground; while Mr. Calver, R.N., with his staff, on the east coast, has continued the survey of the upper part of the Humber from Hull to Goole, has re-examined the eastern gateway leading into Yarmouth Roads, and the Shingles channel at the mouth of the Thames.

Scotland.—In Argyllshire Commander Bedford and his staff have surveyed 14 miles of the open north-west coast of Mull, and 9 miles of Loch Linnhe, with 76 miles of the shores of Loch Awe, besides sounding over an area of 60 miles. Captain Otter and staff have

surveyed Loch Lomond, the Sound of Barra in the Hebrides, a portion of the Isles of Harris and Benbecula, and a part of Rum; while Mr. Jeffery has brought to a close the survey of the coast of Inverness-shire.

Ireland.—On the east coast of Ireland Mr. Hoskyn has been engaged on the upper part of Lough Strangford and on the coast of Down, and has sounded over an area of 65 miles. On the south coast Commander Edye has filled up the off-shore soundings that were wanting in our charts over an area of 1200 square miles; he has also sounded an area of 800 miles on the north coast. A general chart of the west coast of Ireland, on the scale of two-tenths of an inch to a mile, with numerous small plans, has been published by the Admiralty during the past year; as also Dingle and Ventry harbours and Blasket Sound, and the outlying fishing-bank and almost inaccessible islet of Rockall.

Mediterranean.—While carefully sounding the bottom and pioneering the way for the electric submarine cable between Malta and Alexandria, Captain Spratt, with his staff, in the *Medina*, has taken advantage of the opportunity afforded to re-examine the north coast of Africa by Cyrenaica, and to correct its outline; also to make plans of the roadsteads of Tripoli, Benghazi, &c. One of the first uses to which the submarine telegraph was put was to determine the meridian distance between Malta and Alexandria. This has been successfully accomplished by Captains Spratt and Mansell; and the result of these measurements gives $16^{\circ} 6' 3''$ as the difference, or $29^{\circ} 51' 42''$ as the longitude of the lighthouse at Alexandria; this determination differs only $14''$ from that already obtained by chronometric measurements. On the coast of Syria Commander Mansell and his staff have completed a second sheet of the coast from Markab to Cape Bianco, and connected with it several important points in the interior, as Ba'albek, Hermon, Jibbel, Sunnín, and others.

The charts connected with the Mediterranean which have been published during the past year are as follows:—Valetta harbour, Malta, on the scale of 11 inches to a mile; Rhodes Island, on the scale of eight-tenths of an inch, with enlarged plans of the ports; Scarpanto and Casso islands, on the scale of 1 inch; the western portion of Crete, on the scale of half an inch, with views and plans of ports, completing the survey of this rich and beautiful island; Euripo Strait, in Greece, on the scale of 3 inches; and a general chart of the Delta of the Danube, on half an inch, with the Sulina

mouth of that river, showing the increased depth that has been gained over the bar by the recent works which have been carried out by the International Commission.

Africa.—On the west coast of Africa the river Volta has been explored as far as the first rapids at about 50 miles from its mouth, the Ogún for 40 miles from Lagos to within 4 miles of Abeokúta, and the St. Nicholas and Brass branches for 25 miles from the sea; and the sketch-map of each has been published at the Admiralty. In the Cape Colony Mr. Francis Skead, R.N., is engaged on the coast near Hout Bay. In the early part of the year he accompanied Mr. May, R.N., in Dr. Livingstone's new steamer to the Zambesi, and made an improved sketch of the five mouths of that river, and more correctly determined their position, while Mr. May proceeded with Dr. Livingstone and Bishop Mackenzie to the river Rovúma, and explored it for 30 miles from its mouth, which was as far as the falling water would allow them to ascend: the sketch of this river, on the scale of 1 inch to a mile, has been published. In the Red Sea a plan of Dissee Island and harbour, and Commander Mansell's re-survey of the Strait of Jubal, with the Ashraffi reef and islet, have been engraved; and it is gratifying to be enabled to add that the intelligent Viceroy of Egypt, His Highness Said Pasha, has caused three lights to be established to facilitate the navigation of that narrow sea—one on Zafarana point, already lighted; one on the Ashraffi reef, at the southern entrance of the Gulf of Suez, which will be lighted shortly; and a third on the Dædalus reef, which is to be lighted towards the close of the year.

Asia.—The chart of the Persian Gulf, to which I referred last year, by Commander Constable and Lieutenant Stiffe, of Her Majesty's Indian Navy, has been published at the Admiralty in two sheets, on the scale of a quarter of an inch to a mile, with plans of several small ports and various views of headlands: it is accompanied by a memorandum on the former charts of this gulf, with a table of positions; and the Sailing Directions are far advanced in printing. The whole work is highly creditable to the surveying officers of the Indian Navy; and the chart is one of those selected to be sent as a specimen to the International Exhibition. A plan of Bahrein has also been completed by Lieutenant Whish.

In India a gap in the Malabar coast—Thullknob to Borin pagoda—has recently been filled up by Lieut. Williams, I.N.; and thus the whole of the west coast of the peninsula south of Bombay has been surveyed. Lieut. Taylor, I.N., is engaged in writing the

Sailing Directions from Cape Comorin to the entrance of the Persian Gulf; while Lieut. Ward is making progress with those on the south coast of Arabia from Ras al Had to Bab el Mandeb, including Sokotra and the Gulf of Aden. There still remains some portions of this eastern region which it would be highly desirable to examine; and it is understood that the Secretary of State for India in Council has decided that the work shall be done; and I believe that it may help to advance the cause of geography by giving a brief summary of these gaps, coupled with the expression of the wish of the Geographical Society that an early opportunity may offer for their being filled up. They are as follows:—1. The coast of Malacca from the Sakshan River to Pulo Penang, about 300 miles. 2. Coast of Orissa from Santapilly rocks to Point Palmyras, about the same distance. 3. The coast from Chittagong to Akyab, at the head of the Bay of Bengal. 4. The re-examination of the group of the Andaman Isles. 5. The west coast of India from Bombay northwards to Danu, about 100 miles. 6. Bombay harbour on a large scale, so as to admit of docks and other engineering works being planned upon it. 7. The Batnah coast from Maskat to the entrance of the Persian Gulf, 250 miles. 8. The coast of Africa from Ras Bir to the entrance of the Red Sea, 15 miles. 9. A series of chronometric measurements throughout the Bay of Bengal and to Singapore. 10. A similar series from Bombay westwards to Suez and to the outlying islands in the Indian Ocean.

These two last can only be well done by a vessel specially devoted to the service, carrying a batch of at least thirteen chronometers. There is no work that could be undertaken that would place the hydrography of those seas on a firmer basis than the measurements last named; and I believe that I do but give utterance to the hearty desire of this Society in expressing a wish that, before the accomplished surveyors of the Indian Navy are dispersed abroad, Her Majesty's Secretary of State for India, than whom no one knows better the value of accurate geographical information, may be pleased to set this seal to the labours of Ross, Horsburgh, Moresby, Elwon, Grieve, Haines, Ethersey, and other officers of the Indian Navy, who, during the past half-century, have patiently borne the toil and heat of the day to furnish the mariner with charts by which he may with safety navigate those Eastern seas.

In the Banka and Gaspar Straits, and near Linga, Mr. Stanton, R.N., in *H. M. S. Saracen*, has materially corrected our charts during the past year. It may serve to show our ignorance of the geo-

graphy of these regions in the middle of the nineteenth century, when I state that the populous town of Palambang, in Sumatra, was found to be 14 miles in error in latitude in all our best maps and charts, being placed that much too far to the south. A chart of Singapore, by Mr. John Richards, R.N., has recently been published by the Admiralty on the scale of 12 inches to a mile; it shows at a glance the docks, coal-wharfs, and other accommodation at that flourishing entrepôt of the trade of the East.

China and Japan.—One hundred and twenty miles of the upper part of the Yang-tze-Kiang above Hankow has been explored as far as Yo-chow-foo, at the entrance of the Tung-ting Lake, as far as 500 miles above Nanking, during the past year. In addition to this service, Captain Ward in the *Actæon*, and Lieut. Bullock in the *Dove*, have been employed on the southern coast of Japan. In the mean time some of the results of their labours of former years have recently been published by the Admiralty—as Port Adams in the Gulf of Pechili; the Liao river up to Niu-chwang, one of the trading ports under the treaty; Chifu or Yentai harbour; Talién-whan Bay, Wei-hai-wei and Lungmun harbours; Hai-yun Island, containing Thornton Haven, Pechili Strait, and a general chart of the Gulfs of Pechili and Liao-tung. The *Actæon* has just arrived in England, after five years' absence in the China Seas, during which very material additions have been made by her officers and crew to our knowledge of the coast, rivers, and outlying islands of China and Japan.

Australia.—Allusion was made in the Address from the Chair of last year to the wise liberality of the Australian colonies in sharing with the Admiralty the expenses of an organised system of coast surveys. Parties, under the command, respectively, of Commanders Sidney, Cox, Hutchison, Lieut. Brooker, and Mr. J. Jeffreys of the Royal Navy, are now established in New South Wales, Victoria, South Australia, Tasmania, and Queensland; detailed plans of places locally important have been received, and the steady progress of an efficient examination of the extensive lines of seaboard of the several provinces may now be confidently anticipated.

To keep pace with the rapid extension of colonization on the shores of the intertropical part of the east coast, a series of charts to connect with the detailed surveys of the late Captains Owen, Stanley, and Blackwood (which extended from Torres Strait to $18\frac{1}{2}^{\circ}$ south), are in the course of construction, compiled from the detached and partial examinations of our naval surveyors from the

time of Cook to the present date, to be eventually connected, it is to be hoped, by the rising generation.

Charts of the Coral Sea, embracing on a small scale all these coast features, and giving the recent surveys of Captain Denham, R.N., have been published, and prove a great boon to the navigator. The labours of this officer in the Australian seas, extending over nine years' service, deserve more than a passing notice; but, limited necessarily in this Address in time and space, a summary of the more salient statistical features can alone be given. 200 sheets, as I am informed, of charts, plans, and drawings, are completed and in progress; 163 positions catalogued; the variation of the compass tested afloat 2410 times, and 191 times on shore; 41 islands and 42 ocean reefs and sunken shoals surveyed; 700 miles of edge of soundings contoured; and 23 fabulous dangers erased from the charts.

The most favourable accounts have been received of the security of the passage through Torres Strait by the great north-east channel; and the testimony appears to be overwhelming in its favour compared with those by Raine islet and the numerous treacherous openings through the barrier reefs near the 12th parallel of south latitude. The merchant-ship *Castilian*, drawing 20 feet, has recently made two voyages through the north-east channel in sixteen hours. We cannot here forbear paying a passing tribute to the valued labours of the late Captain Francis Blackwood, R.N., who so successfully and clearly defined this remarkable and valuable channel.

A general chart of Australia in two sheets, with the adjacent islands and seas between its northern coast and the equator, has also been completed during the past year. The authorities and materials for this chart have been most extensive: in addition to the well-known names of Flinders, King, Wickham, Stokes, Stanley, Blackwood, Yule, and Denham, the recently-published Dutch charts of the Arafura, Banda, and Java seas have been consulted, and the northern coast of New Guinea, the shores of New Ireland and New Britain, as resulting from various French surveys extending over half a century, connected by the more recent chronometric measurements of Sir E. Belcher—the whole chart being thus reduced to the common meridian of Fort Macquarie, Sydney, New South Wales.

Vancouver Island.—Crossing the Pacific Ocean to the thriving colony of British Columbia, we find that Captain George Richards,

in H. M. S. *Hecate*, with his staff of assistants, has surveyed 700 miles, much of it open sea-coast or the exposed entrances of the great sounds on the west side of Vancouver Island; during which time the party thoroughly sounded over an area of 400 square miles in Barclay and Clayoquot or Clakkot sounds, and more generally over 1400 miles off the entrance to Fuca Strait. In the course of the past year plans have been published at the Admiralty of Esquimalt and Victoria harbours, on the large scale of 10 inches to the mile; of Haro Strait and Middle Channel, on the scale of 1 inch; and Sailing Directions generally for the straits, harbours, and rivers of this district.

Newfoundland.—The re-examination of the south coast of Newfoundland, under Captain Orlebar and his assistants, has made good progress during the past season, in the course of which 200 miles of sea and harbour coast-line have been mapped in six large sheets, generally on the scale of 3 inches to a mile. At the same time, plans of Placentia harbour, Port Basque, and St. Pierre Island, on the same scale, have been published, as well as Pope and Tangier harbours in Nova Scotia—the latter place becoming of importance on account of the immediate vicinity of the gold-diggings which have been discovered.

Bay of Fundy.—The tedious survey of this bay of fogs and rapid tides is at length complete, and Captain Shortland and his staff have moved on to the south-eastern part of the coast of Nova Scotia. In the course of the past season they have mapped 27 miles of open coast and 154 miles of harbour and river shore-line, sounding over an area of 260 square miles. On this eastern coast of America the unhappy civil war, and the uncertain state of political affairs, has led to the publication of forty-two sheets of the several charts and plans taken from the admirable United States Coast Survey, with the Sailing Directions that accompany them.

West Indies.—The survey of the group of the Grenadines has been completed by Mr. Parsons, R.N., and his assistants, and they are now moving on to the island of Sta. Lucia and the port of Castries. In the course of the year they have mapped 45 miles of coast-line, and sounded over an area of 310 square miles. The chart of Grenada, on the scale of 1 inch, and the plan of St. George's harbour, on the scale of 20 inches, have been published. Also, in Texas, plans of the entrances of Rio Grande and Brazos river, with the San Luis, Aransas, and Sabine passes.

Variation of the Compass.—Resulting from the investigations that have been in progress for some time past (which have been alluded to in former Addresses) by Mr. Frederick J. Evans, R.N., F.R.S., Superintendent of the Compass Department of the Admiralty, and Mr. Archibald Smith, F.R.S., whose gratuitous labours in this cause are beyond all praise, a Manual embracing ample practical and theoretical rules for ascertaining and applying the deviation of the compass in ships is on the eve of publication. This Manual has appended to it charts of the lines of equal variation, dip, and horizontal force, by the examination of which the seaman may become familiar with the distribution of these elements, so important as a correlative branch of science to that of navigation under the great impending changes in naval architecture. It is a gratifying feature that these researches should have preceded the sudden demand for a new order of iron war-ships. In connexion with this subject, Mr. Burdwood, R.N., of the Hydrographic Office, has computed and published Tables of the sun's true bearing or azimuth for the parallels of 49° and 50° N., which will enable the mariner at once to determine the amount of variation and local deviation combined by a simple compass-bearing of the sun either in the morning or the evening—thus affording a constant check to the ever-changing deviation in an iron ship, according to whether she heels to star-board or port, which in many cases is an unsuspected source of danger.

Besides the surveys above enumerated as in progress in different parts of the world, the labours of the Hydrographic Office during the past year have consisted in the publication, under the immediate superintendence of Captain George A. Bedford, R.N., Assistant Hydrographer, of about ninety new and corrected charts and plans, some of which I have already mentioned. There have also been published the usual Tide Tables for two thousand places on the face of the globe, Light and Hydrographic Notices acquainting the mariner at once with the slightest change or discovery of rock or shoal that can affect the safety of navigation. Mr. Michael Walker, too, has taken advantage of the leisure afforded by his retirement from office, and has examined and corrected about five hundred of the Maritime Positions, chiefly in the Eastern seas, recently published in the 7th edition of Raper's 'Practice of Navigation.'

ORDNANCE SURVEY.*

The publication of 'The Trigonometrical Survey of the United Kingdom' is now completed, and is comprised in seven quarto volumes, viz. :—

I. The Principal Triangulation, with the Figure, Dimensions, and Mean Specific Gravity of the Earth derived therefrom, 2 vols.

II. Levelling, taken in Ireland, 1 vol.

III. Levelling, taken in England and Wales, 2 vols.

IV. Levelling, taken in Scotland, 2 vols.

Thus this great work, which was commenced in 1783, under General Roy, R.E., is at length finished.

In last year's estimates the sum of 1000*l.* was taken to enable the director of the survey to extend the triangulation of England through France to the frontiers of Belgium, so as to form a connection between the triangulations of England and Belgium. This operation has been completed. The stations selected to form the connexion across the Channel were St. Peter's Church, between Margate and Ramsgate; Coldham, on the high ground north of Folkestone; and Fairlight, a few miles north of Hastings. From these three stations observations were taken to the church at Gravelines, to Mont Couple, near Wissant, and Mont Lambert, near Boulogne.

From these three last-named stations a station raised 74 feet above the level of the ground at Harlettes, between Boulogne and St. Omer, was observed, and then the churches at Cassel and Dunkirk, and then the station at Mont Kemmel, near Ypres, in Belgium. The triangle, Dunkirk, Cassel, and Mont Kemmel, is common to the triangulations of France and Belgium, and is now also made part of the extended triangulation of this country, and the lengths of its sides will therefore be independently determined by the geometricians of the three countries from the measured bases in the three countries, and a comparison of the results will be highly interesting; but the French officers who were ordered to observe at the same stations that ours observed at, not having been able last year to take the observations across the Channel, the comparison cannot yet be made. They have now, however, returned to this country to recommence their work, and it is to be hoped they will be able to finish it this summer.

During last year the Belgian geometricians were engaged in con-

* Colonel Sir Henry James, R.E., Superintendent of the Ordnance Survey.

necting their triangulation with that of Prussia, and the Prussians in connecting theirs with that of Russia; and thus we shall shortly have a connected triangulation, extending from the west of Ireland to the Oural mountains, and the means of computing the length of an arc of parallel of about 75° in length.

The electric telegraph now furnishes the means by which the difference of longitude between distant places can be determined with greater precision than they could formerly be by the transmission of chronometers from one station to another.

The Astronomer Royal will therefore this year re-determine the difference of longitude between Valentia, in the s.w. of Ireland, and the observatory at Greenwich, by means of the electric telegraph; and as it will be necessary for the director of the survey to connect the station selected by the Astronomer Royal at Valentia with the triangulation of the kingdom, a joint expedition is now about to proceed to Valentia for this double purpose, and to complete the quota of work assigned to us for the measurement of this great arc of parallel.

The engraving of the complete map of Ireland in outline, on the scale of one inch to a mile, was finished last year, and the hill features are now being engraved. There are 205 sheets in this map.

The progress of the Cadastral Survey in the north of England and Scotland has been greatly retarded in consequence of the very numerous and extensive surveys which have been made by the Ordnance in the south of England for purposes connected with the defences of the kingdom.

But as all these have been made on the scales adopted for the National Survey, and the plans have been drawn as so many sheets of a complete survey of the counties to which the places belong, they will form a part of the Cadastral Survey of England and Wales, should such a measure be decided on; and as the committee of the House of Commons, of which Lord Bury was chairman, which was appointed last year to report upon "the expediency of extending the Cadastral Survey to those portions of the United Kingdom which have been surveyed upon the scale of one inch to a mile only," have reported in favour of it, the cost of the surveys made for the defences will go to diminish the cost of the Cadastral Survey.

In the north of England, Yorkshire and Lancashire have been published on the 6-inch scale; Westmoreland and Durham on the 25-inch scale; and the survey is in progress in Northumberland

and Cumberland. A large portion of each of these counties has already been published, and they will be finished this year. The last sheets of the 1-inch map of England and Wales are in the hands of the engravers; we may, therefore, expect that this map, which was begun in 1784, will now be soon finished. In Scotland all the southern counties have been published either on the 25-inch or 6-inch scales; and the counties of Forfar, Perth, Stirling, and Dumbarton are in course of publication; and the survey is proceeding in Perthshire, Kincardineshire, and Buteshire. The 1-inch map of Scotland is also in course of publication.

The plans of the eight northern counties of Ireland have been revised and made perfect in every detail, like the plans of the southern counties. This perfect revision was rendered necessary to enable the Government valuers to mark upon the plans every property and tenement; and this has now been done throughout the whole of Ireland. The Ordnance plans are now invariably used for the transfer of land under the Landed Estates Court, the cost of preparing the plans for the court being charged to the carriage of the sale of the property; and the same arrangement will doubtless be introduced here as soon as some progress is made in the Cadastral Survey.

Sir Henry James has this year published six sheets of the Marginal Lines for the sheets of a map of the whole world, on the scale of 2 inches to a mile; the object in view being to have a map constructed on the largest scale required for geographical purposes, the sheets of which can be put together to form a connected map of any part of the world, however large or however small; and to avoid the confusion arising when we attempt to put together maps of different countries, as they are now constructed on different scales and on different projections.

This is a great undertaking, and one which will require the co-operation of a great number of people and some years to accomplish; but the advantages to be derived from having such a grand map of the world are obvious; and it is right that the topographical department of such a country as ours should undertake to make it.

In a discussion upon the relative merits of several projections for large portions of the earth's surface which has been published in the last number of the 'Philosophical Magazine,' it has been demonstrated, that, assuming the errors which all projections of a spherical surface on a plane must necessarily have, viz., distortion in form and distortion in area, are equally objectionable, the distance of the point of projection adopted by Sir Henry James in his geometrical projection of two-thirds of the sphere, will, for the projection of a

hemisphere, give the least possible distortion of form and area, and that the misrepresentation will be a minimum. If we draw a circle and two diameters in it at right angles to each other, one may be taken to represent the plane of projection for the concave hemisphere above it, and the point of sight or projection is at the distance of half the radius in the prolongation of the other beyond its circle. It is now demonstrated that this is the best possible projection for a hemisphere, and it should therefore be adopted by all geographers.

METEOROLOGY.*

In Meteorology some degree of increased interest has been caused by various discussions and publications, besides an organised system of forecasting weather and giving cautionary notice of expected storms.

In treating so complicated and extensive a subject as that of our atmosphere and its movements, it is extremely difficult to combine mathematical exactness with the results of experience obtained by practical ocular observation and much reflection; but to some extent this has been effected recently, the Board of Trade having arranged telegraphic and frequent communication between widely-separated stations and a central office in London; by which a means of *feeling*—indeed one may say *mentally seeing*—successive simultaneous states of the atmosphere over the greater extent of our islands is established; and an insight into its dynamical laws has been thus obtained, to which each passing month has added elucidation and value.

Possibly at this time, when extensions of our arrangements to the Continent are contemplated in France, in Hanover, and in Prussia (although *here* there are still persons who doubt, if they do not entirely disbelieve their utility), it may be desirable to circulate an explicit description of the basis, and the nature, of those forecasts and occasional warnings, which have been proved during the past year.

The first cautionary or storm-warning signals were made in February, 1861; since which time similar warnings have been given, as occasions needed.

In August, 1861, the first published "forecasts" of weather were tried; and after another half-year had elapsed for gaining experience

* Admiral FitzRoy, Director of the Meteorological Department, Board of Trade.

by varied tentative arrangements, the present system was established. Twenty reports are now received each morning (except Sundays), and ten each afternoon, besides five from the Continent. Double forecasts (two days in advance) are published, with the full tables (on which they chiefly depend), and are sent to six daily papers, to one weekly, to Lloyds', to the Admiralty, and to the Horse Guards, besides the Board of Trade.

These forecasts add almost nothing to the pecuniary expense of the system, while their usefulness practically is said to be more and more recognised.* Warnings of storms arise out of them, and (scarcely enough considered) the satisfaction of knowing that no very bad weather is imminent may be very great to a person about to cross the sea. Thus their negative evidence may be actually little less valuable than the positive.

Prophecies or predictions they are not: the term forecast is strictly applicable to such an *opinion* as is the result of a scientific combination and calculation, liable to be occasionally, though rarely, marred by an unexpected "downrush"† of southerly wind, or by a rapid electrical action not yet sufficiently indicated to our extremely limited sight and feeling. We shall know more and more by degrees. At present it is satisfactory to know that the measures practised daily in these proceedings do not depend solely on one individual: they are the results of facts exactly recorded, and deductions from their consideration, for which rules have been given. An assistant is able to share their responsibility now, and others are advancing in the subject of dynamical meteorology.

In order to enable the reader to judge of the basis on which rules for forecasting probable weather are founded, some degree of explanation may here be offered—as the method is new in its combinations, although depending on old or well-known principles.

Air-currents sometimes flow side by side, though in opposite directions, as "parallel streams," for hundreds or even thousands of miles. Sometimes they are more or less superposed: occasionally, indeed frequently, crossing at various angles; sometimes combining, and by the composition of their forces and qualities causing those varieties of weather that are experienced as the wind veers more toward or from the equator or the nearest pole; and sometimes so antagonistic in

* At a recent meeting of the Shareholders of the Great Western Docks at Stonehouse, Plymouth, it was stated officially that "the deficiency (in revenue) is to be attributed chiefly to the absence of vessels requiring the use of the graving-docks for the purpose of repairing the damages occasioned by storms and casualties at sea."

† Herschel.

their angular collision as to cause those large circular eddies or rotatory storms, called cyclones, which are really like the greater storms in all parts of the world, although they do not quite assimilate to local whirlwinds, dust-storms, and other commotions of atmosphere, which seem to be more electrical in their characteristics, if not in their origin.

Whenever a polar current prevails at any place, or is *approaching*, the air becomes heavier, and the barometer high, or rising. When the opposite (equatorial or tropical) prevails or approaches, the mercury is low or falls, because the air is, or is becoming, specifically lighter, and these changes take place slowly. Whenever, from any causes—electrical, chemical, or simply mechanical—either current, or any combination of currents, ceases to press onwards without being opposed, a gradual lightening of the atmosphere, through a greater or less area of hundreds or perhaps thousands of miles occurs, not suddenly, but very gradually, and the barometer falls: there is less tension.

To restore equilibrium, the nearest *disposable* body of air (so to speak), or most moveable, advances first; but an impulse at the same time may be given to other and greater masses that—though later in arriving—may be stronger, last longer, and cause greater pressure, mechanically as well as by combination. Air, like water, mingles slowly, either from above or laterally.

Taking, with Dové, north-east and south-west (true) as the “wind-poles,” all intermediate directions are found to be more or less assimilated to the characteristics of those extremes, as they are nearer one or other; while all the variations of pressure or tension, many of those caused by temperature, and all varieties of winds, may be clearly and directly traced to the operations of two constant principal currents—equatorial or tropical, and polar—our north-east and south-west.

It has been proved that storms—indeed all the greater circulations of atmosphere in the zone between the tropics and polar regions—have an eastward motion bodily, while circulating around a central area. Within the tropics it is otherwise, or westward,—till they *recurve*, moving first toward the *nearer* pole, direct, and then eastward, with more or less direction toward the same pole.

Clear distinction should be made between those ever alternate and often conflicting main currents—tropical or polar, and the local effects of their union or antagonism, namely, mixed winds—whether westerly or easterly, with occasional eddies, or cyclones, on a larger or on a smaller scale.

The lower current does not ordinarily extend far upward (only some few thousand yards), and highlands, mountains, especially *ranges* of mountains, alter and impede its progress, so that a variety of eddy winds, or streams of wind, with local and apparently anomalous effects, are frequently caused.

Heat, electrical action, or cold; condensation of vapour into hail, snow, rain, or fog; or its other changes, namely, evaporation, rarefaction, and expansion—absorbing heat, and therefore causing *cold*—immediately cause currents of air, in a degree proportional to such influence; inducing horizontal motion and dynamical force.

The polar current always *advances* from the polar quarter while *laterally* moving eastward (like a ship making lee-way), being pressed towards the east by the tropical flow which advances from the south-westward, usually above and at an angle with the polar stream or current of air, often mixing with it, but at times *separately* penetrating downward, then sweeping and warming the earth's surface, uncombined with the polar current even while feeling its approaching influence, and thus, as it were, forcing passages between streams of chilling polar air that at the same time are moving in opposite and nearly parallel directions.

At times, after a continuance of tropical air-current, or during its general prevalence, a polar flow or separate stream of air (electric, cold, dry, and of greater pressure or tension than the prevailing body of air then next the earth) passes above, chilling and otherwise influencing the lower air through which, at some places, it penetrates completely.

These movements of air-currents are shown by clouds crossing the heavenly bodies, by the visible characteristics of those clouds, and by simultaneous observations of temperature, tension, force of wind, and its true direction, at many places.

It is very interesting as well as practically useful to mark how these inroads or mixtures of air-currents occur, and to note their beginnings or endings at a few places considerably separated; such, for instance, as Copenhagen and Lisbon, Galway and Heligoland, Jersey and Aberdeen, Queenstown (or Valentia) and Berwick or Yarmouth, with intermediate places. But this special feature may be better referred to after a few other considerations have been submitted as preliminary.

Dynamical force, pressure of air in motion, is generated by disturbed equilibrium, whether electrically by heat or cold, mechanically by aqueous expansion into gas, by contraction into rain, snow,

or ice, or by previously induced action of air-currents among themselves, with their inertia.

Hence it follows that no great disturbance of equable temperature, tension, dryness, or moisture, can occur without a proportionate dynamical force, tending to cause currents of air, or wind, however resisted, deflected, or otherwise affected by similar and simultaneous actions, more or less in opposition or in combination.

Sometimes their opposition is so equal, and equilibrium is so complete, that a calm is the result, no sensible movement horizontally along the earth's surface being perceptible.

Frequently combination occurs, and dynamical effects are produced in proportion. These are particularly evident in the meetings of tropical and polar winds (by the west), by their subsequent continuance in strength as mixed winds, and by the concurrence or combination of cyclones.

Successive, or rather consecutive, gyrations, circuits, or cyclones, often affect one another, acting as temporary mutual checks, until a combination and joint action occurs; their union causing then much greater effects, as may be seen even in water-currents as well as in the atmosphere itself.

Between the tropics and the polar regions, or in temperate zones, the main currents are incessantly active, while more or less antagonistic, from the causes above mentioned; besides which, wherever considerable changes of temperature, development of electricity, heavy rain, or these in combination, cause temporary disturbance of atmospheric equilibrium (or a much altered tension of air), those grand agents of nature, the two great currents, speedily move by the *least resisting lines* to restore equilibrium, or fill the comparative void. One current arrives, probably, or acts, sooner than the other; but invariably collision occurs of some kind or degree, usually occasioning a circuit, a cyclonic (or ellipsonic) gyration, however little noticed when gentle or moderate in force.

As there must be resistance to moving air (or a conflict of currents) to cause gyration, and as there are no such causes on a large scale near the equator, there are no storms (except local squalls) in very low latitudes.

It is at some distance, from about 5° to 20° , from the equator that hurricanes are occasionally felt in their violence. They originate in or near those hot and densely-clouded spaces, sometimes spoken of as the "*cloud-ring*," where aggregated aqueous vapour is at times condensed into heavy rain (partly with vivid electrical action), and

a comparative vacuum is suddenly caused, towards which air rushes from all sides. That which arrives from a higher latitude has a westwardly, that from a lower an eastwardly, tendency, due to the earth's rotation and to the change of latitude, whence a chief cause of the cyclone's invariable rotation in one direction, as above explained.

The hurricane, or cyclone, is impelled to the west in low latitudes, because the tendency of both currents there is to the westward along the surface, although one—the tropical—is much less so, and becomes actually easterly near the tropic, after which its equatorial centrifugal force is more and more evident, while the westwardly tendency of the polar current diminishes; and, therefore, at that latitude hurricane cyclones cease to move westward (recurve), go then easterly, and on toward the polar quarter.

Great and important changes of weather and wind are preceded as well as accompanied, by notable alterations in the state of the atmosphere.

Such changes, being indicated at some places sooner than at others around the British islands, give frequent premonitions; and therefore great differences of pressure (or tension) shown by barometer, of temperature, of dryness or moisture, and direction of wind, should be considered as *signs of changes likely to occur soon*.

It will be observed, on any continued comparison of weather reports, that during the stronger winds a far greater degree of uniformity and regularity is shown than during the prevalence of moderate or light breezes; and this should be remembered in forecasting weather.

When neither of the greater and more extensive atmospheric currents is sweeping across the British islands (currents of which the causes are remote, and on a large scale), the nature or character of our winds approaches, and is rather like that of land and sea breezes in low latitudes, especially in summer.

Either the cooler sea-wind is drawn in over land heated by the summer sun, or cold air from frosty heights, snow-covered land, or chilly valleys, moves towards the sea, which is so uniform in temperature for many weeks together, changing so slowly and but little, in comparison with land, during the year. These light variables may at such times be numerous, simultaneously, around the compass on the various coasts of the British islands.

Frequently it has been asked, "In this country, how much rise or fall of the glasses may foretell remarkable change or a dangerous

storm?" To which can now be replied, "Great changes or storms are usually shown by falls of barometer exceeding half an inch, and by differences of temperature exceeding about fifteen degrees. Nearly a tenth of an inch an hour is a fall presaging a storm or very heavy rain. The more rapidly such changes occur, the more risk there is of dangerous atmospheric commotion."

As all barometric instruments often, if not usually, show what may be expected, a day or even days in advance, rather than the weather of the present or next few hours; and as wind, or its direction, affects them much more than rain or snow, due allowance should always be made for days as well as for hours to come.

The general effect of storms is felt unequally in these islands, and less inland than on our coasts. Wind is diminished or checked by its passage over land. The mountain ranges of Wales or Scotland, rising two to four thousand feet above the ocean level, have great power to alter the direction and probably the velocity of wind, independently of alterations caused by changes of temperature at elevations.

Extensive changes, showing differences of pressure above or below the normal or mean level, amounting to nearly an inch, or thereabouts, are certain to be followed by a marked commotion of the elements in the course of a few days. If the fall has been sudden, or the rise very rapid, swift but brief will be the resulting elementary movement; if slow or gradual, time will elapse before the change, and the altered state of weather will take place more gradually, but last longer.

Notice may thus be obtained and given a few hours, or a day, or even some days, before any important change in the weather actually occurs.

Having such knowledge, it obviously follows that telegraphic warning may be sent in any direction reached by the wires; and that occasionally, on the occurrence of very ominous signs—barometric and other, including always those of the heavens—such cautions may be given before storms as will tend to diminish the risks and loss of life so frequent on our exposed and tempestuous shores. Barometers show the alterations in tension—or, so to speak, the pulsations, on a large scale—of atmosphere; and diagrams express to practised observers what the "indicator-card" of a steam-cylinder shows to a skilful engineer.

Our own islands have very peculiar facilities for meteorological communication by telegraph between outlying stations on the sea-

coast and a central place, all being at nearly the same level, and nearly all comparatively uninfluenced by mountain ranges.

And now the results are, that, having daily knowledge of the weather (including ordinary facts of a meteorological nature) at the extreme limits and centre of our British islands, we are warned of any great change taking place; the greater atmospheric changes being measured by days rather than by hours. Only local changes, however violent they may be occasionally (and dangerous in proportion to their suddenness and violence), only those changes are unfelt at a distance, and do not influence great breadths—such as hundreds of miles area of atmosphere—horizontally.

Some special, and to many persons entirely new, considerations should here be mentioned, as they are now practically valuable in connection with forecasting weather.

When opposing currents of air meet, their masses must continue in motion a certain time, either rotating, or ascending, or going onward horizontally in combination.

Masses of air, either of polar or tropical origin, so to speak, returning (when driven back by stronger opposition), at first, and for a certain time, retain the characteristics of their peculiar and very different natures.

In our latitudes there is a continuous alternation of air-currents, each specifically different, and denoting approach by marked characteristics; and we have proved, by successive series of simultaneous statical observations over a wide range—embracing Scotland, Ireland, all England, and adjacent islands—that, while these alternating or circuitously-moving currents are thus incessantly passing, the whole body of atmosphere, filling our temperate zone, is moving gradually *towards the east*, at an average rate of about 5 geographical miles an hour (from 2 to 8 miles).

During strong westerly winds this eastward motion is greatly increased, and in easterly gales it is proportionately diminished, as measured by its passage along a horizontal surface of earth or ocean.

Knowing these circumstances, and having accurate statical observations of these various currents at selected outlying stations, showing pressure (or tension), temperature, and relative dryness, with the direction and estimated horizontal force of wind at *each place simultaneously*, the dynamical consequences are already measurable approximately on geometrical principles; and, judging by the past, there appears to be reasonable ground for expectation that meteorological dynamics will be soon subjected to mathematical

analysis and accurate formulas. The facts now weighed and measured mentally—in what may be correctly called forecasting weather—are the direction and force of air-currents or wind, reported telegraphically to the central station in London from many distant stations, their respective tension and temperature, moisture or dryness, and their changes since former recent observations. These show whether any or either movement or change is on the increase or decrease; whether a polar current is moving laterally off, passing from our stations towards Europe, or approaching us from the Atlantic; whether moving direct towards the south-westward with great velocity, or with slow progress. If moving fast in the direction of its length, it will approach England more from the east—its speed direct being 20 to 50 or 80 miles an hour; while its constant lateral or easterly tendency (like a ship's leeway in a current), being only 5 miles an hour, is then insensible to us (though clearly deducible from other facts ascertained), and is that much in alteration of actual direction, as well as of what would otherwise be the velocity of that polar current.

With the opposite principal current—the equatorial or south-westerly, more briefly and correctly, tropical—similar but opposite results occur. The direct motion from a south-westerly quarter is accelerated sensibly to our perception by part of the eastward constant (about 5 miles hourly), and therefore a body of air approaches us sooner (other things being equal) from the westward than it does from the eastward.

To seamen accustomed to navigate in ships making leeway while in currents setting variously over the ground, such movements, complicated as they may appear, are familiar. There are the ship's headway, leeway, and drift to be considered, in combination with the motion or current-rate of the buoyant water, and that perhaps an upper current, differing from one beneath, while each is passing across the bottom or bed of the sea beneath all.

