

though adequate to contain our books and maps, have ceased long ago to be capable of holding one-third of the Members who attend our Evening Meetings. Hence we have been indebted for some years to the liberality of the Royal Society and the University of London for permission to assemble in their Great Hall, now, alas! demolished; and now, through the kind consideration of the Managers of the Royal Institution, we congregate in their excellent theatre.

When I consider the highly useful and popular character of our Body, and its intimate connection with the Foreign and Colonial Offices, and the Admiralty, I still entertain the hope that her Majesty's Government will, ere long, provide us with a mansion sufficient for our wants, the more so as six other scientific Societies are at this moment about to be provided, at the public expense, with Meeting Rooms and Apartments at Burlington House. But if this consummation should not be attained, we shall have time sufficient, before the lease of our premises in Whitehall Place expires in September, 1871, to provide ourselves with a Meeting Hall and Offices of our own. Meantime I may express my regret that, in the new scientific buildings now in the course of construction at Burlington House, no arrangements have been made for a large common Hall, containing accommodation for five hundred persons. It is only in the large building of the adjacent University of London, now rising to completion, that such a capacious Hall is in preparation; and, reverting to the former kind consideration of the Senate of that Body, I trust that we shall be permitted to hold our Evening Meetings in it whilst a large Hall of our own is being prepared.

In the mean time, adverting to our present state, I have to congratulate you on the further augmentation of our numbers, as well as upon the punctual issue of the last important and unusually large volume of the 'Journal.' When I look to the various duties, besides the editing of these volumes and the 'Proceedings,' which are performed by our indefatigable Assistant-Secretary, including the recent addition of much correspondence incident to our engagement to distribute Medals to the best geographical proficient of the Public Schools, you will all unite with me in offering our heartiest thanks and acknowledgements to Mr. H. W. Bates.

OBITUARY.

I naturally commence the record of our losses by a brief sketch of the truly eminent geographer and scholar, the late Lord STRANGFORD.

Percy Sydney-Smythe, the third son of the sixth Viscount Strangford, was born on the 26th November, 1825, at St. Petersburg, during his father's embassy in Russia; and, although after a few months he was sent over to England, the first language he spoke was Russian. He did not retain it after six or seven years old; but this early change of mother tongue, if it may be so termed, may have been some help to the extraordinary facility he displayed throughout his life in acquiring languages colloquially as well as by book.

His passion for languages developed itself at a very early age. Unable from partial blindness to join in playground sports, he occupied his out-of-school hours (at Harrow) in learning Persian from a grammar and dictionary of his own purchase, while his examiners will well remember what he achieved in Latin and Greek at the same time. During the one year he remained at Oxford, he taught himself Arabic, and was naturally chosen as one of the two "Student Attachés" nominated from Oxford and Cambridge, in 1845, for Constantinople—an idea having been formed of attaching young men to embassies in the East, for the study of Oriental languages. He became paid Attaché in 1849, and was afterwards made Oriental Secretary, an office he held till he retired from the service in the middle of 1858, having in the previous year succeeded his brother in the title. How he worked at Constantinople his companions there could tell best; but it was in these years that, while labouring assiduously in his official work which he never shirked, he acquired all the immense knowledge that astonished those who knew him well, but of which, alas! so little fruit has been left to the world. From the very first he made a thorough study of Sanskrit, and mastered all and every branch of the languages of the East, carrying them on to their more modern results in the West. He never studied and never took much interest in Chinese or in the Polynesian group of languages; but the study of all the rest became his chief employment. Profiting by the acquaintances he made in the un-Europeanized quarters of Stamboul, he soon spoke Persian and Greek with the facility of a native of the respective countries; could detect the differences of every dialect in pronunciation and idiom of the latter language; whilst the former became so completely his own, that to the very last, if he was suddenly startled, or when talking aloud to himself—a very constant habit of his—nine times out of ten he spoke in Persian.

But mere language was by no means the ultimate aim of his

labours ; on the contrary, he made it his study both on account of its connection with the history of man, and because he believed it to be the one only absolutely trustworthy key to this history from the beginning : it was with this larger, wider, higher view, that it interested and absorbed him ; and it is for this that his early death is to be deplored as an irreparable loss ; for where numbers have studied and will study the details of each phase of these subjects, there are but few who, with the talent of amassing so much detail, have the power of grasping the wider and larger features into one great whole.

The great histories, now shrouded in the mists and veils of antiquity, of the pushing on of one horde after another from the centres of Asia over the plains of Eastern Europe, and the formation of nation after nation in the West, demanded another branch of knowledge,—namely, that of physical geography ; and if Language was Lord Strangford's passion, Geography was his delight. In this study he stood pre-eminent. He knew nothing beyond the faintest outline of geology, but he comprehended in his geographical knowledge the understanding of all the features and *contours* of every country, besides the details of each. He never rested till he knew the height and direction of all the mountain-ranges, the extent and boundaries of the river-basins, with their valleys and plains ; necessarily assisting this study by that of meteorology and climate. Thus his knowledge of geography became profound and full, while his curiously accurate memory enabled him to remember the names of towns and villages, which united them in his mind with the languages and manners of the inhabitants of each nation—the names confirming the geography, and the geography confirming the language.

Lord Strangford's health, naturally extremely delicate, was destroyed by overwork during the Crimean war ; and he was disappointed at finding himself unequal to the fatigues of rough travelling, when, on succeeding to the title, he had leisure and means for so doing. For a few years he tried it, and made plans for far-away journeys ; but it became too soon apparent that home was the best place for him, and he reluctantly gave up all hopes of leaving England, even for the commonplace travelling in Switzerland, which had been an immense pleasure to him. The meteorological changes in that country were a constant source of interest to him when there ; and he had an intense enjoyment of scenery, although able only to see it with the aid of powerful opera-glasses. His aneroid was at all times his inseparable companion ; indeed he was rarely

to be seen anywhere a couple of miles from home, even in London, without the aneroid in his pocket.

She who knew him best can truly speak of his fine temper—of his passionate love of truth and justice—of his indignation against all shams and false pretences—of his goodness and gentleness in private life—of his perfect and remarkable freedom from all malevolence and jealousy—or of his freehanded generosity in giving every man his due, and more than his due, for honest conscientious work—of his keen appreciation of humour and the fund of quiet goodnatured irony in himself, and of his warm and hearty fidelity as a friend. And this was combined with singular humility and modesty. No one ever heard Lord Strangford say one word which could be construed into a boast of himself, or a claim for his own acquirements; on the contrary, he was always ready and anxious to learn from others, with a frank avowal of his own ignorance. When in company with those who felt themselves his inferiors in knowledge, he hung back, rather than led; while to those who sought for information from him, he poured out all from his own stores with lavish kindness.

But this excessive mental activity was too much for Lord Strangford's feeble body. He was attacked at the end of July with a slight and partial paralysis, the effect of over-fatigue, but from this he appeared to have completely recovered, when, on the morning of the 9th of January, an effusion of blood took place on the brain, and he breathed his last in a few hours at the early age of 43 years.

What our Society has lost by this sad and unexpected event is deeply felt by us all; but I must add that my grief on the occasion has been greatly augmented by the deep sympathy I feel for his widow, the daughter of that beloved and sound geographer, the late Admiral Sir Francis Beaufort. The suffering of this most accomplished lady has been intense; but in her sorrow she has, at my urgent request, furnished me with many of the preceding lines; and our Fellows will greet them as the warm and truthful effusions of a deeply attached wife, who has given us those just and delicate delineations of the character of our lamented associate, which no other pen could have so truly indited.

VON MARTIUS.—Germany has lost a truly great man in Charles Frederick P. VON MARTIUS, whom we were proud to claim as one of our Honorary Members. This renowned naturalist and traveller, who died in December, 1868, had so high a repute that many of his countrymen placed him on a level even with Humboldt. He was born at

Erlangen, in Bavaria, in 1794, and his father, the Court Apothecary of that place, having given him an excellent education, he soon took high academical honours, and in 1817 was sent to investigate the natural history of Brazil, by the Austrian and Bavarian Governments, in company with M. Spix. In carrying out their mission, the then almost unknown territory of Brazil was traversed in its entire length through the interior from south to north, and along the River Amazons from the Atlantic to the Peruvian frontier. Returning to Europe in 1820, the remainder of his long and laborious life was occupied in elaborating the results of this great journey, the narrative of which, chiefly written by himself after the death of his colleague, has become a classical book of travel, under the title of 'Spix und Martius' Reise nach Brasilien.' The third volume of this great work, which relates to the Amazons portion of the journey, and is little known in this country, contains, besides the personal narrative of the voyage up the river, a *résumé*, it may be said, of all that was previously known of the Amazons region, showing the amount of conscientious labour, in the closet as well as in the field, employed by von Martius in all he produced. It is additional testimony of no small value to the value of this work that Mr. Bates, now our Assistant-Secretary, who explored the Amazons for 1400 miles in the track of the great traveller, and has carefully studied the narrative of von Martius, was astonished, as he has informed me, at the extent and accuracy of the information acquired by him during so rapid a journey. The numerous publications on botany which followed so raised the estimate of his character that he was advanced to posts of high consideration in his own country. Of the botanical works he composed, the greatest, doubtless, was that on Palms ('Genera et Species Palmarum,' 1823), by which he raised the number of species from 15 as reckoned by Linnæus, and 99 by Humboldt, to the vast number of 582.

I should, however, entirely fail to do justice to von Martius if I spoke of him as a botanist only; for, in addition to much knowledge of other branches of science, he was truly eminent in our closely allied sister science, Ethnology, of which, in the last years of his life, he gave a memorable proof in his sketch of the South American Indians, especially those of Brazil, accompanied by a collection of the vocabularies of these autochthones. In this work the author collected with great ability all those facts which enabled him to give a clear and, in some respects, quite a new idea of the origin and relations of these South American nations, tribes, and

families which have been for countless ages in a state of change. Of this work, Professor Huxley assures me that it contains by far the best and most exhaustive account of the physical character, the geographical distribution, and the social organization of the primitive inhabitants of the Brazils extant.

In a letter I received from this eminent man in October, 1866, when he sent me a copy of his well-composed and apposite *éloges*, which, as Perpetual Secretary of the Academy of Munich, he pronounced on the deceased members, he thus alluded to his ethnological volumes on South America:—"When these shall be printed, all the time and power remaining to an old man shall be applied to the completion of my 'Flora Brasiliensis,' in which labour I am proud to boast of the active co-operation of your eminent countrymen Bentham and Hooker."

Another of our countrymen, the late Robert Brown, justly renowned as the "Princeps Botanicorum," was one of the ardent admirers of von Martius; and, in truth, he was a man of so thoroughly genial a disposition that all our leading botanists, including Sir W. Hooker, loved him as a man and revered him as a great authority.