But the motes circling in a beam of light across a draught of dusty air may perhaps show what is meant by such combined and varying motions of fluid, elastic, and mobile air, as are here mentioned.

One important consideration is the disposal or progress of bodies of air united, or mixed, or contiguous to each other, after their meeting—either directly opposed or at an angle—on the earth's (or ocean's) surface. They do not vanish. They cannot go directly upwards,

against gravitation; westward they cannot (generally) go when there is collision or meeting, because the momentum, elasticity, and extent of the tropical "antitrade,"* or south-wester, usually overpowers any direct polar current, or rises over it and more or less affects the subordinate one below by the friction of its eastward pressure. Downward there is no exit; eastwardly (towards the east) the accumulating air must go, and this tendency continued causes the varieties of wind from the westward; being more or less mixed, more or less purely polar or tropical, as either one prevails in combination.

After a body of air has passed and gone to some distance southward or northward, it may be stopped by an advancing and more powerful mass of atmosphere, which is moving in a direction contrary to or diagonally across its line of force. If their appulse be gradual and gentle, only a check occurs, and the weaker body is pushed back until its special qualities, respecting temperature and moisture, are so masked by those of its opponent as to be almost obliterated; but if these currents meet with energy at very different temperatures and tensions, rapid changes are noticed as the wind shifts, and circuitous eddies, storms, or cyclones occur.

Otherwise, when their meeting is, as first mentioned, gradual, there is the return of a portion of either current (which previously prevailed), either direct or deflected—deflected even through more than one quadrant of a circle—by its advancing opponent, and retaining for some considerable time its own previous characteristics. Thus we have for short times cold dry winds from the south-west, instead of the usual warm and moist ones; or winds of the latter kind from the north, instead of cold ones.

The circuitous tendency of air in motion, and the numerous impediments to its horizontal progress, such as land, ranges of mountains, hills, or even cliffs, induce many a deviation from normal directions, extremely puzzling to the student of this subject; but so retentive is air of its tension and temperature for a time, that, like currents in the ocean, each may be traced by its characteristics as long as within our insular web of stations.

When the polar current is driven back by a tropical advancing from a southerly direction gradually, their action united becomes south-easterly (from the south-eastward); and as the one or other prevails, the wind blows more from one side of east or from the other. Time is required to produce motion in the air—horizon-

* Sir John Herschel's excellent term.

tally—and more time is indispensable for its gradual cessation from movement.

Statical effects are noticed at observatories, or by careful observers anywhere, some hours or days before notable dynamical consequences occur.

When a body of atmosphere is moving from or towards the pole, its impelling force (*vis a tergo*) may cease; while the mass itself has a certain impetus or momentum.

Diminishing tension then results at the place of checked energy, and the upper current (always present) descends. At the same time there is an alteration of tension at the farther extreme, which is meeting and mingling with, if not resisting, checked, and deflected by the advancing opponent.

Consequent on this an extent of air, reaching, perhaps, across some hundred miles, becomes, as it were, isolated. Detached from its original source and maintenance, whether polar or tropical, and then quite surrounded by air of a different character, it is impelled in new and varying directions, still retaining for a time more or less of its characteristics, until altered entirely, and totally incorporated with its conqueror.

Hence we sometimes have cold tropical wind, with electrical and other polar characteristics (for a limited time only), before the tropical predominates; or, on the other hand, a warm polar air-current, with tropical peculiarities.

Moreover, in addition to these causes of apparent inconsistency or irregularity are the results of circling currents—streams of air retaining their features, although changed, it may be even totally, in direction along the earth's surface; besides a variety of merely local alterations, such as are effected by high lands, or valleys, or coast-lines. All these, and many other minor considerations, ought to be familiar and present to a forecaster of weather, who would judge comprehensively according to observed facts and ascertained laws.

Lunarists and Astro-meteorologists support theories which, if in accordance with facts, would affect our whole atmosphere, or a hemisphere, or at least an entire zone, in a similar way, on account of the (supposed) influencing causes acting over all the rotating earth, and not only over Europe, or its adjacent islands.

At the Board of Trade from thirty to forty weather-telegrams are received daily (except Sundays), and the present forecasts, or pre-

monitions of weather, are drawn up on the following arrangement. Districts are thus assumed :—

1. Scotland.
2. Ireland, around the coasts.
3. West Central (Severn to the Solway), coastwise.
4. South-West England (from the Severn to Southampton), by the coast.
5. South-East England (Wight to Thames).
6. East Coast (Thames to Tweed).

As newspaper space is very limited, and as some words are used in different senses by various persons, extreme care is taken in selecting those for such brief, general, and yet sufficiently definite sentences as will suit the purposes satisfactorily.

Such words as are commonly found on published scales of force, or nature of wind and weather, are generally understood, and therefore are used in preference to others, however apparently expressive.

In saying on any day what the *probable* character of the weather will be to-morrow, or the day after, at the foot of a table showing its observed nature that very morning, a limited degree of information is offered for about two days in advance, which is as far as may be trusted generally, on an average, though at times a longer premonition might be given with sufficient accuracy to be of occasional use.

Minute or special details, such as showers at particular places, or merely local squalls, are avoided; but the general or average characteristics, those expected to be principally prevalent (with but few exceptions) the following day and the next after it, including the nights (not those of the weather actually present), are cautiously expressed, after careful consideration. Ordinary variations of cloudiness, or clear sky, or rain, of a *local* or only temporary character, are not noticed usually.

That a broad *general average* or *prevalence* is kept in view, referring to a day or more in advance, and to a district, rather than only to one time or place, should be remembered by the reader.

The great practical difficulty is in separating the effect on the mind of present states of air, weather, and clouds, from abstract considerations of what may be expected on the morrow or next following day.

As meteorological instruments usually foretell important changes by at least a day, or much longer, we have to consider what wind and weather may be expected from the morning observations, compared with those of the days immediately previous, as indicative of

the morrow's weather, and of the day after, at each place; to take an *average* of those *expectations* for each district collectively, in *groups*; and then to estimate the dynamical effects which may be anticipated as the legitimate consequences of such relative tensions, temperatures, and dryness, occasioning more or less inequality in the atmospheric equilibrium, and thus causing greater or less horizontal motions of air-currents, or ordinary winds.

Comparisons of the moist and dry thermometers are very useful, if well observed, in telling the hygrometric condition of air; and thence, with other facts, showing how either current prevails, or has relative influence—a point of much importance in forecasting a change of wind either way, as well as the probability of rainy or dry weather. A good electrometer is not yet available at our out-stations, however desirable such an instrument would be, in expressing, not only relative electrical states of air, but what, till a better term is offered, may, perhaps, be called the *polarity* of our atmosphere (if not its polarisation).

Whether there is a condition, or relative position of the particles of air, in a tropical current, differing from either in a polar current—analogue to the polarisation of light—and whether there is a direct connexion between these main currents and electro-magnetic, especially those mysterious earth-currents, are questions easy to ask; but excessively difficult to be answered, even by philosophical physicists of the highest eminence. To such authorities, however, the writer would appeal for some particular consideration of the following facts:—

With polar currents of air, electricity is above par, or plus; the air is harsh, clouds in it have a hard, oily appearance, animal as well as vegetable life is peculiarly affected in various familiar ways, tension is above par; and all these peculiarities are *constant* qualities independent of temperature of night or day, and of the time of year.

With the opposite or tropical current, different effects are well known to most people; but the comparative absence of electrical tension (or plus electricity), the soft, watery aspect of clouds in such air, and the absence of hard edges or outlines, unless influenced in some degree by the polar element, have not been noticed generally, though they are properties expressive of tropical winds solely (west to south in this hemisphere) in their (unmixed) purity.

In all frequented parts of the world, these peculiar characteristics of the so-called easterly and westerly winds have been carefully noticed, and found to be irrespective of locality,—land or water,

whether with an ocean to the east, or with a continent in that direction, or the converse. It may be remarked, in passing, that easterly winds everywhere (prevalent, not merely temporary currents), either mixed or deflected, are polar—derived more or less from the nearest pole; and that so-called westerly winds are tropical, from a tropical direction, or mixed tropical and polar currents. There is much to be remarked, in connexion with these distinctive features, respecting atmospheric colours, clouds, auroras, and meteors, but not admissible here.

Outline maps, with movable windmarkers, and cyclone glasses or horns, are useful in forecasting weather; and full consideration should be given to the probable position, direction, extent, and degree of progress of those central areas or *nodes* round which the principal currents usually circulate, or turn, as they meet and alter, combine with, or succeed one another.

Here dynamical considerations, with comprehensive comparisons of statical facts, are most important; and to treat them even approximately well, with such quick despatch as is requisite, demands aptitude and experience.

Those who are most concerned about approaching changes, who are going to sea, or on a journey, or on a mere excursion; those who have gardening, agricultural, or other out-door pursuits in view; may often derive useful *cautionary* notices from these published expectations of weather: although (from the nature of such subjects) they can be but scanty, and imperfect, under present circumstances.

Objection has been taken to such forecasts, because they cannot be always exactly correct, for all places, in one district. It is, however, considered by most persons that general, comprehensive expressions, in aid of local observers, who can form independent judgments from the tables and their own instruments, respecting their immediate vicinity, though not so well for distant places, may be very useful as well as interesting: while to an unprovided or otherwise uninformed person, an idea of the kind of weather thought probable cannot be otherwise than acceptable, provided that he is in no way bound to act in accordance with any such views, against his own judgment.

Like the storm-signals, such notices should be merely *cautionary*, to denote anticipated disturbance *somewhere* over these islands, without being in the least degree compulsory, or interfering arbitrarily with the movements of vessels or individuals.

Certain it is, that, although our conclusions may be incorrect, our judgment erroneous, the laws of nature and the signs afforded to man are invariably true. Accurate interpretation is the real deficiency.

Seamen know well the marked characteristics of the two great divisions of wind, in all parts of the world, and do not care to calculate the intermediate changes or combinations to two or three points. They want to know the *quarter* whence a gale may be expected—whether northerly or southerly—in general terms.

Every seaman will admit, that however useful, and, therefore desirable, it would be to know exactly the hour of a storm's commencement—as our acquaintance with meteorology does not enable such times to be fixed—the next best thing is to have limits assigned for extra vigilance and due precaution, which limits are clearly stated, in all the printed popular instructions, to be from the time of hoisting the signal until *two or three days afterwards*.

But, say some, and justly—are ships to remain waiting to avoid a gale that after all may not happen? Are fishermen and coasters to wait idle, and miss their opportunities? By no means. All that the cautionary signals imply, is “Look out.” “Be on your guard.” “Notice your glasses, and the signs of the weather.” “The atmosphere is much disturbed.”

Perhaps sufficient thought has not always been given to the consideration of mere pecuniary loss by wear and tear, risk, accident, delay, and demurrage, caused by a gale at sea; balanced against the results of waiting for a tide or two, perhaps once in two months, when cautioned by a storm-signal.

Be this as it may with coasters, short traders, or even screw-colliers, the question is entirely different with ordinary over-sea or foreign-going ships; especially when starting from a southern or from a western port. To such vessels a gale in the Channel, or even during the first day or two after clearing the land, must always be very prejudicial. Officers and men are mutually strange; things are not in their places, often not secured; and the ship, perhaps, is untried at sea. Of course, however, these remarks are inapplicable to fine, first-class ships; and to powerful, well-managed steamers, independent of wind and weather, which start at fixed hours.

It is scarcely too much to say, even now, that if due attention be paid on the coasts to cautionary signals—and, at the Central Office, to the telegraphed reports—no very dangerous storm need be

anticipated without more or less notice of its approach being generally communicated around the British Islands; or to those particular coasts which probably may be most affected by its greatest strength.

But this hardly applies to our extreme outposts, such as Jersey, Valencia, Nairn, and Heligoland, because their remoteness, invaluable as that condition is for warning other places nearer the centre, is an obvious reason why they cannot always be forewarned themselves.

In using the daily Weather Reports, it ought to be kept in mind that only one state of atmosphere in twenty-four hours is there recorded (excepting for rainfall); therefore it is only by comparisons and due reference to previous reports that probable consequences can be fairly inferred. It is advisable, in considering the forecasts, to look at the second as in some degree part of the first; time of weather continuing not being a certain or reliable notice.

In conclusion, it may be impressed on the reader, that this system is a tentative *experiment*. Each month, however, has hitherto added useful facts, and increased our acquaintance with the difficult, though not uncertain, dynamics of the subject. Nothing, however, could have been well effected in an attempt to apply meteorology to daily practice with confidence, had not a foundation of facts existed in the works of scientific authorities—whose statical records and invaluable deductions afforded a sufficiently extensive basis on which to rely while utilising modern powers of communication by telegraph, from any stations, simultaneously.

SURVEYS OF SPAIN.*

We learn from our correspondent, M. Coello, the accomplished geographer, who is now directing the topographical survey of Spain, that the following additions to our science have recently been made.

During the year 1861 persevering progress has been made in the great triangulation of the country.

All the chains of the triangles of the first order have already been studied, including those which relate to the whole circumference of the kingdom.

The chains of the meridian of Madrid, both to the north and to the south of that capital, have nearly all been measured, and will be completed before the end of the present year.

* Signor Coello, Corr. Member, R.G.S., Director of the Topographical Department in Spain. (Translated by Dr. Hodgkin, Hon. Foreign Secretary.)

The parallel of Madrid to the west has been finished as far as the frontier of Portugal; and the measurement of the triangles of the parallel of Ciudad Real to Badajoz has been commenced. The triangles required to complete the spaces to the west of the meridian of Madrid have been laid down as far as that of Salamanca.

The triangulation of the second order is finished for the whole province of Madrid, as well as that for a part of the adjacent country. We are now only waiting for the results of the last calculations for compensation, which have just been completed, in order to fix the length of the great base of Madrideojos, and begin the long calculation of the work which has been done.

This year these different undertakings will be continued, and signals will be fixed for the measurement of the parallel to the east of Madrid, with the intention of making, concurrently with this work, simultaneous and reciprocal observations to determine the geodistic level, and settle with accuracy the elevation of Madrid above the Mediterranean, presumed at present upon the most received existing calculations to be 660 mètres, which is, perhaps, within ten inches of the truth.

The topographical labours thus undertaken in the province of Madrid will be continued during the year. The corresponding land registration will at the same time be proceeded with, and the levels will be very carefully taken.

The maps are on the scale of $\frac{1}{100,000}$, and of $\frac{1}{50,000}$ for cities and buildings. The classifications, territorial valuations, and dispositions in the public archives, will commence as soon as a portion of the province is completed. The topography is executed with very great accuracy.

During the past year a portion of the Tagus, and of its tributary the Gallo, has been mapped to form a portion of the hydrography of Spain.

The geological department has completed its work in the provinces of Burgos, Santander, and Madrid, and has commenced with those of Leon, Zamora, and Avila.

In the department of Woods and Forests various topographical details have been obtained in the provinces of Santander, Burgos, Valencia, Asturias, Oviedo, and Leon.

All these works have been executed under the direction of the Junta-General of Estadística, who is appointed by the Government to take charge of scientific researches regarding the Spanish territory.

The Hydrographic Department has published various interesting works, more especially some on the Philippine Islands.

The War Department has completed the itinerary of Navarre, and published a beautiful atlas of the campaign in Africa, accompanied with very interesting topographical documents. The itineraries of different provinces are in progress, and some of them will be shortly published.

The results of the statistical returns made at the close of the year 1860 are now in the press, under the direction of the Statistical Board. This is also the case with a very complete Directory of all our provinces. Similar returns from the colonies have likewise been made, and will soon be published.

The same department has published Geological Memoirs regarding the provinces of Avila and Leon, and likewise the Topography of the province of Madrid, with a geological map. The whole of these are due to Don Coriano di Prado.

The plans for railways, canals, and roads, made for the most part by the Department of Public Works, have been prepared with zeal and activity, and some interesting results have been obtained in relation to topography and comparative levels of the country. A Memoir has likewise been published respecting the Public Works in Spain, and is accompanied with a map.

Other interesting works by private individuals have been finished, and in some instances published, amongst which are essays on the ancient Geography of Spain; and special mention must be made of a memoir on the site of the city of Munda, which obtained the prize of the Academy of History.

M. Coello has continued the publication of his Provincial Atlas, and has recently brought out the maps of four provinces. In the beginning of last year he published a general Map of Spain, corrected from the most recent data, a copy of which he has kindly presented to our Society.

RUSSIA.*

Although important questions of social and political reform have been engaging the attention of all intellects in Russia, yet the advance of geographical science there, I am happy to say, has not been retarded.

The Imperial Geographical Society of St. Petersburg continues to display its wonted zeal and activity. Fresh materials are yearly

* John Michell, Esq., F.R.G.S.

contributed by it towards the elucidation and amplification of the geography both of Russia and of the regions by which that country is bounded.

The expedition sent to explore Eastern Siberia has made considerable progress in its labours. According to latest accounts from Port St. Olga, Mr. Schmidt, chief geologist of the expedition, had started to examine the coast from the estuary of the Amur to Possiet harbour. Mr. Glehn, his coadjutor, was employed in a geological exploration of the island of Sahalin, while Mr. Brylkin directed his attention to its ethnography. On the return of the expedition to St. Petersburg in the autumn of the present year, and on the termination of the labours connected with it, the Imperial Geographical Society will devote its time and means to further scientific enterprise. The Council have already under consideration the adoption of measures for organising three new expeditions. One will examine the causes that have led to the gradual shallowing of the Sea of Azof; the object of the second will be to explore that portion of the Russian frontier which adjoins the Chinese territory on the east; the character of the third will be statistico-ethnographical, and the field of its labours will be the interior governments of Russia.

The progressive shallowing of the Sea of Azof had attracted attention for many years. It was supposed to be caused by ballast being thrown overboard from merchant-vessels. On this supposition it was at one time proposed to prohibit the entrance into the Sea of Azof of all ships, either Russian or foreign, not ballasted with water. The Government, however, did not adopt this measure, as doubts were entertained of the correctness of the above supposition.

In 1860 the Academy of Sciences of St. Petersburg arrived at the conclusion that the shoaling of the Sea of Azof had been going on for centuries; that it was not general, but only limited to certain parts; that it was not produced by a discharge of ballast, but was attributable to different local conditions, such as the state of the sea-bottom, proximity of the steppe, violence of winds and currents, &c. It further expressed its opinion that a scientific expedition to examine these circumstances would be productive of useful results.

These conclusions met with the approval of the august President of the Imperial Geographical Society; and the Society was authorised to send a scientific commission to the Sea of Azof. An annual sum of 5000 silver rubles (810*l.*), for two years, was assigned from the

imperial treasury to defray the expenses of the expedition, which is now being organised.

In October last the Russian Minister for Foreign Affairs informed the Imperial Geographical Society that a commission would proceed in the spring of this year to trace the boundary-line between Russia and China on the east, and invited the Society to take advantage of this opportunity for scientific exploration. The Council gratefully accepted the proposal, and have now under consideration the ways and means for acting on it.

According to the treaty concluded between Russia and China in 1860, the line of demarcation should extend from the sources of the Yenisei to the Tian-Shan range of mountains, south of Lake Issyk-kul. The starting-point to be taken is the landmark of Chabin-Dabaga, on the frontiers of the governments of Tomsk and Yeniseisk. This mark, erected in 1728, according to the treaty of Kiakhta, constituted then the most distant point of contact between the two empires. From Chabin-Dabaga the frontier runs in a south-westerly direction as far as Lake Dsai-San, extends along the ridge of the Djungarian Alatau, crosses the river Ili, and then follows the direction of the Tian-Shan to the confines of Kokan. This line of frontier, which has a length of about 2000 versts (1333½ miles), has already been visited on many points by Russian scientific travellers. The country still presents a vast field for future exploration. The region extending to the west of the sources of the Yenisei has not as yet been visited by any traveller.

A commission has been appointed, on the recommendation of Mr. Bezobrazof, for organising an expedition into the interior of Russia, with the special object of collecting statistico-ethnographical data. The commission, presided over by Mr. Kalatchof, consists of MM. Artemief, Bezobrazof, Vernadski, Vtorof, Kalinofski, Kostomarof, Maksimof, Nebolsin, Neiharat, Stackelberg, and Schepkin.

Among the cartographical labours of the Imperial Geographical Society a map of Eastern Siberia, by M. Schwartz, deserves special notice. It consists of seven sheets, and embraces on a scale of 1:1,000,000 the fluvial region of the Amur, the southern portions of the Lena and Yenisei, and of the island of Sahalin. Although many maps of Eastern Siberia have latterly appeared, that of M. Schwartz is the most reliably correct. As its indications are very detailed, and based on exact astronomical determinations, it will serve to complete and rectify the hitherto existing maps.

Mr. Heltersen has compiled a new geological map of Russia.

Several years have elapsed since the appearance of a similar map by Sir Roderick Murchison, M. Verneuil, and Count Keiserling, while the intervening period has been rich in geological discoveries in Russia. In many localities the limits of formation have been more distinctly defined; and this has induced Mr. Helmersen to construct a new map, with the assistance of the well-known Russian geologists, Pander, Hofmann, Abich, Auerbach, Barbot, Grewingk, Feophilatof, and Holmberg.

The 'Journal of the Imperial Geographical Society' for the past year contains, as formerly, articles of high geographical interest. The materials on Central Asia are, in particular, abundant. I may especially direct attention to the sketches of Djungaria, and to a description of the Chinese province of Nan-lu, or Little Bukhara, by Captain Valikhanof, the son of a Kaisak sultan. This traveller and Russian savant, as a native of Central Asia, intimately acquainted with the languages and customs of the countries he visited, enjoyed every facility for studying and describing these hitherto almost inaccessible regions. In the garb of a Kokand merchant, in 1859 he succeeded in reaching Kashgar, and now gives an interesting account of his journey. He minutely describes the atrocities committed by Valikhan, Hodja of Kashgar, who in 1857 ordered the execution of the deeply-lamented Adolphe Schlagintweit, and throws further light on the death of that traveller.

The Sketches of Djungaria, with a detailed description, historical and geographical, of Little Bukhara, will shortly appear in English before the public, and will doubtless prove a valuable addition to our knowledge of the geography of those countries.

ASIA.*

The Russian traveller, N. de Khanikof, who has been engaged in making up the deficiencies in our imperfect knowledge of the Aderbeijan, in Persia, has made a new map of that region, which he has had engraved at Berlin. He has distributed several copies of it, and transmitted his observations regarding that interesting mountain district to the Academy of Sciences in Paris, and also to our secretary, Dr. Shaw, for the use of the Royal Geographical Society.

An uncommon degree of regularity characterises the mountain-ranges of this province of Persia, which is bounded both on the east and on the west by lofty longitudinal ridges. To the east the Talish

* N. Khanikoff (translated by Dr. Hodgkin, Hon. Foreign Secretary.)

mountains separate it from the basin of the Caspian ; and to the west the chain of Kandilar forms a barrier between it and Mesopotamia. To the north and to the south of the Aderbeijan these two chains are joined by longitudinal elevations : the one, commencing at Mount Savalan (of 4752 mètres), joins the Kandilan chain in Kurdistan ; the other, coming off from the Talish mountains, and known as the Buzgush chain, joins Mount Sehend (of 3505 mètres). The space included between Mount Savalan and the Talish chain of mountains is occupied by the plain of Mughan, and the Salt Lake of Urmia is situated in the region lying between the Sehend and the Kandilan chain. The lowest point of this part of Persia, that is to say, the level of the Lake of Urmia, is 1250 mètres above the level of the sea ; and the highest point in the province of Aderbeijan is the summit of Ararat, 5169 mètres high. The line of perpetual snow varies in elevation from 3600 to 3800 mètres. This regular arrangement of the surface of the district, and the character of the climate, dependent on its high position, are very favourable for topographical work. The state of the atmosphere is generally so clear that one is never long without being able to see some one of the lofty summits which serve as landmarks for reference ; and it rarely happens that mirage or dry fog interrupts the distinct vision of objects for an entire day. Notwithstanding the precision with which the skilful topographers from amongst the officers of the Caucasus who acted under his orders, as well as himself, endeavoured to execute the work of laying down the itineraries of detached regions, it would be impossible to combine these independent labours without the basis of some well-determined astronomical or geometrical observations. These happily were not wanting, as he had latitudes and longitudes in Persia which had been settled by M. Lemm, and the results of the triangulation of the Caucasus under the direction of General Chosdzko. The former gave a series of fixed points in the neighbourhood of the Araxes ; and the latter supplied the like data, rigorously established, between Erivan and the basin of the Caspian. Hence the localities given in the north and middle of Khanikof's map have their exact bearings ; and it is only in the south that he had no other data than such as were obtained by azimuths measured with the help of the magnetic needle. The errors to which such observations are necessarily liable will be corrected when the Anglo-Russian commission for defining the Turkish and Russian boundary shall have published its numerous astronomic data.

That part of the map which is strictly new is the southern portion, in which is situated the Lake Urmia, with its islands; the itinerary from Marand to Khoi; and the topographical details in the two provinces of Persian Kurdistan, Lahijan and Ushnu, in which he had the good fortune to complete the researches of his predecessors, Generals Monteith and Rawlinson.

CHINA.*

Geography is already beginning to share in the advantages derivable from Lord Elgin's treaty, the conditions of which so greatly improve the position of the foreigner in China, whether traveller or official, merchant or missionary. Until that treaty came into operation, our countrymen could only penetrate the interior of this vast country in the face of legal prohibitions, and with the liability of arrest at the hands of the native authorities. The new treaty gives British subjects the right of travelling with a passport through the whole land, and so readily has this permission been availed of, that, in the first year after this right was obtained, twelve out of the eighteen provinces of China have been visited by our countrymen, together with Manchoo Tartary, the cradle of the present dynasty.

First among these explorations comes the ascent of the Yang-tze-Kiang, so gallantly undertaken by Colonel Sarel, Captain Blakiston, Dr. Barton, and Mr. Scheresheffsky, the details of which are familiar to us all; while the high sense entertained by this Society of the services these gentlemen have rendered to geography has been marked, as you have seen this day, by the presentation of the Patron's Medal to Captain Blakiston. In tracing the great Yang-tze along 1800 miles of its course, those travellers crossed the six central provinces of Keangsoo, Nganhwuy, Keangse, Hoo-pih, Hoonan, and Sze-chuen; and thus carried their explorations upwards of a thousand miles beyond any point that had previously been openly visited by foreign travellers. The first 700 miles of that river's course is now made familiar to Europeans by the opening of the port of Hankow to foreign commerce, and there is every prospect of the high expectations that have been formed of the capacity of that great central mart being fully realized. Within eight months of the opening of that port it had been visited by nearly 200 foreign craft, consisting for the most part of small

* Sir Harry Parkes, K.C.B., H.B.M. Consul at Shanghai.

steamers; and the foreign trade thus conducted amounted during the first six months to two millions sterling.

Some particulars of no less than seven other journeys, undertaken by our countrymen in the north, centre, and south of China during the past year, have been made public. In the north, Mr. Morrison, our Consul at the new port of Chefoo, with Captain Harcourt as his companion, travelled overland to his post from Teentsin in the month of January, and profited by the opportunity thus afforded him to follow the Grand Canal along nearly 300 miles of its track, to visit the tomb of the great sage Confucius, which is to be seen at Kewfoo, in the charge of his own descendants, a family with a pedigree of 2500 years, dating from the time of the sage himself. Mr. Morrison also visited Tsenan, the capital, and other places in the hitherto unexplored province of Shantung, and the journey took these travellers over 700 miles of country, for the most part new to Europeans. Six months later, two other foreigners set out in an opposite direction, and travelled overland from Teentsin to Moukden, the capital of Manchoo Tartary. They were struck by the manner in which this once Tartar country has been virtually converted into a Chinese province by the superior energy of the Chinese emigrants, and report that the Manchooks, even in this their native land, have lost their ground entirely in all parts of the country where anything is to be made by agriculture and commerce; and that those who remain, by adopting Chinese manners, customs, and *language*, have become, to all intents and purposes, Chinese, and have been absorbed into the predominant race. Later in the year, in November and December, an expedition through the two northern provinces of China, Pe-chih-le and Shan-se, was undertaken by Messrs. Richards and Slossin. Starting from the same point—Teentsin—they appear to have ascended the high plateaus to the north of Peking, and to have skirted the Mongolian steppes until they reached Shan-se. They travelled in this province as far as its capital Tai-yuen, and then, turning westward, re-entered Pe-chih-le, and visited Paou-king, the capital of the latter province, on their way back to Teentsin. The journey occupied the travellers 46 days, during which time they appear to have crossed the Great Wall four times, finding it in a state of decay that may be feared is typical of the country of which it is the chief monument, and they estimate the total length of their journey at 1560 English miles. The flourishing and populous condition of most of the country through which they passed accounts for the

success of the new northern port of Teentsin, the foreign trade of which, in the first year of its being opened, has reached the considerable sum of two millions sterling.

In the centre of China, four gentlemen—Messrs. Dickson, Thorburn, Beach, and Bonney—travelled, in the month of April, from Canton to Hankow, a distance of 756 miles, which they performed in 18 days; their journey differing from those above recited as being made entirely by water, with the exception of one day's land travel across the mountain-range that divides the province of Kwangtung from Hoo-nan. Following the course of the north river in the first-named province, and the Seang river in the latter, they thus traversed both those provinces from south to north, and were the first modern explorers of the great Tung-ting lake, by which they reached the Yang-tze and Hankow. In Chehkiang, Mr. Baker, having recently ascended the Tseentang river, and visited the celebrated green-tea districts of Nganhwuy, has again gone over ground previously travelled by Mr. Fortune, but to find in this instance that the previous prosperous condition of those important tea districts has disappeared before the rebel scourge, and that scenes of industry have been replaced by desolation and destruction.

In the south of China, the Rev. Dr. Legge was the first foreigner to ascend, in April of last year, the east river in the Kwangtung province to a distance of about 300 miles; and the Rev. Mr. Irwin and companions have penetrated up the west river, in the same province, to a somewhat higher point than that reached by the expedition under Captain McCleverty in the spring of 1859, for a description of which we are indebted to our associate Lieutenant Brine. The opening of Formosa to foreign trade gives promise also of our shortly obtaining further information from that island, which is interesting not only from its commercial productions, but also from the presence of aboriginal tribes in its centre and eastern coast, of which little is as yet known.

It is satisfactory to hear from all these travellers that no serious obstacles were placed in their way either by the Chinese authorities or the people; and that, while inconvenienced at times by the not unnatural curiosity of the latter, when anxious to gaze on foreigners for the first time, they received from them, in most cases, friendly welcome and assistance. Our treaty-right to enter the country having thus obtained an effectual recognition, it will be seen that China is now thrown open to the researches of the traveller, subject,

however, to the difficulties arising out of the deplorable disorders which are at present rife in so many of its provinces. Different parties of rebels or robbers, all acting independently of each other, were met by Colonel Sarel's party in Sze-chuen, by Mr. Morrison in Shantung, by Mr. Baker in Chehkeang, and by Mr. Irwin in Kwangtung; while Dr. Dickson's party, on the other hand, travelled from Canton to Hankow—or from the south to the centre of China—without falling in with any of these destructive hordes; and Messrs. Richards and Slossin traversed the provinces of Shan-se and Pe-chih-le under similar favourable circumstances.

AUSTRALIA.*

Every new year brings with it, as we might well expect, recitals of fresh discoveries in this vast and important region of British colonization, of which, in a broad sense, it may be said that we have as yet only occupied the eastern, southern, and western coasts, and partially their adjacent interior lands. No sooner had we bestowed one of our Gold Medals on McDouall Stuart, for his adventurous exploration from South Australia to the northern watershed, than we heard of his having again started in the endeavour to reach the sea which bathes the northern shore of the continent. In the mean time, however, whilst he has again returned, after reaching the watershed of tropical Australia, that end has been attained on a more eastern meridian by the expedition under the command of Richard O'Hara Burke, assisted by the geographer William J. Wills. Notwithstanding the belief of a great number of old colonists and travellers, and which is still entertained, that horses and bullocks are to be preferred for these adventurous journeys, the ascertained fact is, that the scheme suggested many years ago by the Geographical Society, of employing camels as the beasts of burden, is that by which the continent has first been traversed from south to north by any of our countrymen.

Whilst two Australian colonies were thus eager rivals in these discoveries, and that the flourishing younger colonists of Queensland, on the north-east, have been extending the range of their feeding-grounds to zones almost intertropical, and approaching towards the Gulf of Carpentaria, the north-western limits of Western Australia have been vastly extended by the successful survey, by Mr. F. Gregory, of that large portion of the very exten-

* By Sir Roderick Impey Murchison, Vice-Pres. R.G.S.

sive lands which lie between the settled parts of that colony and the Cambridge Gulf.

Let us then devote, in the first place, a few words to the consideration of each of these last important discoveries.

The Victorian expedition, though perfectly successful in the main object of discovering a track to the north, through lands which are for the first time made known to us as being capable of occupation at no distant day, and in reaching the mouth of one of the tributaries of the Gulf of Carpentaria, had, alas! a tragical end. Its bold leader, Burke, as well as his companion, the accomplished geographer, Wills, have fallen, but not until their observations have assured us that they reached the northern shore, at the mouth of the Flinders River. And here we may well applaud the suggestion of Sir H. Barkly, that the great newly-discovered belt of good land between Cooper's Creek and the south end of the Gulf of Carpentaria should be called "Burke's Land;" so that the name of the gallant explorer will thus be perpetuated on the east, as that of Stuart has been properly associated with the chief highlands on the west. As the gallant Burke and his associates had long been absent, and reports arose of their failure and difficulties with which they were beset, it was highly to the credit of the coterminous colonies of South Australia and Queensland that they both made vigorous endeavours to aid in the rescue.

One of these efforts, as made by the direction of Sir Richard McDonnell and the Government of South Australia, proceeded over a considerable extent of new ground to the north-eastern part of that colony; and allusion to it will presently be made, as well as to other expeditions from Victoria and Queensland.

In considering the steps by which this great work of exploration of the interior has been brought to its present advanced state, we must not forget the feats of the laborious and able Surveyor-General of New South Wales, Sir Thomas Mitchell, who laid down sure bases of operation for those who were to follow him. It has also been well said by a recent traveller to the Darling,* and who has gone over much of the same ground, that, of all the expeditions subsequent to those of Mitchell, that under the command of our Medallist Sturt threw most light on the region to the north and north-west of Menendie. "The chivalrous Eyre," he writes, "had previously penetrated to the forbidden shores of Lake Torrens, and the indomitable Stuart has since very nearly crossed the continent;

* Mr. Haverfield.

but both of them I think would admit, that to Captain Sturt belongs the great honour of having opened the door to the vast central regions of Australia."

The Council of our Society has, indeed, judged well in assigning a Medal to the family of the lamented Burke, the leader of the Victorian expedition; and in offering a watch as a recompence to the sole survivor, the stout-hearted and faithful King, whose simple narrative of the deaths of his commanders, Burke and Wills, and of his own preservation of life among the kind natives, has touched the hearts of all who have read the tale.

The details of the labours of Burke and Wills in traversing and retraversing the continent have been so recently laid before the public, that it is unnecessary here to recapitulate them. We must not, however, pass over the Report of the Commissioners who were appointed by the Governor of Victoria to inquire into the circumstances connected with the sufferings and death of Burke and Wills. Endeavouring to ascertain the true causes of that lamentable result, they have thrown the chief blame on Mr. Wright, in not having left adequate supplies of provisions and clothing at Cooper's Creek. They also impute some discredit to the Exploration Committee, for not stimulating Mr. Wright to advance from the Darling, where he had been (as they say) in a state of "fatal inactivity and idling." And lastly, they reprove Mr. Brahe, for retiring from the relief depôt before he was rejoined by his commander, Burke; though, from the great responsibility and the want of sufficiently precise instructions, they excuse that gentleman for his unfortunate decision.

Whilst they regret "the absence of a systematic plan of operation on the part of the leader," they express "their admiration of his gallantry and daring, as well as of the fidelity of his brave coadjutor and their more fortunate and enduring associate King; and they conclude with recording "their feelings of deep sympathy with the deplorable sufferings and untimely deaths of Burke and his fellow comrades."

The friends of Burke must, indeed, derive great satisfaction from referring to the Despatches of Sir Henry Barkly, who generously vindicates the conduct of the gallant leader. In a letter to Sir R. Murchison he thus writes:—"It is true that he (Burke) was by nature impetuous, but we have in reality only heard one side of the case; and I do not feel quite sure that he did not leave definite instructions—possibly even in writing—with his second in command,

and at the Cooper Creek depôt, though none are forthcoming or acknowledged to have existed." "At the worst," he says, "all that can be said of his conduct is, that he relied on others proving as brave and self-sacrificing as himself; that he was out of his reckoning on this point, and lost his own life in consequence." Finally, Sir Henry Barkly has well told Her Majesty's Secretary for the Colonies, that "a less daring leader might never have crossed the continent, or solved the problem so often vainly attempted."

But whilst from the expedition under Burke one man was saved, we have since been informed of the deaths of four white men, who were not long ago massacred in the interior, and of whose loss we should have been entirely ignorant, had not the Government of South Australia, under Sir Richard McDonnell, sent out, as before said, an exploring party from the south-west, to cut in upon the route of Burke.

After passing over lands, in some parts sterile and saliferous, in others watered and productive, the searching party of McKinlay and his assistant Hodgkinson (which was also well found in camels, as well as with horses and provisions) met with the relics of four white men, the skulls and skeletons of whom showed incontestable proofs of their having been murdered. Having obtained possession of a native who had evidently been one of the murderers, since his body exhibited healed-up wounds, and the lodgment of a ball as well as of buck-shot under the skin, he gave to the explorers a recital of the massacre, and how the natives had eaten the flesh of their enemies. As the hair of the victims was still adhering to their skulls, and seemed to the travellers to be of the same colours as those of Burke and his party; and further, as what was taken for "camel" dung was found near the spot, they jumped to the natural conclusion that in this spot (lat. $27^{\circ} 15' \text{ s.}$, long. $139^{\circ} 50' \text{ E.}$, and consequently not far from the return route of Burke) they had really discovered the remains of Burke and his three companions. On their return to the settlements of the colony, however, this theory was entirely dispelled by the true account of the deaths of Burke and Wills, and of the safe return of the sole survivor, King. Who, then, were these unfortunate four explorers of the interior? That they were British subjects, and not natives, is certain; not only from the skeletons and the colours of their hair, but also by the discovery of an English almanac of 1858. We also know that they had made a vigorous resistance, which is established, not

only by the testimony of the black man, but also by the gun-shot wounds inflicted on him. Then, again, we have the proofs of the savage nature of this band of the aborigines, by learning that, after this one native left them, McKinlay's party were shortly assailed by a large well-armed body, who were only repelled by a hot fire from our countrymen.

What a mystery is this, then, and how are we to explain it? Surely we ought to be able to obtain, from the settlers on the outskirts of the colonies of Victoria and South Australia, some information to throw light on the journey into the interior of any persons who may be identified with these hapless men! Again, is it not strange that, at so short a distance as exists between the site of this massacre and that of the deaths of Burke and Wills, the character of the aborigines should differ so essentially? for we are assured by the diary of the last days of Wills, that he and his associates were treated with great kindness by the natives. We also know, from the testimony of the survivor King, that when these poor creatures (among whom he lived until the relief finally reached him) saw the bodies of Burke and Wills they wept over them, because they saw that they might have saved our countrymen from starvation. We thus know that there are generous and tender-hearted aborigines in Australia, as well as those who appear to be irreclaimable and cruel savages; and this, too, in tribes not distant from each other.

Leaving this problem to be solved between our friends the ethnologists and philanthropists, we may in the mean time anticipate that with such energies as have been displayed by the explorers proceeding from our settled colonies in the last thirty years, including the older researches of Mitchell, Eyre, Sturt, Leichardt, and others, there can be no doubt that the colonists of Queensland will soon extend their pastures to the Gulf of Carpentaria; and that the northernmost settlers of South Australia, following up the track of Stuart, will ere long found establishments in the bosom of the noble recesses of Cambridge Gulf and the northern Victoria River, where fleets can anchor securely, and where the vegetation is luxuriant.

If the northern coast of this great continent is thus destined to be occupied by migrations from the east and south, it has recently been to a considerable extent successfully surveyed from the west by Mr. Frank Gregory; who, in extending the boundary of Western Australia, and in demonstrating the existence of large tracts of fine

land, reaching eastwards to beyond east long. 121° , in lat. 21° , has led us to hope that not many years will elapse before the warm desire of British geographers will be realised by actual occupation—at all events by the description of the headlands and inner portions which lie between Nickol Bay and Cambridge Gulf.

Having conveyed his party, with horses and provisions, by sea, from Perth to Nickol Bay, Mr. Gregory first explored the interior to the south-west, or towards the tracts lying on the north-western exterior of the settlements of West Australia, which he had surveyed in 1848. Following up a river, which he named the Fortescue, for 180 miles, and which flows through good lands, he reached elevations, which he termed the Hammels' Range, and through which he travelled by a pass 2000 feet above the sea, in lat. $22^{\circ} 15'$, and east long. $118^{\circ} 4'$. Beyond this range he found extensive fertile plains running far westwards, or towards the colony, as far as the eye could reach. Travelling still further with a smaller party to the south-west, he fell in with a large river flowing from the E.S.E. This he named the Ashburton, from our noble President; and, judging from the fine pasture-lands on its banks, he believes that this tract (which he connected by triangulation with Mount Augustus and the Lynn River of his former survey) will become in a few years a valuable district of the province.

Having returned to the vessel, to recruit and replenish his stores after this his first journey of 780 miles, Mr. F. Gregory then pushed his survey south-east and eastwards, and passed in succession rivers which were called the Yule, the Shelley, and the Shaw, and then to the recipient of the two last rivers—a finer stream, to which the name of De Grey was given, in honour of our last President, under whose auspices the expedition was initiated. Again, much fine land was observed, the united journeys amounting to 2040 miles.

The clear and interesting sketch of this survey which has already been given by Mr. F. Gregory will be much enhanced when his maps are constructed in the accurate manner with which he works out all his data. In the mean time we already learn that this newly-discovered region, consisting of a succession of terraces that rise from the shore to lofty plateaux 2500 feet above the sea, has its culminating point in Mount Bruce, at an altitude of 4000 feet; whilst within the limits of the route followed not less than 2,000,000 acres are fitted for grazing purposes, and at least 200,000 acres are suitable for cultivation. The fruits and plants which are indigenous include, among the latter, tobacco, sandal-wood, and

palms; and the author conceives that, notwithstanding its *quasi* intertropical position, the district is as well adapted to the growth of wool, as grounds in the same latitude in Queensland have proved to be; whilst he feels confident that there are also considerable tracts specially available for raising cotton.

The varied eruptive rocks of the country, whether of granitic or of volcanic origin, and the different sedimentary formations, from high plateaux of older sandstone to the youngest and more calcareous and sandy deposits, have been carefully observed. Again, meteorological and magnetical data have been carefully registered; and we are informed that the aborigines, who are of fine stature, some of them exceeding 6 feet in height, might be made useful in labour, and would by no means prove unmanageable or troublesome if properly treated; whilst a valuable pearl-fishery may also be established in Nickol Bay.

This survey, being the last of the very important services which have been performed by Mr. F. Gregory, is the more entitled to our approbation, as it was undertaken at our recommendation to Her Majesty's Colonial Secretary, the Duke of Newcastle; and we have to thank His Grace for countenancing this expedition in conjunction with the local Colonial Government.

The complete success of this exploration, without the loss of a man, is a decisive proof of the skilful and well-considered pre-arrangements and conduct of the leader, and will, we trust, induce Her Majesty's Government to continue to place reliance on any suggestions which may in future proceed from the Council of the Royal Geographical Society.

In concluding these observations on the recent progress of discovery in Australia, we may well advert to the strenuous efforts made by the colonists of Victoria and Queensland to succour Burke and his party. Naturally anxious as we have been respecting the issue of the searching expeditions sent from Victoria by sea, and overland from Queensland, the news just received is highly gratifying to all geographers and philanthropists. Sir Henry Barkly has written to Sir R. Murchison, stating that, notwithstanding the wreck of the *Firefly* tender, of which we had heard, on one of the reefs in Torres Straits, the good management of Captain Norman, the commander of the *Victoria* steamer, has been such that the *Firefly* was emptied of water and tugged round into the Gulf of Carpentaria, in spite of much stormy weather. Arriving at the mouth of the Albert River, men and horses, with abundance of stores, were

landed from those ships, as well as from two colliers, which had also been sent round; so that Mr. Landsborough, who had been recommended for the search by Mr. Gregory, was at once enabled to explore for some distance into the interior.

In the mean time Mr. Walker, who was sent with a party of aboriginal troopers from Brisbane and Rockhampton, having gained the mouth of the Albert, passed in his route the river Flinders, near the sea, and there, to his delight, found the distinct tracks of Burke's party; thus realising the truth of the narrative of the sole survivor, King, that Burke and Wills really reached the salt water of the Gulf of Carpentaria. This discovery further confirms the belief of the astronomers and geographers who inquired into the subject, that it was the mouth of the Flinders, and not of the Albert, which the gallant adventurers had reached. Being supplied with provisions for four months, Mr. Walker then returned to the mouth of the Flinders, to follow up the trail of Burke; and, as he had been gone 80 days when Captain Norman left the mouth of the Albert, we may reasonably expect to hear soon of his arrival at Cooper's Creek and the colony of Victoria.

Whilst Walker is thus occupied, Mr. Landsborough is proceeding southwards, on the meridian of the Albert River, to Victoria; and thus by this double exploration the whole of the region to which Sir H. Barkly has worthily assigned the name of "Burke's Land" will be thoroughly made known to us.

That which to many cautious persons seemed to be a chimera a few years ago, but which the writer of these lines has always regarded as a most desirable result, will therefore ere long be accomplished, and the shores of Tropical Australia will, through its great indentations, the Gulf of Carpentaria and Cambridge Gulf, be fairly occupied by our colonists, who, communicating with the southern colonies, from whence they spring, by the lines opened out by Stuart and Burke, will carry on an advantageous intercourse with the Eastern Archipelago, and afford grand and useful bays of refuge to all imperilled vessels. Truly we may now rejoice that our Council has wisely, as well as generously, judged in assigning a Medal to the family of Burke, and in not omitting to mark their sense of the faithful conduct and truthful narrative of the brave old soldier, King.

Whilst such has been the progress of discovery in hitherto unknown lands, our knowledge concerning the real mineral structure of the regions already colonised has been largely increased.

The admirable Geological Maps of Victoria, prepared by Mr. Selwyn, and the palæontological illustrations thereof, by Professor McCay, would do honour to the most advanced country in Europe; and though the other colonies cannot as yet boast of similar proficiency in maps and sections, every geologist knows how much his science is indebted to the Rev. W. B. Clarke, for his long-continued and successful endeavours in developing the true geological structure of New South Wales.

If from Australia we extend our observations to other regions of Australasia colonised by Britain, you perceive the rapid progress which is made in the development of wealth, commerce, and civilisation. Thus in Tasmania, thanks to the vigorous endeavours of my young and able friend Mr. Charles Gould, coal-fields of value in the north-eastern portion of that great island have been laid open, and the valuable substance, dysodile, has been extracted.

Again, in New Zealand the Local Governments are exerting themselves to procure the services of scientific men, who, possessing an acquaintance with geography and topography, are well versed in the sciences of geology and mineralogy, and can indicate upon maps the real value of the subsoil of each district. Thus, whilst the able geologist, Dr. Hochstetter, who was one of the men of science who sailed round the world in the Austrian frigate *Novara*, has made us well acquainted with the nature of the rocks and the usefulness of the fossils found around Auckland, my friend Dr. Hector (with whose merits this Society is so well acquainted, through his admirable labours as the senior scientific officer of Palliser's expedition in North America) is now the geologist, geographer, and naturalist of the thriving Scottish colony of Otago, in the southernmost of the New Zealand islands.

So earnest, indeed, are the colonists of New Zealand to obtain a scientific insight into the nature of their rocks, that applications have recently been made to Sir R. Murchison to secure the services of a competent person to conduct a geological survey of the newly-settled district of Wellington.

AFRICA.*

It is long since tidings have reached us from either of our two medallists, Livingstone and Speke, in whose explorations our Society takes especial interest, both from the brilliancy of their former

* Francis Galton, Esq., Hon. Secretary, R.G.S.

achievements and the importance of their present undertakings. Just before the anniversary of 1861 we heard of Livingstone's departure from the Zambesi, in his small steamer, to examine the Rovuma River and ascertain whether any basis existed for the often-expressed belief that that river would afford a convenient and a neutral highway to the vast regions of the Niassa, independent of the complications of Portuguese territorial claims. The result of his examination reached us shortly afterwards: it was far from satisfactory. His steamer of light draught was unable to ascend the Rovuma for more than a few miles, before it became necessary to return hastily, else she would have been left grounded by the falling waters until the ensuing rainy season. Livingstone then revisited the Zambesi and established the members of the University mission in the healthiest quarters he could find near the banks of the Shiré.

We have heard nothing whatever of Speke since our last anniversary, except a fragment of news which is exceedingly satisfactory, though it left him at a stage and a date little removed from where he last wrote to us. It will be remembered that he had then described himself in trouble. The desert of Ugogo was peculiarly parched in 1861; he and the natives had difficulty in obtaining food, and a large number of his porters had deserted and left him. We have since learnt, through a native merchant who had interchanged a few passing words with him, that Speke was accompanied by a fresh body of porters, that he had extricated himself from the desert of Ugogo, and was travelling rapidly and in excellent force on the way to Unianyembe.

Provisions will not fail him if he emerges this summer at Gondakoro on the White Nile, for by aid of the funds liberally subscribed by many Fellows of this Society and by Mr. Consul Petherick's furtherance, boats laden with grain were despatched by that gentleman, under a proper escort, from Khartum up the White Nile, early in this year.

The present condition of the White Nile is such as to grieve deeply those who believe commerce to be the most effectual agent in civilizing Africa. Fifteen years ago the natives along its shores were mostly inoffensive and hospitable to travellers; but the stream of trade that has yearly passed along it, uncontrolled by any moral supervision, and mostly in the hands of reckless adventurers and lawless crews, has driven the numerous tribes along its banks into so general and deep an hostility against strangers, that the White

Nile cannot now be ascended except by an armed force of considerable magnitude.

The hopes we entertained last year of an increased knowledge of the Upper White Nile, through the independent labours of M. Lejean and Dr. Peney, have failed us, owing to the illness and return of the former gentleman and the premature death of the latter. Dr. Peney did some good service to geography before he died: he travelled westwards from Gondakoro for 60 miles, and there apparently struck the penultimate stage of Petherick's former expedition. If this be the case—and the identity of the names of the places and tribes and geographical features leave hardly room for doubt—an enormous rectification becomes necessary in the estimated extent and direction of Petherick's itinerary. Peney also travelled above Gondakoro, through the cataracts, to nearly the furthest point of which we have even a rumour, and he places his goal at about one degree south of Gondakoro, and on absolutely the same meridian.

The determination of the altitude and snowy summit of Kilimanjaro, by the Baron von der Decken and his geological associate Mr. Thornton, has gladdened African geographers, who felt it was little creditable to their science that so interesting a subject should remain year after year open to question. It is a pleasure to find that the wanderings of missionaries, solely in the pursuit of their calling, should have led them here, as it has often done elsewhere, to be the first discoverers of new lands and pioneers to more accurate research.

An elaborate report on the dominions of Zanzibar, by Lieut.-Colonel Rigby, has been published in the Selections from the Records of the Bombay Government. It appears from subsequent accounts that the condition of that island has lately fallen into a very disturbed state.

On the coast of Africa opposite to Kilimanjaro, Captain Burton, our ever active medallist and now H. M. Consul at Fernando Po, has materially contributed to a survey of the large creeks and river-mouths which form a characteristic feature of those shores, and in the knowledge of which we are unduly deficient. We hear also of his ascent of the lofty Cameroon Mountain, and shall doubtless receive from him a detailed account of that extinct volcano, which in its origin, latitude, and proximity to the sea, as well as by its prominence, holds a position on the West Coast curiously corresponding to that of Kilimanjaro on the East of Africa.

The French have exerted themselves with energy in reconnoitring

the tributaries of the great bay or estuary of the Gaboon, all of which take their rise in the flanks of the neighbouring mountain chain through which the Ogobai, familiar to us by the writings of Du Chaillu, bursts its way, in its course from a more distant interior.

Numerous explorations have been made in Senegambia and in the North-Western Sahara. The travels of Boo Moghdad are perhaps the most important. He left St. Louis on the Senegal, and passed to Mogador, on the coast of Morocco. Lambert's journey to Timbo is also of great interest. Duveyrier has returned to Algiers with large stores of information gathered in the Sahara, which he is preparing for publication, and which African geographers await with keen interest. We are sorry to hear that that energetic young traveller is suffering very severely from the effect of his many journeys.

Heuglin's expedition in search of information bearing on Vogel's fate, in Wadai, has made some advance in his necessarily circuitous route. He landed at Massowa and spent some months in Abyssinia, awaiting the favourable season for onward travel. His researches in that country have been original and minute, especially with regard to the geology and hypsometry of its northern borderland.

Our medallist Barth is engaged in the publication of a work of paramount importance to African ethnologists, namely, an elaborate collection of vocabularies of the tribes of Central Africa. It is mainly from a comparison of dialects that we may hope to unravel some portion of the mutual relations and early history of the various races which inhabit that large portion of the earth's surface, and we rejoice that the present work has been undertaken by so accomplished a philologist and geographer.

Finally, large maps of Africa are in progress of publication, the one by Dr. Petermann, in his comprehensive 'Mittheilungen,' and the other by Mr. Ravenstein, in England.*

* Since the Anniversary Meeting, intelligence has been received of Dr. Livingstone's navigation of the west coast of the Nyassa (in an open boat) up to lat. $11^{\circ} 20'$; during the whole of which distance (200 miles) its width appeared never to exceed 60 miles, no large river was seen to flow into it, and no certain account was obtainable of its northern termination. It lay between highlands; its waters were of great depth, and continually and dangerously stormy. The same mail informed us of the deaths, from fever, of Bishop Mackenzie and of another important member of the University mission.

OUR OWN LABOURS.*

The relation of the Society to the wide range of science which it cultivates may be referred to with satisfaction. Through its influence, or by its Associates, it may be identified with most of the enterprises which enlarge the knowledge of the more-remote regions or add to the details of those more intimately known. Although the progress of geography—a science which has been the growth of so many ages—can be but imperfectly estimated by the brief retrospect of the limited period to which this notice must be confined, still the past *two* years have been marked by some very important accessions to our knowledge.

It might perhaps be inferred that the industry of modern travellers, so well and so persistently carried on, would have left to these later times but few regions unexplored, or features to be noticed in primary discovery; but the late Transactions of our Society will lead to the inference that there lies hidden much more than has been revealed, and that our motto "*Ob terras reclusas,*" will still apply almost as justly to the countries close around us as to the still unknown mysteries of Africa or Australia. The last volumes of our Transactions publish the details of primary discovery and exploration more extensive and important, of countries absolutely unknown before, than those contained in the first, when the true course of the then mysterious Niger, or the earliest journeys into the interior of Australia, were described.

There is one evidence of the appreciation of the Society and its usefulness in the unbroken chain of travellers and labourers which are and have been connected with it; those of later times being often the friends, pupils, or associates of those who first enriched its volumes with the results of their enterprise, and whose works may be traced continuously from its origin to those which I shall briefly allude to presently. The Annual Addresses of former Presidents will show how large a share has been taken in the progress of Geography by the Royal Geographical Society since its foundation.

EUROPE.—In Europe the work of general research into the minute details of geography is far too great for individual labour, and the Addresses of your Presidents will show what great undertakings are carried on by various Governments; but that there is room for per-

* Alexander George Findlay, Esq., F.R.G.S.

sonal enterprise is shown by the communications of our well-known Associates Capt. Sherard Osborne, Capt. Spratt, and Major Stokes, on the course of the Lower Danube, descriptions of great national utility.

Our Corresponding Member, Professor Paul Chaix, has sent us an account of the surveys connected with the Great Federal Map of Switzerland, which have been in progress for half a century. Professor Holst, of Christiania, has also given an account, rendered for us by our Secretary, Dr. Norton Shaw, of the important and excellent surveys in Norway, which have been proceeding since the year 1779, a period at the dawn of geodetical science.

We have an interesting account of a portion of the Caucasus, the country of the Lesghi tribes of Hilly Daghestan, by the Baron de Bode, son of our deceased Associate. This communication, and a more widely extended dissertation on the Caucasus generally, by Captain D. Cameron, F.R.G.S., draws attention to an enchanting country and a most interesting people, or rather variety of races. As a region for tourists, the Caucasus would seem to present attractions and novelties far exceeding those met with on most beaten tracks.

Iceland was visited by the expedition which examined into the geographical positions for the proposed Atlantic telegraph by the northern route; and our excellent Associate and Medallist, Dr. Rae, has given us a graphic account of his crossing this interesting island.

ASIA has afforded a large field for the enterprise of those of our Associates who have penetrated into its less known regions recently laid open to us by political events.

The most important of these is the navigation and accurate survey of the upper portion of that great river which is the pride of China, the Yang-tze-Kiang. In a late volume of the Journal an account is given by our well-known Associate, Mr. Laurence Oliphant, the Secretary to the Embassy, of the ascent of the river to Hankow, 623 miles above its mouth. To this expedition was also attached our excellent Associate Capt. Sherard Osborne, who, in the Arctic regions, in the Black Sea, and elsewhere, has done such good service to geography. Another arctic officer, Mr. Court, who, under Sir R. M'Clure, performed the North-West Passage, also aided in this good work. Mr. Blackney's name must also be associated in this expedition, as having given us an excellent account of his observations. It will be fresh in the memory of all that

these officers and their coadjutors ascended this mighty river in vessels of large draught of water to this great distance with our eminent Fellow Lord Elgin.

It must be a subject of gratification to the Society that the further exploration of this mighty and important river should have been executed through the personal zeal of our Associates, who have just received the highest mark of our appreciation, and who, like the officers of the preceding expedition, have won laurels in very different quarters of the globe. This topic is alluded to in another portion of this Address; but it is difficult to overrate the importance of these communications, either in a commercial sense or in relation to our future intercourse with that industrious and peculiar people.

In another part of China, the warfare led our Associate Lieut. Brine, with an expedition under Capt. McCleverty, R.N., up the Si-Kiang; and he has given us an account of the country through which the ships passed for 75 miles, and of the capabilities of the river for commercial purposes. This and the interesting communications of Capt. Sprye, and our Associate Dr. McCosh, on the countries on the west frontier of China, have been alluded to in a previous Address.

It is to be regretted that political circumstances prevented the expedition under Capt. Smyth, accompanied by Lieut. Jackson, Dr. Stewart, &c., from proceeding into Chinese Tartary last year. When our relations with China shall have attained a more firm basis, this important subject may be renewed, and will assuredly have again, as in the first case, all the support and countenance the Society can give.

Lieut. Oliver, R.A., has sent us some notes on the country west of Canton—another addition to our knowledge of this hitherto almost hidden country.

In an adjacent region we have had some interesting matter communicated by the late M. Mouhot, on Cambodia, where he had been resident for some years; and Mr. Edw. O'Riley has sent some notes on a tour through the Shan States. The communications of Mr. D. O. King of his journeys to the south-east of Bangkok, alluded to in a former Address, and the notes on the same country, collected by our Associate Mr. Jas. Campbell, demonstrate how busy is the spirit of inquiry respecting these countries, which have remained almost entirely closed to Europeans till recent times.

Foremost in the research stands our indefatigable Corresponding

Associate and Medallist Sir Robert H. Schomburgk, busy in the acquisition of information, and active in travelling through this hitherto little visited country and enervating climate. He has forwarded us several memoirs on the country of Siam, in which he represents the British Government: one on a boat-voyage to the town of Pecha-buri, and many particulars of a region which we only knew from vague conjecture or crude delineation. His Report on the trade and resources of this country are of high interest. Another of these communications was an account of a painful journey he had accomplished up the great river Menam, and thence on the backs of elephants to Moulmein, in our own possessions on the Bay of Bengal. It is thirty years since he gained his first reputation in the Transactions of the Royal Geographical Society, by his survey of Anegada in the West Indies, and twenty-three years since he claimed its Medal for his extensive and excellent researches in British Guiana and neighbouring countries. These are so well remembered that they need only be adverted to here to associate his earlier adventures with the later communications which we have welcomed.

In JAPAN the Society and our Associates have taken a deep and active interest, and have zealously endeavoured to advance our knowledge of this important country. It will be sufficient here to allude to the Papers sent by our Associate Mr. Rutherford Alcock, Her Majesty's envoy to that country. His accounts of his journeys into the interior, and of his ascent of their sacred mountain Fusiyama, form an epoch in geographical progress.

Another narrative is also most interesting, that of the journeys of Mr. Pemberton Hodgson into the interior of the untravelled and uncivilized island of Yesso. The discussions which ensued on these Papers, and the remarks of Mr. Laurence Oliphant, Sir Frederick Nicholson, Mr. Wylie, and others, must be of great interest to those who have watched the early stages of our intercourse with the Japanese. One fact of importance, often repeated by geographers, is manifest by the experience of Mr. Hodgson in these several journeys. Although unarmed, and accompanied by ladies, he travelled safely amid the demi-savage inhabitants, who had never before seen a European, without the slightest obstruction, and receiving perfect courtesy and hospitality. This fact, which may be also gathered from the experience of many in all parts of the world, teaches a lesson to those who first meet with untutored men, that they should be treated with that consideration the want of

which has generally been the origin of that opprobrium too frequently bestowed upon what is retaliation.

Political events have placed another country prominently before the geographical world. The great river Amur has been found to be one of the most important rivers of Northern Asia, as by it the vast and isolated central steppes of Mongolia can be readily approached by water-conveyance; and it is even stated that, with a very small amount of road and canal, the traffic could easily be carried on from the Pacific to the Baltic. The Addresses of Sir Roderick Murchison will tell how much the Russian explorers and surveyors have done to elucidate the geography of this region, and the excellent map constructed by Mr. Arrowsmith will show its features at a glance.

In the last published volume of our Transactions we have a further accession to Asiatic geography—a translation of the narrative and account of a Journey to the Tian-Shan, or Celestial Mountains, in Russian Tartary, by P. P. Semenov, which was undertaken under the auspices of the Imperial Russian Geographical Society. M. Semenov was the first European who visited (in 1857) this gigantic range—one of the four which traverse Asia in a parallel direction, only two of which have been explored, the Himalayas from the south, and the Altai from the north. Another translated Memoir on the same country is also given, by M. A. Golubev, who has travelled on the Chinese frontier.

There are two Papers on the beautiful valley of Kashmir by our Associates, Mr. W. H. Purdon, C.E., and Capt. H. H. Austen. In addition to a description of the physical features of this interesting country, they give a farther account of that most remarkable and important work, the Trigonometrical Survey of India, as carried over it. In former Addresses and Memoirs this immense undertaking, carried on by the East India Company, first under Colonel Lambton, and then under the control of our respected Associates Sir George Everest till 1843, and Sir A. S. Waugh, has been dilated on. In these Papers the services rendered to science, and to geography in particular, by Capt. T. G. Montgomerie, are stated. The refined operations of a survey of this order, carried over a peaceful and accessible country, possess none of the interest or romance that these great Indian observations are invested with. In the triangulation and survey of Kashmir the officers met with great difficulties; much of the service was carried on during the great

Indian mutiny, surrounded by hostile people, and amid physical difficulties never before encountered in such a manner. The whole history of the vast survey of Northern India may be cited as a fine testimonial of the progress of primary exploration.

Of the large and almost unknown island of New Guinea we have had some account from our Associate Mr. A. Russell Wallace, for some time its sole European inhabitant. Mr. Wallace's zeal in the cause of science is well known, and his accessions to our knowledge of the natural history of this vast island have been shown in other places.

Mr. Spenser St. John, F.R.G.S., now in Haïti, has given us a most valuable account of the north-west coast of Borneo, where he was Consul-General—a further accession to our knowledge of the country first developed by our Associate Sir James Brooke.

The itineraries of Captain Claude Clerk, F.R.G.S., in Persia, in 1857–9, will be read with interest, affording valuable materials to the geographer. Captain Clerk describes his journeys between Tehran and Herat in the North, and Tehran and Bushire in Western Persia.

Proceeding to another part, we have a graphic and excellent account of the Andaman Islands, in the Bay of Bengal, by our Associate Dr. Mouat. This little group and its curious inhabitants seem to have been scarcely visited, though much in the way of commerce, till it was chosen as the place of exile for some of the Indian mutineers.

Sir Henry Rawlinson, who, twenty-three years since, claimed the Medal of the Royal Geographical Society as a comparative geographer of the highest order, and who, since his first recognition by this Society, has laboured so intensely, and with such admirable results, has advocated in our pages a most important proposal for connecting by electric telegraph our Indian possessions with this country. The route proposed is by way of Constantinople and the Euphrates, and thence through Persia, &c., to Kurrachi. The Ottoman Government has constructed the line as far as Bus-sorah, a route advocated in the early days of this Society by our respected Associate and Medallist General Chesney, as the readiest way to India for an overland transit. Although the progress of ocean steam-navigation has altered the relations which then existed, it is gratifying to know that the views endorsed by the Society have been so far recognised now as to form the basis for the

modern system of telegraphic connexion. The discussion which ensued on Sir H. Rawlinson's proposition demonstrates that it was one of the highest geographical and national importance.

AFRICA has engrossed a large share of the attention of the Royal Geographical Society. From the time that the Society's first Medal was awarded to Richard Lander, thirty-one years since, for solving the great problem of the course of the Niger, to the present moment, when we are looking for the consummation of its endeavours to elucidate that other ancient enigma, the true sources of the Nile, the Society has been more or less occupied with obtaining information of the physical and moral condition of this great continent and its people.

At the first period above named, our maps of Africa exhibited its interior as nearly one universal blank, or with only the vague surmises of crude speculation. Now the geography of inner Africa presents a very different aspect. The pages of our Transactions are an index to the progress of discovery, which has been gradually displacing the imaginary arid desert by the well-watered and fertile country, or the supposed tenantless solitude with busy and populous tribes.

It is needless to advert to the early travels of Dr. Livingstone across the continent. The relation of the Geographical Society to that great traveller, and the wonderful successes due to his indomitable courage and untiring energy, must ever be a subject of congratulation.

The Society has for many years most zealously advanced those attempts to resolve the great geographical problem of the true sources of the White Nile; and all are now looking with great interest, for tidings of the expedition under our Medallist Captain Speke and his companion Captain Grant, in the confident hope that the experience its leader gained when associated with Captain Burton in the Somali country, and in the journeys they had to the great African lakes, will enable him to complete successfully what was then commenced, and definitively set at rest that question of so many ages' standing. It is needless now to speculate as to any connexion there may or may not be between the head-waters of the Nile and the Victoria Nyanza, which he visited in July, 1858, as this will all be determined, it is believed, when we hear of the traveller's further progress. This topic is elsewhere adverted to, as is the expedition of Mr. Petherick, who also travels under the auspices of the Society to the aid of Captains Speke and Grant.

We look hopefully that before the next session we may welcome these gallant men on their successful return.

A brief account has been received from our Associate, Mr. Thornton, of an expedition to the great volcano Kilimanjaro, which has been thought to have some connexion with the physical geography of the Nile basin. Mr. Thornton was at first connected as geologist to Dr. Livingstone's expedition, but afterwards joined the Baron von der Decken, a Hanoverian gentleman, to the mountain. This journey is of great importance; for while it fully confirms the accounts of the German missionaries given in our former Proceedings, it has the great additional claim of accurate survey and geological observation. Being an isolated volcanic cone, Kilimanjaro does not form part of that great eastern meridional axis which was so well argued upon by Sir Roderick Murchison in former years, and which has been reasoned on by some as the Mountains of the Moon of ancient geographers. The Baron von der Decken and his associate did not reach this great division between the Eastern and Western waters, and therefore the Nile question, probably, is not affected by the result of their journey.

Dr. Livingstone's proceedings are noticed in another part of this Address; a brief allusion to them here will therefore suffice. His visit to the Victoria Falls of the great river Zambesi, and his farther observations on this important river, are of great interest. Connected also with his operations is the exploration of the river Shiré and the great Lake Shirwa. The more exact knowledge thus placed before us, instead of the imperfect accounts given by the Portuguese of former years, are of great importance in the future conduct of commercial or other relations with these regions. In the progress of this expedition an important part has been taken by our Associate Mr. Baines, well known as the artist of the North Australian expedition, and also in Kaffraria. Mr. Charles Livingstone, Dr. Kirk, the botanist of the expedition, and Mr. May, our Associate, have well seconded their leader in examining and reporting on the country. The examination of the Rovuma River, although not deciding whether it is the outlet of one of the chain of the East African lakes, is of much importance.

The geography of Eastern Africa has thus assumed an entirely new aspect within a very brief period. The exact knowledge we now possess contrasts in every way with the chaos of opinion and imperfect observation which before these expeditions were organised were our only guides. Although much may be required before we

can have a perfect and accurate geographical picture of Eastern or Central Africa, yet the data thus laid down will be the foundation of that which will be subsequently acquired. The representations we now have demonstrate how imperatively necessary it is that astronomical observation should be connected with the necessarily vague estimates of a traveller over an unknown country.

On the shores of Western tropical Africa, our indefatigable Associate and medallist, Captain Burton, is active in the acquisition of information concerning the country where he represents Her Majesty's Government. The accounts of his visits to various places in the Bights of Benin and Benfia will be read with much interest, and there is no doubt but that his varied talent and extensive knowledge will accumulate much valuable information on these countries. He ascended and surveyed the Ogun or Abbeokuta River, in company with Captain Bedingfield, our Associate, who is well known to us in connexion with his examinations of the Congo, and as one of Dr. Livingstone's expedition.

Dr. Baikie, R.N., our Associate, who has been long on the Niger and Tchadda rivers, and has been endeavouring to establish a commanding position for England in Central Africa, has written hopefully of his prospects, should his expedition be retained. Intelligence has just arrived that the *Sunbeam* has ascended the river for 600 miles.

Another communication records the proceedings of Commander Dolben, F.R.G.S., during his ascent of the river Volta for 120 miles for the first time by white men.

With the increasing importance of the commerce of the Gold Coast and Western Africa generally, these narratives acquire great additional interest, and inspire the hope that a more intimate acquaintance with the physical condition of these countries will lead to a beneficial intercourse with the people who have so long been debased by the slave-traffic.

NORTH AMERICA.—For many years, as is well known, the Geographical Society took a most active part in the promotion of Arctic discovery, during the progress of which nearly the whole of the northern limits of America was accurately surveyed; and it is this service that developed the energies and skill of so many excellent officers, whose geographical labours have been so frequently mentioned in this and many previous Addresses, and are distributed throughout the pages of our Transactions.

During the period of these searching expeditions, one portion of the British dominions, now famous as British Columbia, was almost

less known and visited than these icy and remote regions; and the explorations and surveys of our medallist Captain Palliser, with his coadjutors, Captain Blakiston, Dr. Hector, Lieutenant Palmer, C.E., and Mr. Sullivan, which have been treated of recently in former Addresses, have proved of immense service. The sudden interest with which the gold discovery has invested this country has given a high value to these explorations, which the Geographical Society so earnestly forwarded.

In the early days of the colonization of a country all exact information is of the utmost importance, and the reports of our Associate, Commander Mayne, R.N., of Lieutenant Palmer, C.E., of Mr. Justice Begbie, Mr. Downie, and others, as given in the Journal, must do great service. Captain R. W. Torrens has also given us an account of his ascent of the Nass River for 116 miles above Fort Simpson, near the borders of Russian America, and of the evidences of the existence of gold that were found in this novel journey. Our Associate, Captain Grant, has sent further notes on Vancouver Island and its capabilities.

On *Central America* we have had a paper on the republic of Nicaragua, by Mr. Vice-Consul G. R. Perry, and another from our well-known Associate Captain Bedford Pim, proposing a new transit-route across the American Isthmus through the lake of Nicaragua.

In *South America* our Associate Mr. Clement Markham, while engaged in the collection of the cinchona-plant among the mountains of Peru, which were to be transferred to the Himalayas for cultivation in our Indian possessions, has gathered much geographical information respecting the head-waters of the Purus, or Madre de Dios, one of the great affluents of the mighty Amazon, and also of the geography of the province of Carabaya, in Southern Peru.

From this same region we have a very curious narrative and illustration of a portion of the country to the south-east of Quito, sent us by Mr. R. Spruce, accompanied by his own remarks on the same region of the Quitoian Andes. Dr. Jameson, of the university of Quito, has given us an account of an excursion from that city to the Mountain Cayambe, lying on the Equator.

AUSTRALIA.—The progress of Australia forms a very important chapter in the history of man. The rapidity with which exploration has been followed by colonization is remarkable. Almost all discovery made in this vast country may be said to have been made in connexion with the extension of its pastoral and commercial capabilities. The many explorations which the Society has encouraged

and recorded since its establishment, have added a new world to the uses of civilised man. The first paper in its Transactions relates to the infant days of the Western colony, and its first volumes record the earliest discoveries of Sturt, Cunningham, and other travellers, who pushed over the boundaries of its limited Eastern settlements. How soon these important discoveries were utilized is familiar to us all; and in later days, since Mr. Eyre and Mr. Sturt, our worthy Medallists, first attempted to traverse the continent from south to north, the benefits which have accrued from their enterprise have well justified the awards of the Society. In the last volume of the Journal is an account of the ascent of the Murray and Darling Rivers, by Mr. Randell, in a steam-boat. This fact, and the account of the settlements on the courses of these rivers, is an example of the importance of these primary explorations.

But the Transactions of the last two years are not of inferior importance or interest to those adventures detailed in the earliest volumes of the Society, at a period when the whole continent of Australia was a field for vague conjecture. In another part of this Address the wondrous journeys of Burke and Wills, and of McDouall Stuart, are dilated on, and which, judging from the past, are destined to have as great an influence on the future of Australia as those of our early Medallists.

While thus recounting the travels in the Eastern portion of Australia, we cannot forget the claims of that family of Gregorys who have so advanced our knowledge of the Western part by their admirable exploring capabilities. Their merits have been fully explained in former Addresses, and the last journey of Mr. Frank Gregory will stand foremost in the ranks of discovery. These topics have been alluded to previously.

Besides those above, a long array of names may be cited as having added to our knowledge of Australia in the pages of our Transactions. Among these we have recently those of Wilson, Landor, Chimmó, Freeling, Hack, Flood, Babbage, Warburton, Sinclair, Governor MacDonnell, Selwyn, Dempster, Dalrymple, &c. &c. The actual social benefit which has been and will be derived from their observations must be very highly estimated.