M. DE LA ROQUETTE.—I will next say a few words in honour of an eminent French writer, the late M. de la Roquette, who was elected Honorary Corresponding Member of our Society in 1857. This excellent man was most distinguished by his devotion to the memory of distinguished geographers and travellers, which led him to compile their biographies with much research, accuracy, and warmth of appreciation. Thus we read in the *Bulletin* of the French Geographical Society, of which body he was one of the founders, the Lives of Hommaire de Hell, Dubois de Montperreux, Lieutenant Bellot, Sir John Franklin, Constant Prevost, Alexander von Humboldt, Daussy, and Jomard. When he was engaged in writing the Biographies of our famous countryman Sir John Franklin and of the illustrious Alexander von Humboldt, M. de la Roquette procured from me many letters of these great men which I possessed, and which threw fresh light on their characters. He was the author also of numerous articles in the *Biographie Universelle*, and of many papers on geographical subjects, published in the *Bulletin* of the Geographical Society of France, and in the *Annales des Voyages*, to which he was a contributor so long ago as 1824, in the time of the elder Malte-Brun, the editor of that important serial publication devoted to our Science. A member of the French Geographical

Society since its commencement; he was for several years the General Secretary of that Body, in which office his great activity and love of geographical pursuits enabled him to render great service. So much were his labours appreciated that he was elected Vice-President of that Society in 1847, and again in 1857 and 1858, and a few years before his death he received the title of Honorary President.

M. de la Roquette died in the eighty-fourth year of his age, and was buried in the presence of many distinguished men of science on the 12th of last August; the funeral oration being pronounced by that eminent leader of the French geographers, M. d'Avezac, of whom we are justly proud as one of our Foreign Associates, and who, I am happy to say, is still enjoying good health. In that graphic sketch M. d'Avezac indicates the various phases of the career of M. de la Roquette before the year 1821, when he seriously attached himself to geography. In it we are also reminded of the various translations of foreign works which he carried out and annotated, such as those of the English Expedition up the Orinoco and Apuré rivers by Hippiusley, Wilkinson's Description of Moldavia and Wallachia, and the Voyages of Columbus, which he translated from the Spanish in conjunction with our Foreign Associate, my old companion, Édouard de Verneuil. His last work was the publication of many of the most remarkable letters of Alexander von Humboldt, which he collected with great assiduity. Of these, one volume only has appeared, but the other is far advanced. Activity and conscientious accuracy, as M. d'Avezac has well said, were the dominant features of the character of de la Roquette, and these, combined with the kindest manners, rendered him a great favourite among numerous friends and acquaintances.

SIR JAMES BROOKE, Bart., K.C.B.—No one of our deceased Fellows deserves a more lasting place in our annals than the late Sir James Brooke, so widely known as the Rajah of Sarawak, who died at his seat in the south of Devonshire, on the 11th June, 1868. The son of a civil servant of the East India Company, he was born at Bandel, in Bengal, in 1803. Shortly after, entering military service, he was severely wounded in the Burmese war, at Ringpoor, and returned to England. Subsequently he visited China, and it was on his return from that country that he undertook, at his own cost, in 1838, that expedition to Borneo, which by the energy and devotion with which he carried it out, and from the important results with which it terminated, has justly won for him

a foremost place among the most enterprising of British explorers who have followed in the track of Raleigh.

The fitting out of his own yacht, the *Royalist*, with the bold and avowed object of suppressing piracy in the Eastern Archipelago, and the progress he made in visiting different places in these seas, is graphically given in his own Diaries, most fortunately preserved for the public through the friendship of that gallant and accomplished officer, Captain, now Admiral, Sir Rodney Mundy. In them we learn what great difficulties he had to overcome in extirpating piracy among the Dyaks* of Borneo, and the feats which were accomplished by the crews and boats of the *Iris* and *Phlegethon*, in all of which adventures Brooke took a leading part with his friend, Captain Mundy, as depicted in this work with illustrations. Afterwards, in the Expedition to Borneo of H.M.S. *Dido*, under Captain, now Admiral, Sir H. Keppel, which took place in 1846, we further learn with what eagerness he strove to suppress piracy, and to bring the native Dyaks to a sense of order, and how he established his own Government of Sarawak, of which he had been declared the Rajah in 1841, at the desire of Muda Hassim, his predecessor in that dignity. His official proclamation as Governor of Sarawak dates from the 21st of September, 1841, on which day the British flag was there hoisted. Men of his generation can remember with what delight the Rajah was received in England in 1847, when he returned after all these exploits. Even the Queen congratulated him, conferring on him the knighthood of the Bath, and the Lord Mayor and Common Council voted him the freedom of the City of London; he received the diploma of D.C.L. from the University of Oxford, amid many plaudits, and, not least, we honoured him with one of our Gold Medals. He was created also, by the Queen, Commissioner and Consul to the Native States of Borneo, and Governor of Labuan, which latter island, valuable as promising coal, was purchased from the Sultan of Borneo by the British Government.

But, alas! this noble example of a chivalrous English gentleman was destined to undergo much severe criticism, and to brave and to have to stand against charges publicly brought against him (as I think, in a mistaken view of the subject) by that honest and straightforward, but occasionally uncompromising economist, Joseph Hume; whose endeavours, however, to procure from the House of

* 'Journal of James Brooke,' by Captain Rodney Mundy, R.N., p. 183.

Commons what would have been equivalent to a censure on his conduct were more than once defeated.

On the other hand, our deceased Fellow had numerous warm supporters, including the naval officers Admirals Sir Thomas Cochrane, Sir James Gordon, Sir H. Keppel, and Sir Rodney Mundy, with whom he had been associated; and one of his most zealous defenders was our former President, that enlightened nobleman, Francis Egerton, the first Earl of Ellesmere.

This period of trouble being passed, not, however, without great mental suffering and injury to his bodily health, Sir James Brooke was taken out in 1853 to his Government of Sarawak by his distinguished friend Admiral Hall. He and Keppel had the gratification of seeing order thoroughly established, a good Christian Mission organized which ended in the establishment of a bishopric, the duties of which were zealously performed by the Right Rev. F. M. MacDougall, Bishop of Labuan. During the last years of his residence in Sarawak (1857) Sir J. Brooke very narrowly escaped being killed, through a sudden attack of an infuriated body of Chinese, who had been irritated to madness by the suppression of the trade in opium; and on this occasion, as in every event of his life, he showed the most perfect coolness and resolution.

Viewing the career of Sir James Brooke as Rajah of Sarawak, we have a right to be proud of him, as a singularly gallant and successful explorer and an enlightened administrator; whilst every one who knew the man became attached to him, from those manly and open manners by which, doubtless, he exercised a great influence over the uncivilised people among whom he had cast his lot. Among his numerous warm friends no one had a sincerer regard for him than that patroness of all good works, Miss Burdett Coutts.

The late lamented Rajah Brooke was buried in the secluded village of Shapstor, Devonshire, near his residence of Bunator, at which he died. He bequeathed his property and rights to two nephews successively, and, failing any children of the present Rajah and his brother, he willed the reversion of them to the Queen. By this document he authorized his kind and attached friend, Miss Burdett Coutts, to carry out his wishes in a joint-trust with Mr. J. A. Smith and Mr. Thomas Fairbairn. By this act he also gave a clear proof of his loyal feeling towards the poor people whom he had raised from an abased condition to a state of comfort; by it he further evinced his resolution to prevent future misgovernment,

and thus to entail, as it were, the official register that Sarawak must, from its important maritime position and useful productions, be ever held as a British dependency.

SIR C. WENTWORTH DILKE.—The sudden death of Sir C. Wentworth Dilke, Bart., at St. Petersburg, on the 10th May, has deprived the public at large of a very useful and respected member, and our Society of one of its old associates. Sir Charles Wentworth Dilke, Bart., had repaired to St. Petersburg, with his younger son, Mr. Ashton W. Dilke, to act as the representative of British Horticulture at the Congress of Botanists and Florists, now assembled at the Imperial city, and I had myself given him letters of introduction to my friends within it.

Educated at Westminster School and Trinity College, Cambridge, he soon left the bar, for which he was designed, and entered with vivacity into literary work, chiefly as connected with the 'Athenæum' weekly journal, of which his father was long the proprietor and editor. He took a very active part in establishing the Royal Horticultural Society, and thereby attracted the marked notice of his Royal Highness the Prince Consort. He was also one of those who resuscitated and imparted fresh energy to the Society of Arts, which has since risen so highly in public estimation. The success of the Great International Exhibition was in a considerable degree indebted to him, as will be acknowledged by Mr. Henry Cole, C.B., who then commenced that series of efforts to encourage the Establishments at South Kensington for the promotion of Science and Arts, which prospered so strikingly under the ægis of the late lamented Prince Consort.

The brilliant success of the Exhibition of 1851, in which Wentworth Dilke acted as one of the most energetic of the Executive Committee, led her Majesty's Government to name him one of the five Royal Commissioners for conducting the second Great Exhibition of 1862; and it was after the demise of the Prince Consort, whose views he so effectively supported, that the Queen conferred the title of Baronet upon him.

Sir Charles Wentworth Dilke entered the House of Commons as Member for Wallingford, which he represented until the last dissolution. He is succeeded in the title by his eldest son, one of the new members for Chelsea; who has already, at his early age, attained well-merited distinction by his remarkable work entitled 'Greater Britain,' in which he has not only much excited the reading

public, but has shown that he possesses the true spirit of a British explorer, the capacity of an able statist, and the felicity of a ready writer.

In reference to our deceased member, Sir C. Wentworth Dilke, I ought further to state that he served gratuitously as the English Commissioner at the Great American National Exhibition at New York in 1853.

Mr. J. H. BROOKING, who died on the 13th January, 1869, a highly respected merchant in the city of London, was one of the best supporters of our Society, to which he attracted many influential mercantile gentlemen, who, like himself, felt that geographical explorations in distant lands frequently lead to most important commercial results. By his death we have lost a very effective member of our Council, and a clear-headed man of business, who watched zealously over our finances, and who had most certainly at heart the permanent interests of our Body.

Sir JOHN P. BOILEAU, Bart., who died on the 9th of last March, was much esteemed by a large circle of friends for his engaging social qualities, and his extensive accomplishments. He was a Vice-President of the Society of Antiquaries.

Mr. JOHN DICKINSON, F.R.S., for many years a Fellow of this Society, had at the time of his decease, on the 11th of January last, nearly attained the advanced age of 87. Actively engaged in business pursuits during by far the greater part of his long life, he still took a keen interest in various branches of science, and more especially those of astronomy and geography, having constructed an observatory at his country house of Abbots Hill, in Hertfordshire, and having in his later years devoted the greater part of his leisure hours to the study of narratives of recent geographical discoveries. As a mechanical inventor he was well known, particularly in connection with the manufacture of paper, which he materially assisted in bringing to its present state of perfection. Besides various pamphlets connected with the water supply of London, and other questions of the day, he communicated to the Royal Society some observations on the supply of water from the chalk stratum in the neighbourhood of London, containing much valuable information, and including records, extending over many years, of the amount of percolation through a Dalton gauge, which have since been frequently quoted.