We have had recently a very excellent account of the Fiji Islands, in the Pacific Ocean, by Mr. Bensusan, long a resident there, and by Dr. Berthold Seemann, whose long experience as a naturalist has added much to our knowledge of this beautiful group, as well

as of the other numerous countries he has visited. Though there may be a difference of opinion as to the propriety of our colonising the Archipelago, there can be none as to the beauty and interest which belongs to the islands themselves.

The OCEAN has received some share of attention from our Associates. There are many features of marine physics which are still very obscure, notwithstanding the great accumulation of independent observation which has been collected. The depth, the movements, the constitution of the ocean, are each the subject of controversy, and in each branch of inquiry there is ample field for individual enterprise.

During the expedition undertaken for ascertaining the practicability of a northern route for an Atlantic telegraph-cable, the sounding-voyage in the *Bull Dog*, under our Medallist, Sir F. Leopold M'Clintock, of Arctic celebrity, has given us probably more exact data on the depth of the ocean than has been before obtained. We have now accounts of about 260 of these experiments in the North Atlantic, by which the depth has been stated at from one to four or seven miles. But many, nay most of these soundings, are open to very great doubt, and we have yet much to learn as to the depth of the ocean. In the voyage of the *Bull Dog*, besides the actual evidence of depth given by bringing up the bottom in most cases, there were some new facts elicited, which, while they overturn much previous speculation, create a desire for a great extension of the inquiry. The fact of a live star-fish and a worm brought up from enormous depths ($1\frac{1}{2}$ mile), would not have been thought possible prior to its being demonstrated. Another singular feature is that the specimens of mud brought up in these high northern latitudes, consisting almost exclusively of minute organisms, *alive*, principally foraminifera, globigerina, &c., are almost identical with those obtained by the United States officers, Lieut. Craven, U.S.N., &c., from great depths within the tropics, beneath the tepid waters of the Gulf-stream. This demonstrates that there must be a similar water-climate at each of these distant regions. Therefore the theory that there is neither light, heat, nor physical conditions necessary to support animal life at these enormous depths must be abandoned, and, while it overturns all this, it opens up a new and vast field for observation and speculation as to the actual constitution and influence which the ocean bears upon the great economy of nature.

Mr. Hopkins, a name well known to meteorologists, has given us a Paper on the conditions of the ocean and other topics relating to the North Pole.

Captain Irminger, of the Royal Danish Navy, has given us a very interesting dissertation on the ocean currents in the vicinity of Iceland, which brings forward several new features.

Another important ocean topic has been also added to by the observations of Lieut. Heathcote, I.N., on the difficult and complex system of currents in the Bay of Bengal. These are directly applicable to nautical purposes, and are of much value.

In this summary of the special application of geographical enterprise which it has been the sphere of the Royal Geographical Society to disseminate during the last two years, much is necessarily omitted for want of space. They are special as compared with the great extent of inquiry open to geographers. In the more extended sense of general geography, we may notice a paper by that eminent physical geographer, our Corresponding Member, Commander M. F. Maury, on the Southern Ocean and the Antarctic Pole. In mathematical geography Colonel Sir Henry James has described his new projection alluded to in a former Address, and Sir John Herschel has given us another communication on a similar subject. Our Honorary Secretary, Mr. Spottiswoode, has brought mathematical investigation to bear on the probable conditions of mountain ranges, and has given us another paper on a method of obtaining longitudes from the moon's greatest altitude.

Much more might be said as to the influence of the Society in the acquisition and future dissemination of geographical knowledge through the wide-spread influence of its numerous Associates, and of the cordiality existing among us, and of the many causes to which we may attribute the present prosperity of the Society.

Having now concluded the Report which the contributions of distinguished geographers have enabled me to lay before the Society, I may be allowed, perhaps, to say a few words on my own behalf.

This is the last time of my occupying this chair. Allow me, before I leave it, to thank you for the considerate kindness with which you have dealt with my frequent absences, my many shortcomings. I resign my office—for I have no doubt of his election—

to one whom you have long known, whose knowledge and skill and conciliatory power you have long learned to appreciate. If the Society has increased under me, it has been owing to his advice, and that of the able Council with which you surrounded me. It is to their zeal and efficiency that we are indebted for our growing importance as a public body.

We have, in fact, become a public department, if that appellation is to be assigned rather to the amount of service rendered than to the cost incurred. We collect, revise, digest, and amplify all the geographical information supplied to the various public offices, and communicated to us. We keep it ready for their use, and for the use of the merchant, manufacturer, and colonist. We organise and direct missions of discovery, fitted out for public objects at the public expense. We have no members of our body hanging on, in a state of apathy and indifference, for the sake of salary or superannuation. The Council is ever young in zeal and energy, if not in years. Whatever is done, is done as a labour of love, with the enthusiasm of votaries. Add to this that the subjects we treat of are of universal interest, universal application. They appeal to all our sympathies, whether of the present, the future, or the past. Such a Society, so conducted, so supported, can never fail.

PROCEEDINGS
OF
THE ROYAL GEOGRAPHICAL SOCIETY
OF LONDON.

SESSION 1861-62.

Fourteenth Meeting, Monday, June 16, 1862.*

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

ELECTIONS.—*His Highness Said Pasha, the Vice-Roy of Egypt, as an Honorary Member, and Dr. H. Kiepert, Professor of Geography in the University of Berlin, as a Corresponding Member; and Capt. the Hon. James R. Drummond, R.N., C.B.; Lieut.-Col. Elkington; Vice-Admiral Sir Charles Howe Fremantle, K.C.B.; Capt. Edward Donald Malcolm; Capt. John Puget; Sir Henry Young, late Governor of Tasmania; James Anderson; Samuel Bruce; Eugène Claude; George Cockle; Edward William Cox; John Baily Darvall; William Hardman; Henry Schuback Hood; Henry Lannoy Hunter; Frederick Isaac; Leonard Jaques; David Lyon; George Mitchell; William Parry; Mark Richardson, and William Whitmore, Esqrs., were elected Fellows.*

ACCESSIONS.—Among the Accessions to the Library and Map-rooms since the former Meeting were—St. John's 'Life in the Forests of the Far East,' part 3 of Philip's Imperial Library Atlas; 3 sheets of India, showing the districts bordering on the British Trans-Indus Frontier, by Major J. T. Walker, F.R.G.S.; Routes of African travellers, by J. L. M'Leod, Esq., F.R.G.S.; Map of Aderbeijan, by N. Khanikof; L'Herzegovine, by H. Br. de Beaumont; Ellipse, donnant les inclinaisons, les déclinaisons, et les intensités magnétiques, &c., by Jules A. Lelaisant, Paris; République du Paraguay, by M. E. Mouchez, &c., &c.

EXHIBITIONS.—Charts and illustrations, resulting from Capt. H. M. Denham's Voyage in the Western Pacific, as well as weapons and instruments used by the Northern Australians and Pacific

* This Meeting, originally fixed for Monday, the 9th of June, was postponed to the 16th of June, in compliance with the request of the National Association for the Promotion of Social Science.

Islanders; Japanese Sketches, by R. Alcock, Esq., H.M. Minister in Japan: a suit of Japanese Armour, by Consul Pemberton Hodgson; Sketches in the Holy Land, by Dr. Beke; specimens of wood and iron from Lower Assam, by Sir M. Stephenson, F.R.G.S.; map of the Holy Land, by E. Stanford, on 4 sheets, &c., were exhibited at the meeting.

THE PRESIDENT, in opening the business of the meeting, expressed his great satisfaction that the opinions of Mr. Arrowsmith and himself, and many other geographers, respecting the merits of M. Du Chaillu, as an explorer who had added materially to our acquaintance with the physical features of the Gaboon Region in Western Africa, had been recently confirmed by the well-known and clear-sighted German geographer M. Petermann. In a letter to the President, M. Petermann referred particularly to a memoir of his own, published in the widely-spread and useful work the 'Mittheilungen,' which was accompanied by maps, showing by comparison how much more had been really accomplished by M. Du Chaillu than by any preceding explorer of Western Africa, of which country he might justly be called the geographical pioneer. In lamenting that the map of M. Du Chaillu had been so inaccurately drawn, the President stated that no one had ever claimed for that explorer any pretensions to scientific skill; the Geographical Society had recognized in him the character of a zealous naturalist, who, in capturing gorillas and in wandering among various native tribes, had incidentally been of great service in the cause of Geography.

THE PRESIDENT then read the following letter from His Excellency Sir H. Barkly, Governor of Victoria, dated Melbourne, 25th April, 1862:—

"In acknowledging your favour of the 25th February, I am glad to be able to send you (per Colonial Office bag) the printed Reports, with maps, &c., of the Explorative Expeditions to the Gulf of Carpentaria, as also a Map of Howitt's recent explorations near Cooper Creek.

"Walker's journey overland from the Fitzroy you will find most interesting, as, after penetrating the scrubs, which so baffled both Mitchell and Leichardt, he travelled through a fine basaltic country, finding the tracks of the latter explorer far beyond the point on the Alice to which they had been traced by Gregory. Landsburgh was not so fortunate in the district he had to traverse in his attempt to reach Central Mount Stuart; but still he calls it 'fine sheep country,' and he saw it at its worst in the height of a tropical summer.

"We now await with great interest the news of the return of these two leaders and their parties to the South by Burke's route, which they proposed to follow down all the way to Cooper Creek; and, to guard against accidents, Howitt has been directed to remain at the Dépôt (Fort Wills) until they are both accounted for.

"As he has established his communication with the out-stations of South Australia at Mount Hopeless, and with those of the New South Wales squatters beyond Mount Murchison on the other side, and can draw ample supplies from either, there is no doubt of his being able to maintain himself here for any length of time that may be needed, especially as his relations with the Natives are most amicable. He was about, when we last heard from him, to start in search of M'Kinlay, who, since the wonderful reports to which you allude, has not been heard of.

"You would, I fancy, conclude, from the evidence of King before the Burke and Wills Inquiry Commission, that the story of the discovery of remains, &c., made by M'Kinlay, referred to his finding the body of Gray, who died, you will remember, four days before the rest of the party got back to the Dépôt. There was a certain amount of exaggeration in the accounts given, but no positive untruth. Had not King survived to tell the tale, it would have been

supposed that Gray, and probably Burke and the others, were killed by the Natives.

"Thanks for all you did at the Meeting of the Geographical Society, and for the trouble you have taken in communicating with Arrowsmith as to calling the new country Burke's Land. If, as I presume, the maps now sent find their way into the possession of that geographer, perhaps you will let him know that by next mail our Surveyor-general, Mr. Ligon, will have carried up his General Explorative Map of Australia to date, and that there will be some alteration of names, as I find, from there being so many exploring parties, that three or four rivers have been christened after myself, and some other people also; and I have told Mr. Ligon that I have selected that named after me by Walker—a new stream flowing to the south-west from the dividing watershed of the continent—and that he must find other names for the rest.

"Mr. Ligon's map will include the details of Mr. F. T. Gregory's recent tours on the west coast, which that gentleman, who leaves, I believe, in the present mail for England, has put at his disposal.

"Mr. Gregory's desire is to get the north-west corner of Australia proclaimed as a separate colony; and I hope he will succeed, as it would much facilitate its occupation for grazing purposes."

The Papers read were—

- 1.—*The Surveys of H.M.S. 'Herald' in the Pacific, under the Command of Captain H. Mangles Denham, R.N., F.R.G.S., &c., &c.*

[Captain Denham's original communication is printed at length in Additional Notices, p. 197.]

THE PRESIDENT called attention to this memoir, which gave a brief outline of the very remarkable labours of Captain Denham, R.N., who, in command of H.M.S. *Herald*, had most strikingly enriched maritime Geography in his numerous distinct surveys during nearly ten years, and had sent home to the Admiralty a multitude of data of the highest value in relation to terrestrial magnetism, tides, currents, deep-sea soundings, &c. Captain Denham was the first to ascertain the prodigious depth of the ocean (44,000 feet) between South America and South Africa, and to show that this depth far exceeded the altitude of the highest mountains above the sea. One of the most useful of the labours of Captain Denham was the establishment, after long and patient surveys, of the existence of a deep-sea passage, from South to North, of great width, and of upwards of 700 miles in length, to the east of Australia, wholly free from coral-reefs and sunken rocks; whilst his precise delineations of the outlines of the Fiji Islands, accompanied by numerous practical sketches, were precious contributions to our knowledge of that interesting group.

The second Paper read was—

- 2.—*Excursion to Harrān in Padan Aram, and thence over Mount Gilead and the Jordan to Shechem.* By CHARLES T. BEKE, Esq., PH. DR. F.S.A., F.R.G.S., &c. (Gold Medallist R.G.S.)

THE author having expressed the opinion in his 'Origines Biblicæ,' published in 1834, that the Padan Aram of Abraham was the plain of Damascus, and not Mesopotamia beyond Euprates, was induced by Mr. Porter's subsequent discovery of a village called Harrān,

15 miles east of Damascus, to make a journey, in company with his wife, in order to visit it, and to track the route of the patriarch Jacob on his "seven days' journey" to Mount Gilead. Harrān is a thriving village of 150 to 200 stone houses, plastered with mud, and contains numerous architectural fragments, especially three Ionic columns, from which it derives its local name of *Harrān-el-Awamīd*. A fragment of an inscription was found, but it was too defaced to be deciphered. There exists no local tradition bearing on the ancient history of the village. Dr. Beke discovered a well on the western side of the town, which he conjectures to be the well "without the city" where Abraham's servant met Rebekah.

Leaving Harran on January 1st, the travellers first passed over "the river" Awaj, the Pharpar of Scripture, and then followed the great Haj road across the plains of Hauran till they came to Jebel Ajtun, or Mount Gilead, which they ascended. On reaching the summit, near Mahnah,—the Mahanaim of Genesis,—they obtained an extensive view, embracing most of the remarkable places in Galilee. Then descending Wady Ajlun by Kellat-er-Rubbud, crossing Wady Rajib, and passing by the tomb of Abu Obeida, they reached the Jordan, a little way to the north of Wady Zerka, the Jabbok of Scripture, near where Lieut. Molyneux's party were plundered by the Mashalka ("Messalliek") Arabs, who, on the present occasion, escorted Dr. and Mrs. Beke across the river. After passing the Jordan, however, they had a skirmish with some Beduins; getting free from whom, they crossed the Makhrūd, and ascended Wady Fār'a to Nablūs, the ancient Shechem.

In Dr. Beke's elaborate paper the geographical correspondence of the chief places through which he travelled, with the events of the Bible narrative, are discussed with minuteness. As regards the latter part of the journey, he considers that after the patriarch Jacob had left Succoth (which he places to the south of the Jabbok) and crossed the Jordan, he entered Wady Fār'a at its junction with the former river, passing between the Makhrud and Karn Sartebbeh.

THE PRESIDENT begged the Society specially to return their thanks to Mrs. Beke, as well as to her husband, as that lady had shared in all the incidents of the journey which had been described.

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- 3.—*Narrative of a Journey through the Interior of Japan from Nagasaki to Yeddo.* By Sir RUTHERFORD ALCOCK, K.C.B., F.R.G.S., Ext. Min. Plen. and Consul-Gen. in Japan.

This journey, of which copious details are given in *Additional Notices*, p. 200, led through the inland sea of Japan to Hiogo and

Osaca, the great commercial emporium of the Empire, and thence overland to Yeddo. The usual obstructiveness on the part of Japanese officials and the feudal lords or Damios was displayed on this occasion, and overcome, not without danger of a collision, by the firmness of Mr. Alcock. It was essential that his journey should be made, for the time was fast approaching when these ports were to be opened to foreigners, and information on their capabilities had to be obtained. The result was that Osaca appeared beyond a doubt to be the most promising site in Japan for the principal seat of foreign commerce.

THE PRESIDENT commended the author in an earnest manner for his highly-interesting sketch of the social condition of Japan.

THE PRESIDENT then called the attention of the Fellows to the proposal of M. Jules Gérard to establish an African Society for explorations south-west from Algeria; and, having complimented his associates on the increasing prosperity of the Royal Geographical Society, he adjourned the meetings till November next.

ADDITIONAL NOTICES.

(Printed by order of Council.)

1.—*The "Herald's" Voyage, 1852-61.* By CAPTAIN DENHAM, R.N., F.R.S.
(See p. 195.)

IN 1851 strong representations were made to Her Majesty's Government respecting both the rapidly-increasing traffic between our Australian colonies and the western coast of America, and our inadequate knowledge of the intervening navigation among the insulated rocks and intricate clusters of islands which extend to the eastward of New Caledonia. It was urged also that distant commerce and maritime enterprise would derive great benefit from a thorough examination of that region, from having its dangers fully explored, and from having its harbours so charted and described that the seaman would know where he could either obtain supplies or repair for refit or refuge, or endeavour to fix his whaling or his coaling stations. An exploring and surveying voyage was accordingly undertaken in 1852, which, under Admiralty instructions, from time to time was conducted by Captain Henry Mangles Denham, of the Royal Navy, in Her Majesty's ship *Herald*, until 1861, when she was recalled in consideration of so long an absence from England.

The hydrographic results of this voyage being *transmitted annually*, the existing charts were forthwith corrected, and several new ones published, together with such hydrographic papers as would *at once* give the maritime world the benefit of those results; and, in due course, the original matter, franked by the Duke of Somerset as First Lord of the Admiralty, and by Admiral Washington as the Admiralty Hydrographer, is now laid before this

Society; comprising 163 determinations of latitudes and longitudes, 2601 magnetic results, 41 islands, 42 reefs and shoals, 22 barrier-reef prongs, 450 miles of Australian coast-line, with the estuaries Shark Gulf, Port Jackson, Moreton Bay, and the Derwent of Tasmania, 700 miles' contouring of the main bank, the edge of soundings off Capes Good Hope and Agulhas, thence along the Australian coast, and around the Lord Howe, Norfolk, and Kermadec islands; 107,000 miles of ship-track notations of depths, winds, currents, ocean temperatures, meteorology, and natural history, with the researching evidence upon which twenty-three *vigias* (or fabulous reefs) were expunged. The detail of the above is set forth in the 144 charts and plans, together with 93 illustrative drawings, and 15 sheets of tabulations, also submitted to inspection.

The free use of the deep-sea lead throughout the passages out and home led to the delineation of certain ocean-banks of soundings in the South Atlantic; one of which (the Victoria) in $20^{\circ} 45' \text{ S.}$, $37^{\circ} 47' \text{ W.}$, rises abruptly from no soundings to 19 fathoms, is of coralline structure, and spreads 80 miles by 12, attracting the fin-back whale, and affording haddock-fishing. The *Herald* was anchored for several days on these banks.

It was on the passage out that, in 37° S. , and 37° W. , about midway between Tristan d'Cunha and Buenos Ayres, soundings were obtained in 7706 fathoms, and other opportunities were taken of testing the depth at which the minimum temperature of the ocean is to be found (vide tabulation). The results shewed 41° as near the surface as 600 fathoms (although the surface-water was at the temperature of 80°), 40° at 900 fathoms, and not of lower temperature at 1500 fathoms.

The deep-sea lead frequently going, *always ready*, and the hand-leads *constantly going* when intersecting the assigned positions of *vigias*, precluded our mistaking earthquake tremor of the ship (as it will though out of soundings) for "grazing over a shoal." Tremors were experienced by the *Herald* (her leads *going*) when in the vicinity of the alleged *Equator shoals*, between the meridians of 21° and 22° W. , affording reason for expunging such unnecessary terrors from our charts as the "Purdy shoals" of 1831 and 1842.

The region of the *Herald's* special exploration very soon became suggestive of a distinct oceanic designation, and that of "Western Pacific" was adopted, implying all that space embraced by the meridians 150° and 180° E. between the Equator and 45° S.

By determining the salient positions both of the islands and reefs belonging to the New Caledonia, Loyalty, New Hebrides, Fijian, and Tonga groups on the *north*, and also of Lord Howe, Norfolk, and the Kermadec islands, with the warning banks of soundings, which range about the parallel of 30° S. , a clear passage is indicated of 300 miles wide for the first 1600 miles directly eastward of Australia. On this track the harbour of Matuku (the southernmost island of Fiji) is of easy access; it is adapted for a coaling-station; while the chiefs and a Christianized population present every facility.

Having mapped all that space embraced by New South Wales, New Zealand, Kermadec group, Tonga, Fiji, New Hebrides, and New Caledonia, so as to open up the first stage of communication between our Australian colonies and Western America, and having landed and established the Pitcairners at Norfolk Island, a detail survey of the Fiji group was taken in hand, which, however, had to be relinquished (when only its south-western section had been delineated upon a 3-inch scale), to meet the demand for a similar development of the Coral Sea as that which this expedition had wrought directly eastward of Australia; in the course of which Captain Denham traced the fate of Mr. Benjamin Boyd, of the R.Y.S. yacht *Wanderer*, and punished his murderer at Guadalcanal, of the Solomon group. The space to which Captain Denham's researches were then directed, is bounded to the westward by the great barrier-reef of Australia, and to the north-eastward by New Caledonia, Solomon Islands, and the Louisiade range—the trends of which converge to Torres

Strait. This coral sea, heretofore beset with vaguely-charted dangers, and rendered the more perplexing by many *reported* reefs, caused sad disasters, which, however, did not deter voyagers, who looked upon a *north-western* route to India as a great facility for ships of Tasmania, Melbourne, New Zealand, Sydney, and Queensland. In due course, however, this sea, with its isolated reefs (coming abruptly awash, though with no soundings around), became mapped; and now presents a clear 1200-mile route (free of current, and within the steady south-east trades), of 150 miles width; a route which may be availed of upon but three successive courses—viz. N. by W. $\frac{3}{4}$ W. 240 miles, N.W. $\frac{1}{2}$ W. 700 miles, and W. $\frac{1}{2}$ N. 220 miles—after crossing the parallel of 25° S., upon the meridian of 156° E., until sighting the (about to be lighted) Raine Island tower in Torres Strait. None of the six reefs (Cato, Wreck, Kenn, Libou, Osprey, Willis) on the western hand, nor the Bellona, Bampton, and Mellish reefs, on the eastern hand, need be feared; but, to give confidence, and to help a crippled ship to a sheltered anchorage,—which, happily, these reefs afford,—the Colonial Governments entertain Captain Denham's proposition of lighting Cato, Kenn, and Raine; in the same spirit his suggestions were adopted by the New South Wales Government regarding the coast-lights, beacons and buoys. The detailed examination of the reefs was such as to reveal their refuge capacities; and although 350 miles from land, light-house establishments can be formed and maintained (each having a cay free from surf, on sufficiently solid coralline substratum), and the landing of supplies would be easier accomplished than at our Eddystone or Smalls! each reef has upon its north-western and *leeward* aspect an eight-fathom shelf of fine coral grit. The plan-charts of these reefs, with a masthead look-out, will enable the cruiser or whaler to round-to under their lee, to all the succour of a Portland or Plymouth Breakwater,—at once clear of a turbulent sea-way,—where she may caulk topsides, set up rigging, rate chronometers, obtain turtle, fish, and seafoal-eggs, and enjoy the priceless tropical comfort of open ports and scuttles. This "coral sea" development indicated such postal and commercial benefits as suggested the compliment of designating it the "Denham Route:" for, by it, and through Torres Strait, steamers of one-half the size now employed to round Cape Leeuwin, can make the passage to Singapore in smooth water in one-fifth less time. Nor is it restricted to western monsoons for shipping to get to the *southward* through the Coral Sea, as the *Herald* worked the passage, against the south-eastern monsoon and trade, in twenty-six days.

To afford immediate, though temporary, means of "making-out" some of the more salient of these reefs, beacons were erected from the *débris* of wrecks and the *Herald's* stores so far as they would admit; while, with a view to permanent improvement, and for the sake of visitors or castaways, cocoa-nuts, shrubs, grasses, and every description of seed likely to grow and self-plant, were sown in the way most likely to clothe and promote the superstructure. These "cays," situated above high-water level, become the resort for seafoal to lay their eggs, and, as the birds die off, guano is produced and a vegetation is promoted that bids fair to render these ocean spots available refuges. Bottled-up papers were always left by the *Herald*, giving the latitude and longitude, and the course and distance to the nearest port, with such provisions, match-boxes, &c., and cooking-utensils, as could be spared, or had been collected from the wrecks fallen in with.

In 1858, the favourable season (January to June) for a sailing-passage along the southern aspect of Australia, and for a sojourn upon its western coast, was employed in determining the question as to Shark Bay being adapted for forming a settlement. Its position, and configuration of harbours on the maps extant had suggested it as a position for a penal settlement. The survey of this gulf was therefore prosecuted to the extent of its tidal interstices, which ramify over 400 miles of coast-line; its estuaries, however, were found to be intercepted by shallows only to be penetrated by the marine surveyors' step-by-step

process; and eventually the region proved to be such a tissue of negatives as but ill-requited the time and toil expended upon its examination; for neither timber, water, nor stone, could be found near its shores; and but a few Natives were at last seen at the head of the innermost estuary, who meekly accepted biscuit and water (caring for nothing else of ours), they having but mud-bags to suck, and a thin parsnip-sort of root to eat. The utterly destitute character of this region being determined by the beginning of June, when the dry moderate weather is quickly succeeded by storms—the furrowing effects of which, as traceable upon the semi-indurated sandhills, would indicate its being subject to hurricane visitations,—the *Herald* cleared this “gulf of negatives,” with her last month’s short allowance of water, on the 5th of June, 1858; the first 600 miles (being a *sailing* ship) was on the port-tack to the westward; but when in 32° s. and 104° E., she gradually got upon her 2600-mile track for Sydney (via Bass Strait), reaching it on July 12th for supplies. She was soon again in the Coral Sea, clearing up its capacity as a route; and this being accomplished by October, 1860, she sailed homeward by Torres Strait, determining its middle passage, settling the position of its western dangers (Cook’s Straits, Proudfoot, &c.), and then proving that the parallel of Booby Island, $10^{\circ} 36'$ s., is a clear track down the “Arafura” sea, until abreast of Timor, when the soundings jump so abruptly from 100 to 12 fathoms, as to demand a “good look-out,” and to indicate a bottom adverse to submarine telegraphic connexion of Australia by its north-western Cape.

Track-chart notations, as in the passage out, were continued via Java, Madagascar, Cape of Good Hope, St. Helena, Ascension, passing over certain reported shoals in 1000 fathoms, making the passage, with obvious advantage to a *sailing* ship (in the season of English Channel *easterly* winds), to the *eastward* of the Azores; and, on the 7th of May 1861, closing the operations of this expedition in 777 fathoms, 52 miles outside the edge of soundings.

2.—*Extracts from Narrative of a Journey through the Interior of Japan from Nagasaki to Yeddo, in 1861.* By RUTHERFORD ALCOCK, F.R.G.S., Min. Plen. and Consul-General in Japan. (See p. 197.)

A PAPER was read in this Society last season, giving some account of my journey in the interior of Japan, which was undertaken for the ascent of the mountain of Fusi-yama, and with the further purpose of visiting the sulphur-springs of Atami. I had intended giving an equally detailed narrative of the incidents and principal objects of general and scientific interest which came under my notice during a much more extended exploration of the interior of the country in a journey I undertook last year about this time, from Nagasaki to Yeddo, across the island of Kinsin, through the inland sea to Hiogo and Asaca, the great commercial emporium of the empire, and thence overland to Yeddo, the capital of the Tycoon. I have unfortunately, however, arrived in England much too late in the season to give effect to this purpose now, and I owe, indeed, to the obliging courtesy of the President and Council the opportunity of presenting to the Society even the very brief and imperfect sketch now before me, and for which I must beg the indulgence of all who are willing to listen to it. Fortunately in my previous paper I gave such details of the general features of the country, the usual incidents of travel in Japan, and the social state and physical geography of the districts then traversed, that, to those who were present, or who may since have read it in the ‘Transactions of the Society,’ any repetition of such details would be superfluous, and they will be prepared without any further preface to take their place in the motley caravan which formed my cortège on the 1st of June last year, and start at

once from the semi-Dutch colony of Decima in the bay of Nagasaki. It was such a morning as we have many in this pleasant climate of England, even in June. It began with a chilling drizzle, which soon deepened into a heavy drenching rain. The wet season of Japan had, in fact, commenced, beginning as it does with tolerable regularity about the end of May and extending into July. When it does not rain, in this season, the sun shines out with scorching power. I had thus a pleasant prospect before me of a thirty days' journey on horseback, either under a drenching rain or a tropical sun; for, although Japan has no pretensions geographically to a place in the tropics, during the summer months it asserts a claim to take rank with the best of the Spice Islands, both by its luxuriant vegetation and the power of the sun, and this so effectively and perseveringly that no traveller will feel disposed to contest the point. Were any evidence wanted, Japan would furnish another conclusive example that latitude only forms one element in the determining causes of heat and cold and of climate generally. In this little group of islands at this side of the globe, often compared to Great Britain and Ireland both from their size, distribution, and geographical position, the northern island of Yezo, in which our consular port of Hakodadi is situated, has a Siberian winter, where the inhabitants are snowed up several feet deep for many months; while at the capital of Yeddo, corresponding to London, in the larger island south, snow never lies beyond a day or two, and during October, November, and December, and often January, there is only an Italian winter in the most favoured portions of that favoured land. A bright sun, a clear atmosphere, and sky of the purest blue without a fleck or a cloud, sometimes for weeks together, are all to be counted upon. The trees put on their richest tints of every shade and hue, from the deep green of the camelia to the bright scarlet of the maple and the russet brown of the beech: these intermingled with a hundred varieties of evergreens, shrubs, and forest trees, of which the evergreen oak is one of the noblest as well as the most common. Nature has indeed lavished her wealth on the soil and vegetation, on all the physical features of Japan, and given an Italian sky and temperature with an eastern sun to enhance the beauty of all her other gifts. Unfortunately she seems to have exhausted her generosity when she made this terrestrial garden, and to have forgotten the children that were to live in it—some to till the ground and others to govern it—for one is often tempted to quote Byron's line descriptive of another Eastern land where all "save the spirit of man is divine." But in our impatience at a perpetual menace of violence, which all of Western race must live under, for many long years to come, I fear, we are apt to do injustice to the great virtues of the mass of the population. They not only are the most patient, untiring, and successful husbandmen and cultivators of the soil, but they are also a frugal, contented, and good-humoured race—docile and long-suffering, and to all appearance the easiest to govern and make happy of any it has been my fate to live among. They are, with all this, among the most ingenious and enterprising of Eastern races in all industrial pursuits; and I firmly believe, if they had fair play, could hold their own against either Birmingham or Manchester, Paris or Lyons, in many of the manufactures for which these centres of trade are noted.

As regards our relations and commercial interchange of products with the nation, however, all this is to a great degree neutralized and counterbalanced by one element in their institutions, and that is **FEUDALISM**. The iron hand of a proud, astute, and relentless class of feudal chiefs weighs heavily upon all the energies of the people. Proprietors of all the soil, exercising feudal sway with feudal privileges of life and death over all below them as their born thralls and subjects, they leave to the cultivators no more than is sufficient for a bare subsistence, and reduce the life of the mass to a mere animal existence. What Great Britain and France were in the times of the Crusades—what Venice was in the palmy days of its power, under a jealous and ruthless

oligarchy, with its phantom sceptre in the hands of a powerless doge, ruled and coerced by a secret Council of Ten—Japan now is in all that concerns its privileged classes; its feudal nobles and their armed retainers all ready to do battle, and to kill or be killed with equal promptitude at the beck and call of their chiefs. These are the classes that consume all the surplus wealth and produce of the soil. To maintain these idle and dangerous classes in their haughty privileges and unapproachable superiority, some thirty millions of the most industrious race on earth, perhaps, toil and spin, dig and delve in the fairest land of the East. And for the last three hundred years, ever since the expulsion of the foreigners and the destruction of every trace of the foreign-imported Christianity under Taico Sama and his usurping and still more implacable successor Gongen Sama (the two most revered and glorified Tycoons of their history), this state of things seems to have been steadily maintained, and, what is perhaps still more remarkable, maintained without civil feuds between the Damios, insurrection against the sovereign executive vested in the Tycoons, or murmur among the oppressed masses, which, though politically dead, are yet like the busy inhabitants of a vast ant-hill, ever in movement, ever toiling, and seemingly within the limited range of a very material civilization, ever enjoying life without a thought for the past or a care for the future. And yet with such a people, enterprising in all that lies within their field of exertion or vision, careless of life, proud of their nationality, with a warlike and belligerent class to head them, if once there were a cry to arms or revolt, who can say what a day or a year might bring forth, now that a new element is being infused into their national life?

Japan, as I once wrote to Her Majesty's Secretary of State for Foreign Affairs, was not a country I could recommend just at present for a nervous man. Fires every night destroying whole streets or quarters of a vast city; earthquakes in every week, with an aggravating uncertainty as to the time or duration and extent of the shocks; and a perpetual threat, every now and then enforced by an assassination or an attempt at a more general massacre of foreigners, and occasionally of their own ministers if supposed to be favourable to foreign relations, being the general conditions of life in Yeddo; and I may be allowed to say they are not the pleasantest in the world, nor altogether satisfactory in any respect. Such as they were, however, I had to make the best of it, not only for myself, but for others. The time was approaching for the opening of new ports for commerce and the residence of foreigners, more especially Hiogo and Osaka on the inland sea of Surnada—ports the opening of which the Government of the Tycoon were evincing the most anxious desire to defer; and it was very essential that I should, in the exercise of my treaty right, as the British Minister, to travel freely through the empire, have personal means of observation and satisfy myself, not only as to the real value of these ports, but of the state of feeling of the people there, and throughout the country generally, as well as of the actual relations existing between the mass of the population and the ruling classes. I say it was essential, for these were data which constituted the very elements of any sound judgment as to the policy or expediency of the only two courses open to Western Powers—namely, either to insist on the full execution of the treaties in all their stipulations regardless of any consequences to the government of the country—or, in other words, disregarding and disbelieving all their predictions of disasters and revolution as the inevitable result; or secondly, with or without certain conditions or equivalents, to accede to the proposal of the Tycoon and his Council of Ministers to defer the opening of the remaining two ports and two cities for a definite period of five years. I had to give an opinion on this important question; and, before giving it, I was determined to seek the means of forming it on data collected in a larger and freer field than the capital afforded, and by my own personal observation, since I could place implicit trust in *nothing* that came from Japanese sources. Once satisfied that this was the right course to follow, I made my

arrangements in accord with my excellent colleague M. de Wit, the Dutch Consul-General, who also desired, following the track of his predecessors the Dutch Commissioners from ancient times, to make the journey from Nagasaki to Yeddo overland. And on the 1st of June, nothing heeding either the lachrymose and persistent remonstrances of the Governor of Nagasaki against the imprudence of our venturing on the highways beset by Lonins and enemies to the peace (as he had by especial desire ascertained), nor even the lachrymose state of the weather, which, however, was more sensibly felt, our cavalcade of some fifty or sixty persons began the journey—consisting of our own party of five Europeans, an escort of Japanese officials with their officers and servants, with baggage-horses, Norimons, and porters—the inevitable *impedimenta* and accompaniments of a long journey in Japan—and threaded our way through the stone-paved, but sloppy, streets of Nagasaki.

The route lies, in the first instance, across the north-western angle of the southern island of Kinsin to the fortified town of Kokura, at the entrance of the Sea of Surnada, stretching for 150 miles between the mainland of Nippon (the name the Japanese adopt when speaking of the empire) and the island of Sikopf. This part of the journey occupied nine days, travelling at the rate of 8 re a-day, or something less than 24 miles. During this part of the journey M. de Wit and myself had been persuaded to trust to the cattle we should find on the way as post-horses—a mistake no one will ever make twice. Whether it was the malice or idleness of our officials, or that only the most sorry beasts could be found for hire, may admit of some doubt. This was our one great misery, and I confess to have chafed under it, remembering that I had left a good horse behind me, under bad advice. As for the weather it rained most days, more or less; and the mountain roads, especially down in the valleys, became at times all but impassable. But not even these untoward conditions, serious as they were, could rob the country of its picturesque features of continually alternating hill and dale, mountain and valley; the former often terraced to the very summit, though the sterile sandstone might constantly be seen cropping up as if protesting against the continued miracle of patient husbandry which could draw verdure and food from such a soil. Indeed, so constant is this sandstone formation, that the fields below seemed little else than sand; and every river we crossed was choked up with sand washed down from the adjoining hills, and were chiefly remarkable for the absence or scarcity of water. In 300 miles, all the way to Yeddo, we only came upon two rivers navigable for boats, and one alone for junks—that on the banks of which Osaka is situated: yet by dint of patient toil and incessant irrigation, even Kinsin, which in most countries would be a desert, is made a fruitful soil. The wheat harvest was in progress; but how, in the midst of so much rain, and in the wet season, indeed, the Japanese farmer manages to cut and house his corn is a problem we have never been able to solve. They do not pile it up in sheaves as we do on the ground, but hang the sheaves on horizontal pegs fixed to stakes scattered over the fields for that purpose. The rice harvest is in November, and fortunately under happier circumstances, as rice is the great staple of food, and a bad harvest of this cereal is a national calamity; whereas wheat is grown in much smaller quantity, and is rather a luxury than a necessity. It is chiefly used for little cakes or as vermicelli, and mingled with beans in a sort of soft dough.

In June green plots of the brightest hue indicate where the seed-rice is sown, and the transplanting process was, in many places, going on; while in others the peasant, with a light ploughshare, and sometimes with a harrow, and a bullock or a pony, was busily engaged breaking up the ground in preparation, and, with the water let in, was to all appearance reducing the soil to a state of liquid mud and manure.

The arum, a sort of lotus-plant with an edible root, the sweet potato and bearded wheat, and a bean from which they make the best soy in the East,

furnished the chief crops. A few patches of tea, occasionally a cotton-field, or a home-plot of tobacco, and more rarely a few poppies, here and there appeared. The variety of timber and foliage is great. The vines and the vegetable-wax tree preponderate perhaps, but these are everywhere intermingled with the *Cryptomeria japonica*, the bamboo and the palm-tree, thus blending the vegetation of the temperate and tropical zones in a way I have never observed elsewhere. The hedgerows are mainly composed of evergreens; the yew, the camelia, and the gardenia growing wild with the *cryptomeria*, which is generally kept carefully clipped; and from the Japanese there is little doubt the Dutch borrowed and introduced into Europe the fashion of clipped trees and hedges, which go to this day by the name of Dutch gardens. I do not know whether Macadam went to Japan for the idea of his macadamised roads, or our American cousins for their knickerbockers, but I can confidently affirm all these things were old in Japan three hundred years ago.

On the third day, at Urisino in the morning and Takiwo in the evening, we found hot sulphur-springs in much request among the natives for bathing. The first which we reached at midday was open to the street, with a mat-roof only to keep off the sun. As we approached an elderly dame stepped out on to the margin, leaving half-a-dozen of the other sex behind to continue their bathing. The freedom of the matron from all self-consciousness or embarrassment was so perfect, that the charitable exclamation of John Huss, when he saw a pious old woman hastening to bring a faggot to his stake, seemed perfectly applicable,—*O sancta simplicitas!* O sainted simplicity and happy matron, with no fear of a censorious world, vexed by no arbitrary code of conventional proprieties, and feeling no shame in the absence of covering. She had washed and was clean; and with the consciousness alone that a duty had been fulfilled, she evidently saw no reason why all the world should not know, and see it too, if they chanced to come that way.

During this journey through Kinsin, the richness and fertility of the land, so far as agricultural produce was concerned, presented a strange contrast with the obvious poverty of those who tilled the ground and lived upon it. Even in the large towns, though better houses were to be seen than in the villages or hamlets, there was still no sign of commercial activity or prosperity. I was indeed struck by the fact throughout the whole journey, that only where trade existed was there any material evidence of activity or wealth. Of the exact conditions of the tenure of land, I have no reliable information, though it has been with me a constant subject of interest and inquiry. The rent exacted, according to different accounts, varies from two to four fifths. Whatever may be the proportion, I think I saw conclusive evidence that nothing beyond the barest subsistence is left to the cultivator. Absolute destitution in Japan seems rare, and the very beggars have rather a nonchalant and jovial air, as though begging were rather an amusement than a necessity; but accumulated wealth in the hands of the higher class would seem to be quite as rare.

On the third day of our journey, when near Takiwa, we came upon some coal-mines of the Prince of Vizens. The coals appeared of fair quality and bituminous, but exposed in heaps to the air, and liable to rapid deterioration. The mine itself was apparently worked in a very primitive fashion by horizontal adits.

Arrived at Kokura, the fortified capital of Bouzen, and one of the keys to the straits between the two islands of Kinsin and Niphon, we embarked for Leinonosaki, on the opposite shore, where H.M.S. *Ringdove* was waiting to convey me to Hiogo, at the other end of the Surnada Sea. Leinonosaki is a long, straggling town, winding along the bay for a mile or more under the hills which rise at least a thousand feet above. It is only a *dépôt* for native produce and foreign goods—the first to be sent into Nagasaki and other ports, the other for distribution inland.

I must not stop to dilate on the beauties of the inland sea. The scenery is really very fine, though I think it has been somewhat overrated by the few casual visitors. This Sea of Surnada is studded over with islands; its shores are evidently volcanic; many perfect cones may be seen in the ranges of hills, though none appear in a state of activity. The villages on the shores are but fishing-hamlets of the most miserable kind. The sea itself is, however, the highway of a great traffic. Admiral Hope, in the two days occupied in traversing its length, had the junks passing him counted, and they amounted to 1500.

On arriving at Hiogo we found Takiniobo, a Governor of Foreign Affairs, waiting to receive M. de Wit and myself. He had been sent express by the Government to arrest our further progress overland, and induce us to complete the journey by ship. The ground alleged was danger to us personally, but this failing in its effect, he was instructed to urge the importance to the Government, in a political point of view, of our abstaining from a visit to Miaco, the capital of the Mikado—a negotiation being nearly happily concluded for a marriage of conciliation between the Mikado's sister and the young Tycoon, in which foreigners would be great gainers. After two long interviews I and my colleague consented to waive our intention of visiting Miaco, but firmly refused to take ship, or otherwise change our course. The rest of the journey was accomplished much more satisfactorily to ourselves if not to our Japanese friends. Two of my own horses having been despatched to meet me at Hiogo, I found them waiting my arrival fresh and in excellent condition. Hiogo is a town of some considerable size on the edge of the bay, and may be considered to some extent the shipping port of the larger city and commercial capital of Japan, Osaka, which is situated in a valley some 30 miles distant. Through this valley a river runs, dividing into numerous branches, and further connected by a multiplicity of canals. We proceeded there on the following day. Its immense area and the signs of material wealth and commercial activity exceeded my expectations. Even a cursory glance sufficed to satisfy me that Osaka, not Yeddo, was the great centre of commerce in Japan; and that Osaka and Hiogo together, in a commercial point of view, would be more valuable to us than all the other ports put together. We were nearly an hour in traversing the vast suburbs on horseback, before we seemed to gain the great thoroughfares, filled to overflowing with an immense but very orderly crowd. There was, indeed, much pushing and squeezing; and now and then a desperate raid on some luckless front rank was made by the police, and blows were furiously dealt on the shaven heads of the offenders; but the only weapon was a paper fan, and although in their hands it proved a most efficient instrument, it not only broke no bones, but had the additional advantage over our policeman's staff of not even ruffling the temper. We came at last to the main branch of the river, spanned by a substantial timber-bridge of 300 yards. Not a trace of hostile feeling was anywhere to be seen among the people. Here, as might be seen at a glance, was a vast population with whom trade is the chief occupation, and at every step I saw evidences of the greatest activity. Piled up near the bridge were glazed tiles and pipes for drains, and large earthen jars for coffins—the Japanese preferring to be buried as they sit—resting upon their heels. It seems to them, no doubt, more natural, and is decidedly more economical of space. Instead of the traditional six feet of earth, a Japanese can be buried in three; while, if he is poor, his body is reduced to ashes, and a homœopathic allowance of earth suffices for his grave. The Japanese have some strange superstition about either sleeping or being buried with their heads to the North, and my servant would on no account permit my bed to be laid down on the mats in a wrong direction; and, the better to avoid mistakes in all the *houjens* or hostelnies, the points of the compass are distinctly marked on the ceiling of the principal apartment. I could not remain many days in Osaka, but long enough to perambulate it in

all directions, and to pick up some interesting specimens of pottery very similar to Palissy and Majolica ware, and some good specimens of silk and tapestry for the Exhibition, but for which I had to pay a high price compared with the rates in Yeddo. The sun was very powerful, and the second day we took boats, a sort of gondola, by the aid of which we traversed the whole city in various directions, and with the same facility as we might at Venice. We visited the theatre, and I am only sorry time will not permit me to give any description of the dramatic performance as an illustration of Japanese life. Strangely enough I found, after my return to Yeddo, that I had actually witnessed here a rehearsal, as it were, of the scene of violence and bloodshed, in which I was destined to be a chief actor in the attack on the Legation by a band of armed ruffians the second night after my arrival: only the scene in the play was laid in a hostelry on the road instead of the Legation.

I was detained more than a month in Japan, when I had fixed a time for my departure, by an occurrence well illustrating the innate recklessness of the national character. One morning as Ando Tausimano Karni, the Minister of Foreign Affairs, was proceeding to the palace, not a hundred paces scarcely from his own residence, surrounded by his own retinue of officers and armed retainers, a shot was fired at him, wounding one of his servants, and a party of only eight men suddenly flung themselves sword in hand upon his Norimon. Before any defence could be made, he received a sword-thrust in the body, and other wounds. The assailants were all slain on the spot, except two, one of whom, badly wounded, was taken prisoner; and the Minister informed me that some of the attacking party, according to this man's account, were survivors of the attack on the Legation, after our return from this journey. With men so ready for desperate enterprises, and so reckless of life, the policy to be pursued by Western Powers, in the interests of commerce and of civilisation, must needs be a grave and an embarrassing question. Merchants, as is natural, are eager and impatient for the removal of all barriers and limitations—anxious for the immediate opening of more ports, but without very carefully counting the probable cost and the price to be paid. What if this could only be carried out, or, indeed, attempted at the price of a social and political revolution in the country; an outbreak of violence and slaughter on the part of the armed classes, and the overthrow of the existing Government, with a subsequent state of chaos and chronic war such as now exists in China? Is there any Western Power, with real interests at stake in the East, who would willingly accept the responsibility of measures of coercion to be followed by even a probability of such results? And, if any could be found, who would be the gainers? Not the merchants, assuredly, nor commerce; for if it did not make all trade and residence in the empire impossible for half a century, it would at least put an end to both for the present, and it is not this country to whom such a policy could be acceptable. Any further Eastern complication requiring squadrons and troops, and bringing all the horrors of war upon a well-disposed and unoffending population, could not fail to be unpopular to the last degree. And the Western Powers collectively appear to have arrived at the conclusion that, bad as may be their prospects of rapidly overcoming the obstacles interposed by the ruling classes, there could be no advantage to commerce, or civilisation either, which would compensate, even if it could justify, the cost and the evils inseparable from a resort to force. And, in the absence of this, merchants and statesman alike must, I believe, learn to be content to take patience, and trust something to time and persevering efforts of a more peaceable character.

3.—*On the most promising Fields for New Exploration in Eastern Africa.*

[THE following letter was written by a Sub-committee of the Council of the Royal Geographical Society, in reply to an application from the Geographical Society of Bombay. It is now printed for general information.]

IN reference to the inquiries made by the Bombay Geographical Society, it should be observed that the extent of coast whence future explorations of importance may be directed into Eastern Africa, has become considerably limited by expeditions now in progress or recently completed.

Beginning at the south, we may look upon the Nyassa as entirely in the hands of Livingstone and other Zambesi travellers, such as Count Thurnheim. Livingstone, as we know, has established easy access to the southern end of the lake, and announced his intention of exploring the whole of it at the earliest opportunity. It would be a waste of resources to direct new travellers to that same district.

Proceeding northward, the itineraries of native traders supply enough information for the present rude wants of African geography, of the country between Quiloa and Nyassa; and we have received slight but definite knowledge of the same through Röscher's ill-fated expedition, followed up as it was to some degree by the Baron von der Decken.

Taking yet another step, we arrive at the track of Burton and Speke, who have certainly left nothing of primary importance undescribed.

The fourth and last section of known country is to the eastward of Mombas, whence Baron von der Decken (accompanied by the English geologist, Mr. Thornton) has lately travelled to Kilimanjaro, and where he still proposes to travel.

Thus there is no urgent call for a new expedition that should leave the coast of Africa between the Zambesi and Mombas; but Eastern Africa is almost untouched between Mombas and the Red Sea. The field that here awaits new explorations is too vast to be exhausted by any single expedition. Three distinct undertakings may be specified.

The first is to ascend the Juba, the Ozi, and other rivers, as far as they are navigable. They have all been visited by slavers, and opposition might be experienced on entering them, partly from that cause and partly owing to hostilities between the Somaui and the Massai; but no serious obstruction need be apprehended by a well-equipped party, large enough to command respect.

The second and the most difficult would be a land exploration through the Somaui. Their language is an obstacle to a traveller from the side of Zanzibar, where interpreters cannot be engaged; while the religious and the political fanaticism of their northern tribes is an equal bar to travellers from Aden, where a suitable expeditionary party might, perhaps, be collected. The most promising course would be to land at Mogadoxo, and to reside there for some months, learning the language and acquiring a hold on the goodwill of the people, before attempting further progress.

Additional interest is given to this exploration by the fact that Lieut.-Colonel Rigby, H.B.M.'s Consul at Zanzibar, is firmly persuaded that some Englishmen are now in captivity among the Somaui; for a report to that effect has been confirmed by different witnesses. He believes them to be a part of the crew or passengers of an East Indiaman, supposed to have been wrecked near the Mauritius in 1855, but whose cargo, or rather a number of miscellaneous effects resembling those known to have been carried by her, are come into the possession of the Somaui. An exploring party would find in this report an intelligible pretext for their presence in the land, and a stimulating object for their earlier movements.

The last course would be to adopt Mombas as the headquarters, and thence

to pass into the interior by a route to the north of that travelled by the Baron von der Decken. The country behind Mombas is a less unhealthy residence than other parts of the coast; and an expeditionary party might be organised there at leisure, with help from Zanzibar. The Rev. Mr. Krapf resides in its neighbourhood; the natives are accustomed to Europeans; and the traders mostly speak Hindustani. It would be impossible at the present time to plan an exploration in Africa that would afford hope of a more interesting discovery than one leading from Mombas round the northern flank of Kenia, and thence onwards towards Gondokoro.

18th March, 1862.

4.—*Calagouk, or Curlew Island, in the Bay of Bengal, as a Sea-coast Sanitarium.* By DUNCAN MACPHERSON, M.D., Inspector-General of Hospitals, Madras Establishment.

THE MOSCOS, contiguous to the mouth of Tavoy River; Tavoy Island, half-way between Tavoy and Mergui; and King's Island, opposite Mergui, have come respectively under our inquiries. Of these various islands, the following is in every respect the most suitable for a sanitarium.

Curlew Island, the headquarters of the Alguada Reef lighthouse establishment, is situated in the Gulf of Martaban, 5 miles from the mainland of the Tenasserim coast, and 30 miles of Amherst Point, in lat. $15^{\circ} 52'$, and in long. $97^{\circ} 42'$. It is 8 miles long, exclusive of Cavendish Island, which lies at its extreme south end, and which is half a mile in length. The greatest breadth of the island is about $1\frac{1}{4}$ mile; and on its highest part, which is about 500 feet above the sea, are the "remarkable trees," a point for navigators in making the coast.

The base of the island is primary rock, the superstratum being a rich mixture of open porous soil, composed of sand and vegetable mould. Its formation is very peculiar, the northern and southern portions differing considerably. The northern half on the western side is composed of a long granite ridge, with an average perpendicular drop to the sea, varying from 250 to 300 feet. To the east the ground descends to the sea in gentle or abrupt slopes. The opposite side of the island is broken into alternate or isolated hills, with level well-raised intervening spaces, forming three bays. The first, Quarry-bay, where the stones are now being prepared for the Alguada lighthouse, is the deepest at high-water; the beach is sandy, but at ebb tide an extensive mud-flat, covered in places with mangrove, is exposed: the somewhat narrowness of the channel between the island and the mainland on its side tending to the accumulation of mud.

The southern half of the island differs entirely from the northern, inasmuch as both sides are broken into bays. To the west, Retreat Bay, Rocky Bay, Sea Bay, and Fish Bay are beautiful, hard, sandy beaches, well protected by high land on each side, and open to the ocean in front, with a fine rolling surf on the beach, and only divided from one another by projecting rocky points, and from the corresponding bays on the eastern side by well-raised necks of land, sloping east and west, free from all swampy ground, and ascending north and south to the hills which divide the bays. The eastern bays look on the distant mainland, rising in bold outline on the horizon. These very much resemble the western bay; in fact differ only by the mud uncovering at half-tides, the rise and fall at spring-tides being 22 feet. All the bays on the eastern side are perfectly protected from the south-west monsoon; while during the north-east monsoon the bay on the western side, and the deep water close up to the ridge on the north, afford a free, open, and safe place for yachting

and boating. The bays on both sides are peculiarly well suited for bathing, the water on the western side especially being always pure and clear, except at spring-tides.

Ascending from Retreat Bay the ridge referred to above is reached. This ridge, and indeed the entire island, is clothed with fine primeval forest, with trees of immense dimensions and height. Under their overshadowing branches a well-shaded road might with ease be carried along the ridge, having the open ocean on one hand, with the view of the fine contour of the island itself and the bold coast of the Tenasserim provinces in the distance beyond on the other. Here and there this ridge opens out into plateaus, forming beautiful sites for houses; and, with the exception of a slight rise about the centre, the road would nearly run on a uniform level for a distance of 5 miles. The same road might there be extended to the southward, encircling the bay and crossing the intervening points of land, and also to the northern part of the island, where there is a considerable space of garden and cultivable ground. The free percolation of air by means of these roads, judicious clearing for building sites, and the adoption of measures to facilitate the natural drainage, one year prior to the occupation of the island for sanitary purposes, are measures of the highest urgency and importance.

The island has now been occupied by a large party of workmen since April, 1860. Usually the pioneers or first settlers in every locality suffer considerably, especially where no prior arrangements have been made to guard against disease. In the present case a large body of natives of India, Burmah, and China, European officers and subordinates, entered on operations of a harassing nature, at the hottest season of the year. Quarry Bay, where they settled, is, sanitarily considered, by no means the best locality to settle on. But the presence of good stone, and the facilities for shipping it to the reef, induced the superintendent to fix his headquarters here. I append a return of the strength of the establishment, the prevailing diseases, and the mortality, from the 3rd April, 1860, to the 30th April, 1861, from which it will be observed that, everything considered, the sick and death rate have been unusually small. It must be borne in mind that the party for many months had little or no protection by night or by day, and that their huts occupied unwholesome sites in the midst of felled jungle, yet the report presents a gratifying immunity from the graver diseases. The fevers were chiefly of an ephemeral nature, the sick-list being chiefly kept up by local injuries and their results,—diseases not contracted on the island and cutaneous affections, from the want of antiscorbutic articles of diet.

DAILY AVERAGE per Cent. of Prevailing Diseases, from 30th April, 1860, to 30th April, 1861.

	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	Averages.
Strength . .	212	209	295	367	400	433	495	502	480	480	705	710	440
Dysentery . .	·09	2·07	..	..	..	..	·10	·36	..	·14	..	..	·23
Ulcers . . .	0·7	5·1	3·1	4·1	5·5	3·8	2·6	3·5	4·1	2·1	2·08	3·64	3·38
Fever . . .	0·8	1·0	0·9	1·0	1·2	1·5	3·4	4·9	4·1	4·1	2·3	1·55	2·17
Other diseases .	5·05	8·61	6·13	6·14	7·05	8·01	4·25	8·99	8·30	16·74	11·99	22·22	6·13

There were nine deaths during the year from diseases contracted on the island, viz. :—Three from dysentery in January; three from fever; from ex-

posure, one in July, one in November, and one in January; three from accidents and other diseases. No deaths occurred amongst the Europeans.

During the ten days of my residence on the island, in the months of May and June, the climate was exceedingly agreeable. The nights were cool, and no punkahs were necessary during the day. In fact, a refreshing sea-breeze was present at all times in every part of the island visited by me during the day, and a blanket was always grateful at night. The average of the thermometer at this period during the day is 75° , during the hot weather it is 86° ; and Captain Fraser speaks in glowing terms of the climate at all seasons, as compared with that in Calcutta. Water of an excellent quality is procurable at a depth of 15 feet; and a perennial spring of sweet water flows through the centre of the island. The rainfall, Captain Fraser thinks, is under that experienced on the mainland opposite.

The great advantage of this island is its proximity to Madras and Calcutta, and to the principal stations in Burmah.

5.—*Topographical Notes on Tunis.*

["This paper appears to be a careful compilation of considerably more than a century ago. Some of the places described are correct, as far as the compiler goes, but many changes have occurred in the interim. His mention of mines requires verification, for it is difficult to pronounce what is authentic and what he gathered from itinerant Jews and others. There are evidences of the manuscript having been ransacked, but I do not remember having met it in print."—Vice-Admiral W. H. SMYTH, K.S.F., F.R.G.S., &c.]

Biserta, a large town about 50 miles north-west from Tunis, seated by the sea-side; about half a mile long, but narrow. The lake, on the banks whereof it is seated, discharges itself into the sea by the town walls, and forms the port. Towards the east is the island where the Christians formerly lived. The inhabitants are pretty numerous, and are for the most part of the race of the Andalusian Moors who were drove out of Spain. They have about this town very good arable land, which produces a great quantity of beans, chichorie, and sundry other sorts of grain, which is exported for Italy and France, except wheat and barley, that not being exported without a particular licence. They sow cotton and tobacco. The lake reaches up 30 miles in the country; and there is an ebb and flow every six hours, and at the full of the moon then it is more. In the year 1755 there was found an old-built well of very fine fresh spring-water; it was stopt up; it is in the market where they sell the wheat.

Ras El Gibel, a town of about 300 houses, 8 miles west from St. Farina, and about a mile from the sea. There are seven churches with steeples.

Porto Farina is a an unwall'd town of above 100 houses; a large lake is before it, at the end whereof is a very handsome large bason for holding the men-of-war and cruisers belonging to Tunis, it being the safest and best port belonging to the kingdom of Tunis. To the northward of the town is a salt-work. In 1739, when I was first there, there were two men-of-war—one of 50 guns, given by the Grand Signor in 1732, and the other of 50 guns, built by one Mr. Markham, an English builder, which has never been at sea yet, nor, I believe, never will. Near this place, about 1750, was discovered, by a Milanese, a quicksilver-mine, very good, but neglected by the Bey.

El Alea, a neat town seated on the top of a hill, whence its name (the high), is inhabited chiefly by Andalusian Moors, about 10 miles south-west from Porto Farina. It is at this place only where the thistles grow which are used by the capmakers at Tunis; they will thrive nowhere else, as has been tried.

Solyman, a small unwall'd town of about 200 houses, about 22 miles south-

east of Tunis, is seated on a plain a mile from the sea, inhabited chiefly by Andalus and Tripolines. Saffron also grows hereabouts.

Hamam Leef.—This is a famous hot-bath seated at the foot of a very high, steep, rocky hill. Here are two baths built, one for the men, and the other for the women : they go down three or four steps to them, and the water is up to their middle ; there is a bench of stone to sit on ; it is frequented chiefly for the cure of the French disease. The water of this bath is entirely sulphurous ; it is about 12 miles south-east of Tunis.

Galipia, a small town situated at about 15 miles south-east from Cape Bona, and about 2 miles from the sea-side. The castle stands on the top of a rocky hill close to the water-side, and is a very ancient building, and very difficult to go up.

Zouwan, a neat town of 450 houses, seated on a hill at the foot of a large hill, inhabited chiefly by Andalus, who are dyers and gardeners, there being a very good spring of fresh water, which comes out of the hill above the town, which serves both for dyeing and for their gardens. Where the head of the spring is, is the ruins of an old temple built over it ; it is round.

Mesakin, a small town of about 100 houses, inhabited chiefly by Sherifs, who won't allow neither Jew nor Christian to enter the town.

El Jeridde, a large tract of land lying on the borders of the Sahara or Desert and subject to Tunis. It is a sandy soil, and the only produce of it is dates, with which they drive a great trade with the Moors round about them ; besides, they make great quantities of fine barracans and fine burnouses of wool they get from the Emamma, a tribe of Moors who are near them, in exchange of their dates. The caravan that goes from South Barbary to Cairo every year calls at the Jeridde, both going and coming, and exchanges goods for dates. The people are yellow and thin, and have bad sight by reason of the heat of the sand. They reckon three days' journey from the Jeridde to Tuggurt. The water of the Jeridde is purgative to strangers for a while, till they are used to it. Madder is cultivated here ; and, upon a demand in Tunis, they carry it there from hence, it not turning to account, by reason of the land-carriage, unless very scarce and dear.

Bahar Pharaon, or the Sea of Pharaoh, is a kind of lake in the Jeridde ; some part water, but the most part sand, and in several places quicksands ; so that where the people passed over is marked with stumps of date-trees, otherwise there would be no finding the way.

Tozer, the chief town of the Jeridde. Here is a palace built for the Bey, where he commonly resides when he comes to the Jeridde. At this town the caravan that goes from South Barbary to Cairo and back again, calls here ; and the Codemsees pass here mostly.

Nefta, a town of the Jeridde, 15 miles south-west from Tozer. They have plantations of date-trees and springs of warm water.

Sfax, or *Sfacus*, is a handsome town, four-square, and walled round. The town is seated on a sandy plain about a stone's-throw from the sea. It is about a mile in circuit, and very populous. They make a great deal of linen cloth there. This place drives a great trade to Alexandria for flax and rice ; and ships off from thence (when the Bey gives leave) oil, olives, and soap for Alexandria, and wool for Christendom, and henna for Tunis.

Sminjah is a plain so called, famous for the defeat of Hassein Ben Allie by the Algerines in 1735, and afterwards for the defeat of Sidie Jonas about two months afterwards by Hassein Ben Allie. And in this plain are some quarries of black marble, pretty good.

Mezzelbeb, a neat town situated on a plain on the eastern bank of the river Mejerdah, inhabited chiefly by the Andalusians. At this place is a fine bridge over the river, built by Mahomet Bey. The river is very deep here, and as broad again as where the bridge is going to Porto Farina.

Hamman Zreeba, a hot-bath nine miles south from Zowwan. The water is impregnated with rock-alum and sulphur.

Uselet, a parcel of high mountains so called; they are about 18 miles square each way; and they reckon among these mountains about 6000 men inhabitants besides women and children. The mountains are craggy, and of very difficult access, being very narrow ways; but among the mountains they have valleys; and the caroub-tree is very plenty; and they keep a great many bees. They have several stone cisterns in the hollows of the mountains, which the rain fills and serves them for their drink. The people are very hardy, and very dextrous in handling small arms. I have been told by a Jew who used to travel in those parts selling trifles, that he had seen a great many stone statues in those mountains, dressed in a short dress, some with their heads off, others wanting their arms, defaced, I supposed, by the Arabs.

Tabarca is a small island near the borders of Algier, belonging formerly to Tunis, and afterwards to the family of Lomellini of Genoa, confirmed to them by a firman from the Grand Signor in 1740. There might be about 800 or 900 souls in the town, and 22 coral-boats thereto belonging. Facing the island is the ruins of the ancient Tagasta. The ruins of the town Tagasta are two miles in circuit; and there are three large magazines standing, and several sepulchres, which the Tabarkines broke down for the stones.

Keph, a strong town on the frontiers towards the Algier territories. The castle is a Roman structure. The climate here in winter time is very cold, and they have a good deal of snow-fall about the hills. Near this place is a very good copper-mine, and also an iron-mine, discovered in the old Bey's time. Near Chef are woods from whence they bring bark, which is used by the preparers of morocco-leather skins, and they also bring white galls from thence used by the said tanners.

Gafsa, a neat town a day's journey from the Jeridde. The houses are built of mud walls and palm-tree rafters. They make very fine burnouses and bar-racans here, and very fine worsted, of which the Turks, who are in garrison, make mahakas, which the women use to rub themselves with when they go to the bagnios; they put some of the inside of the date-tree under and sew the worsted over them. The wool they get from the Emama, a tribe of Moors not far from them. About a musket-shot from the town is a mountain called Gibel Gâtöre, from whence they supply the kingdom of Tunis with flints for the muskets and pistols.

Jerba, an island belonging to Tunis lying just on the borders of Tripolie, near 60 miles in circumference. The soil is sandy and produces great quantities of water-melons. The people are very industrious, and are mostly merchants, but have the character of being very sharp and also close-fisted, which has caused a proverb in this country: "Como un Jerbino" (like a Jerbin)—that is, miserly; and they are also reckoned one of the four of the greatest cheats, viz. a Jew, a Genoese, a Jerbin, and a Greek. They are mostly of a sect called Hamse.

Gurbos, a place about 12 miles to the northward of Soliman. Near the sea-shore at this place is a very hot bath: the water comes from the mountain above it, and is impregnated with alum; the water is so hot that it is hardly bearable. There are some ruins at this place.

Susa, a handsome walled town of about a mile in circuit, at about a stone's-throw from the sea-side, 15 miles south-east of Erkla. There are also several ruins about the town. The country round about is sandy, but produces great quantities of oil and olives. There is a great deal of linen cloth made here, being the best made in the kingdom. They have several wells of water: they are ancient, and built with large massy stones.

Moraisah, lying 6 miles north-east of Suliman, close by the sea-side. Here are very extensive ruins, and was formerly a city of some figure: they have

brought away a great many stones from hence, which have served to build the castles at the Goletta and other buildings in Tunis. There is a great deal of ruins to be seen under water in calm weather, particularly a large gateway standing upright.

Sahul, a part of the country so called which comprehends all the land near the sea-coast from Ergla to Sfax: it abounds with olive-plantations. They cultivate and make indigo. The Moors of the Neageas, of Uled Saïde, and Dreid have their quarters in these parts.

Arad, a large tract of land, part plain and part mountainous; called also the Little Jeridde. It joins to the Sahul and the Jeridde, and goes as far as the borders of Tripolie. They have plenty of date-plantations, though not so good as those of the Jeridde; and they cultivate the henna.

Carthage is now only an heap of ruins: all the remains are the large cisterns, which are 17 in number, adjoining close to each other; there is one of them divided into two parts, with a cupola on each end. On the southernmost side are nine, and on the other side seven. They are all of equal dimensions, and are as follows:—

The length from within the walls is 90 feet, and in breadth 18 feet 10 inches.

The breadth of the wall that divides the two cisterns 4 feet 10 inches.

The breadth of the passages within the walls 6 feet 8 inches.

The depth from the top of the arch to the wall that divides the cisterns is 10 feet 3 inches.

The breadth of the cupolas 20 feet.

The thickness of the wall on the top is 2 feet 8 inches.

I measured the depth of one cistern that had some water in it, and found it to be 26 feet.

At the end of these cisterns, on the north side, is a wall built that one can go no further on the east side. The Moors have dug a hole in the wall to find treasure, and it is said they found some; but on the terrace of the cisterns, and adjoining to them on the west part, is a cupola which I measured the depth of, and found it 28 feet. The top of the cupola is broke down; and about 12 feet down is a square hole, for what use I don't know. In each cistern are eight small earthen pipes on the top—I suppose for the admission of the water—about 3 inches diameter. The cisterns on the south side are falling to ruin, several being fallen in.

Near the sea-side, at the distance of about 20 feet, and not far from the cisterns, are several fragments of ruins on a rising ground; and I went underground in an opening, and found it was an arched place supported on large pillars built of stone, and that there were four ways going always cross and cross. I could not go in far by reason of the rubbish. I was told by one that he had heard that some Turks had been in there, and came to a large hall supported by marble pillars, and that they could go underground a great way; but it is now so filled up with rubbish that one can go only a little way in. I was told by one who lived at the castle, built near the cisterns, that in digging to make a garden they found several tombs, of two long stones for the sides, and one for the head, and another for the feet; they were narrow, and covered with a red-like slate: there were bones in them, and some bones of a child; their heads were laid north-west.

Near the cisterns, a little to the northward, is a spring of water, which comes out in a valley from a large mountain. The water in winter is good, but in summer it is something brackish: it comes into a kind of stone trough. Some Moors have been in, and say it is very spacious. About half a mile nearer Tunis are another set of cisterns; they seem to be shorter and broader than the others. The Moors have inhabited them.

There are several cisterns all about the hills of Carthage, and sundry other ruins, but nothing that deserves to be taken notice of.

Beeban, a place so called, about 40 miles east of Jerba, is the last place belonging to Tunis towards the eastward.

Nabal, a large open town, seated at about a mile's distance from the sea in a sandy plain. Near this place, on a mountain called Gibel Shib, or the alum mountain, there is an alum-mine. They don't know how to work it clean; they have formerly tried, but found the expense exceed the gains.

Ras Sem, in the kingdom of Tripolie. I have been told by a Corsican renegade, who had been Bey of Derna, that he had twice seen that place, and that he had seen there petrified palm-trees and also olive-trees, and like people's knee-bones, which were turned like flint-stones; and that people going there on purpose seldom found it because, lying in the sandy desert, the land being blown by the wind covered that place, and at some times the wind would drive it away, when what he told me of might be seen.

Gamuda, a place where are the ruins of a large town seated on the side of a hill. There are no inhabitants here. This is one of the stations of the winter camp. They find the abebile (?) here, and nowhere else in the kingdom; they are found in a plain on the surface of the ground.

Cairoan, a very large town, the next in bigness to Tunis. This town was supposed to have been built by the first Arabs who came down and conquered this country, there being several of the chiefs buried there. They have a handsome large church wherein is hung up the armour of the Arab chiefs, as helmet, breastplate, &c., as used in those times. The people pay no head-money, it being esteemed a holy place, next to Mecca; and the Moors say, that in case the Christians should take Mecca, then this town would be visited by pilgrims instead of that place. They reckon in this town 4024 houses. The people are very industrious, and much given to trade. They are reckoned very honest and just, but very sharp in their dealings, looking after the smallest matter, which they won't lose.

Jibbel Iskill, or Gebel Iskill, is a large high mountain about 16 miles from Biserta. At the end of the lake it is full of wild hogs, being full of woods. Here is a hot-bath, frequented by the Moors, and several ancient ruins. In the summer time, when the water is low, they send cattle to graze, there being fine pasture. In winter time they go there by water.

El Hamma de Tozer, a large village about 6 miles distant from Tozer. Here is a hot-bath: the water is not very hot, but after bathing it causes an abundant sweat, and is good in many diseases, and much frequented by the Moors. The water here is very good and sweet—the best in the Jeridde, and serves to water the date-plantations, being a copious spring.

Cheps, a large town through which a river runs that divides it in two parts, but it is joined by an ordinary stone bridge. The port is in the river, but it is very dangerous. The water of the river is sweet, but very heavy and unwholesome to strangers. The chief of their trade consists in the henna, of which they have many plantations. The water ebbs and flows very much, and at low water they can see the ruins of a large town. Some miles distant is the ruins of the old town of Cheps.

Gem, a large village built about half a mile from the famous Amphitheatre. In the Amphitheatre is a hole, and the Moors say that there is a passage under ground that leads to Medea. A Jew told me he had been a long way in it; and several Moors told him they had been a great way in it.

Toburba, a small town seated on the western side of the Mejerdah, inhabited chiefly by Andaluses. There is a handsome bridge built by Mahomed Bey out of the ruins of an amphitheatre. Here is a batan for milling caps.

Weyd el Erg a river about 6 miles east of La Calla. It is supposed that formerly there has been a port here, there being a great deal of ruins dispersed all about this track. There are otters in this lake: the Moors eat them.

Biserta.—The lake of Biserta is in two parts joined together by a narrow

channel: that part towards Biserta is reckoned to be 25 Italian miles in circumference; the uppermost part is reckoned larger than the other; and within it, near the channel, is the fishery of Tingia.

Truzza is a very high mountain, and on the top of it is a large hole from whence ascend hot vapours, and it is used as a bagnio by laying wood over the hole, and a mat upon it, and the person lays down on it, being well wrapped up. Towards the foot of the mountain is a grotto; and some goats having gone in there, when they came out again their hair was turned yellow. Allie ordered people to go in, but they could find no end. At this place are woods of fir and pine.

Gilma.—Here are the ruins of a very large town built on the side of a hill. On the foot of it are several square towers, pretty high but narrow, covered on the top, and a door to go in; within each, on the floor, is a square stone about 4 feet high and as many square; and on the top is a round hole, about 6 inches diameter, which runs down into another larger; and within the tower, towards the top, are four figures cut out in gips, one on every side—one with a lance, another with bow and arrows, and such like arms.

Here is also a rivulet of fresh water.

In a large mountain, a day's journey on horseback from Tabarca, there is a lead-mine. They have ovens to melt and prepare it. They have several openings of the mine; but they don't take much care to melt it, being a good deal of dross mixed with it. It is a very large and plentiful mine, and is forbid to be worked but for the use of the Bey; but a great deal of it is sent in contraband to Bona in order to make their pots; and all the Arabs supply themselves here, also in contraband, with lead to make bullets; that for Bona is run to the sea-side, whence it is shipped on board the sandalls.

This is the road going to Tabarca, and is a very narrow and bad pass. The garrison of Tabarca have sometimes been set upon (in times of disturbance) here by the Moors.

A few miles from Bardo there is a copper-mine—very good ore; and not far from it is a silver-mine; and in the mountains above Tabarca is a silver-mine. Both these silver-mines were discovered in 1738 by a man who came here and gave himself out for a miner, and spoke several languages. I fancy he must have been a German renegado, though none knew what he was; and he tried the ore, and produced silver; but being accused of a design of running away, the Bey ordered him to be imprisoned, which he took so ill, that with a knife he had, he killed his servant, and then cut his throat.

The large copper-mine is beyond Chef, near the river Serat, on the Alger frontier. The mine is very rich.

At Spaitla is a copper-mine, and at Truzza is a silver-mine.

6.—*The Andaman Islands.* By REV. CHARLES PARISH, Chaplain, Bengal Service.

Communicated by SIR WILLIAM HOOKER, F.R.G.S.

Moulmein, Dec. 10, 1862.