I have only to add that Mr. John Dickinson was very highly

respected by numerous cultivators of science, letters, and the fine arts, and that in common with many of my friends I fully appreciated his fine social qualities.

Sir EDWARD CUNARD, Bart., was distinguished by the talent and activity he displayed in keeping up in perfect efficiency the famous line of rapid packets between America and England established by his father, the first Baronet, and has left behind him a really good and respected name.

Rev. S. W. KING, Rector of Saxlingham, Norfolk, was a man of high scientific attainments, known to the general public as the author of the 'Italian Valleys of the Alps.' He was not only a geographer, taking a lively interest in the operations of our Society, but a cultivator of various other allied branches of science, including geology, entomology, and archæology, having imbibed these tastes from his father the Rev. W. H. King, an accomplished scholar, who resided at the vicarage of Nuneaton, Warwickshire, where our late associate received the rudiments of that solid education which rendered his later life so distinguished. As an antiquary he published several interesting papers, and his geological researches in Norfolk are well known to the cultivators of that noble science, some of his discoveries having been made public in Sir Charles Lyell's 'Antiquity of Man.'

Mr. King has been called away in the prime of life; had he been spared, there is no doubt he would have made for himself a name and a place in the highest ranks of science. He died on the 8th of July, 1868.

Dr. H. NORTON SHAW.—Although never enrolled on our lists as a Fellow of the Society, and therefore not strictly coming within the scope of the Obituary, to which the occupiers of this Chair are confined, I feel it to be my duty to say a few words respecting one who was for fourteen years the active Assistant-Secretary of our Body, and whose zeal and ability were exerted in promoting the welfare of the Society by procuring numerous additions to its members.

Born in one of the Danish West India Islands, the son of a General in the Danish service, young Norton Shaw received part of his education in New York. He afterwards became an Assistant-Surgeon in the Navy, and, having retired from that vocation, he was chosen in 1848 our Assistant-Secretary. At that time, the number of our Fellows was not more than a third of what it subsequently became, and Dr. Shaw had the merit of supporting the then President, Captain (afterwards Admiral) Smyth, with so much vigour that

new life was infused into our proceedings ; and the Roll of our Fellows first assumed that progressive enlargement which has not abated down to the present time.

Among the many cases in which he personally exerted himself to promote the interests of the Society and the cause of Geography, I shall ever remember the zeal with which he successfully advocated the appeal that I made to erect a Memorial to the brave young French officer Bellot, who lost his life in the search after Franklin, and which monument stands on the Quay near Greenwich Hospital. Let me also place it on record that it was Dr. Norton Shaw who took the most active part in the organisation of that great festival which was offered to Livingstone after his first great exploration in Southern Africa, and at which I presided to do honour to the illustrious traveller. In short, it was on occasions when honour had to be shown to the good deeds of geographical explorers that the services of our late energetic officer were most conspicuous.

Though he never published original works, his name is connected as editor with various good and useful publications, and the 'Royal Illustrated Atlas,' which he conducted, was very creditable to him ; whilst his services as Editor of the annual volumes of our Journal, during so many years, give him a just claim on our gratitude.

Some time after leaving our service, at the end of the Session of 1863, he was appointed by Lord Stanley, then Secretary for Foreign Affairs, British Consul at the island of Ste. Croix, at which place, being a Danish possession, he was well qualified to act, from his knowledge of the language. He died in that colony in the summer of last year.

His eldest son is an accomplished young lawyer at Copenhagen.

Sir JOHN V. P. JOHNSTONE, Bart., many years the respected Member of Parliament for Scarborough, who recently died from the effects of a fall in the hunting field, was one of my oldest and most valued friends. He was a judicious patron both of science and the fine arts, inasmuch as by his aid William Smith, the father of English geology, was, during some of his aged years, comfortably supported ; whilst the now celebrated sculptor, Noble, when in his youth, was kindly fostered and encouraged by him. The first of these, when acting as Sir John's land agent, constructed a geological map of his beautiful estate of Hackness, near Scarborough, which remains as a model to convince all country gentle-

men that the farmer must always be indebted to the geologist; and my friend Mr. Noble has more than once spoken to me in the warmest terms of gratitude towards his earliest patron. A member of the British Association for the Advancement of Science from its foundation at York in 1831, where, as the son-in-law of the venerable Archbishop Vernon Harcourt, and the brother-in-law of its eminent founder, the Rev. William Vernon Harcourt, he was of real service to us. He was subsequently one of the active originators of the Royal Agricultural Society of England, in the management of which he played a conspicuous and useful part. Few men of this age were more beloved than Sir John Johnstone, who was ever recognised as a warm-hearted, liberal, and enlightened country gentleman by very many devoted friends, and by the men of all classes in the county of York, who deplored his death.

Besides those Fellows who have made some mark in Geography or the associated sciences, the Society has lost the following Associates:—

Lords ASHBURTON and CALTHORPE, the first an elegant scholar, and the brother of our former President; the other a man of high character, and justly esteemed for his great philanthropy and truly religious conduct.

Sir WILLIAM CLAY, Bart., many years a Member of Parliament, and once holding the office of Secretary to the Board of Control; he was also the author of good works on Finance.

From among the other deceased Fellows I single out the name of my old and valued friend, Mr. EDWARD MAJORIBANKS, the widely known and universally respected senior partner in the house of Messrs. Coutts and Co., who died in his 90th year, after a wise and well-spent life.

The remaining list of deceased Fellows is as follows:—Mr. John Arthur, Mr. Charles Bell, Mr. Charles Coote, Captain Roderick Dew, R.N., C.B., an enterprising naval officer; Commander C. R. Egerton, R.N., Mr. William Ewart, during many years a useful and laborious Member of Parliament; Mr. Anthony L. Fisher, Mr. Richard Fort, Mr. John Griffith Frith, Mr. George H. Fitz-Roy, Mr. A. Gibson, Sir William H. Holmes, of Demerara, who held public offices in British Guiana; Major G. A. James, Mr. J. M. Laurie, Mr. H. L. Long, Mr. George W. Lenox, Mr. George Macfarlan, Mr. Colin W. Macrae, Dr. Samuel Osborn, Mr. T. V. Robins,

Mr. G. M. Robinson, Mr. John Smith, Mr. James Simpson, Mr. Charles John Tindal, Mr. Nash V. E. Vaughan, and Mr. Robert Walker.

ADMIRALTY SURVEYS.*

The hydrographical surveys under the Admiralty have progressed very satisfactorily during the past year, both at home and abroad; and, in addition to the ordinary results of these surveys, great advances have, through them, been made in our knowledge of the character of the sea-bottom at its greatest depths, which both in the interests of submarine telegraphy, and as throwing a light on subjects connected with physical science, hitherto not altogether clear, have been received with general satisfaction. It is further hoped that a cultivation of such investigations may be attended with still further discoveries of practical utility as well as of scientific interest.

The researches of Dr. Carpenter and Professor Wyville Thomson on the subject of sea-bottoms and temperatures at considerable depths between the Hebrides and the Faroe Isles, which were carried out in H.M.S. *Lightning*, placed at their disposal by the Admiralty for a portion of last summer, have proved of such special interest as to lead to a further investigation of a more extended character to be undertaken during the present year.

The interesting results of the former expedition have been described by Dr. Carpenter in a preliminary Paper, and published in the Royal Society's 'Proceedings,' vol. xvii., No. 107.

Home Coasts.—The examination and rectification of the Surveys of the Coasts of the United Kingdom are, with one special exception, confined for the present to the force under Staff-Commander E. K. Calver, in H.M.S. *Porcupine*, which, during the past year, has been principally employed in making a very minute and critical survey of the River Medway, on a scale of 20 inches to the mile, between the Dockyard at Chatham and Okehamness, with the view of affording reliable data in connexion with the deepening of that river, and the great Government works in progress there.

Staff-Commander Calver has also surveyed the South Bay of Wexford, for the purpose of testing its capability as a site for a harbour proposed in that narrow portion of the Irish Sea, which, owing to the dangerous and impracticable character of the entrance

* By Capt. G. H. Richards, R.N., F.R.S., Hydrographer to the Admiralty.

to Wexford itself, is much to be desired for commercial purposes; a re-survey has likewise been made of several of the off-lying shoals on the Suffolk coast, and of a portion of the entrance of Harwich.

Portsmouth Harbour and Spithead.—This special survey is being carried on by a small party under Staff-Commander D. Hall, by means of boats; it comprises a very elaborate examination of the whole harbour on a scale of 30 inches to the mile, which had become necessary, both on account of the extension of the dock works, as well as with a view to removing some of the many banks which obstruct the waters of this our principal naval arsenal, the entrance to which has been so greatly improved by dredging during the past few years; good progress has been made with this survey, as well as a re-examination of Spithead, in connexion with its re-buoyage, and the publication of a larger plan of its anchorage than hitherto existed.

Channel Islands.—This survey is being conducted by Staff-Commander J. Richards and one assistant, with the means afforded by the vessels employed in protecting the fisheries, and by the aid of boats; during the summer of 1868 the northern portion of the Minquiers Reef, and other dangers between Jersey and the coast of France, have been surveyed. The channels northward and southward of Jersey, as far westward as the meridian of the Roches Douvres have also been sounded, and several new dangers discovered and placed on the charts.

It is hoped that the survey of these islands, the dangerous and intricate character of which has called for the most able and vigilant research on the part of the officer conducting it during several years, will be brought to a close at the end of this season, and that the results will leave nothing to be desired on the part of the navigator.

Mediterranean.—It was stated in the last yearly Report that the *Hydra*, in which vessel this survey was being conducted by Captain Shortland, had been called away to obtain deep soundings for the submarine cable between Aden and Bombay. After successfully completing this service, an account of which has been written by Captain Shortland and published by the Admiralty, the ship returned to England, bringing a consecutive line of deep-sea soundings from the Cape of Good Hope by St. Helena to the English Channel. The greatest depth obtained on this line was about 200 miles southward of St. Helena, at 2800 fathoms, and this is believed to be the

deepest reliable sounding on record, a considerable quantity of the bottom having been obtained and preserved.

The *Hydra* was replaced in the Mediterranean by the *Newport*, a small screw-steamer under Commander G. S. Nares, whose first duty was to survey the line for the submarine cable between Malta and Alexandria, and then to escort the cable-ship while submerging the cable; both of which duties were successfully performed. The greatest depth on this line was found to be 1840 fathoms.

The *Newport* has since completed the survey of the western portion of Sicily, preparatory to extending the soundings across the volcanic region of the Adventure Bank to Tunis, and satisfactorily determining the position of the various banks which lie between Sicily and the African shore. The roadstead of Melazzo, at the entrance of Messina Strait, and the harbour of Syracuse have also been surveyed.

Strait of Magellan.—The *Nassau*, Captain R. C. Mayne, C.B., has completed the eastern portion of this strait from Cape Virgin to the Chilian Settlement, Punta Arena, which has been published by the Admiralty in two sheets, on a good navigating scale.

The inner channels between Port Tamar and the Gulf of Peñas have also been generally examined. Several new anchorages have been discovered and surveyed, which will be of great advantage as stopping-places for steam-vessels bound into the Pacific by these inner waters. All the intricate portions of the channels, such as the English Narrows, Victory Pass, and the channel between Long and Summer Islands, have been examined and charted on good scales.

In the latter passage not more than 33 feet at low water can be commanded over the ridge which joins the two islands, and the width here is not over three cables' length, or 600 yards; sufficient, however, in the smooth water of these regions, for the heaviest ships at present in existence.

In the western portion of the Strait itself a general examination has been made of both shores from Cape Pillar to Port Famine, resulting in the discovery of some safe anchorage for the largest ships—a want hitherto much felt, and resulting but lately in the total loss of a fine steamer, the *Santiago*, belonging to the Pacific Steam Navigation Company, which struck on a rock off that inconvenient and unsafe port "Mercy Bay," hitherto the only known anchorage available at the western entrance.

During the season when the severity of the climate prevented the *Nassau* from working in these tempestuous regions, she was usefully employed on the western coast of America, and surveyed the bays of

Coquimbo and Herradura—a want much called for by the increasing trade of these ports. On returning south from Chiloe, the *Nassau* passed inside that almost unknown group of isles in the Chonos Archipelago, and again into the Pacific by the Darwin Passage, the navigation of which was found available for vessels of any size.

The *Nassau* is about to return to England after a somewhat short but very arduous service of three years, during which her officers have added much to our knowledge of that most convenient route for steamers between the Atlantic and Pacific Oceans, and left, indeed, nothing to be required by the navigator but that care and vigilance which, under even the most favourable circumstances, is imperatively necessary in such a region of storms.

North China and Japan.—This region is considered to include all the coasts of China and Japan north of the parallel of Hong Kong, and its examination is being carried on by the officers of the *Sylvia*, under Commander E. W. Brooker.

As, however, we possess very fair surveys of the coast of China itself, between Hong Kong and the entrance of the Yang-tse River, the object has been to confine, as far as possible, the labours of the *Sylvia* to making such an impression on some portion of the coast of Japan as would probably lead to a systematic and consecutive survey of its extensive shores. Owing, however, to the increasing commerce and consequently increasing demands of navigation at points widely distant from each other, to the actual physical changes that are taking place at the entrances of the great rivers of China, and to the frequent calls that are made on the surveying officers to search for some reported danger, often imaginary, or to report on some special subject to some special authority, it has been found difficult with a single vessel to follow out this object, and the consequence has been hitherto that we have been what may be called tinkering at Japan, and the valuable work which the surveyors have obtained has, from its fragmentary character, not been as available for present use as it would have been under a different system. During the past year, however, very considerable progress has been made in the direction pointed out, and a good survey has been made of the coast of Kui-sui (the southern island) between the port of Nagasaki, through Spex Strait, as far as the entrance of the Strait of Simonoseki. The actual distance between these points is but 120 miles; but the broken character and deep indentations of the shore extend the actual survey to over 500 miles. In November, 1868, the *Sylvia* was called away from Japan and crossed over to the

Great Yang-tsze Bank to search for a shoal reported on its outer edge, 120 miles from the Lightvessel at the entrance of the river. The danger, however, was not discovered, nor did the examination in any way indicate the probability of its existence.

On her way to the south, a re-survey of the channel and banks at the entrance of the River Min was executed, where great changes were found to have taken place since former surveys of 1843-54; and a system of buoyage was proposed to the Chinese authorities which, if adopted, will greatly facilitate the navigation of the river, on the banks of which, about 35 miles within the entrance, stands the important city of Foo Chow.

The *Sylvia* has returned to resume her surveying duties in Japan, and will proceed with the examination of such parts of the coast as will be of most interest to commerce and navigation. Hitherto this country has borne almost exclusively the burden of opening up the boundless resources of the extensive and flourishing empire of Japan by its explorations and surveys; and the many casualties which have occurred, and may be expected to occur, not only among the mercantile marine but to our ships of war, for the want of correct charts, would appear fully to justify the employment of one small vessel on such useful work. At the same time, looking to the enlightened progress of the Japanese themselves, and the aptness they have shown for acquiring the knowledge and modern appliances possessed by the civilised nations of other countries, it is reasonable to hope that the time is not distant when we may expect them to co-operate, or to take a leading part, in a work so necessary as the correct delineation of their own shores, and of the dangers and obstructions which at present render the approach to them, in many cases, attended with difficulty and risk.

The China Sea Survey.—Under this name is included that extensive region lying between the parallel of about 4° s. and that of Hong-Kong in about 22° n.; bounded on its west by the eastern shores of Sumatra, the Malay Peninsula, and China; on its east by Borneo and Palawan; and comprising within it those numerous islands which form the various channels into the China Sea south of Singapore; and the innumerable coral-reefs which encumber the China Sea proper, and divide it into the two great highways through which the commerce of the West passes to Hong-Kong and the north.

The making of these paths clear, and the opening up of the ports of China to the vast commerce which now pours into them from all

parts of the world, has been the patient but persevering work of the navy of this country for thirty years.

Commenced in war and continued in peace, well may it have been considered a gigantic task to which no end could be seen when first undertaken; and yet the end, so far as this great area is concerned, may now be clearly and definitely counted upon. And when it is remembered that never more than two, and frequently not more than one, of the smallest class of vessels in the navy have been consecutively employed on this great work; and when the results are considered, the price which it has cost in money will scarcely be considered an excessive one: nor will the labour, and energy, and ability which has been devoted to it be deemed to have been ill-bestowed.

The survey is at present being conducted in H.M.S. *Rifleman*, under Staff-Commander J. W. Reed. During the past year the examination of the reefs which form the eastern edge of the main passage from Singapore to Hong-Kong have been completed, as also some others in the Palawan Passage; and both these routes may now be considered as sufficiently known to ensure the safety of navigation with ordinary caution.

The survey of Balabac Strait, between Borneo and Palawan, together with the Island of Balabac* and Balambangan, is also well advanced; and here the *Rifleman* is now employed. When this work is completed, the route eastward of Palawan to the Philippines and the coast of China during the adverse monsoon will be made safe; although the Sulu and Celebes Sea, with Macassar Strait, will still remain a nest of dangers for future exploration.

During a visit to the Gulf of Siam the position of some doubtful dangers were searched for and found not to exist, and have consequently been expunged from the charts.

The *Rifleman* has also made very considerable additions to the survey of Singapore Strait, by which the chart of that neighbourhood has been much improved and 30 miles of the Malay Peninsula northward of Singapore has been re-surveyed and sounded.

Staff-Commander Reed and his officers availed themselves of the opportunity of observing the total eclipse of the sun, which occurred on the 18th August, 1868, and for this purpose visited Baram Point, on the west coast of Borneo. He was accompanied by Mr. Pope

* One of H.M. ships has been totally lost on the dangerous reefs to the westward of this island since the survey commenced last year, and the *Rifleman* herself grounded during the prosecution of the work and narrowly escaped shipwreck.

Hennessey, the Governor of Labuan, who went for the purpose of making similar observations, and which were very successfully obtained. The *Rifleman's* observations were communicated to the Royal Society.

Before quitting the China Seas, it will not be out of place to mention that extensive surveys of the Philippine Isles and seas adjacent are in course of progress by a Hydrographic Commission, under the conduct of Captain Claudio Montero, of the Spanish Navy, through whose co-operation with Staff-Commander Reed, and courtesy in sending to this Department copies of his surveys immediately they were made, very valuable additions and corrections have been made in the Admiralty Charts of these regions.

West Indies.—Staff-Commander Parsons, with his two assistants, have been principally employed during the past season in making an accurate detailed survey of the island of Barbadoes, which will be completed during the present year. Hitherto no survey worthy of the name had existed of this small but flourishing and valuable island, and more than one serious accident and shipwreck had of late occurred from want of correct charts.

The surveyors in the West Indies have been several times diverted from their ordinary duties during the last season to examine whether any material changes had been caused by the earthquake-wave of 1867, which does not appear to have been the case; and surveys of Virgin Gorda and its approaches have been made in reference to its capabilities as a packet-station.

NEWFOUNDLAND.—Staff-Commander J. H. Kerr and his two assistants have surveyed 200 miles of coast-line and sounded over 700 square miles in the vicinity of Cape Freels and Togo Island, on the east coast. The dangerous character of the shoals, which extend far off this coast, render it very necessary that they should be well defined on the charts, especially since—in consequence of the decline of the fisheries on the Newfoundland coast—the traffic to the Labrador grounds is so much increased; and to which this route is the high-road, both for the fishery vessels and the ships of war which are employed in their protection.

Staff-Commander Kerr has likewise completed the survey of Conception Bay, and determined several astronomical positions round the entire coast, with a view to the construction of a new series of charts to supersede those of the last century.

BRITISH COLUMBIA.—The surveying party in this colony, under Staff-Commander Pender in a hired vessel, have been employed in

examining and making clear the channels between the northern end of Vancouver Island and the British boundary in $54^{\circ} 40' N.$; 900 miles of coast have been so examined, 150 miles of which have been exposed coast, at all times difficult and hazardous to effect a landing upon. Portland Inlet, through the centre of which runs the boundary between the British and lately acquired territory of the United States, has been surveyed and found to extend 11 miles farther north than shown on the old charts. Several new anchorages have also been found and surveyed on the main route between Vancouver Island and Fort Simpson, the northern boundary.

CAPE OF GOOD HOPE.—Navigating-Lieutenant Archdeacon and his assistants have, during the past year, completed the survey of the eastern coast of the colony to the Bashee River, about 150 miles short of Natal; when, in consequence of negotiations pending between the Colonial Government and the native tribes east of the Bashee, it was considered desirable not to pursue the work further at present, and the party were consequently removed to the western coast of the colony, which they have surveyed as far north as Saldanha Bay, and found many errors in the old charts. They are now continuing the work northerly, and a survey of Saldanha Bay together with a re-survey of False Bay are in progress.

AUSTRALIA.—*New South Wales.*—The re-survey of the seaboard of this colony from Cape Howe in the south to Danger Point in the north, embracing a distance of about 600 miles of latitude, has now been completed; and its numerous ports and anchorages surveyed with all the accuracy necessary for ocean navigation, or indeed for any purposes. At the present time the officers are obtaining the off-shore soundings and other data necessary to render the charts complete, and at the close of the present year the Admiralty Survey of New South Wales will be complete, and the officers withdrawn. The survey was commenced by Captain Sidney in the year 1861, and is now under the conduct of Navigating-Lieutenant J. T. Gowland, Captain Sidney having retired in 1868, after a long and meritorious service of 34 years, during which he was constantly engaged in surveying duties in various parts of the globe.