MY DEAR SIR WILLIAM,—I have lately had an excursion to the Andamans, and, more interesting still, to Barren Island. Our new settlement at *Port Blair* in the southernmost of the three main islands, is at present not on the *mainland* (as we may well call the larger islands), but on three very small islets close to the mainland, in the bay or port. These are quite cleared, so hardly any botanising is to be done on them; and the mainland is not safe to visit without a guard of seamen, owing to the hostility of the natives. Moreover, when you visit it, you can yet do nothing more than skirt the shore, or, it may be, penetrate some 100 yards inland, as the country is one vast

impenetrable jungle, swarming with leeches in the rainy, and with those still less delightful things *ticks* in the dry, season. Therefore, as I was there but four days—was poorly one day, and had duties to perform—you may suppose that I did not do much botanically. I strolled about, however, a little, and saw enough to show me that, generally speaking (although of course there must be some things new), the vegetation small and great is that of our Tenasserim coast. From the absence of palms of all kinds—at least about Port Blair (as far, that is, as my limited observation went)—and of large endogenous plants (at all events in sufficient numbers to catch the eye), you would hardly imagine, as you look down upon the scene from the top of one of the smaller islands, that it was a tropical one—although, indeed, as soon as you try to force your way through the vegetation, its rank growth speaks at once of heat and moisture such as temperate regions know nothing of. The land is not high; still there is no level land about Port Blair; the islands, as far as the eye can reach, form a series of gentle undulations densely clothed in green, the highest points being 700, 800, or even perhaps 1000 feet. The highest land in the whole archipelago does not, I believe, much exceed 2000 feet. I was at home among most of the herbaceous plants, ferns, and orchids, as they were my old friends of the coast. I found, however, a *Lindsæ*, which I had not yet found here, and which I am not sure of, and a terrestrial orchid—*Platantheræ*, species new to me. But the fact that I have not yet met with these plants in our provinces, is no proof that they are not there also. It is very likely they are, but that I do not happen to have fallen in with them. One little interesting fact I discovered relative to the very limited *manufactures* of the poor Andamanese. It is, that they make their bowstrings of the fibre of *Dendrobia formosum* and *secundum*. Their bows are very powerful, and they are capital shots. The men and women go alike in *puris naturalibus*; and their life seems spent, poor creatures, in searching for food, chiefly shellfish, though they *shoot* other fish, and a pig occasionally. There are no other wild beasts known on the islands, as that expression is commonly understood, except one small carnivorous animal, which Mr. Blyth, of Calcutta, named to me; but I forget what he called it. Mr. Blyth requested me to search for frogs for him, as he said it was supposed by naturalists, that *Batrachians* were not found on islands at a great distance from continents. In this instance, however, they are; for I had no difficulty in catching him some frogs. But I must leave the Andamans now, hoping to make a better future acquaintance with them, and come to that place, which I have been long wishing to visit, Barren Island. I wish I were competent to describe this island and its formation geologically, for it is most interesting. Of its general structure and form, of course I need not speak, as every one knows that from Lyell, though he is mistaken wholly in one point; for he says that the sea flows round the base of the cone *inside* the outer wall of the island. It is difficult to understand where his information could have come from. Not only is it not so, but the valley, filled with rugged and broken blocks of lava, is much elevated above the sea—I should say, generally, 50 or 60 feet—and there are no appearances of any recent elevation of the island.

We landed (a party of five), early in the morning, at the only practicable landing-place—a breach in the summit of this submarine mountain, out of which the lava had flowed into the sea (the steamer meanwhile steaming gently to and fro, as there is no anchorage). It is only when opposite to this breach, as I call it, that you can get a sight of the inner cone, for the general elevation of the island is about the same as that of the cone, namely, about 800 feet. The cone is composed entirely of scoriæ and loose cinders, and is perfectly black; and, being excessively steep (about 45°), is, as you may imagine, very difficult to ascend. We ascended it, however. Near the summit the loose material of which the cone is composed is cemented into a tolerably hard surface or crust, by the deposits of sulphur and gypsum (I believe) which

are precipitated from the vapours which are continually given out from it. There is a small crater on the top about 40 or 50 feet deep, and 100 feet in diameter. The bottom of it is quite smooth, and firm, and cool (*i. e.* was so at the time of our visit). It is along the *edge of this crater*, which is marked by long, narrow fissures, that the sulphureous vapours issue. Speaking generally, you may say that the cone is devoid of vegetation, as there is not enough upon it to be noticed at a distance, or to alter in any degree its prevailing black colour. Vegetation, however, does exist. Tufts of a species of *Juncus* are seen here and there, and a few miserably-stunted ferns—*viz.* *Nephrolepis hirsutula*, *Pteris longifolia* and *quadriaurita*, and that curious little plant *Psilotum*. These were the *only* plants growing on the cone. Round the base, and filling up the valley, flows (or has flowed at some distant time) a stream of black lava, which has evidently emptied itself into the sea at the breach in the side wall of the island, before mentioned. I say a *stream*, because I think it is impossible to view it from the top of the cone without coming to the conclusion that it was once a stream flowing round the base and rushing out into the sea; but the surface of the lava is neither smooth nor even, but consists of a mass of loose blocks, some solid and crystalline in their texture, and others (by far the greater number) porous and tufaceous, of every size and shape thrown and heaped together in the greatest disorder, as if (as I suppose must have been the case) thrown out from the crater on the top of the lava-current as it began to cool. No vegetation grows on this; but it is all as black as the cone, and is the most painful stuff to walk over that can be imagined, from the sharp points presented to the feet, the looseness of the blocks of tuff, and the horrible holes intervening. The inner sides of the island, facing the cone, are also generally of the same material as the cone itself, *i. e.* of loose cinders and scoriæ, black and steep, except here and there where the native rock projects and displays the stratification of the island. At the base of these slopes, and encroaching here and there on the lava, is tall rank grass; and a low jungle of three or four low shrubs, one of which is a species of *Muscenda*. I wished to have gathered specimens of everything that grew in the interior of the island, and left a man on purpose to collect for me while I ascended the cone. Unfortunately, however, he injured his foot at the very commencement of his walking, and could do nothing; and I had enough to do to scramble up and down the cone, and look to my footing among the lava-blocks. I hope, however, to visit it again. If I do, I shall stay at the foot and botanise while my friends go up, as *once* is quite enough to have made the ascent. Looking to the interior of the island, it is well called "Barren Island," for it is truly a valley of desolation, dark and gloomy; but, as viewed from the sea, it is extremely fertile, all the slopes seaward being clothed with thick vegetation, though of what kind I had no opportunity of seeing.

The opportunities of landing there are of course very rare, as it involves a delay of the steamer, which is not always a thing to be managed, and there is no anchorage; and landing, except in very calm weather, is not possible, as there is but one spot where a landing can be effected, and the water must be very still to make it practicable even there. I forgot to mention that the sea becomes hot as you approach this landing-place, till, near the shore, it becomes scalding hot—a circumstance which occasioned a little meriment; for some of our men, not expecting anything of the kind, jumped out of the boat as usual into the water, and of course began dancing about very actively till they could either get in again or on shore.

But I think I have made my letter long enough, so shall conclude.

Believe me, my dear Sir William, very truly yours,

C. PARISH.

7.—*Journal of a Commercial Trip from Tientsin through the provinces of Shansi and Pechili.* By MESSRS. RICHARDS and SLOSSIN.*

24th Nov. 1860.—Started this morning early before breakfast, as we had a long journey to perform. We still continued in the beautiful valley of Tientsin for some distance, till we came to a small walled town totally in ruins; here we commenced to ascend a mountain 2000 feet above Pekin, and proceeded along its top for some distance, till we came to a small town, where we watered our mules. The well here was 120 fathoms in depth.

From this we descended into a fine valley of some extent, and at 12 noon arrived at a small village named Ee-To-Chen, where we prepared a hasty breakfast. A short distance from here was a walled city, named Wha-Lee-Hien, where we were surprised to find the main street completely blocked up with people and, all along the street-sides, wares and goods of all descriptions displayed for sale; it was evidently a market-day.

We passed several small towns and villages, generally situated on rivers; and, after crossing a small river, continued on until sunset, when we arrived at a large town named Lu-Chu. In this district the roads were fine.

25th.—The weather this morning was intensely cold. The road still continued in this fine valley, which is very thickly inhabited; we passed small walled towns at short intervals, six of which were at one time counted within sight. We met a constant stream of carts and asses laden with coal, in which there must be an immense traffic.

At 12 P.M. stopped at a small town, where we had breakfast. We saw numerous joss-houses, all beautifully situated; every farm-house and village was neatly walled in, and had fine brick gates. The people of this valley, which is named Yu-chu, have every appearance of being in good circumstances; there are no poor nor beggars. The valley lies between ranges of mountains—the left range is very lofty, and covered with snow; that on the right is not so high, and gradually runs down into the valley. All over the country are numerous groves of trees, which generally enclose either a joss-house or a burial-place.

At 3 P.M. arrived at the city of Yu-chu, which is on the borders of the province of Shansi. Its walls can be seen at a great distance. The principal staples of trade of this city are coal and cotton: the cotton is grown in the valley; the coal-mines are about 5 li distant, of great extent, and of very superior quality.

Before entering Yu-chu we passed a handsome gate, and crossed a fine granite bridge, built over the moat which surrounds the city. There are four other large gates; the principal streets of the town are broad, and at short distances apart are handsome granite arches, which give to the street the appearance of an avenue of arches. Towers are built within the city, to about the same height as the walls, on which are erected fine buildings of three stories in height, and there are handsome steps to ascend them.

26th.—Received a visit from a young mandarin, the son of the chief magistrate, accompanied by his secretary and three more officials. They came to inquire whether we were going to stay long; and, if we were, the magistrate would give us rooms in his yamun, as he knew that our apartments were very small. Thanking them for their kindness, we informed them that we would start early in the afternoon.

* It has not been found possible to identify more than a few of the places mentioned in this Paper. The authors' own spelling has, therefore, been maintained in every instance.—ED.

The coal-mines here are very extensive, and the coal bears a famed name throughout the country ; it very much resembles the Cannel coal—not being dirty like the bituminous,—and when lighted it will burn for a long time, leaving nothing but fine white ashes, which are in great demand for manure. We were informed that, on account of there being no river communication, it would cost 5000 cash per picul to deliver it at Tientsin ; here the price is 150 cash per picul. It is in universal use, and is even transported as far as Mongolia, and is the main support of the city and valley of Yu-chu.

As our chart only gave the outlines of the province of Shansi, we inquired of the mandarin to give us some information we desired : and at 3 P.M. commenced retracing our steps to get upon the high road to Shansi. At 6 P.M. arrived at Koo-Yea-Thuva, where we stopped for the night, and had miserable accommodation.

27th.—After a most uncomfortable night's rest we rose early, and went on. At 1 P.M. arrived at Tueo-Sheo, where we had breakfast, and after a long ride arrived at Ta-Too-Koo, situated on the high road to Shansi ; here we had a comfortable room in a joss-house, there being no suitable inn at the place. The people are very civil and quiet.

28th.—It is a cold, frosty morning, with a high wind. The country is not so rich in this valley, and the land is poor ; the roads are very rough, and fit only for a Chinese cart. Passed many walled towns, most of them in ruins ; and at 1 P.M. arrived at Pa-Ma-Fa, where we had breakfast, and again went on. It was bitterly cold, and the roads continued miserable, making it very uncomfortable. At 5 P.M. arrived at a large city named Si-Ning-Si, where we found a good inn, and stopped for the night. We were informed that we were the first foreigners that ever entered the city.

The streets of the city are very broad, and somewhat cleaner than we have lately seen ; they run at right angles, and have many ornamental arched gateways across them. This is the last city on the borders of the province of Pechili ; it is situated on the high road leading into Shansi, and we here begin to see some improvement in land and country.

The valley in which it lies is of great extent : on the right side the mountains almost wholly disappear, and on the left, at a great distance, we can see an extensive range of blue mountains running westward. Scattered over the face of the country are many patches of fine trees and extensive and handsome joss-houses ; besides, here and there, are Mahometan burial-places.

[29th.]—The day was a very pleasant one, but so hazy that the mountains on each side of us were scarcely visible. The roads are better than yesterday, and we went along nicely. About 12 noon we crossed a small river, which is the boundary-line between the province of Pechili and Shansi. A short distance from here we passed through a small walled city named the Heavenly City, and here there is a large country trade carried on. About 2 P.M. a strong west wind arose, which made it very dusty and cold, and the road was poor and shingly.

Our mules were very much exhausted when, at sunset, we arrived at a small walled city named Chu-Po, having had no water since we left in the morning ; and we were ourselves somewhat tired and faint, having had nothing to eat since 7 A.M.

30th.—Left this morning at daylight ; the weather clear but excessively cold, and the roads poor and indifferent. At 1 P.M. arrived at Pea-Tea-San, a small walled town of little importance. We here took breakfast ; and, after a disagreeable ride, at 4 P.M. arrived at the city of Tai-Tong-Fu, which is quite an important place.

The first part of the day's journey was continually on the ascent for about 40 li, until nearly on a level with the mountains on our right ; after which we descended into the valley in which this city is situated. We passed great numbers of carts all laden with coal, drawn by motley teams ; composed

generally of a mule or steer, two donkeys and a horse: they carried from three to four tons of coal, all in large lumps.

When walking through the streets we were continually surrounded by numbers of people; they never offered us any abuse, nor annoyed us by shouting, but were very civil. We were credibly informed that the walls of the city were 34 li in circumference, and that its population was very great, something over 800,000 souls. The principal streets are wide, and the shops and houses very fine, some of the latter being singularly handsome. The guard-houses over the gates of the city were three stories in height; but they have been much neglected, and are now rapidly falling to pieces. The wall in some places is in good condition, but in many others shows symptoms of decay.

We received a number of visits from Chinese merchants, and also a letter written in Latin from a Chinese Catholic priest offering his services, for which we called upon him and returned thanks. Our business being finished about 1 P.M., we started; and from the time of leaving our hotel to the gates of the city, a distance of more than two miles, the streets through which we passed were so jammed with people who had collected to have a look at us, that nothing was to be seen but a sea of heads.

The day was clear but excessively cold, and after a long ride we arrived at a small town named Su-nu-tsong, where we stopped for the night.

2nd Dec.—Before daylight resumed our journey, the weather fine, but still excessively cold. At 9 A.M. arrived at Way-zen-sec, where we had breakfast; and after a long ride arrived at Wau-yah-lea, where we stopped for the night.

During the day we passed many villages, and saw many flocks of sheep and herds of cattle on the fields; nearly every person we met was armed, and at short distances we passed guard-houses, there being many robbers on this road. There had been a convoy of three carts, carrying specie, with us for the last two days; and they seemed desirous, although armed, of staying in our company, but we travelled too fast for them—they have just arrived at the hotel two hours after us.

3rd.—This morning before sunrise we started. After proceeding on some distance we passed through a large town named Tai-yau; here there appeared to be quite a large trade carried on, some of the houses and shops being very fine. We passed a broad river completely frozen up; its course was easterly.

Had breakfast at a wayside inn; and just after sunset arrived at the village of Qun-woo, which is situated at the foot of the mountains, over which the Great Wall is built, and at the entrance of a pass. There are some very fine fortifications here, and the wall has well-built double bastions, but we saw symptoms of decay everywhere, and in many places the wall had nearly tumbled down.

There is an immense amount of traffic on this road; during the day we passed thousands of donkeys and carts laden with coal and iron, besides numerous files of camels, in one of which we counted 527; we must have passed on the whole more than 1500. We also met many travellers in chairs, and the road was thronged with pedestrians; the inns are numerous, and some of them very good. There is a great deal of competition on this road, and we often met runners at a distance of 5 li from the inns, soliciting custom.

The roads all through the valley are very inferior: sometimes they cover a space of over 200 yards in breadth, and are nearly impassable, being terribly cut up. In the summer time the farmers prevent the carts from encroaching on their grounds, by digging deep dykes along the roadside. Our course for the last three days has been about south-west.

4th.—Before sunrise proceeded on; the day was clear but cold. A short distance from the hotel we passed the wall, which had been completely washed away for about 100 feet; nothing remained to show where the gate had been

but a part of an arch which could scarcely be distinguished. A fence was built across the gap, and we passed through a common gate.

The road led along the bed of a mountain-stream, which we crossed repeatedly during the day, and, as its water was frozen, the passage was difficult and slippery for our mules. The mountains on each side rose to a great height; on the summit of the highest of them were brick towers, varying from 100 to 200 feet in breadth.

For about two hours after leaving we were continually on the ascent, which in many cases was very steep, till we arrived at a small village on the top of a mountain, named Yea-Min-Quay. Here we passed through three gates, which are in a very ruinous condition. After passing the last gate the road descended so precipitously that our cartmen had to block the wheels or they could not have got down in safety; alongside the gate is a beautiful joss-house in good repair.

From here to the place where we had our breakfast, named Nan-Yen-Sawe, we were continually on the descent, and over a most wretched road, cut up and full of rocks. This place is situated at the end of the pass, which is 40 li in length. During our ride through, we met and passed carts and donkeys, generally laden with coal and iron, and nearly a continual stream of camels, more in numbers than we have seen on any preceding day.

We soon got out of the mountains into the valley, which is apparently of great extent; for, as far as the eye can reach towards the south-west, there is nothing to be seen but a level plain.

Directly south of us, about 80 li distant, is a large range of mountains; at a short distance from the foot of which is situated a walled city, named Tung-Chaw. Just before sunset we arrived at a stopping-place named Yun-Mun-Poo.

It had been our intention to stop here for the night; but, finding no decent accommodation, we proceeded on some distance and arrived at a hotel situated in the suburbs of a large city named Pein-Tien-Poo. The people here were curious but civil.

5th.—At 5 A.M. left our hotel, and fell in with a continuous stream of carts, donkeys, and camels, who travel all hours of the night; each cart having attached to it a lantern, which gives a beautiful effect when the train is seen winding along a road. The walls of the city are in good repair; and this is the first place in which we have seen them built with round towers; they are about 100 feet apart, are elevated 10 feet above the walls, and project about two-thirds of their thickness outside them. Usually the towers are square, here they are circular.

At daylight passed a walled city named Wang-Long-Poo. There is every indication of its being a very busy place. The streets are wide and clean, and ornamented with arches; the shops and houses are neat, some of them are large and extensive, and everything indicates great prosperity.

About 9 A.M. passed through another walled city, named Qua-shi-hien, beautifully situated on the summit of a hill, surrounded by a deep valley. This is crossed as you enter and leave the city by five granite bridges, which stand about 40 feet above the bottom of the valley.

At 10 A.M. arrived at a large village, named Nan-yu-see, where we had breakfast, and in the afternoon passed a large walled city, with extensive suburbs, named Yun-pin-sien. The shops and houses presented a neat appearance, being clean and handsomely painted. The streets were crowded with men, and filled with all kinds of produce; everywhere we turned we saw signs of prosperity.

About 4 P.M. passed a walled city, named Pin-dee-sien-e (Commercial City), which was built with bricks, and was evidently an opulent place, being the abode of many retired rich men.

At sunset arrived at Schien-kau, where we put up for the night, being much fatigued, having made four capital days' work.

All through the valley the soil is very rich, the villages numerous and well built with brick, and generally situated in beautiful groves of trees; and the inhabitants are generally well dressed. There was every indication of prosperity, and we seldom saw a beggar.

6th.—At daylight this morning passed a walled city, named Kin-san-poo, *i. e.*, Golden City, which does not deserve its name, as the houses and shops are poor and mean; there is no trade, and its inhabitants are merely supported by the travellers who make it a resting-place. Its walls are nearly totally destroyed.

At 9 A.M. passed another walled city, named Pan-Shi, somewhat in better condition than the latter one, but of little importance; it is likewise supported by the travelling community, nearly every house in the place being a hotel.

At 10 and 11 A.M. passed two small cities, named Urh-Shih-Li-Poo, *i. e.* Twenty-Li City, and Shih-Li-Poo, *i. e.*, Ten-Li City; both places of little importance. Shortly after leaving the latter place we sighted the extensive walls and high towers of a large city in the distance; and at 12 A.M. entered the city of Hin-chow, before which we passed four handsome gates. The main streets are paved with granite, and lined with handsome shops and houses, and crowded with all kinds of produce and merchandise. The city is situated partly on a hill; and in the suburbs are many fine residences, evidently the houses of men of wealth.

A short time afterwards, passed through a large place named Ma-Qua-Chun; soon after leaving it we entered a pass, the sides of which were about 90 feet in height. The road was much cut up, and full of large shingles, and its width rarely sufficient for one car to pass at a time; we were often detained a long time, to allow great trains of carts to pass. We passed villages, to each of which there were gates; and in all we passed eight gates. Many of the houses were built out of the ground, like those in Mongolia.

At 6 P.M. arrived at Sang-Wong-Tien, and took up our quarters just outside the gate, in a good hotel.

7th.—This morning before daybreak it was severely cold, but at noon it moderated and became quite pleasant. We passed during the day several walled towns, namely, Teh-Yu-Pe-Thin, Quaw-To-Soon, Chang-Tong-Chen, and several others, about six in number, of which we did not take the names. All these towns are doing a fair trade, owing to the great traffic on this road. This is especially the case with Chang-Tong-Chen, which is situated partly on a hill; and where are the residences of many retired men of wealth from the capital, Tai-yuen-Foo. The place is divided by walls, to each of which are gates; and during the day we passed more than four gates.

After leaving this place we entered into many ravines or passes; and spent the greater part of the day in going through them.

We did not see the city of Tai-yuen-Foo, the capital of Shansi, till we were nearly upon it, on account of its being situated in a valley; before we entered it, on our right hand, stood a fine pagoda, ten stories in height, neatly painted. The walls are of the usual height and in good repair, and the towers over the gates are of the same height as those at Peking, having four stories. We were credibly informed that the city was 36 li in circumference, and that its population was immense—over one million of inhabitants. The suburbs are very extensive. We had just entered the city, and passed through the second gate, when we were stopped by the guard, who asked who we were, and requested our passports. We informed them that we would show them to the proper authorities when we arrived at our hotel. The streets of the city are quite broad, the shops numerous and fine; it is a great manufacturing place of iron and furniture-ware of all kinds and

descriptions. The streets were crowded with people, and along the side-walks were many beautiful joss-houses, one of which especially struck our attention, being beautifully ornamented with gilt and carved work.

After we had been some time in bed that night, we were awakened by a noise at the door, which, on opening, we found to proceed from the yard, full of the chief magistrate's retinue. We asked what they wanted, and they said that the Quam-foo had come to see our passports. We said that we were undressed, and requested him to come in, and he should see them. The messenger soon returned, and said he would not come in; when we told him that, as we did not wish to give our passport but to a man of authority, he should send in his secretary. Then they sent in a man whom we saw from his appearance was not his secretary—but either a chair-bearer or coolie,—so of course we refused to give them up.

Finding that nobody else came, and hearing that the magistrate had gone into an adjoining room, we dressed ourselves and went in, and found him sitting in great state, evidently expecting us to kow-tow to him. We bowed, gave him our passports, which he looked at hastily, took down our names and the date, and was folding them up to return, saying that was sufficient, when we told him that if he wished to take a copy of them he could do so at his leisure, but that they must be returned on the following day. He took them and then bowed, showing that he would require us no more.

8th.—To-day stopped in the city to recruit ourselves and to gain information. During the morning we were visited by many influential merchants, from whom we gained much valuable commercial information.

9th.—At daylight we left our hotel.

The country is very bare, and we passed a number of small towns. All along the roadside, and over the country, are numberless wells used for the purposes of irrigation.

At noon arrived at a walled town, named Men-Ta-Hein, where we cooked our breakfast.

The face of the country presents a singular appearance, being cut up into numberless ravines, some of which are of great depth, 200 feet or more, and every spot of ground is under cultivation, being terraced off. These commence at the bottom of the ravine, and rise one above the other to the top; and present a very neat appearance, being neatly banked up with earth.

At 7 p.m. arrived at Tan-Ah-Yee, a distance of 120 li. The houses of the town are well built of stones and bricks, with flat roofs—the roof of the lower house making a floor for the house built above.

Here is a considerable trade in the manufacture of agricultural implements.

A short distance from our hotel, on the righthand side of the valley, we noticed a pagoda four stories in height, situated on a hill; alongside of which was a fine joss-house, nearly buried in evergreens.

We now commenced to ascend till we arrived at the summit of the mountain, on which we continued some distance; even here every available spot of land was under cultivation and neatly terraced off. After descending into a small valley, passing a large town in which there were many fine hotels, and crossing a river, we again ascended another range of mountains; over which we continued some 40 li, till we descended into a very large and populous valley, in which there are many fine villages. Shortly afterwards we sighted quite a large city, named Ching-Ping: its walls are about 60 feet high, and are far superior and in better condition than any we had yet passed. We entered at the west gate, which is a very handsome one, and evidently great care is taken of it. The bastion is built in the shape of a half-moon. The city proper is not large, but the suburbs are very extensive, and the principal part of the business is carried on here. The streets are broad, and filled with people and merchandize; the inhabitants expressed no great curiosity, simply turning around to look at us.

Just before leaving the city we passed the yamun, which is really an ornament to the place, and the handsomest that we have yet seen.

It was our intention to take breakfast here; but finding no suitable hotel we proceeded on until, at noon, we arrived at a walled town, named Too-che-lean.

From here the roads commenced to grow worse, being covered with rocks, and we were often detained by carts. After sunset we arrived at a town named Tsha-tsha, where we stopped for the night.

11th.—At daylight, when we left our hotel, the weather was delightful; but the road, which still continued in the bed of a mountain-stream, was full of large shingles.

At 11 A.M. arrived at a large town, named E-chin, where we had breakfast. A short distance from here we commenced to ascend a range of mountains, over 2000 feet in height. The road had formerly been paved with large granite blocks; but now it is nearly destroyed by weather and heavy rains, and, being very steep, it was with great difficulty that our carts were enabled to surmount it. The pass is named Nan-lean-mun; and on the summit of the mountain we passed through two handsome gates situated about 100 feet apart, over which are built extensive joss-houses.

This mountain is composed almost entirely of coal, and the Chinese are working pits; they also gather it with ease from the surface.

From here we had a magnificent view of the surrounding country, as we were at a greater elevation than the neighbouring mountains.

We then descended into a valley in which there is situated a large walled city named Ping-sing-chow, through which we passed. The main street was crowded with men and produce, and was over three miles in length; and at every 50 feet or so were erected handsome granite arches, which being neatly carved presented a beautiful appearance.

During the day we passed great numbers of camels, carts and mules, laden with raw cotton, Manchester goods packed in small bales, opium, sugar, &c. The camels travel generally all night through the passes, as the roads then are free from carts and other obstructions.

We passed through many villages, whose names we did not take down. The houses were built of cut granite; and the people seemed to spare no pains in their buildings, which are unusually large and commodious.

12th.—At daylight left our khan and proceeded on. The road was a most fearful one, being nothing but a mere mass of rocks; and at one place one of the carts was upset, and it was with great difficulty our mules could pull through.

Passed many fine villages neatly built of granite, and at noon arrived at Way-Seu-Chen, where we had a meal, 10 li from here. At 1 P.M. we came to the gates of the pass named Tong-Tiea-Mun. Here again we crossed the Great Wall for the last time, and from the province of Shansi entered that of Pechili, the wall at this place separating the provinces. We had travelled in Shansi to within one day's journey of the province of Ho-nan, and would have visited it but for want of time.

Shortly after passing the gates we ascended another range of mountains, on the summit of which we passed through two fine gates. The road was paved, but as usual in a most wretched condition, being mostly worn away. We then descended by a fearfully steep road, worse by far than any we had previously passed over, till we arrived at a small walled town, named Tsing-Kung, where we stopped for the night.

13th.—A short distance from our hotel this morning we passed a large town, named Na-Qua, and then descended into a valley and crossed the head of the river Hen-To-Ho; passed through a large walled city, named King-Chung, on the righthand side of which stands a handsome pagoda seven stories in height. Formerly there had been a fine granite bridge spanning the river here; but

now two-thirds of it have been washed away, only six arches remaining. There are a few ferry-boats here; but they are not in use, the river being very shallow and rapid. Saw here for the first time watermills used for grinding grain, &c. There are also numerous lime-kilns along the valley, some of which we visited, and on inquiry found the lime to be 100 cash per picul.

Passed through two large walled towns, the inn-yards of which were full of camels; and we met many strings of them, all laden with cotton, sugar, opium, &c.

At 12 A.M. arrived at E-Seu, where we had a meal. From here we crossed a high mountain, on whose summit were two fine joss-houses and gates; then we made a precipitous descent into a valley, along which we continued till, after passing two remarkable-looking hills, we entered the extensive city of Wey-Lu-Hien: the walls are handsomely built of granite, save the battlements, which are brick and all in good condition.

We passed by the west gate, through an extensive grain-market, and entered the suburbs leading along the city wall. Here there is a great trade carried on, many fine shops and large warehouses filled with raw cotton, nankin, iron, sugar, opium, &c., and also many fine woollens. This city is a great central depot for all goods of foreign importation, before crossing the mountain and entering the province of Shansi.

We had intended to stop here for the night, as the sun was just setting; but soon being surrounded by an immense crowd who became very annoying, we proceeded on, and at 9 P.M. arrived at Chaw-Chu-Poo, where we had most miserable accommodations. Shortly after leaving Wey-Lu-Hien we entered on to the vast plain of Pechili; and here ended our mountain-travel, which commenced on the 9th of November, and had been most of the time at an elevation of over 2000 feet above Peking.

14th.—Started this morning at daylight, and soon sighted the river which we had previously crossed; it empties itself into a lake named Ta-Ten-Tse. Passed many fine villages, and saw that the yards of the principal inns were crowded with carts laden with goods of all descriptions bound over the mountains into Shansi. At a great distance over the plain we could just see the towers of some large city and a continuous stream of carts laden with cotton, &c., bound for Shansi.

At 6 A.M. arrived inside the walls of the city of Ching-ting-Foo, and were surprised at the dullness of the place, as contrasted with the great amount of traffic we had seen outside. We were informed that the walls of the city were 100 li in circumference; but not more than one quarter of the space inclosed is inhabited, the rest being mere field, in which one can at any time find hares and pheasants: we bought one of the latter; it was a splendid bird, and we were told it was shot in the city. Great quantities of cotton are grown in this neighbourhood.

Passed through a large town named Foo-Chin-Che, where we saw a beautiful black bear performing for the amusement of a crowd of Chinese.

At 7 P.M. arrived at a walled city named Shin-Loo-Hien, a place of little importance, being a mere travellers' resort.

Throughout the day the road was lined with carts, all laden with goods. Everybody goes armed in some way or other—whether with spears, swords, bows, or matchlock-guns; we met many recruits going to Pau-ting-Foo, called thither, as they informed us, by the Viceroy of the province, who resides there. We passed a number of small villages and one walled town, named Men-Zen-Lien. At 11 A.M. arrived at the walled city of King-Chu, inside of which there is a very lofty and handsome pagoda of 12 stories in height, which we saw at a great distance. The walls of the city are of great circumference, but nearly in total ruins; the trade here is a mere country one. Here we had a meal, and after a short rest went on, passing many small villages and a large walled city named Shin-Loo-Hien. At 5 P.M. arrived

at Way-Lu, a large walled city, in the suburbs of which we took up our quarters for the night.

During the day we passed great quantities of marble in the shape of doorsteps, watertroughs, &c. It can be obtained a short distance from here.

16th.—The weather this morning was clear but piercingly cold when we left our hotel; we walked through the city, which is an unimportant one and doing a mere country trade.

At 9 A.M. passed through a walled town, named Fang-Luen-Chuw, where we had breakfast. Shortly afterwards passed King-Hien-Tien; here there is quite a trade: the main street through which we passed was thronged with people; it was evidently a market day, as there was a great quantity of cotton and other produce exposed for sale.

At 1 P.M. we sighted the walls of the capital of Pechili, Pau-ting-Foo, and proceeded to the north-west gate, where we stopped at a comfortable inn.

Before arriving here, we crossed two large stone bridges, the last of which spans a reservoir of water elevated some 8 feet above the moat which surrounds the city. About 100 feet from the city walls there is an embankment of earth, six feet high and pierced with loopholes for matchlocks or jingalls.

Shortly afterwards we entered the city. The streets are narrow, but the shops and houses are very fine, and some of them beautifully ornamented with gilt and carved work.

17th.—Left before daylight; the weather was bitter cold, and it was with great difficulty that we could keep ourselves warm in our carts. The road at first led along the city walls, and the scenery was very tame. We passed many villages all surrounded by trees, and at 11 A.M. entered a large place named Pang-Hean, where we had breakfast. There was a fair held here; and the streets were crowded with country people, who had different wares displayed for sale, besides cotton and grain.

At 1 P.M. passed a large walled city, named Ka-Yeng-Chen, a place of some importance.

At 6 P.M. arrived at quite a busy city, named Jen-Choey-Sun, where we stopped for the night.

18th.—Long before daylight we left our hotel. The road led through the city, which is a very extensive one and is situated in the high road from Peking to Shansi, Ho-nan and the other provinces. The weather was intensely cold, everything being frozen up; the roads good, but the scenery tame and uninteresting.

At 10 A.M. stopped at a small town named Chang-chen-ho to get our breakfast; there was a fair held here also, and the principal staples exposed for sale were cotton and grain. At sunset arrived at a walled city, named Tai-hien, where we stopped for the night. The walls of the city have nearly disappeared; the houses are mean and poor, and the trade carried on is merely local.

19th.—Having 175 li to do before we could complete our journey, we determined to do it all in one day, and at 3 A.M. were on the road.

At 9 A.M. crossed the Grand Canal on the ice, and at 10 stopped at Tshian-ghai for breakfast. This city was once of some importance, but now is almost in ruins, caused by the Nankin rebels, in 1854, who nearly destroyed it; and traces of their work can still be seen, many of the houses being unbuild.

A short time afterwards passed another walled city, also mostly destroyed.

About 3 P.M. we sighted, in the distance, the walls of Tien-tsin; and, after passing the walls built to protect the place from the rebels and English, at 4 P.M. arrived at our place of destination and home. We thus completed a journey of forty-six days; during which we crossed the Great Wall four times in four different places, visited above 100 cities, and traversed a distance of over 4700 li (Chinese miles), or 2566 English miles.

8.—*Excursion to the West of Canton.* By Lieut. OLIVER, R.A. Extract from a Letter, dated Canton, March 21st, 1861.

WE had eight days' leave, and everything was prepared. We procured an interpreter from the yamun, named Lee Asheen, passports from the consul, and letters of introduction to the magistrates of the districts, Sam-Shui and Shin-Hing, from the Governor-General of the two kwangs, Old Laou. The next thing was to get a boat. Nearly all the communication in China is by canals and rivers. We found a Chinese boatman who was willing to contract with us to take us in his vessel, the *Old Dragon*, as far as Shin-Hing and back in eight days. The *Old Dragon* was a fine boat, 70 feet long, covered all over like a Lord Mayor's state-barge, and propelled either by poling, tracking, or rowing. The crew consisted of the master, his mother, two brothers, a sister, cook, pilot, and 12 sailors. Our party consisted of Capt. Des Vœux, Lieut. Sandwith, Lieut. Malcolm, Lieut. Hunt, Ensign Hunter, and myself.

We had our beds, traps, &c., on board early on Monday morning, 11th of March, and breakfasted at the Custom-house. However, we did not leave the Shameen till 12 o'clock, when we were joined by Mr. Bonney, an American Wesleyan missionary. We were now towed up the Fatu Creek, leaving Howqua's Garden on our left. We kept in this creek till we reached Tung-kao, at 1.30, when we turned into a broader piece of water running west. At 2.15 we passed Pho-tien, and at 2.30 Een-Po. At 3 o'clock we arrived at Ng-Kai-How or Yun-Kin-Chung. Here was a fleet of braves, 20 boats full, each containing about 60 or 70 men. They all turned out to look at us, and blew their horns, and made a tumultuous noise with gongs and tom-toms. They were proceeding to quell an insurrection in the northern part of the province. At 4.30 we saw Upper Kuss-Kow on our left, and soon after Lower Kuss-Kow, and now Fatshan appeared directly in front of us. Fatshan is nearly as large as Canton, but is not walled. It took two hours to pass through Fatshan. The houses and quays were covered with human faces, and all their eyes centred on our boat. The Chinese ladies crowded their balconies and verandahs, but retired shrieking when we looked at them with our field-glasses. They have an idea that our binoculars have the power of representing them upside down, which hurts their vanity. However, they peeped at us through the chinks of the jalousies. It was 7 when we had left the town, and quite dark, so we anchored for the night.