Victoria.—Navigating-Lieutenant Henry J. Stanley with two assistants have, during the past season, been employed in surveying the coast of this colony between Cape Schanck and Wilson's Promontory, and plans of the bays and anchorages within these limits have been made on scales suitable for navigation. A re-survey of the entrance to Port Phillip has also been completed.

The southern shores of Australia are much exposed, and generally difficult to land upon in consequence of the heavy surf almost continually rolling on the beach. More extended means are, therefore, required to carry on the work, nor can it be expected to proceed with the same rapidity and uniformity which has been found practicable on the more sheltered coasts of New South Wales and Queensland.

South Australia.—During the year 1868 the eastern shore of St. Vincent Gulf has been examined from Adelaide to Cape Jervis, thus completing the survey of the whole of this extensive gulf. The outer coast eastward, from Cape Jervis to 30 miles beyond the Murray River, has likewise been surveyed.

Captain Hutchison having been promoted, the charge of the survey is now in the hands of Navigating-Lieutenant F. Howard, who is continuing it with one assistant.

Queensland.—Navigating-Lieutenant E. P. Bedwell and an assistant have surveyed the coast of Queensland from Moreton Bay to Indian Head, or nearly to Sandy Cape, a distance of 130 miles, and have carried the soundings to a distance of 15 miles from the shore. This is a very important addition to our knowledge of a part of the coast hitherto entirely unsurveyed. Wide Bay and the bar to the entrance of Great Sandy Strait, with the southern portion of the strait itself, have also been sounded.

H.M.S. *Virago*, which is principally employed on the coast of Queensland in the channels inside the Great Barrier between Sandy Cape and Cape York, has a surveying officer—Lieutenant Armit—attached to her, who loses no opportunity which circumstances afford him of adding to the charts of this region, some portions of which are still very imperfectly known.

Auxiliary Surveys.—Commander Chimmo and the officers of H.M.S. *Gannet* were employed during the early part of 1868 in completing the survey of Trinidad and the approach to the Gulf of Paria; and subsequently in defining the deep limits of the banks south of Newfoundland, and searching for some off-lying shoals which were supposed to exist; likewise in investigating the phenomena of the Gulf Stream; and, finally, in carrying a line of deep-sea soundings across the Atlantic; in all of which researches they added considerably to our knowledge, and Commander Chimmo's investigations formed the subject of a paper which was read before the Royal Geographical Society.

H.M.S. *Serpent*.—Commander Bullock having been directed in

1868 to proceed from Japan to the Java Sea, for the purpose of obtaining deep-sea soundings to facilitate the laying of a submarine cable between Australia and Java, he accordingly left Japan in May, 1868, and, proceeding eastward of the Philippine Isles, touched at Mantawalu Kiki in the Gulf of Tomini, Celebes Island, where the total eclipse of the 18th August, 1868, was observed by the officers of the *Serpent*, and also by professional astronomers from Manilla, whom Commander Bullock had brought from thence for the occasion, the results being communicated to the Royal Astronomical Society. From here the *Serpent* proceeded to Amboyna, and thence to Koepang in Timor, in the neighbourhood of which some slight surveying operations were performed; and a line of deep soundings was then carried south of the Isles of Flores and Sumbawa, through Bali Strait to Pampang Bay, on its western shore, a detailed plan of which was made as a terminus for the shore-end of the cable. The result of this survey proved that a moderate depth of water—not more than 1800 fathoms—existed along the proposed line, and that it was a suitable route for a cable.

After refitting at Singapore, the *Serpent*, taking her departure from Penang, carried a deep line of soundings across the Bay of Bengal to Point de Galle, at the south end of Ceylon, the greatest depth found being 2200 fathoms.

Summary.—During the year 1868, Sailing Directions have been prepared and published for the West Coast of Africa from the River Cameroon to the Cape of Good Hope; and for the Bristol Channel, between Hartland Point and St. Ann's Head.

The 'North Sea Pilot,' Part IV., has also been revised, and various Hydrographical Notices, containing the latest information of the coasts of China, Japan, the Straits of Magellan, &c., have been brought out.

The usual Tide Tables and Lists of Lights have been published, and 146,500 copies of Admiralty Charts have been printed for the use of the royal navy and the public.

Fifty-one new Charts have been engraved, exclusive of a series of Pilot Charts for the Atlantic Ocean, explanatory of the winds, currents, and other ocean phenomena for the different seasons of the year.

NEW PUBLICATIONS.—*Tchihatcheff's* 'Asie Mineure.'—My distinguished friend, M. Pierre de Tchihatcheff, who, during eight years of personal researches and nearly twenty years of scientific

and literary labours, made Asia Minor his special domain, has completed his indefatigable labours by two volumes on the secondary and tertiary rocks of that classical region. It is, indeed, fortunate that such a character as Pierre de Tchihatcheff should, however rarely, stand out in striking relief among those men of independent means who enrol themselves in the army of science. The labours of many years, the large expenditure of money, and the risk of life, which he has incurred, in evolving with untiring zeal, the geography, botany, natural history, and geology of the vast country of which our former President, William Hamilton, gave us the first general outline, merit our warmest acknowledgments. Let me further say that I commend these volumes for being not only full of good matter, but as being written in the most pleasing and attractive style. I also specially admire M. de Tchihatcheff for the gallant declaration he makes in his last preface, when he announces that, after all his labours, it is not as an invalid in repose that he takes leave of his readers in offering them his eight volumes on Asia Minor,* with his maps, both geographical and geological (to say nothing of his numerous other publications, including his *Geology of the Altai Mountains*), but as a still vigorous pilgrim, who, being once more on foot, solicits their encouragement and approval as he enters on some new crusade. The man after my own heart is one who, like Pierre de Tchihatcheff, is always struggling onward; and I only regret that my own term of life is so much further advanced than that of my distinguished friend, that I cannot longer expect to make any more of those explorations which it has been the happiness of my life to pursue, in my endeavours to extend, like him, geological and geographical knowledge.

The eulogy of Pierre de Tchihatcheff which the lamented and truly eminent geologist le Vicomte d'Archiac wrote in a letter to me is so true and apposite that I give it here, as being also my own estimate of the value of the works. "I hope," writes D'Archiac, "to be able to show that his works on Asia Minor constitute one of the most remarkable and vast scientific monuments of our age; for among all explorers of unknown lands no one can boast of having, like him, produced such detailed and precise works on all branches of natural science, after traversing in every direction and step by step, during ten years, a wild and difficult region as large

* 'Asie Mineure; Description physique de cette Contrée.' Paris. Guérin, éditeur. (Théodore Morquand, 5, Rue Bonaparté.)

as France; and what is more, all this by himself alone, without the material or moral assistance of any Government, scientific body, or association, and entirely at his own cost."

*Whymper's 'Alaska.'**—Of the several works describing distant tracts which have appeared in the past year, none has interested me more than the narrative of the travels and adventures of Mr. Frederick Whymper, in the territory of Alaska and along the course of the great River Yukon. Russian America (now acquired by the United States), though very imperfectly known even to geographers, and almost entirely unknown to the general public, has, thanks to the zeal and enterprise of Mr. F. Whymper, been most graphically described. He has given us an animated description of the vast tract of country watered by the great River Yukon, including many good statistical and geographical data, with sketches of its stalwart Red Indian inhabitants, the whole illustrated by some most effective woodcuts and a very instructive map. Besides the description of the great Alaska and Yukon territory, the author's observations on Vancouver Island and the Archipelago of Behring's Sea present to us in a compact and attractive form much fresh and valuable information. The volume further recommends itself to the reader by a good sketch of the physical outlines of Kamschatka and its lofty snow-covered volcanoes, with an account of the discoveries of Behring and his fate. All the natural phenomena in that region of auroras and wonderful meteorological changes are explained, and the work terminates with a lively description of life as it now exists in California. By it we learn that the unfavourable picture drawn of this virgin country by early emigrants has been entirely changed; and through its settlement by our energetic kinsmen, this prolific region, enjoying a splendid climate, has been rendered eminently productive of all cereals and of the most delicious fruits, which, like the hidden precious metals, simply required the industry of man to be brought forth in abundance.

Delesse's 'Carte lithologique des Mers de France.'—An original and instructive map has recently been published in France by the accomplished Chief Mining Engineer, Professor Delesse, entitled 'Carte lithologique des Mers de France.' By applying four different tints of light colours to different parts of France, Belgium, and the South of England, the author indicates the portions of those dry lands which shed their waters respectively into the Ocean, the Mediterranean, the Bristol Channel, and the German Ocean.

* 'Travels in Alaska and on the River Yukon.' (Murray. 1868.)

Then, by other colours, he shows the varied nature of the sea-bottom for a considerable distance off the coasts of these countries; marking, at the same time, by a series of contour-lines, the elevations of land and the depths of the sea. Thus, it may be seen at a glance how narrow is the belt of shallow sea along the Mediterranean coast of France, and how wide is the shallow border-zone around the Atlantic coasts both of France and England. The different mineral character of areas of the sea-bottom is marked by different colours in a clear and instructive way. Shelly deposits, of great service to the farmer, are seen to be connected with calcareous or granitic shores like those of Normandy and Brittany, and to be rare on coasts where argillaceous deposits or sterile sands, like those of the Landes, prevail. This map also indicates, by horizontal curves, the true orography of France and its surrounding hydrographical basins, and also the amount of rainfall, the direction of winds and currents, and the propagation of tides. In short, as a lithological map of the seas around France, this work—which can be consulted with great advantage by seamen and engineers employed in submarine works, as well as by geologists, zoologists, and agriculturists—will prove a valuable help to students as well as to practical men.

Neubauer's 'Geography of the Talmud.'—One of those learned works which make but little stir in the world on their first appearance, but which are found to be of permanent utility to all earnest students, is the 'Geography of the Talmud,' by Adolphe Neubauer: * a work which gained a prize offered by the French Academy for the best treatise on the subject. While Reland and Lightfoot made very sparing use of the geographical remarks of the Talmudistic books concerning Palestine, M. Neubauer enters into them profoundly; and he gives, from the same ancient records, some interesting facts relating to Babylonia and Mesopotamia which have not hitherto been noticed by historians or geographers. The work itself is one of great learning and minute research; but it contains a preface, written in a clear and agreeable style, which gives a summary of the literature of the Talmud and forms an excellent general introduction to the subject.

Wallace's 'Malay Archipelago.'—Since the days when my lamented friend, John Craufurd, made the English public well acquainted with all the leading geographical and statistical features of the

* La Géographie du Talmud, Mémoire couronné par l'Académie. Ad. Neubauer. (Paris, M. Levy Frères. London, Williams and Norgate.)

Indian Archipelago, the most remarkable work which has been published is that which has just appeared from the pen of our Associate, that eminent naturalist Alfred Russel Wallace.* As we took an interest in Mr. Wallace's expedition when first planned by himself, and received from time to time papers from him on various portions of his travels, we may well feel a pride in his great success, and in the striking contributions to various departments of science which have been the result of his eight years' wanderings.

As Mr. Wallace justly observes, the vast group of islands extending from Sumatra to the islands east of New Guinea are equal in the extent of surface which they cover to one of the primary divisions of the earth's surface, although the region in most maps is almost ignored as a geographical whole, being divided between Asia and the Pacific Islands. The Malay Archipelago extends for more than 4000 miles in length from east to west, and is about 1300 in breadth from north to south. Its area is equal to that of all Europe and great part of Western Asia combined, and some of its islands are larger than France or the Austrian empire. The region, moreover, is exceedingly diversified, both in physical features and in animal and vegetable productions. One of the chief volcanic belts upon the globe passes through the archipelago, and produces a striking contrast between the scenery of the volcanic and non-volcanic islands. The organic productions are, to a great extent, peculiar, and remarkable for the beauty of their forms, and, in the case of the fruits and spices, their value to mankind. The task which Mr. Wallace set before him was to visit all the principal parts of this great equatorial region and explore its physical geography and natural history—a task which employed him during eight years from 1854 to 1862.

The result of Mr. Wallace's researches which chiefly interests us as geographers is the establishment of a natural division between the eastern and western portions of the archipelago; a sketch of which, with the principal facts and reasonings leading to it, was given by him in a remarkable paper read before us soon after his return, in June 1863. The first suggestion of this division seems to have been supplied by the animal productions, which are so widely different in the western and eastern halves of the Archipelago, the great islands of Sumatra, Java, and Borneo, on the one hand, containing the elephant, rhinoceros, wild cattle, and a vast number of genera and species of mammals and birds allied to, or

* 'The Malay Archipelago; the Land of the Orang Utan and the Bird of Paradise.' 2 vols. (Macmillan and Co. 1869.)

identical with, those of Continental Asia, whilst New Guinea and the Moluccas are destitute of all these Asiatic forms of life, and, in their stead, contain numerous genera of Australian types. The two faunas thus wonderfully contrasted nearly meet at a central line, which runs north and south along the channels between Borneo and Celebes, and between the small islands Bali and Lombok in the Java Sea. Between the two islands last mentioned the channel is only 15 miles wide, yet the two sides of this narrow strait differ as essentially in their animal life as Europe does from America.

In establishing this division Mr. Wallace applies the same principle which is followed by some European geologists and naturalists, in working out the relations of animal life and their bearings on the former geological connexion of countries now separated by the sea; for example, in the case of the British Islands and the continent of Europe. The fact that our islands are peopled by animal and vegetable forms, with few exceptions identical with those of the neighbouring continent, led, in the first place, to the conclusion that they were united by land at a period not further remote than the peopling of North-Western Europe by its present species of organic beings; and this hypothesis has now been confirmed in a remarkable manner by geological investigations of post-tertiary deposits, which prove that this connexion must have existed. The shallowness of the intervening sea is also accepted as an argument in favour of the recent union of these land areas. Mr. Wallace assumes, with many other eminent naturalists, that this principle may be carried further, and that when the terrestrial animal productions of islands, or islands and their neighbouring continents, are dissimilar from each other, it may be concluded that there has been no connexion between them in recent geological times. It must be allowed that some facts lend great support to these conclusions; for example, it is found that where there is great dissimilarity in the organic forms between lands compared in this manner, they are usually separated by a deep sea instead of a shallow one; and, if all geological changes had been slow, the depth to which the sea-bed had sunk might be taken as a kind of rough measure of the lapse of time. Applying this test to the Malay Archipelago, Mr. Wallace has found that the seas lying between the great islands of Borneo, Java, and Sumatra (in short, all the islands having Asiatic forms of life), and the Asiatic continent, have a maximum depth of not more than 50 fathoms: and, at the other extremity, New Guinea and the neighbouring islands are connected with Australia by a similar shallow sea. The space, how-

ever, between these two areas of lands and shallow sea is occupied by a very deep sea, and the Australian types seem to diminish in numbers, in advancing westward from New Guinea, as we approach the channel that divides the "Austro-Malayan" from the "Indo-Malayan" portions of the archipelago.

For the details of this remarkable subject, which unites the science of Geography with those of Geology and Natural History, and also for the curious speculations on the modifications of species, I must refer you to Mr. Wallace's book. So well has he elaborated his leading generalization, and so thoroughly has he made it his own, that already other writers are beginning to term the dividing channel between the two halves of the archipelago "Wallace's line." In addition to this ingenious speculation, the two volumes contain a store of interesting and important facts relating to the physical geography of the various portions of the archipelago, and to the native inhabitants, climate, and productions of the remote islands which he visited.

Much, however, as Mr. Wallace is to be admired as a great naturalist and a most attractive writer, I cannot, as an experienced geologist, subscribe to his assumption that *all* former changes of the outline of the earth were produced slowly. On the contrary, it seems to me that the profound chasm which he describes as existing between the islands of Bali and Lombok has more probably resulted from one of those deep and sudden ruptures of the crust of the earth which the field geologist meets with so very frequently. It would, indeed, require a detailed examination of the cliffs and shores of these opposite islands (a point on which the author is silent) before we can refer the enormously deep channel which separates them to the ordinary action of a marine current during countless ages. Having, at our last anniversary, endeavoured to combat the doctrine of uniformity of causation through all time, I will follow up the subject towards the end of this Address by comparing some of the present with the former changes of the earth's surface.

*Bickmore's 'Travels in the East Indian Archipelago.'**—In reference to this region, it also gives me pleasure to call attention to the well-filled volume thereon by Mr. Albert S. Bickmore. This accomplished young American traveller, who, after an absence of four years from the United States, gave us on his way homeward a very lively and

* 'Travels in the East Indian Archipelago.' By A. S. Bickmore. (Murray, 1868.)

attractive sketch of his journey across a large portion of China,* between Canton and the River Yang-tsze Kiang, of which we had no previous description, has recently published a work, giving a full account of that portion of his wanderings relating to the Indian Archipelago.

Besides the talent of describing, in a clear and entertaining manner, the people and their customs, particularly as regards Sumatra, of which region we had previously very little knowledge, Mr. Bickmore has really great merit as a naturalist; the chief object of his voyage having been to collect the rare shells of Amboyna, first figured and described by Rumphius—adding considerably to the number of species, and so enriching the museums of his native land that his countrymen have most properly rewarded him by making him Professor in one of their Universities. He has also received an important post in connexion with the proposed new State Museum of New York, towards which the Legislature has lately voted a large sum of money, and which is to occupy one of the best positions in the city, at the Central Park.

One fact mentioned by this author, in describing the Minahasa district in the Celebes, is very creditable to the labours of the missionaries. But a few years ago the people of this tract were notorious cannibals; they are now greatly civilised, and, in having been taught to read and write, and adopt the precepts of Christianity, all their bloody sacrifices have been abandoned. Thus, whilst in 1840 one only out of sixteen of the inhabitants was a Christian, now the relation is as two to five. Besides these and many other descriptions of the people for the general reader, the geologist will find much to interest him in Professor Bickmore's account of some of the phenomena of that region of earthquakes and volcanoes.

Keith Johnston's 'Elementary Atlases.'—These cheap Atlases, which I noticed in my last year's Address, continue to be published by our talented and enterprising associate Mr. A. Keith Johnston. I have before me, at the present time, three of the physical maps forming part of the series; two illustrating the physical geography of the Mediterranean Basin, and the other the Currents of the Ocean. The execution of these small maps, in which so much information is conveyed by means of colours, contour lines, and shading, is admirable, and their author is entitled to all credit for

* See 'Proceedings,' vol. xii. p. 51.

placing such means of geographical instruction within the reach of even the poorest classes.

Fullarton's 'Hand Atlas.'—Messrs. A. Fullarton and Co. have commenced the publication of a new collection of Maps, with descriptive letter-press, under the title of 'A Descriptive Hand-Atlas of the World,' edited by J. Bartholomew, F.R.G.S. This work, of which four parts have appeared, seems to me to contain much geographical information in a convenient form, useful not only to the geographer but to the student of other branches of science and to merchants. One of the maps illustrates all the principal physical phenomena of the earth's surface, and the distribution of races and religions. The other more detailed maps are remarkable for the clearness of their execution.

ARCTIC RESEARCHES.—Having on various occasions dwelt upon the progress annually made in North Polar explorations, it was my duty at the last anniversary to direct special attention to the effort then about to be made by the Germans, as incited and guided by our medallist, Dr. Petermann, to advance into the Polar basin by the eastern and north-eastern coast of Greenland. Although the result was not commensurate with the anticipation of the designer, yet the advance was notable when we reflect upon the fact that the little Norwegian schooner, the *Germania*, under many adverse circumstances, reached so high a latitude as $81^{\circ} 05'$.

While such was the endeavour on the east coast of Greenland, the Swedish Government, following up the spirited efforts it had made, to its great honour, since 1861, fitted out a well-formed scientific expedition, to develop the natural history and physical geography of the western and northern shores of Spitzbergen, and, further, to endeavour to penetrate northwards from Spitzbergen towards the Pole. It must be recorded that the initiative in these remarkable Swedish Arctic explorations was made by M. Otto Torrell, in 1858, who visited, in that year, the western parts of Spitzbergen, in company with M. A. E. Nordenskiöld, on board a hired yacht. This expedition was chiefly engaged in Natural History researches and Geographical explorations. The general physical investigation was only commenced in the Government expeditions of 1861 and 1864, the latter under the command of M. Nordenskiöld. The endeavour to navigate the icy sea towards the Pole was a new feature in the expedition of 1868, and the plan of it was quite original, inasmuch as this effort was not to be made before the autumn, *i. e.* in

the season when former expeditions had ceased their labours. The grounds were, that it was to be inferred that, at this period of the year, the effect of the summer sun in melting and dissipating the ice-floes would have produced its greatest results, and that then, if ever, a passage might be forced, to be followed by a rapid return. After reaching the latitude of $81^{\circ} 42'$, the highest ever yet authentically recorded as attained by any ship, the Swedish screw-steamer sprung a leak, in consequence of a shock against a huge mass of ice, and was with great difficulty saved; and, after refitting in an icy fiord, was just enabled to reach home.