We started at 3 A.M. on Tuesday, the 12th, and Malcolm and myself swam ashore at daylight, and had a run for a couple of miles, till we flushed a woodcock; then we swam on board again quickly, and aroused the others, who were sleeping soundly. We all dressed and went on shore at 6.15 A.M., at a place called Tsy-Tông. Here was a fine towing-road, and high solid dykes to prevent inundations. The country here is very fine—large patches of sugar-cane, mulberry-trees by the mile together; sandy hills, like the Bournemouth cliffs, to the north. Here we shot divers, teal, doves, and kingfishers, but could not get any woodcocks, although two were reported hit. All this time our boat was going ahead with a favourable breeze from the east, and we had to run some miles to catch it up. 7.30: Shay-ng-kow on the left, Kee-Shek on the right. At 8 o'clock we passed a long island covered with wheat-fields. At 9 o'clock the boat waited for us to come on board at Slong-Tung; the Si-cheou fine hills in the distance. We were now 20 miles from Fatshan. Here we breakfasted, and started again at 9.45, with the tide. At 10.45 we went ashore on the left bank. More brick-kilns and mulberry-fields. 11 A.M.: on the opposite coast was the Sy-Tsz-Tow, or Lion's Head Peak, with a new pagoda being built near it. 11.15: came to Ma-Sha, a village with about 1000 inhabitants, and surrounded by banyan-trees and fields of mustard and sugar-cane. Mr. Bonney and myself, with Captain Des Vœux, were

behind, and the others shooting in front, when the young men of the village came out with shields and swords to kill us, shouting to one another to do so; but none of them liked to begin, and the old men told them that they would get the worst of it. This is the only indication of hostility we ever saw or heard of, and is a remnant of the old Canton spite against us. Not long ago, the little urchins near Canton would sing whenever a foreigner appeared, "The White Devil comes!—sharpen the knife!—sharpen the knife!—off with his head!" Twelve sugar-mills are worked by oxen on the opposite side of the river Fawng-Teng. Returned to our boat at 12.30, and at 1.30 reached Sy-Nam. Large sandbanks. On the right we passed the finest temple in Sy-Nam, viz. Teen-How, and a three-storied pagoda on a small rocky island. Beyond were some strong batteries, with guns mounted, overlooking the town. The river here was covered with small ferry-boats, which took passengers across the river for two cash. At 3 o'clock reached Sam-Shui—Sam meaning *three*, and Shui *water*, as here three waters meet. The town of Sam-Shui is about 2 miles from the river; it is a fine walled town, and has an elegant pagoda outside. We sent our interpreter ashore to the chief magistrate's yamun with our cards (in Chinese fashion on red paper, my name being O-LI-FA), and our letters of introduction, whilst we went for a short walk on shore, and up to the beautiful nine-storied pagoda. Unfortunately, we found the pagoda a mere shell; the interior woodwork, staircase, &c., having been burnt out by the rebels in 1858. When we returned to the boat we found the chief mandarin's compradore with a noble present of ducks, geese, fowl-eggs, preserved fruits, oranges, annquots (a kind of citron), vegetables, cakes, &c.; also a message to say he was very sorry he had no milk or cream to give us, but if we were going to stay he would get some for our Excellencies. We left Sam-Shui at 5.15, and anchored off an island with a fortress on it. In the broad Si-Kiang River, which we had now reached, we were 56 miles due west of Canton. I was off duty this night, so slept soundly.

Wednesday, 13th March.—7 A.M. we passed Tsing-Kee, which contains one school and a pawnbroker's shop. Went ashore soon afterwards, and had a swim. Here are paddy-fields, dry now, and fine banyan-trees. At 7.25 passed Ni-Tawng, 150 inhabitants. We were now only 33 miles from Shia-Hing-Foo. At 7.40 came to Poo-e-Shai, a large academy here built in the first year of the present Emperor, Hien-Tung. Opposite were the Nam-Wan, or Southern Bay hills—we call them Mount MacCleverty—about 1500 feet high. Here also is a great salt depôt. At 9 A.M. returned to breakfast. On the left bank are large examination-halls, marked by a forest of mandarins' poles. Went on left shore at 12.20, under an avenue of tall banyan-trees, with the most beautiful beards. 12.40 passed Sha-Wan, a village of 60 people, with large fishponds and plenty of snipe, some of which were shot for dinner. There is a beautiful echo here from the hills. As we were walking along the bank I found in a pyramidal landmark a large and long lizard called Sha-ni, or a snake on legs. It is very venomous, and about 15 inches long. At 1 P.M. walked under the Sun-Tsune pagoda, and through the To-Ki village, with 200 inhabitants. The mountains here converge to the river, and a magnificent gorge is formed by the river cutting its way between them—the mountains, rising on one side to 2800 feet high, called by us Mount Parkes, and on the other side Mount Straubenzee, 1800 feet. Beyond this, again, is Mount Malcolm, 400 feet high. At 1.45 we returned to our boat, and entered the pass. Water very deep—no bottom at 12½ fathoms. On the left a huge sugar-loafed peak, the sides covered with plantations. This pass is called the Shin-Hing-Huss. 2.40: still in the pass. The scenery so beautiful that we let our dinner get cold while admiring it. 3.45 reached the western entrance of the pass. See Shin-Hing-Foo in the distance, with a small pagoda and a hill on the right. We can now see seven pagodas. 5.15 passed the seven-storied pagodas. 5.45 passed a nine-storied pagoda. 6.20 anchored at

the western suburb of Shin-Hing. 6.30 went ashore, but could not go far, as the city gates were shut, and it was dark by 7. Sent our cards and letters to the mandarin.

Thursday, 14th March.—We are now 93 miles west of Canton. After breakfast sent for palanquins, to pay our visit to the mandarin. Two braves on the bank extorted 33 cash from our chair-bearers. At 9.25 started in eight chairs to the yamun. Entered the city by the east gate; passed through several streets like those in Canton, noticed several bow-makers' and armourers' shops; also some handsome temples, with lions. Reached the yamun of Chaying-Kwank-Po. Received courteously by the mandarin, who asked us to be seated at a table, and regaled us with tea, cakes, almonds, pomelos, ginger, citron, &c. We reported the officials who squeezed our chair-coolies, and they were accordingly bastinadoed with split bamboos. He told us the people might throw stones at us at first, till they got used to seeing us, but he would send soldiers to guard us. We begged him not to take any trouble, as we were well able to take care of ourselves. As he, however, insisted, we were accompanied by a party of his braves, who made themselves very useful in carrying some biscuits and potted meat, our sketch-books, &c., up to the Marble Rocks. At 10.15 we went out by the north gate, over some stone bridges, and through paddy-fields, which were being harrowed—water-buffaloes drawing the harrows, which were guided by women, who, in this part of the world, much resemble the women at Saltash, near Plymouth. At 11 o'clock we reached the largest rock of the Seven Stars, Sam-Seen-Koon. We had seen the Marble Rocks from the city: they looked in the distance like the Needles of the Isle of Wight on a level plain, backed by a range of high mountains. There are seven rocks, about 200 feet high, of beautiful marble. These Seven Stars are very curious; and I do not know how to account for their presence, sticking up with their ragged-pointed tops and perpendicular sides in the middle of a large plain. We ascended to the top of the easternmost rock, the largest of the set. There are two temples to Buddha on this rock. In the lower temple there was an elaborate statue of Buddha, representing him with forty-eight arms. There are inscriptions of gigantic dimensions on all the rocks, of the reigns of Yong-Ching, Kang-Kee, and Keen-Long. We reached the summit of the eastern rock by 12 o'clock, and I found some ferns. We descended again and walked to the temple of Koon-Yum-Ngam, in the rock next to the eastern one, and the second in magnitude. Here was a wonderful cavern, or the "Cave of the Seven Stars." Part of it is cut to represent a joss-house, the idols being formed of choice specimens of marble. Two figures of warriors are in front of the altar, before the idol, and are not unlike similar effigies in old churches and cathedrals at home, also of white polished marble. The stalactites, in every imaginable form, reflecting the light from above with innumerable sparkling crystals, formed a beautiful canopy above. This hermitage, as it were, forms only the entrance to the large grotto, to which you descend by some forty steps, and then a splendid scene lies before you. The whole rock seems hollowed out, whilst large crystals hang down into the light; their source being in utter darkness up above, only revealed now and then when we let off rockets. When we discharged our rifles and revolvers the thunders and reverberations were grand, extending in hoarse murmurs into the very bowels of the mountain. It reminded me very much of the grotto at Hans, in Belgium. The effect was further heightened by the crystals being detached from the roof by the bullets of our pieces, and, tumbling headlong, scattering as they struck projections of the rocks with a myriad of scintillations. Our attention was next drawn by the Buddhist hermit to a hollow rock—a natural stone drum; when this was struck a sharp blow, it vibrated, and gave a not unmusical sound—in fact, a Chinese Memnon. We now lighted twisted bamboo torches, and penetrated a quarter of a mile through a narrow cavern; but, after all, saw nothing equal to the first grotto. However, the figures of the monk and our half-naked

coolies, with the picturesque dress of the Chinese soldiers, looked very quaint and romantic by the light of the torches in these Tartarean regions. We spent nearly the whole day in the caves. I left some of the coloured pictures of the Christmas number of your 'Illustrated News' with the old monk, who was greatly pleased. We returned to our boat in the afternoon, and in the evening dropped down again with the tide, commencing our homeward trip. I had filled my portfolio with sketches, and it will take me some time to finish them up. The captain of our vessel would not suffer us to go through the Pass of Shin-Hing-Huss at night, being frightened with the idea of the Lally-Lus and pirates, who infest those wild mountains; but we made him proceed, and consequently reached the eastern gap by midnight, when we anchored by a Chinese custom-house, at a place called How-Lik.

Friday, 15th March.—This morning we had intended to ascend Mount Malcolm, and take an aneroid to determine its height more accurately; but as we found it too cloudy and foggy to make it safe to attempt the ascent, we delayed it till the morrow. However, Messrs. Bonney, Malcolm, Des Vœux, and myself went up to the foot of the mountain to see a large Buddhist monastery we heard of; and the others crossed over to To-ki to shoot snipe for dinner. We started directly across some flat ground for nearly five miles, and then entered a valley leading to the monastery. A pretty stream tumbled over a rocky bed, like the Esk near Dalkeith; whilst in front rose a huge cliff with perpendicular sides, its top covered with woods, and Alps upon Alps rose beyond. The hills on each side were covered with bracken-fern, and the misty and cool day made it resemble Scotch scenery altogether, though presently it far surpassed it. The Chinese call this "The Mountain of the Golden Lake;" and the monastery and woods they call "The Groves of the Pleasant Mists." And rightly are they named. As soon as we turned the corner of the cliff, there was an exclamation of delight from everyone. It resembled some illustrations I have seen in Milton by the artist Martin. The vegetation and foliage was perfect—a blending of our tropical and your more northern flora in a sweet entanglement. Our guide led the way—his name, Teen-Tuk; and two Chinese boys, Ayon and Assam, carried our rifles and instruments. These Teng-Foo mountains are celebrated in Chinese literature, and deserve well all the admiration that their poets have heaped upon them. Here were tall cotton-trees; the tulip-tree with immense red blossoms; ferns twenty feet high; and *pinus silvestris* of enormous size; acacias, bamboos, teak-trees, parasites, and creepers; monkey-ladders and ropes of orchids festooning the vaulted roof of branches; beautiful little sandy squirrels, with grey stripes, leaped nimbly about, chasing one another, as tame as domestic cats. The cries of jungle-fowl and guinea-hens were answered by the shrieks of the pheasant and the song of the bulbul, interrupted by the sound of the beak of the toucan, one of which was killed, a magnificent specimen—green shot with gold, large yellow beak, thirteen inches long. Several squirrels fell victims to our death-dealing weapons, and Malcolm got a pretty black-and-white bird, with "an unprecedented length of tail." A little further on was a Chinese summer-house, with its usual accompaniment of Confucian precepts and Buddhist prayers. At a corner beyond, through an accidental break in the leafy covering overhead, we beheld trees growing out of the side of inaccessible rocks 1500 feet above our head, overhanging as though to crush us. We now ascended by zigzag narrow paths cut out of the rock for about 1000 feet, when we came to the Tek-chime Monastery at about 11.33 A.M. Here is a temple called Hing-Wun-Tz. The Principal or Abbot, named Chea-ne-Fan, received us courteously, and gave us a very good repast on rice and vegetables, principally mushrooms; for the Buddhist monks are not allowed to eat flesh. We saw the new temple, and the yet remaining charred relics of the old one, lately burnt by the rebels; also some splendid China tea-roses. We returned the same

way to our boat, which we reached at 4 P.M. After dinner, at 5.30, we took our dingy, and pulled over to the tea-plantations under the lofty Sugar-cone mountain, on the southern side of the Shin-Hing-Huss. Near to these plantations we visited a quarry 800 feet deep, from which they dig the black stone which the Chinese use for inkstands, or rather what we should call palettes: the Chinese using solid Indian ink, rub it, when wanted, on these peculiar tablets. The stone is valuable, but the quarry was not being worked, the mandarins having stopped the proprietors. "But," said the inhabitants, "if you Taiwans (or Great Nation) will order the mandarins, they will be forced to allow us to work this mine"—showing that the people of China have a little notion of our power. When we returned on board, we slipped our moorings, and went to Lo-un-Chun, a place nearer the Teng-Foo mountains, and situate at the bend of the river near Kwangli.

Saturday, 16th March.—Breakfasted at 7 A.M. Started soon after to try to reach the top of the Teng-Foo Mountain. Very misty. Went up to the Monastery by 9.40 A.M. Here we got some bamboo-poles, and continued the ascent. By mid-day we reached a place beyond which our guide had never been. No scenery but dense white clouds. We, however, pushed up the steep rocks, and at length got to a peak of about 2000 feet elevation. What was our disappointment to find that this was not the highest peak; to reach which we should have to descend, and re-ascent on the other side of a tremendous chasm. This was impossible, and with many regrets we returned to the Monastery, leaving the ascent of the real highest peak for travellers with more time. As our leave would be up on the following Monday, we were obliged to make all sail back to Canton. We returned to our boat, after seeing two beautiful falls, and a bell weighing 2000 catties. At 7 in the evening we got back, and set sail for Poo-ne-Shui, but at 9 o'clock stopped at Wang-Sha on account of the rain.

Sunday, 17th March.—7.30 passed Tsing-kee; 12 arrived at Synam; 9 P.M. arrived at Fatshan, and anchored.

Monday, 18th March.—Seeing Fatshan all the morning. Arrived in Canton at 6 P.M.

9.—*British Columbia, and a proposed Emigrant Route from Pembina to Yale.* By WM. KELLY, Esq., F.R.G.S.

THE geographical position of British Columbia, with respect to the mother-country and other European fountains of emigration, places it at a serious disadvantage in competing for population with the great American and Australian regions, at least under the present arrangements for transport. In fact, the only two recognised routes of approach to it are those by the Isthmus of Panama and round Cape Horn; the former of which, whether direct from Southampton or by way of New York, is attended with so considerable an outlay, that it is utterly out of the reach of the class of emigrants alone fit for encountering the primary difficulties of pioneer colonization; and although the latter may perhaps offer some trifling advantages on the score of economy, the extreme length, danger, and suffering inseparable from a voyage round Cape Horn to the westward, must operate as a complete bar to family emigration.

This state of things is the more to be deplored from the fact—which I can conscientiously aver from two years and six months' residence in British Columbia—that there is no other British possession more suitable or congenial to the Celtic or Anglo-Saxon race as regards climate, nor one which presents more genuine or substantial allurements to settlers in the extent and variety

of its internal resources. To which may be added the probability of a steam communication between Australia and Fraser River—a consummation that hinges upon the formation of a highway from the Atlantic to the Pacific Ocean; Sydney being absolutely 900 miles nearer to New Westminster than to Panama, by which latter route it is at present contemplated to establish a mail route for the purpose of expedition.

The mean temperature of British Columbia approximates as nearly as may be to that of the British Isles. In the immediate valley of Fraser River, up to its junction with Thompson River, where it may be said to run through a grand mountain defile for over 120 miles, the winter season is perhaps somewhat colder and more protracted than ours save in the north of Scotland; but after emerging from the foothills of the Cascade Ranges into the vast open rolling territory lying between them and the Rocky Mountains, the seasons do not exceed the British average.

At Fort George, which approximates to the 54th parallel of latitude, all sorts of cereals and garden vegetables arrive at perfect maturity, and cattle, for the most part, can be safely wintered out; for even in seasons when the ground is covered with a tolerably deep coat of snow, there is a tall, coarse, succulent bunch-grass, which penetrates the surface, affording them abundant nourishment. Farther north, as we approach the Russian frontier, the natural variation of temperature, of course, is experienced; but to the southward, the newly-discovered valley of the Semilkameen, from the peculiar position and configuration of the country, enjoys a mild and genial atmosphere, altogether unusual in similar parallels of latitude. Throughout the colony, neither the heat of summer nor the cold of winter at all approaches the extremes of Canada or the more northern states of the Union. In ordinary seasons mining operations only suffer a brief interruption in the north—none at all in the valley of the Semilkameen. And if we are to measure the salubrity of the climate by the bills of mortality, it must rank wonderfully high indeed; for, with the exception of *scurvy*—inevitable at the outset from the dearth of vegetables and fresh provisions,—I was perfectly astonished at the general exemption from endemic disease, particularly considering the extreme hardships and predisposing causes attending a miner's life in a new country. In truth, a large proportion of the deaths that came under my cognisance were such as in an older country would challenge the inquiry of the coroner.

The salmon-fishery affords an immense scope for capital and enterprise. It is quite impossible to imagine the extent and density of the shoals of this fish in their full season. I have often stood on a rock and dipped out the fish with a large ruder-landing-net as quick as I could submerge it, and have seen Indians at the same time literally shovelling them ashore with canoe-paddles. Salt for curing them is obtainable in any quantity from the great saline springs in Vancouver Island; and as all the inhabitants of the Pacific islands, whether in the South Sea or Northern Archipelago, are excessively partial to cured fish, there could be no difficulty whatever in finding a ready and remunerative market for all that could be put up.

Next I would call attention to the endless supply of timber of the finest description and greatest variety—pine, fir, spruce, hemlock, cedar, oak, ash, maple, willow, alder, cotton-wood, &c. But the timber valuable as an article of export is the pine, which, from its prodigious size and uncommon straightness, is peculiarly suitable for masts and spars, a grand specimen of which may be seen in Kew Gardens. There is no doubt that vessels taking out merchandise could make splendid return-freights by loading with spar logs, which command an extraordinary price and ready sale in the home markets. These logs can be had of any dimensions. On the immediate banks of the Fraser, for at least 50 miles from its mouth, hundreds upon hundreds of most magnificent trees, cut down to clear the site of New Westminster, were burnt upon the ground.

Although there is scope enough of territory in British Columbia suitable for pastoral and agricultural purposes to satisfy the requirements of an independent state, I conceive that the colony is to be chiefly estimated for its unbounded mineral wealth. Its gold is well known.

Silver, too, has been discovered in many districts.

Cinnabar of the richest description was found in the Cariboo country by Captain Bowen, a gentleman with whom I am intimately acquainted.

Every one of the returning prospectors who came down last fall from the north and north-western districts, to make arrangements for the present season, brought specimens of one sort or another; among which I can enumerate, from inspection, pure copper, platinum, agates, cornelians, coal, limestone, marbles of the purest and most beautiful kind. Lignite, or a species of bituminous wood of the earthy variety, is quite common in those districts, and is used by the miners for fuel. It is of a brownish-black colour, nearly as light as water, very friable. It burns freely when blown, sending forth a light blaze, which may be utilised for blacksmithing purposes.

Plumbago of the purest kind has been found in many localities by Major Downie in masses of magnitude sufficiently large to supply all the markets of the world. Mineral and hot springs, too, are features of this richly endowed colony.

As to the general character of the soil in the thousands of square miles fit for settlement, it is sufficient to say, that it is undeniably excellent in all its varieties for either agriculture or pasture. The cereals, fruits, and vegetables of Britain and France can be readily produced; and stock, as I have already observed, can for the most part be wintered out without any supply of fodder. It is therefore abundantly manifest that British Columbia offers a field for emigration, now especially that the land-system has been liberalised.

Population is all that British Columbia requires to ensure its growth and unbounded prosperity; but, in order to get that, we must have some practicable avenue of approach, which, as regards time, safety, and economy, shall be within the reach of the small farmer, tradesman, and navvie. Such a one, from the nature of the country, and from the estimates of highly qualified travellers, there is no doubt could be constructed for 250,000*l.*—made, too, after such a manner as to form a sound basis or foundation for future railway operations between Pembina, on the 49th parallel, and a central point in British Columbia—say Yale, the highest point of steamboat navigation on the Fraser River. The entire distance from point to point does not exceed 1100 miles, 250 of which can be accomplished by river-steamers in the South Saskatchewan.

In the Royal Speech, Her Majesty indulged in the hope “that my new colony on the Pacific, British Columbia, may be but one step in the career of steady progress by which my dominions in North America may be ultimately peopled in an unbroken chain from the Atlantic to the Pacific by a loyal and industrious population”—a hope certain to be ultimately consummated, as well from the grand prospects growing out of eastern policy, as from the fact that the splendid country lying between the Red River settlement and the Vermilion Pass is in the wheat-growing parallel; that vast and varied mineral discoveries have recently been made in British Columbia; and that the embouchure of the Fraser furnishes one of the finest harbours in the world. At present the most direct route is *via* Portland, U.S., whence Chicago can be reached in ten days by the Grand Trunk Railway. From Chicago to St. Paul’s, a distance of 350 miles, can be accomplished in one day by rail; and thence to Pembina, about 450, in one day, when the railway is finished (at present it takes eight days). From this point it is that recent explorers suggest the formation of an emigrant trail, diverging north-westerly, to Elbow on the South Saskatchewan in an oblique direction, instead of diverging at right angles to Assiniboine. Several small parties of Canadians

and Americans travelled this trail in 1859 and 1860; one of which was under the conduct of a Mr. McQueen, a gentleman of intelligence and discrimination, whose acquaintance I had the good fortune to make. He describes the route as one easily made into a good waggon-road—much superior to the overland Oregon one. It is sparsely wooded at intervals, and abounds in feed and water all the way, affording many most eligible localities for settlement. He estimates the distance from Pembina to Elbow at 420 miles. From Elbow his party proceeded along the Saskatchewan about 150 miles, and found it perfectly navigable the entire way for good-sized steamers. They then diverged in a direct westerly course (finding the river took a great southerly sweep), and, after travelling 100 miles over grassy prairies, they struck the river again, and followed it up to Fort Bow, about 80 miles; and even here Mr. McQueen pronounces it navigable for stern-wheel steamers. From Fort Bow, as Dr. Hector says, "The ascent to the water-parting on the Vermilion Pass is scarcely perceptible, being only as 1 in 135"—an opinion fully confirmed by Mr. McQueen, who, with his party, weary and footsore, under heavy packs, reached the forks of Thompson and Fraser rivers (the heart of British Columbia) in twelve days, stopping very frequently each day to prospect for gold, and make inquiries from the various digging-parties they came across. To recapitulate, then: throwing in one day of grace for contingencies, Pembina can be reached from Portland in five days; and, admitting that the remaining 1100 can be accomplished at the same average rate that the American overland-mail contractors do their work, the entire distance from Portland, on the Atlantic, to New Westminster, on the Pacific, could be performed readily in twenty-five days. With such a line once started, Her Majesty's expression would soon become developed, and a thoroughfare within reach of all classes of emigrants fairly established.

If Government will make moderate concessions of the public domain along the route, capitalists can readily be found who will undertake to construct a good, well-graded waggon-road, suitable for the basis of a future railway, under conditions to allow Government to re-enter possession of the grant whenever it should be required for public purposes. In a short lapse of time we would then have pony-expresses, soon followed by stage-coaches for the heavier mails. Although I am aware that at the present juncture it is not prudent to cite American precedents on any subject, I nevertheless feel confident that ascertained results, fortified by well and long-proved experience, cannot be hastily ignored. The United States Government has invariably found the granting subsidies to overland-mails was putting out the public money to fructify at the best advantage, by at one and the same time enhancing the value of the public domain in opening it up for settlement, and by improving the revenue and trade in encouraging the spread and increase of population. This, to my positive knowledge, has been remarkably demonstrated in subsidising the daily overland mail from Sacramento city, in California, to Portland, in Oregon, a distance above 700 miles over what was theretofore a perfect wilderness; and although the service has been little over one year at work, nearly all the fertile tracts along the route have been taken up, while the stages for horse-changing and refreshments have become the nucleus of townships, where land now sells by the foot. There is no doubt whatever that similar results would follow if a like system were adopted on the line I propose. Or if the Government undertook the scheme as a public work, I believe the necessary funds would be forthcoming, ere its completion, from the sale of public lands for farms and townships.

The Government of British Columbia, in excusable anticipation of a Pacific Railway, is constructing its highways into the interior at such easy grades that on a future day they may be available for laying down rails upon. And that such a railway will be made there seems every plausible assurance, as well from the exigencies of our newborn eastern commerce, as because the whole

range of the Rocky Mountains south of the 49th parallel does not furnish one single practicable pass, while that called the Vermilion Pass, in the direct line, is in British territory, and does not exceed 4944 feet in altitude. Dr. Hector describes it as "not presenting any difficulty whatever to the construction of a railway, connecting the fertile prairies of the Saskatchewan with the auriferous valleys of British Columbia."

I think I shall abundantly prove, by the following extracts from a letter written by a distinguished member of this Society (Captain Richards, of the surveying-ship *Hecate*, in reply to an address from the corporation of New Westminster), the excellence of that port as a point of departure:—

"Her Majesty's Surveying Ship, 'Hecate,' off New Westminster,
October, 30th, 1860.

"... However highly you may estimate our services, it is yet to natural causes alone that the Fraser River owes its immunity from dangers and difficulties, almost always incident to Bar harbours. Effectually sheltered and protected as it is, in common with the coast of British Columbia, by the natural breakwater which the sister colony affords, your noble river is accessible at *all times of tide* to vessels of from 18 to 20 feet draught and 1000 tons.

"It is free from risk of life and property in a higher degree than any river I am acquainted with on the western side of this continent; and when a light-ship is stationed at the Sand Heads, or the entrance marked by permanent buoys, the seaman may guide his vessel through at *all times* with ease and safety."

10—*Ascent of Um Shaumur, the Highest Peak of the Sinaitic Peninsula, 1862.* By the Rev. T. J. PROUT, M.A., F.G.S., Student and late Censor, Christ Church, Oxford.*

THE mountain Um Shaumur, the loftiest and grandest in the peninsula of Sinai, is situated about 12 miles south-south-west of Gebel Katherin, but from the rugged nature of the intervening country, a somewhat circuitous journey of 10 or 12 hours' duration* is required to reach it. The mountain rises precipitously in three peaks or base-tops, of which the western is considerably the highest (say 300 feet above the central, and 100 feet above the eastern peak). The height of the western peak above the sea has been given at 9200 feet; but I cannot vouch for the correctness of the statement; and indeed all figures in this account must be understood as approximative, as we had no means with us of taking accurate measurements. The camel-road to the mountain, from the Convent of St. Catherine, lies first of all in a south-easterly direction up the Wady Shu'eib, and along the track leading to Shurm, for about two hours; and then, turning more to the southward, winds through rather a dull valley as far as regards scenery, but possessing some interest geologically from the extensive deposits of recent sandstone and conglomerate which have been formed along its bed by the wearing away of the mountains above. About two hours more, at the ordinary rate of camel-travelling, bring us to some high ground at the upper end of this valley, from whence we obtain a fine view full in front of the cone-shaped "Jebel-el-

* A narrative of a previous ascent of one of the minor peaks of Um Shaumur, accompanied by a sketch of the mountain, has been forwarded to the Society by the Rev. Frederick Howlett.—ED.

Odha." Descending from the height on the further side, we enter the Wady Rahabeh—a wady of the same general character as the last—and in other two hours arrive at an Arab resting-place, under shelter of some fallen rocks on the western side of the wady. Not far from this spot, but more in the centre of the valley, are several Arab storehouses or magazines—desolate-looking buildings of stone rudely and loosely put together, and furnished respectively with a single entrance of about a yard square in size. Whenever the Arabs to whom these magazines belong, deposit property within, they merely fill up the entrance with brushwood arranged in a peculiar manner, and leave it without any other protection whatever. Moreover we were informed, that although the removal of the brushwood would be an easy matter, yet that no case was known of the sanctity of a storehouse so sealed having been violated. Travellers intending to ascend Um Shaumur will probably be disposed, if they have no tents with them, to pass the night under the shelter, such as it is, of this resting-place; but if they have brought tents with them, they will do better to push on about an hour and a half further, and encamp in a small lateral valley, the "Wady Zeitūneh," so called from an ancient olive-tree (probably the only one for many miles round) which stands not far from its entrance. The particular advantage of the place for encampment is, that close to the tree there is a well of tolerable water. And here it may be added, that along the whole route, from the Convent of St. Catherine to this spot, no other water is passed, with the exception of a very indifferent spring some distance to the north of the resting-place in the Wady Rahabeh.

Supposing, however, for the present that we start in the morning from the resting-place in the Wady Rahabeh, a walk of an hour and a half over a low ridge, and along the bed of a narrow winding valley floored with deep sand and gravel, brings us to the top of the corrie at its upper end, from whence, on the further side, we obtain a view of the more eastern portion of Um Shaumur. The way to the mountain, however, does not yet lie straight before us. The ravine in front is so deep and difficult to traverse that it is advisable, if not absolutely necessary, to make rather a long circuit by some still higher and much steeper ridges to the westward. A stiff climb of an hour and a quarter up to and along these ridges brings us to a point from which the whole of the northern face of Um Shaumur is visible from top to bottom. The view of Um Shaumur from this point is very striking, the whole mountain being nearly sheer precipice with the exception of a gully below the central peak filled with scattered fragments of every size, from masses weighing many tons to small stones. The said gully is an important feature in the mountain; for by it alone, as far as we could see, are the higher parts to be approached. Before commencing the ascent of Um Shaumur proper, it is necessary to descend some thousand feet to a narrow neck or isthmus of rock connecting the hill on which we stand with the main body of the mountain. Both on the east and west sides of the neck are very deep and narrow ravines; and but little reflection is here required to convince one that Um Shaumur could not well have been the "Mount of the Law," as some have conjectured it to be. For, independently of its lying so much out of the probable track of the Israelites, there is not room in the crevasse-like ravines which surround its base for any large number of people to encamp. In the gorge on the western side of the neck are the ruins of the old chapel or convent of St. Antony, and near it there flows a stream of excellent water having its source high up in the gully above.

Having at length reached the base of Um Shaumur itself, we now commence a scramble over or round or under the various fragments of rock which choke the gully by which, as already stated, our ascent must be made; and after about an hour's steady climbing, but without any real difficulty, we reach the central peak. To this point several travellers have ascended before us; and it is a little higher up that *the* difficulty of the mountain occurs. The

huge masses of syenite which support the western summit are so precipitous as to be, at first sight at least, quite insurmountable without the aid of a ladder. But on further inspection the perpendicular face of one of the largest of these buttresses is found to be rent from top to bottom by a fissure of some width indeed at the aperture, but gradually contracting until there is barely room for a man to turn or even to stand in it. On the floor of this part of the fissure there is an accumulation of detritus which raises us just within reach of a small ledge or shelf formed by a few stones which have fallen from above and stuck fast between the lateral faces of rock. To this ledge it is necessary to worm oneself up as one best can. There is no room for a spring or other display of gymnastic activity, and the smooth sides of rock afford no hold for booted feet. In our case, however, the lean and wiry Arab who acted as our guide, having divested himself of his sandals and other impedimenta, saved much time and trouble by first screwing himself up to the ledge, and then giving my friend and myself a hand, which slight aid was all that was required. I may, however, here remark, that on mountains like Um Shaumur the possession of a rope, if not always necessary, is at least desirable by way of precaution. The ledge once gained, a few minutes more scramble placed us on the summit of Um Shaumur; the first Europeans, we believe, who have scaled this the highest point of the Sinaitic peninsula. As probably Um Shaumur is surmountable only by the way I have described, it is possible that former travellers have been baffled by not finding the fissure in the Hagar-el-Bint; or perhaps the ledge itself by which we ascended is the result of a fall of stones which has taken place since the mountain was last attempted. The view from the summit of Um Shaumur is extremely grand. We have first, from north-west to north-east, a sea of jagged peaks and bare rugged hills of dark-red granite and syenite, shut in in the distance by Serbâl, Katherin, Mâsa; and other mountains of the Sinai range; while more towards the east the eye ranges across the Gulf of Akaba to the lofty mountains of Arabia. On the south again, or rather the south-east, the ridge on which we stand is continued with more or less interruption of its deeply-serrated outline until it ceases at the Cape "Râs Mohammed." Turning westward, at some little distance, not immediately at our feet, we discern the plain of Ka'a', extending to the shore of the Gulf of Suez; and further off, beyond an expanse of deepest blue, the high and sometimes sharp-topped mountains of Africa stretching away in the distant horizon.

The mountains of the southern part of the peninsula of Sinai consist of coarse-grained granite and syenite, both occasionally porphyritic, and weathering for the most part into a dark-red colour. These coarse rocks are, however, sometimes traversed by veins of red felspathic syenite of much finer grain, and also by veins of greyish-white quartz; but dykes and outpourings of trap are much more frequent than either. In the detritus along the hillsides and valleys I observed great quantities of yellow mica, together with specimens of tourmaline, augite, prehnite, &c. But our visit was of too cursory a nature to admit of a minute examination of the geology, geography, or otherwise of the Peninsula. I may, however, state in conclusion, that in the red sandstone region abutting the granite district on the north, and lying generally between it and the limestone range of Et-Tih is abundance of iron and copper; and not only so, but there are in several localities traces of extensive works having been carried on for the extraction of both these metals. More especially is this the case in the neighbourhood of the hill called "Surabit-el-Kadim." A thorough exploration of the wadies there would probably not only show that the history of the peninsula is not to be confined to the few years of its occupation by the Israelites, but would at the same time do much to clear up the mystery which still hangs over the question of Sinaitic inscriptions. I might say a good deal more on this subject; but, as it is difficult to separate the results of my own observations from information which I received, I feel that

it is not fair towards the gentleman who gave me that information, and whose hospitality in the desert I gratefully acknowledge, to anticipate in any way the publication of discoveries which rightfully belong to him, and which, I trust, he will himself ere long communicate to the world.

11.—*Account of the Ascent of the Camaroons Mountain, in Western Africa.* By Captain RICHARD BURTON, H.B.M. Consul at Fernando Po, Gold Medallist. (Communicated by the FOREIGN OFFICE.)

Consul Burton to Earl Russell.

Fernando Po, February 22, 1862.

MY LORD,—I have the honour to report that I have made two ascents of the hitherto unexplored Camaroons Mountain, and have discovered a magnificent site for a sanitarium, a convict station, or a negro colony. I have enclosed a report, to be forwarded, if your Lordship thinks proper, to the Secretary of the Royal Geographical Society.

I have, &c., (Signed) RICHD. F. BURTON.

(Enclosure.)

A Reconnaissance of "Theon Ochema," Camaroons Mountain.

"Τέτταρας δ' ἡμέρας φερόμενοι, νυκτὸς τὴν γῆν ἀφεωρώμεν φλογὸς μεστήν. Ἐν μέσῳ δ' ἦν ἡλιβατόντι πῦρ τῶν ἄλλων μείζον ἀπτόμενον, ὡς ἐδόκει, τῶν ἔστρων. Τοῦτο δ' ἡμέρας ὅρος ἐφαίνετο μέγιστον Θεῶν δχημα καλούμενον.

"Post cursum dierum quatuor, noctu terram conspiciebamus flammis refertam. In medio autem erat excelsus quidam et ceteris major ignis, ipsa, uti videbatur, tangens astra. Is interdū apparuit esse mons altissimus, qui Theon Ochema vocatur."

[This remarkable passage in Hanno's 'Periplus,' chap. 16, is to be explained only by the firing of the grass and the burning solfaterra on the Camaroons Mountain.]

THE Royal Geographical Society may, at first sight, not be disposed to think much of an exploration which appears only to have reached a mountain district 14 miles of direct, and 21 of indirect distance from the sea. But a little knowledge of the subject gives another view of it. Water is often wanting; provisions are never to be found on these tropical heights. The wild people are a notoriously bad, though cowardly race, and everywhere, as the late expedition to Kilimanjaro proves, if such proof be required, savages are unwilling to see their mountains ascended for the first time. Add to this, that the only escort in these lands must be krooboys—sturdy fellows, but the most arrant poltroons. They hate land-work; they malingere by inducing sore feet; they run away; and at the best of times they are fond, as Murphy is, of depending on Pat to ask Corny to think about coming some day and help to carry a small bundle of straw to repair the roof.

For nearly four centuries this magnificent pile of mountains, the "Theon Ochema" of Hanno and Pliny has been looming before the eyes of the passing European mariner, yet the summit has been ever virgin. Two attempts have lately been made. In 1847 a Mr. Merrick, of the Baptist Mission on the Camaroons River, succeeded in emerging from the forest into the open grassy levels. But pure water failed him; his people suffered from cold and thirst, and he was compelled to return. Two years afterwards he died. In 1860, M. Gustav Mann, a young Hanoverian botanist, travelling and collecting in West Africa under the patronage of Sir William Hooker, ascended a few hundred feet, when press of time persuaded him to stop. Here, then, remained for me a mountain whose "glorious pinnacle never yet felt the foot of man."

Geographically speaking, the Camaroons Mountain is a parallelogram laying

between $3^{\circ} 57'$ and $4^{\circ} 25'$ north latitude, and $9^{\circ} 25'$ and $9^{\circ} 1'$ east longitude. It is bounded on the east by the Bimbia River, a stream probably discharged by the mountains. The western limit is a branch of the Rio del Rey, or Rumbi River. The Atlantic washes the southern face, and the area towards the north still wants exploration. The distance from the southern foot to the summit, as laid down in the charts, is 14 miles; allowing the same for Country Cape, 28 miles will be its length; and its breadth from the Bimbia to the Rio del Rey is not less than 24 miles, forming an area of 600 square miles. Captain Owen, R.N., estimates the diameter at nearly 20 miles, which would give an area of about 314 miles; but he does not include the high lands to the north-east, extending to the Rumbi range.

This huge volcanic mass is one of a long line of basalt islands, beginning at the unexplored Rumbi range, and stretching from 33° north-east to 33° south-west; through Camaroons, Fernando Po, Prince's Island, St. Thomas', and Ascension. It occupies the bottom of the Bight of Biafra, in the very centre of the Gulf of Guinea, where the coast of Western Africa—after that long sweep eastwards which made the later classical geographers shear off the vast triangle south of the equator—bends almost at a right angle towards the Antarctic pole. The lands behind it being still unexplored, it is difficult to say whether this basaltic buttress to the Atlantic waters does, or does not, communicate through the Rumbi Mountains with those West African ghauts, the Sierra del Crystal. On the other hand, it may be connected by the Kwa Hills to the north-westward, and by the Bassa Mountains upon the Niger, with that mass of high ground east of Sierra Leone, and known upon our maps as the Kong Mountains.

My first visit to Victoria—the little missionary station whence the ascent was to be made—was on the 10th December, 1861, in H.M.S. *Bloodhound*, Commander Dolben. There I found Mr. Mann eager to begin the journey, but still “palavering” with the petty chiefs on the road. An official visit to the Camaroons—an odious “trust river”—procured another volunteer, the Rev. A. Saker, for eighteen years a resident in these parts, a linguist and ethnologist highly respected by the people. Returning to Fernando Po to complete the outfit, for which four days sufficed, I had yet another volunteer for the expedition, which gave it an international character. Señor Atilano Calvo Iturburu, Assessor or Assistant Judge and Secretary to Government, Fernando Po, was as weary as myself of “palaver,” and at least as anxious for a mouthful of fresh air. You must not confound him with certain awful personages in pepper-and-salt wigs and ample gowns, but rather think of him as a fast young pig-sticking Anglo-Indian magistrate.

The dawn of the 18th December found Judge Calvo and myself lying in H.M.S. *Bloodhound*, off the lovely Bay of Victoria, where Mr. Saker was awaiting us. Mr. Mann had set out in advance to await us at the highest village, and we were to follow on the next morning. Precisely at 6 A.M., as agreed upon, we arose, despite the ravages of mosquitoes and sand-flies, and fifty minutes afterwards found ourselves *en route* with a hurrah! The party consisted of Mr. Saker and his two kroomen, who carried his bed, his bunker, and his carefully-locked box of creature comforts—the veteran traveller never lost sight of his fellows. He was accompanied by the interpreter, Mr. Johnson, who having begun life as a factotum to Governor Beecroft, had settled down in his old age as a teacher in the Camaroons Mission. Judge Calvo's escort was composed of four kroomen—all of them hopeless convicts from the cuartel of Fernando Po—and King Eyo, a youth whose idleness and uselessness were admirable and exemplary even in Africa. My party consisted of six krooboyes under their head man, Black Will. They were placed in charge of my steward Selim Agha, an invaluable man, a native of Tegulet, and a protégé of the late venerable Mr. Robert Thurburn, of Alexandria. He had spent a dozen years of his life at a school in Scotland, where he learned to cook,

doctor, spin, carpenter, shoot, collect specimens, and stuff birds—briefly everything.

Our route lay through a bush—such is the magnificent Anglo-African term for a forest of trees often 100 feet high—composed of palms and acacias, a variety of figs and cardamoms, the kola-tree (*Sterculia acuminata*), and three kinds valuable for timber, namely, the African oak (*Oldfieldia Africana*), the scrubby oak of Sierra Leone (*Sophira alata*), and the brimstone-tree or yellow wood (*Mormida lucida*). This also is the region of huge grasses which extend to 4000 feet above sea-level, where dwarfened growths take their places. The whole of this country is admirably adapted for cacao (*Theobroma cacao*), coffee, and sugar; it is a pity to see it wasted on plantains and koko (*Colocua esculenta*). We twice forded the bright little mountain-stream which supplies Victoria with the purest water, and ascended some tough heights, passing west of Mount Henry—a site which I at once fixed upon as a provisional sanitarium, to be prepared before the grand institution near the summit of the mountain. After four hours—2h. 20m. of actual walking—we entered the settlement of the Chief Miyombi, passed some outlying huts, and halted for breakfast at Bosumbo, the head-quarter village, lying 23,420 feet from Victoria. These and other distances were measured by my factotum Selim, with a line supplied to me by Lieutenant Dolben. At Bosumbo Mr. Saker's French aneroid showed 29.6, and Mr. Mann's B.P. apparatus gave 210.5°; temperature, 67.5°.

We now stood upwards of 1000 feet above sea-level, and at noon merrily resumed our way. The path, a mere rut, led through dense bush and grass, with a general northerly direction bending westwards. After passing through a somewhat populous district, we entered upon a vile series of rocky ridges, separated by ravines, and impassable during the rains.

At 4.30 P.M. we made Mapanya, the district of the Chief Botani, and the highest village on this part of the mountain. It lies 17,300 feet from Bosumbo; the aneroid showed 28.23, the B.P. 207.5°; temperature, 72.5°.

The first person we saw was Mr. Mann, who at once informed us that he had just returned from reaching the summit. Faces fell at the announcement: it had been understood that he would wait our arrival. Presently we were reassured. The time of his walking rendered it impossible that he could have been near the mysterious spot. Eventually it became clear that he had never seen his bourne.

The next trouble was the ceremonious welcome with which we were received. The Chief Botani, a yellow man with a bright blue pair of tattooed regulation-whiskers, appeared before us in his royal garb, tall black tile, old scarlet and gamboge coatee of Royal Marines, and a pocket-handkerchief. Thus habited he performed a lively dance, apparently borrowed from the movements of excited poultry. I did not enjoy it. In Africa, when the King dances you have to pay for the honour.

Mapanya is the usual Bakwiri village, a single street separating four huts on the northern from two on the southern side. The site is a little clearing, well grown with plantains, and backed by a glorious screen of wooded heights. The huts are oblong, with pent roofs. The walls are of wattle, supported by posts of the strong and fibrous tree-fern, and provided with sheets of bark to keep out the wind. The roofs are thatched with palm-leaves. The inner space is divided into three "pieces;" at one end of the long walls is a closet, partitioned off by posts and party-walls; the centre, where the only door is, represents the hall; whilst the other third is devoted to the fire-place, with a platform above it for storing and drying wood. The ceiling is black, as if painted with coal-tar, and the floor, which ignores a broom, is at once the chair, the bed, and the resting-place of man, woman, and child, goat and sheep, pig and poultry, to say no more.

The tribe to whom this part of the mountain belongs is called in our charts

Bakwileh. The proper word is Bakwíri, from "kwiri," a jungle, and meaning literally Boyesman or Bushman. They are allied in language to Ilubu, or people of Bimbía, and their dialect is a branch of the great South African family, whose type is the Kafir tongue. The Bakwíri are a light-coloured race like the Bubis of Fernando Po, and have well-made legs, like mountaineers generally. They bear a bad reputation; they are harmless only because each village of five huts has a "palaver" with its neighbours, and because the poison-ordeals sadly thin their numbers. They can hardly be persuaded to part with their flocks, or even their poultry, except by the inducements of rum, a tall hat, or an English shirt. Mr. Mann's scarlet blankets excited, however, the utmost admiration. The people offered successively in exchange for one, a pig and a goat, a small boy, and a large girl.

We halted at Mapanya on the 20th December, having sent the kroobos to Victoria for a reinforcement of provisions. A lively scene met our eyes at 2 P.M. The dancing Chief Botani had been "dashed" by Mr. Mann, and had received a similar present from me. Not content with that he demanded more, which was refused. Then he and his followers, drunk with "bilám," or trade rum, attempted to seize Mr. Mann's interpreter, a child known as "Poor Fellow." They drew their long knives, and had laid forcible hands upon the little wretch, when Mr. Mann energetically rescued him. Upon which the war-drum was beaten, the women began to leave the village, and the men to flock in. Mr. Saker being unarmed, there were only three of us, and the fun soon became fast and furious. We stood to our weapons, and occupied the doorways of the huts so as not to be taken in rear. Presently the fumes of the rum ceased to affect their brains, and all excitement disappeared—Botani, the Chief, wearing a very hang-dog look.

The next day, however, matters were worse. Our kroomen returned from Victoria, accompanied by the Chief Miyombi, of Bosumbo, much the worse for liquor. On being refused more rum he persuaded Botani to demand 500 "big tings," i.e., 500*l.*, for his gracious permission to ascend a place upon whose top cloth would be found growing. The demand was lowered to 300*l.*, when we laughed in his face. He then ordered us down the mountain. We showed our guns, and told him that we should start up the mountain that day. Botani then declared that he would allow no carriers to accompany us. We had loads for twenty-five men, at least, and there were only fourteen: so he retired to another village, and quietly waited there to hear of our failure.

A little after noon, Messrs. Saker and Calvo set out with fourteen kroomen, and reached a place in the forest which was afterwards called "Ridge Camp." The bearers were then sent back, and only nine came, causing us a trouble which brought back to my mind bygone days in East Africa. Shortly after 5 P.M. we effected a start. The distance is 6000 feet, and there are five very bad ascents. The road is a copy of that leading to Mapanya—high pitches, ladders of rock and root, tall grasses, ridges, hollows, scrambling-places, nettles, and legions of biting ants. The palm had disappeared near Mapanya, and now we saw the last of the plantain, and the first of the graceful tree-fern. As darkness was imminent, we heard shouts above us, and those who had rested came down to assist the wearied. I arrived at 6.30 P.M., and Mr. Mann shortly afterwards brought up the rear of his luggage. At Ridge Camp the aneroid showed 27.2. We passed a comfortless night in the forest. The inhospitable Bakwíri had refused us water, the ground was uneven, and the total loss of rest was a bad preparation for the hard day's work that awaited us.

Before dawn on the 22nd of December we left Ridge Camp, made a cache for our extra loads, and determined to reach water before the night. The real march began at 8 A.M. The characteristic of the scenery now was the fern—fern, fern, everywhere. Some were like palm-trees, 10 to 20 feet high, surpassingly fair to look at; others were dwarfed epiphytes, springing moss-

like from the arms of their parent trees. There were beds of ferns upon the ground, and others running creeper-like up the trunks. Never had I seen a more beautiful fernery, set off as it is by the huge tropical growth around it. The path, however, was vile.

After 2510 feet, which consumed a good hour of our valuable time, we passed under a natural arch of fallen trees, which we called "Fern Gate." The B.P. here showed 120.4° , the temperature 66° . Beyond it lay a new land. Bush and forest suddenly ceased as if felled with the axe; and, O, joy! we had emerged from the regions of the tall grasses. Nothing met the eye but a broad green slope of small moss and larger fern, all of it the *F. nephrolapis*, based upon a rugged bed of old and degraded lava. We called this first stream Lava Bed No. 1, and specimens of it, and of the other fire-rivers long since quenched, have been forwarded for the inspection of a certain ex-President of the Royal Geographical Society, whom it were needless to name here. The direction of the bed is from 291° to due north, that is to say, it has flowed from north to south with a little easting. I afterwards found this a rule which safely guided us to the topmost peak. The craters may open irregularly and in all directions, but the lava-flow follows the direction of the wind. More expert volcanists will determine if there be any connection between the two facts. The breadth of the bed may be half a mile; the lower part finding little slope thins out, and ends in a dense forest. The banks are girt on both sides by giant trees; and looking down from the half-way heights, the idea of a huge fir* is suggested.

Having breakfasted and eaten blackberries (*R. apetalus*), we began the ascent at 9.50 A.M. The hunters' path led up the western edge of the lava-river, and gradually curved to the eastern. It was severe work: six particularly steep pitches presented themselves, and the way often wound up prisms of lava from 15 to 25 feet high. In the lower part, where the blocks cannot be seen, there was imminent risk of spraining an ankle. Higher up, the ascent became more rocky and bare. *Salvia* scented the air, and the surface was spangled with blight blossoms unknown even to our expert "botaniker." There was also heath, but, ah! how different from what you understand by such word—an *Ericanella* 15 feet high, thin and rugged as an old tamarisk. The bees now began to settle upon us, but no one was stung. As we ascended, the heat of the sun became terrible. The kroomen tailed off; Selim Agha remained behind in charge of them, and verily I believe saved several lives by squeezing water out of the thick mosses that hung from the banks.

The last third of the road is the most rugged of all. The bed now nears the place whence it issued, and the unequal cooling of the masses has made it uncommonly rough walking, or rather climbing. You look up and see a high, abrupt, and broken transverse wall; you reach this in half an hour, more than half-exhausted, and you see nothing but another. I found it impossible to keep my eyes open; something fiery and feverish had got into my veins. So requesting my companions, who were far fresher, to keep going, I lay down upon a lava block, slept soundly for an hour till 4 P.M., and was thus able to finish the ascent.

Lava Bed No. 1 issues from a dwarf cone which, from its exceptional darkness, we called "Black Crater." It is a punch-bowl, opening towards the south, long extinct; the western lip rises 200 feet from the level platform below, or 356 feet measured along the slope. The crater is about 100 yards in diameter, and the circumference of its middle height may be 600 yards. The outer surface is fine cinder, mostly bare, very sparsely overgrown with now dry grass and with stunted shrubs, and there is a little green vegetation

* Manuscript illegible.

inside the crater. It is distant 8350 feet from Fern Gate. The B.P. showed 200.2°, the temperature being 63.25°.

Mr. Mann kindly volunteered to set out with a krooman, and to bring back a beaker of water. His offer was accepted by a most grateful public, and we afterwards named the fountain which an old Mokwiri had shown to him "Mann's Spring." Without such discovery, indeed, our work would have been trebled. By degrees our kroomen appeared with bed and baggage; five of them, however, remained behind. Another bad camping-place had been selected. The high north-east wind roared over us all night, and a change from 78° to 40° Fahrenheit in a few hours is a severe trial of strength. Even at 6 A.M. the mercury stood at 48°.

A lovely morning, when the large red sun had

"Retinged the dark and livid air with bloom,"

made amends for past troubles. Before us, beyond a grassy hollow, about one mile broad, rose, separated apparently by a great gulf, the awful form of Mount Trestrail, stern, solitary, and rising one-third higher than Vesuvius, without neighbour or rival. The charts give it 5820 feet. Captain William Allen calls it "Mongo Mt. Etindet," which would mean the "separate mountain," but Mr. Saker had never heard the word.

As Selim Agha and his squad did not appear at 2 P.M., we sent them a beaker of water, and set out for Mann's Spring, distant 9594 feet. Our direction was northerly, with a little westing. The walk is charming by contrast, winding round the grassy shoulders and folds of various hills. On the right we passed a crater, whose double effusion of lava united at the base, inclosing a clump of vivid verdure, probably the *Hypericum angustifolium*, a European growth which had now become common. The path, a mere rut, struck, after forty-five minutes, into a thickly-wooded ravine, nearly the highest limit of large vegetation. After the fiery sun there was pleasure in its cool shade, and its air scented with a garden of blue labiates and white clematis hanging from lofty trees. The forest, except where herbaceous plants clothed the ground, rather resembled an English wood than an African jungle, and the birds twittered from morning to night upon the moss-bearded branches.

We at once paid a visit to Mann's Spring. It is a little runnel of pure cold water, issuing from peaty earth, at the foot of a small rock-bank, and sinking into the dark brown mould beyond. It is embowered in blue flowers, and surrounded by nettles, which supplied us with a Scottish spinach. A few yards from it the kroomen had cleared a slope for our camp: we expected even then to remain here for some time. Shortly after our arrival all the stragglers came up, happily without an accident, except some chafed feet, which they afterwards improved into laming sores. At Mann's Spring Camp the B.P. ranged between 199.5° and 200°, temperature 65°, which would give it in round numbers 7000 feet of altitude. It is in the Tierra Temprada of this mountain, where the wooded lands of the Caliente climate below touch the Pays Brulé, the Tierra Fria, above. During a residence there, lasting from the 23rd December, 1861, to the 31st January, 1862, I made up my mind that it would be an admirable spot for a Sanitarium or a Colony. Materials for a road and for house-building lie all around. Of the 60,000 runaway negroes in Canada give me but 300, and I will make a path practicable for mules at the end of a dry season. Pestilent Lagos will require a "sick bay," and where can a Lebanon be found equal to the beautiful, the majestic Camarouns?

Christmas-eve and Christmas-day were spent in taking bearings, and rambling about the hills, and in naming the places. According to Captain Allen the Bimbia people call the topmost heights "Mongo Ma Lobn," or the Mount of Heaven. We loyally christened them "Victoria" and "Albert," being then ignorant of the awful event which had destroyed Christmas merri-

ment in Old England. As the natives have no distinguishing terms for the several heights, we thought it not ungeographical to seize the opportunity.

The ascents of "Earthwork Crater," so called from its extreme regularity of outline, and "Mount Helen," in honour of Mrs. Saker, who had supplied the Christmas plum-pudding, showed us a wonderful prospect. The mind was thrown back upon the wild scenes that Nature must have worked here. A wondrous confusion reigned around. A vast circle of thick white cloud, iridescent by the sun, and careering round and round us whilst we were standing in limpid air, forms a setting for the tumbled mass of craters—we counted twenty-eight—gashes, deep crevasses, thick lava-beds, and ribs of scoriaceous rock, marshalled in the region before us. But after a brief *coup d'œil*, every eye was turned from the lesser to the greater giants northwards, where, clear and distinct in the thin air of morning, rose the grand presence of the Peak. It was manifestly divided into a pair of distinct heads, which at once suggested the two most fitting names. The deep metallic blue that invested the monarch of West African mountains, compared with the brown, dotted with points of blackish verdure, on the nearer rocky parallel, suggested that a chasm would separate fore from back ground. The idea proved, happily for us, erroneous.

On Christmas-day, 1861, Mr. Saker left us for a season, his presence being required at Victoria. Mr. Mann had been confined to his hammock for some time: the Judge and I therefore determined upon a reconnaissance of the Great Mountain; and at 5.30 A.M. on Friday, December 27, 1861, we set out, accompanied by three kroomen, upon our eventful walk.

Emerging from the forest that clothes the base of Earthwork Crater, we found ourselves on the grassy tract, and presently saw Mount Helen bearing $75^{\circ} 25'$. After about 2000 feet we came upon a bed of lava, which we called No. 2. Following it up we arrived at the base of Mount Helen, distant 7814 feet: here the B.P. showed 198° , temperature 66° , whilst on the summit it was B.P. 195.4° , temperature 57.5° .

Having enjoyed a pipe under one of the few wind-rung trees that dot its south-western side, we struck over a long grassy and rocky reach of mountain slope, separating us from a magnificent mountain, which, as a dutiful husband, I had named Mount Isabel. Its distance from Mount Helen is 8648 feet, and the B.P. was 193.75° , temperature 60° . We then ascended a steep cone, after which a kind of *terre pleine* led us to a sheltered spot, which we judged well fitted for a *dépôt* of water and for breakfast.

Before us northwards, however, was a spectacle that robbed me of appetite; there, straight in front of us, they rose in ineffable majesty—those towering peaks,—tangible, as it were, in the morning æther. There was no chasm. Beyond the base of Mount Isabel the ground swelled gradually upwards, forming a labyrinth of green-black lava-streams, and a congeries of grass-grown craters extending up to the main cone. A faint verdure seemed to streak the eastern slopes, which were far less abrupt than the western; a long and highly-inclined sweep of blue—the effect of fine black cinder—separated Victoria from Albert Mountain; and whilst the latter showed a distinct but small crater, the former was beautified with descending stripes of red and yellow, falling, as it were, from a cliff or niche a few feet below its apex.

I seized the Judge's arm, and urged an instant advance. He meekly shook his head, and referred me to my breakfast, which stuck in my throat. Our krooboy had required driving the whole morning, and with increased fatigue I expected a rare afternoon.

At 10.30 A.M. we arose once more, with an uncommon elation of spirit: "excelsior" being now the word. The direction—path there was none—lay along the steep side of a hill, where we walked upon the edges of our feet. After a quarter of an hour we had reached, at a running pace, Lava Bed No. 3. It issues from a crater below, and south-westward of, the main peak. Appa-

rently the oldest formation, the material is overgrown with dry green moss, and crumbles like pumice under the tread. Turning the head of the stream which is suddenly arrested by a rise, we followed a smooth groove along the eastern flank of a small cone on the proper right, and then struck across the bed towards another on the left of the lava-river. The passage occupied half-an-hour. The mossy part was 800 feet broad, and the last 400 feet stretched over a stream of ruddy-black clinkers, detached stones, hard and rough, which caused torture to our feet. I afterwards observed the same formations to extend under the friable outer coat of lava. Meanwhile the contrast of the small dark vein with the large, soft, green artery is curious in the extreme.

At 11.30 A.M. we reached the cone on the proper left of the stream, much encouraged by seeing that we were sensibly nearing our destination. After a ten minutes' walk along its clean-cut edge, encumbered only by tussocks of wiry yellow grass, we found ourselves again compelled to cross the same lava-river higher up the bed, where, though narrower, it is far more ridgy and broken, being near its source.

This second passage led us to what appeared to be two grassy cones, which lie at the foot of the grand crater. Not knowing that they were outliers disconnected with our destination, we thought proper to ascend them. It was the last straw that broke the Judge's back. The incline was unusually steep, the surface stiff grass, and patches of hot black scoriæ; and the sun was oppressive. After a painful clamber we reached the summit, and found that the two cones were one, with a central depression. We stood on the rim of a beautifully defined crater, narrow and edge-like at the top, about 100 yards in circumference, sloping inwards like a punch-bowl, and grass-clad to the very floor, which was a jetty pavement of fragmentary lava.

There, after that waste of labour—the cone could easily have been rounded—we allowed ourselves to rest for fifteen minutes by the watch; we abandoned ourselves to the charm of the situation, and made eternal silence vocal with a cheer. We were the first Europeans certainly—probably the first men—who had ever stood within gunshot of the giant sugar-loaf whose now-extinguished fires caught the old Carthaginian's gaze.

We then debated upon the mode of ascent. The Judge preferred the long eastern shoulder, which was green with lichens, as being the easier. I preferred to breast Victoria Peak by the nearest path, towards the red and yellow fire-tinted scoriæ, and to leave on the left the smooth steep black slide of dust-like lava that, separating the two eminences from afar, wore a blue tinge. At 1 P.M. we began by walking round the crater of the grassy cone; here, however, the Judge stopped. Looking at the wall before him—I afterwards found by measurement that it measured 3300 feet along the slope—he judged it beyond his powers, and advised me to reserve it for another day. Subsequent events almost make me regret that I had been less obstinate. But on second thoughts—no! to be the first is everything; to be second is nothing.

Descending the tufted cone I began the last ascent, accompanied by a single krooboy and by a flask of anisado and water, which the Judge had kindly lent to me. At first the walking was easy, and the slope gentle, but the loose cinders caused fatigue by slipping from under foot. Arriving after a long elbow to the left at blocks of basalt, which we afterwards called "Half-way Rocks," I turned to the right, and, steadily keeping the red and yellow cliff in sight, ascended along the ragged edge of a little ridge, which afforded mossy lava to support the tread. In places there were thin scatters of a quartz conglomerate, which I never saw except upon that cone. The sun was fiery, and the high north-easter left its marks upon me for a fortnight afterwards.

At 1.30 the easier slope was surmounted, and walking became so troublesome that I preferred an occasional "all-fours." As we neared the summit my krooman sank down with thirst-glazed lips, and he was allowed to remain.

behind. A few moments more saw me upon Theon Ochema, where a new and unexpected set of objects met my sight.

Victoria Peak I now discovered was but the outer walls of a double crater, black, and, to judge by the eye, 250 feet deep, opening southwards, where it has discharged a prodigious lava-stream, and divided into two by a thin partition-wall. Unable to boil at that visit, I afterwards found the mercury rise to 193.5° , temperature 60° , at the base; and at the summit of Victoria Peak 189.75° , temperature 59° . Mr. Saker on one occasion made B.P. 188° , temperature 59° ; but I am disposed to doubt this observation. To the north-west of Victoria Crater lies Albert Crater, a far smaller formation, but remarkable for its high back wall, where the B.P. was 189.5° , temperature 59.6° . The two craters are parted by a curious V-shaped dyke of compact grey-stone, in large blocks, like a ruined Cyclopean wall, and 25 feet high. To the west-north-west of Albert Crater, and divided from it by a jagged wall of basalt, lies Prince's Crater, by far the smallest of the three.

But these were subsequent discoveries. Time forced me to be content with a cursory look at Victoria Crater. By way of recording my claim, I made a little cairn of stones. The krooby had rejoined me with the B.P. apparatus, but the others had lagged behind with my poncho. The furious north-easter charging round the black summit threatened to make a Phaeton of me—to sweep us like flies off the peak; and after sundry attempts I desisted, promising myself better luck next time.

In such doings 2.30 p.m. had sped: there was a reverse to our bright medal, a night in the wild and open. The descent of the cone occupied half an hour. I tried the Vesuvian style of gravitation, and found the cinders so loose and the slope so great that a wreck upon the boulders studding the base was imminent. This descent occupied thirty minutes, and when I threw myself down to rest at the foot it was already 3 p.m. I had taken upwards of seven hours to finish off the five miles of ascent, and still hoped to effect a return in three hours.

I hurry over the homeward march. Arrived at Mount Isabel we refreshed exhausted nature, and hastened on after a ten minutes' halt. A wind was already blowing, which sent the mercury to 40° . Shortly after 6.30 p.m., as we passed our guide and beacon Mount Helen, a cloud-bank was all we could see in the west. The pace now became frantic: twilight, though longer upon the mountains than in the plains, is short. Before 7 p.m. we were surrounded by a darkness that could be felt. We were compelled to halt. The kroo cry, however, at last brought a response, and presently we saw fire-sticks—the excellent Selim being as usual to the fore—making their way towards us. The cold night-wind whispering pleurisy kept us moving till assistance came, and we reached camp at 8.30 p.m., instead of 6 p.m.; twelve hours having been employed in finishing ten miles. After the supper of hungry men we retired to rest, but not to sleep; the sun and wind had sorely burned our hands and faces, our legs ached, and that African plague, spasmodic cramps of the lower limbs, awoke me every half hour.

In the morning the reconnoiters were distinguished from their fellows by hobbling about like cheap screws after a long field-day. Another African plague supervened. In an evil hour I made that march in a pair of loose waterproof boots, which began by softening the feet, and ended by half flaying them. Wounds in these lands are hard to heal; I have heard of a man losing his leg in consequence of a mosquito-bite. Briefly, a hurt which in England would have passed away in a week, wasted thirty days of my precious time.

A variety of expeditions followed this first exploration. Messrs. Calvo and Mann ascended, on the 3rd of January, 1862, Albert Peak; left a maximum and a minimum thermometer there, discovered the V-shaped dyke above alluded to, and returned on the next day prematurely. The cause was the recurrence of Mr. Mann's complaint; a week reduced him so low that he

listened to our advice and accompanied to Victoria the Judge, now homewards bound.

On the 5th of January the Rev. Mr. Saker again joined our party. He had brought up with him Mr. R. Smith, a coadjutor, who eventually became too unwell to venture higher.

On the 13th January, Mr. Saker made the third ascent, and the first boiling of thermometer upon Victoria Peak. He returned on the next day at 6 P.M., sadly tired, and on the 15th January he descended the mountain.

Mr. Mann was as unlucky as I was: fifteen days out of the four months which in these latitudes compose the botanist's year, are a terrible loss. He reappeared in camp on the 25th January, having accomplished the severe ascent from Ridge Camp to Mann's Spring in seven hours. My foot had permitted me to crawl about since the 22nd January, at present one of my lucky days. We made all preparations for a final visit to the summit without delay. The tornado season was setting in: the thunder was now above, not below us; and globular lightning shooting like Roman candles across the path is not pleasant.

At 7 P.M. on the 27th January we set out for the fourth expedition, resolved to pass two nights near the summit. The first day was spent in sketching, taking bearings, and collecting plants; we passed the hours of darkness on Mount Isabel. The next day took us to "Saker's Camp," a cone at the foot of the great mountain: beyond exploring the interior of Victoria Crater, and vainly attempting to measure the circumference of the huge cone, we did nothing. At night the cold caused itself to be felt, the mercury sank to 33·5° Fahrenheit, our waterproofs were white with hoar, and the peak was powdered with frozen dew. And yet there are those who doubt that snow has been seen on the Camaroons Mountain! The minimum thermometer upon the back wall of Albert Crater showed 27° Fahrenheit.

The next day enabled me to make a happy discovery. Mr. Mann and I started by different roads: they had told me it was impossible to ascend the blue slide between Victoria and Albert. The word is naturally somewhat irritating; I resolved, therefore, to try, and agreed to meet my fellow-traveller on the summit. At 2 P.M. we took formal possession of the place; flew the union jack; drank the health of the Sovereign Lady with our last bottle of champagne; and left our names upon a leaden plate, with two sixpences—rather a bright idea, but not emanating from my cranium.

After this ceremony, Mr. Mann returned to camp. I was not satisfied, and wanted something more, especially a view of the country to the north-east and the north-west. Accompanied by my factotum and a krooboy, I climbed up the dyke separating the two great chasms, and walked down a smooth cinder-valley trending north-east between Victoria Crater and the northern wall of Albert Crater. Fortune favoured me with a sight of the utterly unknown land; the wind-driven clouds melted away, and I saw that the land to the north exactly reflects the land to the south. Still disappointed, I turned to the north-west, behind Albert Crater, and observed some suspicious cracks and gashes, long, narrow, and deep, which raised my hopes sky-high; they proved, however, thoroughly extinct, nor could I detect in them the least smell of sulphur. Disappointed, I ascended the highest wall of Albert Crater, where the krooboy was sitting, B.P. thermometer in hand.

Hardly had the candle been lighted when Selim, who had struck over certain dwarf and broken hillocks, stained with red and yellow, and lying due north of where I stood, re-appeared, highly excited. When he told me the cause, his feelings were shared; we started on grand gallop, and presently met our reward.

My factotum had discovered a complete solfaterra. It lies north-north-east of Albert Crater, somewhat below the highest point, and where the downwards slope begins. Smoke arose in puffy volumes from the long lines of white

marl and sulphur which, divided by small ridges of moss, ran in a northern and southern direction. During rainy weather the phenomenon must be seen from the low lands, and perhaps may still be visible from Fernando Po.

This discovery accounts for many detached reports. If, as the guides say, Mont Blanc smokes his pipe, then Ochema's pipe is not yet put out. The fiery mountain noticed by the old Punic navigator; the flames which the people of Bimbia described to Captain Allen as proceeding from the earth; the flashes seen by the cloth merchants at Camaroons River and by the people of Fernando Po, are now satisfactorily explained. I am pleased to announce to the Royal Geographical Society of Great Britain the addition of another volcano, not wholly extinct, to the list of those already known.

Nothing now remained but to descend and dine. On the next day we again separated. Mr. Mann ascended Albert Peak to remove his thermometer, whilst I returned to camp and finished the measurements. The event of the day was a hailstorm, the stones being of a size approaching to the inconvenient. I reached camp at 4 P.M., and my fellow-traveller arrived about an hour afterwards.

All of geographical interest being now ready, on the 31st of January, 1862, I left, not without regret, "Mann's Spring Camp," where so many peaceful happy days, without sand-flies or prickly heat, had sped. The Chief Botani received me with a civility bordering on servility. After leaving his village, however, a fellow in the lower districts presented a musket at my men, hoping to make them run away and cast their loads; they had learned, however, that the danger of being shot was problematical, but that the punishment of desertion was certain. Finally, on the 2nd of February, 1862, I once more saw the scattered bungalows of Victoria, where the kindly Mrs. Saker, who would not leave the place till our safe return, received me with all hospitality.

In concluding this hurried sketch of a highly-interesting region, I must express my regret that my instruments were wholly inadequate to the task. An aneroid is the poorest substitute for the mountain-barometer; I had no hygrometer; and even a clinometer was not at hand.

These few lines will, it is hoped, show the adaptability of the Camaroons Mountain for a sanitarium, a colony, or a convict station. A locale which shows every morning hoar-frost during the hot season in a region removed but 4° from the equator is not to be despised in the days when it is proposed to remove Calcutta to Simla. The Anglo-Scandinavian race cannot, it is true, thrive in all climates: but there are few, and those are valueless, in which choice of site would not make him a cosmopolite.

12.—*Geological Notes on Campana, in the Province of Esmeraldas, Ecuador.* By JAMES WILSON.

[In communicating the following short letter from Mr. James Wilson, Sir Roderick Murchison makes this comment:—"Although Mr. Wilson (known to geologists and geographers by his explorations in California and Tropical Australia) has not been able to make any extensive surveys in Ecuador, where he has been labouring hard as the surveyor of a land company in the province of Esmeralda, yet the discoveries which he has made of the existence of the works of man in a stratum of mould beneath the sea-level, and covered by several feet of clay—the phenomenon being persistent for 60 miles—is of the highest interest to physical geographers and geologists. These facts seem to demonstrate that, within the human period, the lands on the coast of Central America were depressed and submerged, and that after the accumulation of marine clays above the terrestrial relics the whole coast was elevated to its present position."]

"25th April, 1862.

"DEAR SIR RODERICK,—I fear I am now nearly lost to your memory, in that, although sojourning in an interesting country, I have not sent a single line to keep me remembered at the Meetings of the Geographical Society, as I had hoped to do when I first set out for Ecuador in the service of the Ecuador Land Company. My work has been most arduous in surveying these dense forests of the equator, though my recompense, I am sorry to say, is by no means commensurate. With the exception of a journey through the forest of Quito, I have seen little of the country; being confined to the locality of the Pailon, which presents only one kind of rock, a sort of volcanic conglomerate, consisting principally of a vast bed of volcanic sand or ashes, in which are irregularly embedded stones of various shapes and sizes, up to massive boulders of tons in weight, the whole bearing a striking resemblance to the northern drift. There is, however, one remarkable feature in the formation of the coast of this locality; and, so far as I have been, along the coast of this province: it is a stratum of mould, in which fragments of pottery and articles of gold, and other remains of human work, are found. Over this lies a bed of clay, varying from 5 to 10 feet in thickness. The bed of clay rises above the tide, more or less; but the stratum of mould containing these relics is below that level. I have found it at various points, for a distance of 60 miles; and I believe it might be traced to a much greater distance. In the course of a few months my engagement with the Company terminates; when I shall be able to travel more freely, and to greater distances, and be able again to afford the Geographical Society a paper. Captain Melville White (to whom I entrust this, and who has visited us in this retired locality), has travelled very extensively in these countries, and will most probably afford much geographical information.

"Wishing you good health, I remain, Sir Roderick, your very obedient servant,

"JAMES S. WILSON."

13.—*Planispheres*. By the Chevalier IGNAZIO VILLA.

THE Chevalier Ignazio Villa submitted seven planispheres to the Society, accompanied by a printed description, from which the following is extracted:—

No. 1. *Grand Terrestrial Planisphere*.—The northern hemisphere is laid out with radial meridians, the antarctic pole being in the centre. All the earth is thus represented within a single circle; the highest mountains and the active volcanoes are marked on the plan, and elevated at the circumference of the outer circle on the French metrical scale. This planisphere, being made to rotate, exhibits the hour in all countries, and their longitudinal differences in time. Clockwork movement can also be applied, so that one may see the phenomena relative to local times that in the course of twenty-four hours follow each other upon the earth.

No. 2. *Celestial Planisphere*.—This planisphere represents the entire heavens on a single circular plane, indicating all the constellations visible to the naked eye in their angular positions. Round this planisphere there is a girdle, on which is portrayed an epitome of all the countries of the earth; so that they may be found at once in their longitudinal positions. In this system the earth is immoveable, and the celestial planisphere rotates in sidereal time. It shows at a glance the constellation which passes at any moment under any meridian, and places in direct relation all terrestrial and celestial points, as well as the right ascensions and declinations of the latter, and verifies the distances of the moon and stars from the sun. This celestial planisphere will be useful in marine schools and in the study of astronomy; and, when a

clock is attached, it can be framed, and mounted on a pivot, so as to be used on board ship. It is also applicable to watches.

No. 3. *Grand Cosmographic Table*.—At the centre is the terrestrial system in its orbit, with its partial and total eclipses, the phases of the moon, its tides, the refractions of the sun, the day and night of the polar circles, the position of the sun in regard to the poles, the constellations of the months, and the signs of the Zodiac. In the four corners are portrayed four globes in perspective: two for the solstices, and two for the equinoxes, with their inclinations to the terrestrial axis; the shadows representing the precise curves as they are projected each day upon the earth. By means of these curves, the rising and setting of the sun can be easily found for any latitude. Beneath are placed two synoptic scales, one indicating the length of the day and night in all countries or parallels of the earth; the other is an equatorial band, divided at the tropics with a solar scale, by which may be seen immediately the right ascension of the sun for all days of the year.

No. 4. *Grand Map of a Quarter of the Earth*, exhibits part of Asia, Europe, the northern parts of Africa and the American continent down to the Equator, thus including all the most interesting parts of the commercial world, projected according to Mercator. It enables any one to find, without calculation, the differences which result from the rotation of the earth between any country and the longitudinal zero.

Nos. 5 and 6 are Planispheres on a smaller scale, illustrating the theory of the winds, terrestrial magnetism, and other subjects of physical geography.

No. 7, *an Universal Meridian*, indicates the equation of time of each day in minutes, seconds, and hundredths.

The terrestrial planisphere (No 1), after having been examined by a Special Commission appointed by the Austrian Government, obtained the reward of a gold medal and has been adopted for the use of the Imperial schools throughout the empire. The series of seven plans have been adopted in all the Lycea of Tuscany; and were subsequently purchased by the Italian Minister of Public Instruction, for the schools of that kingdom.

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