The natural history results alone, which the Swedes have obtained, have in themselves well repaid the cost of their endeavours, by the copious additions made to our knowledge of the geology, zoology, and botany of Spitzbergen; the only previous exploration conducted in a similar systematic manner being the *Expédition du Nord*, which, in the years 1838 and 1839, the French carried out under Gaimard. But what specially calls for our admiration is that the Swedes are animated by the resolve to make another great effort, thus really taking the lead in the resolute endeavour to solve the great northern problem; and for their noble efforts in this cause, our Council have most rightly adjudicated the Founder's Medal of this year to M. Nordenskiöld.

The sketch which M. Nordenskiöld, the scientific chief of the expedition of 1868, in conjunction with the naval commander, Captain von Otter, sent to us, and which was read to our Society, has elicited the warmest approbation of naturalists and geographers; and from the data which have been already obtained we have a right to anticipate that, if it be given to man so to penetrate within the Arctic Circle as to determine the real nature of the great area around the North Pole, Nordenskiöld and his companions have a fair chance to achieve it. One great scientific merit of this Swedish enterprise has been the completion, in 1864, by M. Nordenskiöld and his assistants, of the preliminary survey for measuring an arc of the meridian in these latitudes, so long ago strenuously advocated by General Sabine. Already nearly the whole of the coasts, deep bays and channels of this group of islands have been surveyed with precision by these courageous and successful explorers, and the excellent map they have produced gives evidence of the amount of their labours.

The grand subject of North Polar survey was clearly put before the French public last year by our zealous and accomplished

foreign Associate, M. Malte-Brun, in his work, entitled 'Les Trois Projets'—meaning thereby the English, German, and French propositions for advancing towards the Pole—in which he fairly examined the respective values of the schemes of Sherard Osborn by Baffin's Bay and Smith Sound, as largely dwelt upon in our Society—that of Spitzbergen, as advocated by Petermann and supported by Sabine, and that of Behring Straits, as projected by Lieutenant Lambert, of the French Navy.

As I have before treated of these questions, and also of a fourth project, or that by the east coast of Greenland, as suggested by the whaling Captain Gray, I need not now revert to them. I have, however, the truest satisfaction in announcing to the scientific world that the scheme which our Government declined to adopt is now in the act of being carried out by the spirit and at the expense of a Scottish gentleman and a Fellow of our Society.

Mr. James Lamont, member for Buteshire in the last House of Commons, who formerly explored the Spitzbergen seas and gave to the reading public an animated sketch of walrus hunting, adding also much to our acquaintance with the fauna, as well as the geology, of the Arctic Circle, left the Clyde in April in a screw-steamer of 250 tons' burthen, built, fitted out, and manned, at his own expense, with a seasoned crew of ice-men, a practised captain, and a naturalist, in which he is now making the bold endeavour to succeed, where others have failed, in penetrating further towards the North Pole.* We geographers may then rejoice in the fact that the electors of Bute should have rejected the services of Mr. Lamont, for, by losing his seat in the Senate, he has thereby been enabled to devote his zeal, ability, and purse to our cause.

I forbear to attempt to predict what the determination may prove to be respecting the real physical condition of the region around the North Pole. Whether it be for the most part a huge watery basin,

* Mr. Lamont's vessel, the *Diana*, passed through the Crinan Canal, went on successfully through the Caledonian Canal to Inverness, whence he wrote to me on the 20th April, stating that he hoped to be at Tromsø on the 1st May, and would then have full four summer Arctic months at his disposal. I learn from Mr. Lamont that he will endeavour to pass by the north-east side of Spitzbergen; hoping that, if he can once reach Gillies Land, he may be able in his steamer to proceed up its west coast for a great distance northwards. His preconceived opinion, founded on the repeated failures of his precursors to effect an entrance into the ice by the north-west, is that the east side of Spitzbergen is the proper route. If he should succeed in proving that lands extend towards the Pole far beyond Nova Zembla, he will have given us important new geographical data which will materially circumscribe the area of the supposed open Polar Sea. In the mean time let us heartily applaud this spirited and noble enterprise of a Scottish gentleman.

from parts of which the many whales migrate southwards to Smith Sound and Baffin's Bay, or whether it be encumbered with lands, it would appear to be certain, from the fragments of rocks and earth which the Swedes have recently found floating on the ice from the north towards Spitzbergen, that in that direction, at all events, there are lands, which may be a continuation of those of Arnheim and Wrangel, which range from off the northern coast of Siberia, and were, indeed, first sighted by our own Kellett, and subsequently delineated more extensively by the captain of the American whaler, to whom I adverted in last year's Address.

Among the discoveries which have been made in the natural history products of the Polar Regions, none has more attracted men of science than the fact that the subsoil there contained in several parts the remains of fossil-plants of a warm climate. In their earlier researches the British Arctic Officers—of whom General Sabine is the earliest type left—collected fossils which were referred to that old carboniferous period when tree-ferns and palms flourished; and subsequently animals of the age of the Lias were also discovered. It is of late years, however, that, through the collections made in Greenland by our navigators during the search for Franklin, and subsequently by Mr. Whymper, and in Spitzbergen by the Swedish Expedition, that Dr. Heer, the celebrated botanist of Zürich, has been enabled to describe a rich flora of Miocene age, of which, even in the collection of Mr. Whymper, 95 species of plants indicative of a climate similar to South Italy have been described. Such being the fact, geologists—who ingeniously endeavoured to account for the former existence of an exuberant flora in the now icy Arctic region by an appeal solely to changes of physical geography of the lands and waters—are now dragged into the much grander cycles of certain astronomers, who endeavoured to account for the wonder by carrying us back hundreds of thousands of years, to a period when the earth, by a deviation of its axis, presented its now Arctic and Antarctic regions to the direct action of the rays of the sun.

ANTARCTIC OCEAN.—Our endeavours to induce the Government to maintain the renown of our navy in the exploration of Polar Seas, by completing the work, towards which we had already accomplished so much, namely, of determining the geography and natural history of the North Polar Region, were made, in great measure, because we well knew that in a very few years England, and indeed all civilized maritime nations, would be called upon to send

astronomers to observe the transit of Venus amid the difficult and less known icy seas of the Antarctic Circle. We argued* (and I think most justly) that on the arrival of the time when it would be necessary to establish observatories in that region, scarcely a naval man would be left skilled in ice-navigation, or who had still the power of instructing others in it. Hence we strongly urged that we should enter upon that great and scientific Antarctic undertaking under enormous disadvantages.

That period, however, of Antarctic research is now fast approaching, and all Arctic maritime practice of the Royal Navy for North Polar purposes having been refused, we find that the preparatory arrangements for the observations of the Transits of Venus in 1874 and 1882 have already undergone, in the Astronomical Society, the luminous scrutiny of Mr. Airy, the Astronomer Royal, whose paper on the subject was followed by observations by Captain Richards the Hydrographer, Mr. H. Toynbee, Rear-Admiral Omanney, Staff-Commander Davis, Mr. E. J. Stone, and Mr. Warren de la Rue. The geographical portion of the question has indeed been well put before our Society (in which it underwent a very animated discussion) by Staff-Commander Davis, himself an Antarctic explorer, and one of the former associates of that eminently distinguished Polar navigator, Sir James Ross.

That preparatory expeditions must be fitted out to secure the establishment of proper observatories, in order to clear up this great datum line in the physics of the universe, I must consider certain, when I quote the Astronomer Royal, who, speaking of the Expedition sent into the Pacific to observe the transit of Venus in 1769, justly says that it has ever since been esteemed one of the highest scientific glories of England in the last century. Surely then our country, largely as it has advanced in physical science in the last hundred years, ought much more strongly to feel the urgency and desirability of this new expedition. But, alas! I cannot but feel a misgiving (notwithstanding the confident hope of my valued friend the Hydrographer) as to the national endeavours which will be made, when I know that so important a branch of science as that of North Polar research, which did not carry with it the vulgar recommendation of usefulness and profit, was slighted by too many of my countrymen, with whom the common aphorism of "cui bono" is a sufficient apology for a shabby abstinence from much which would ennoble our nation.

* See my Address, 1865, 'Journal,' vol. 35, p. clxxxii.

EUROPE.—*Switzerland*.—I have received, as in former years, an account of the progress of the national survey of Switzerland, from our learned and active Corresponding Member, M. J. M. Ziegler, of Winterthur. The able men of science, who have been engaged in the triangulation of this interesting portion of Europe, and in fixing by an elaborate series of hypsometrical observations and exact levelings the true profile of this rugged land in various directions, have not yet reached the end of their labours. At present it is intended to continue the topographical survey of those parts of the country whose cantonal maps are of an earlier date than 1831. To the name of General Dufour, who is so widely known in connection with the federal maps of Switzerland, must be added those of Professor Wolf and Messrs. Plantameur, Denzler, and Hirsch, who have all co-operated in the Swiss Survey. In 1867 the work of the triangulation of Switzerland, in connection with the surrounding countries, was brought to a close by M. Denzler, and the operations of the *nivellement de précision* were so far advanced that the hypsometrical network for the West of Switzerland may be considered as now terminated, embracing the districts from Geneva to Basle. These geodetical operations have become of more general geographical importance since the establishment of the International Geodetic Association for Central and Southern Europe, which a Swiss delegate always attends, and through which the surveyors of the various states are enabled to connect their work so as to lead finally to that desirable result—a perfectly accurate map on a large scale of the whole region.

The Federal Government, as I am informed by M. Ziegler, has recently decided to undertake the publication of facsimiles of the original surveys of Switzerland, which are on a scale of 1 in 50,000 for the highlands, and 1 in 25,000 for the lowlands. These will extend to several hundred sheets of maps, similar to those of our own Ordnance Survey Maps, and will be a lasting monument of the scientific enterprise of this enlightened nation. The Geological Survey of the country, under the directorship of Professor B. Studer, is also in active operation, and its officers are publishing numerous valuable maps.

Italy.—The Italian Geographical Society shows vigorous signs of life, under the guidance of its excellent and indefatigable President, my friend the Commendatore Cristoforo Negri. We trust his genial enthusiasm and unwearied labour will have its reward in the solid

and permanent establishment of this Society. Barely two years old, it already numbered, on the 23rd of April, 662 effective members, including 21 Life Members. Two numbers of the Society's Journal have already been issued, presenting an aggregate of some 700 pages, and a third is in a forward state.

Among the papers already issued may be mentioned a valuable one by the Marchese Antinori, on his own travels and those of Signor Piaggia in Central Africa, which was noticed in my opening discourse in November last; an account, by Signor O. Beccari, of his travels in Borneo; a sketch of the voyage of the Italian frigate *Magenta* round the world, by Professor Henry Giglioli, coadjutor of the lamented Senator F. de' Filippi, and successor to the charge of the scientific branch of the Mission, on de' Filippi's death at Hong-Kong, February 9th, 1867; a Journal during the Expedition to Abyssinia, kept by Captain Egidio Osio, of the Italian staff, who was attached to Sir Robert Napier's head-quarters; a paper on the Hydrography of the Nile and Central Africa, by the eminent engineer Elia Lombardini; an interesting letter on old Venetian intercourse with Abyssinia, by Signor Guglielmo Berchet, who has already extracted so much that is valuable from the great stores of the Venetian archives; a grammar of the language of the Denka tribe on the White Nile, by Signor Giovanni Beltrame; and an interesting and appropriate discourse on the Italian travellers of the present century, by Professor Gaetano Branca. It will be for the young Society to take care that in future the achievements of Italian travellers have prompter justice done them both at home and abroad.

The narrative of young Signor Beccari is a concise sketch of what was evidently a series of journeys of great interest, in the interior of Sarawak and the adjoining regions of Borneo. Unfortunately he does not seem to have combined any precise geographical observations with his especial object, the collection of botanical and zoological specimens. With regard to the voyage of the *Magenta*, the general account of the expedition and its scientific results is under preparation for the Italian Government, by Professor Giglioli, assisted by contributions from Captain Arminjon and his officers. The zoological collections brought home by the Mission are in the Museum at Turin, and embrace some 2000 species, chiefly vertebrates and the lower divisions of the invertebrata. Hydrographic surveys were executed in the channels of Western Patagonia; charts of Halt Bay and the English Narrows, from these surveys, have lately been published by

the Ministry of Marine. Many ethnological specimens were collected, such as skulls, arms, and implements, besides nine fine Peruvian mummies belonging to a tribe of Aymaras, and found in the vicinity of Cobija in Bolivia. These are believed to be the first of the kind which have reached Europe. Their heads are compressed *upwards*; in this respect contrasting with the Quichua mummies found near Lima, of which also a good series was procured.

AFRICA.—In relation to the interior of Southern Africa and the probable line of research which Livingstone may have followed from the Cazembe country, near the southern end of the Lake Tanganyika, whence he dated his last letter in December, 1867, I have seen cause to modify the views I published regarding his return *viâ* Zanzibar, and to revert to the opinion I expressed on the 27th April, 1868.*

In a letter from Dr. Kirk at Zanzibar, dated the 5th March, it was very disheartening to learn that by no one of the many traders in ivory who had reached the east coast from the country of Uniamuezi—which the great traveller must have traversed if he had advanced, as we supposed, by the eastern shore of the Lake Tanganyika—had a scrap of intelligence been received respecting him. The theory which I have now formed to account for this entire want of information is that he has quitted the eastern region entirely, and has been following the waters which flow from the western side of the lake. These will lead him necessarily across a large unknown region, to emerge, I trust, at some port on the western coast. In this case, being in a country the inhabitants of which have no intercourse with the Zanzibar territory, we can never more expect to learn any tidings of him from the eastern seaboard. We already know, however, that he had been living with some very hospitable and intelligent Arabs in the interior, and from them he may have learnt that the Lake Tanganyika was really barred up at its northern end, by mountains through which its waters could not flow into the Albert Nyanza of Baker. Or he may, indeed, have satisfied himself by measurement that the altitude of the Tanganyika was of about the same height as that determined by Burton and Speke, and therefore much lower than the Equatorial lakes. In either case, he would abandon the northern search which, at our last anniversary, I believed he might make. Being

* See 'Proceedings,' April 27, 1868, p. 184.

aware that he was in good health and spirits when he last wrote, and satisfied with his kind reception by the Arab traders, I can see no ground whatever for despondency; and, in the absence of all other information, I suggest that he has been following the waters which are laid down upon the old map of Duarte Lopez prepared in the end of the sixteenth century, and that he will successfully emerge from Africa on the same coast as that where he terminated his first great traverse of South Africa.

According to Mr. Major, who called our attention to the above-mentioned remarkable document (which is in the British Museum), this is the very first map on which the interior of Africa was laid down from sources independent of Ptolemy. Although drawn by an unscientific hand, it contains more data which have been shown to be true by recent discoveries than any of the maps which either preceded or followed it. Those which have since been published, up to the period of actual exploration, have been mere speculative combinations from it and from Ptolemy, and consequently inaccurate. Of this map of Duarte Lopez, published in 1591, our Secretary, Mr. Major, has also published a reduction in his admirable 'Life of Prince Henry the Navigator.' This Duarte Lopez, a Portuguese, resided in St. Paul de Loanda from 1578 to 1587, a period at which his countrymen were well established on the Congo, as well as in Sofalá and Mozambique on the east; and during those nine years he was able to gather a large amount of important geographical information from native travellers. On this map are laid down the two great lakes Victoria Nyanza and Albert Nyanza approximately in their right positions on the equator, with another great lake due south of the Albert Nyanza. This southern lake Mr. Major believes to represent a union of the two lakes Tanganyika and Livingstone's Nyassa, probably through the information being derived from the conflicting accounts of travellers coming from different parts of the interior to the west coast. It is unnecessary here to point out those features in the old map which in uniting all the southern waters with those of the Nile basin are probably inaccurate. It is enough to indicate that it is decisive as to the main point, that rivers flow from this lake to the west; and that as regards the now ascertained phenomena respecting the northward course of the watershed of the Nile waters, all the main data are in accordance with modern observation. In our present uncertainty respecting the size of the Albert Nyanza, it is, indeed, interesting to observe that the lake which corresponds to it in Lopez's map is

stated in his book to be 200 miles *across* (per traverso). The length is not mentioned. From it are made to flow not only the Nile, which it has received from the southern lake, but the Zaire or Congo. So early as 1519, Enciso, in his 'Suma de Geografia,' had spoken of a great lake, from which flowed both the Manicongo and the Nile; and Barros, in speaking of this same lake from which these two great rivers flowed, gives astounding accounts of its size, the great ships which sailed on it, and of a civilised people around it who lived in stone houses equal to those of the Portuguese, and so forth. But, due allowance being made for exaggeration, we see in it the indication of a central lake of immense extent.

On this map of Lopez was also laid down for the first time the great empire of Monomoezi or Uniamuezi, occupying its right position between the Victoria Nyanza and Lake Tanganyika.

But I will not now dwell on the various claims to credibility which this remarkable map presents, as they have been already well set forth by Mr. Major. My object is to call attention to the curious information it affords respecting those regions about which we hope to receive due enlightenment on the return of Livingstone, and which will, as far as the Nile basin extends, be thoroughly laid open by Sir Samuel Baker, should he—through the patronage and munificent support of the Viceroy of Egypt—be enabled to carry out his grand project of navigating the Albert Nyanza in a steamer, of bringing into order the uncivilised and ever-warring native chiefs east and west of the White Nile, and of entirely suppressing the slave-trade in that region.

When we reflect upon the statement of Lopez which accompanied his old map, that the lake—which he lays down as occupying the same equatorial position as the Albert Nyanza—had a width (*i. e.* from east to west) of 200 miles, I am led to suggest, that the detached large sheet of water heard of by the brothers Poncet, and already inserted in a map by Petermann, may prove after all to be simply the western end of the Albert Nyanza, and a part of that great internal water-system which gives birth to the Nile.

South African Gold-Fields.—Whilst I adhere to the opinion I expressed last year, that the Ophir of Solomon was probably in that part of South Africa which lies between the southern affluents of the Zambesi River and the northern feeders of the Limpopo, in which some gold has recently been discovered, I did not and do not hold out any incitement to speculators to look to that region as one which

will prove rich in produce. Many countries, like Bohemia and Spain in Europe, which formerly yielded notable quantities of gold, are now barren of it; the ore having been largely extracted in past centuries. To what extent the gold collected in the days of Solomon, or in ages long after by the Portuguese settlers, did exhaust these alluvial auriferous deposits of South-Eastern Africa, in which gold might be easily worked, is unknown; but it is certain that the information recently derived from the Government of Natal, and obligingly communicated to this Society by the Secretary for the Colonies, affords but slender hopes of the realization of profitable diggings in the vicinity of that colony. At the same time it is to be recollected that as yet none of the parent gold-bearing rocks from which such deposits have been derived have been penetrated; but even if so commenced, we can scarcely expect that such works can as yet be profitably carried out in the wild, distant, and uncivilised regions where such parent rocks occur.

ASIA.—Central Asia.—The subject of Central Asia has still more than in preceding years occupied our attention. For, whilst the Russians have made very extensive surveys in the Thian Shan Mountains and far beyond their conquests along the course of the Jaxartes or Syr Daria and in the Khannat of Bokhara, our Medallist, Capt. Montgomerie, has, through the agency of his well-instructed native Pundits, completed a geographical survey of the south-western mountainous regions of Thibet, which was entirely unknown to our predecessors, and in which extensive gold-fields occur.

Thanks to the measures taken by our energetic Associate, Mr. Forsyth, to propitiate the present ruler or Kooshbegie of Eastern Turkistan, Mr. Shaw, a British tea-planter from Kangra, has been enabled to traverse all the lofty mountain passes north of Leh, and has carried his caravan of merchandise into the Yarkand territory. As this is the first time in which such a success has been achieved, and as all that fertile region has been entirely abandoned by the Chinese, we may reasonably infer that our tea-plantations of Hindostan may in future supply the Mahommedan inhabitants of the vast region formerly known as Chinese Tartary with the indispensable article of tea, which they have scarcely tasted since they threw off the Chinese yoke.

If the extensive chain of the Thian Shan, which the geographer Semenof has in great part delineated, should be fixed upon as

the eastern boundary of the Russian empire in Central Asia, our allies may on their part carry on from their frontier a profitable trade with the Kooshbegie, or chief, of this fertile region of Eastern Turkistan, whilst the British may send thither the Indian tea, *vid* Cashmere, in exchange for the many valuable products of that region.

The subject of trade routes between Turkistan and India has indeed occupied the attention of the Society on two evenings during the present session, and it is a source of pleasure to all geographers to find how surely, though slowly, we are becoming acquainted with the regions beyond the northern frontier of India, across which European travellers in the middle ages frequently passed on their way to China. With regard to the itinerary of Mahomed Amin, a Yarkand merchant, communicated to us by Mr. Hayward, I am informed by Colonel Henry Yule that this was the same person who was guide to the unfortunate Adolphus Schlagintweit. According to Colonel Yule, to whom I am indebted for nearly all the information in the following part of my Address, the routes had indeed been already in print, among the Appendices to that interesting 'Report on the Trade and Resources of the Countries on the North-West Boundary of British India,' by Mr. B. H. Davies, of the Indian Civil Service, which was printed at Lahore seven years ago (1862). This Report was printed in 1864 by order of the House of Commons, on the motion of Mr. Henry Seymour, but from the reprint were excluded the whole of the valuable original data constituting the Appendices, as well as the whole of the maps! For this saving, which was not an economy, I do not know which department we have to thank; but, from this cause, the routes contained in the original Lahore Report have been scarcely accessible in this country, and it may be worthy of consideration whether we should not do well to reprint others which are to be found in its Appendices, as well as that of which Mr. Hayward sent us a copy.

The maps accompanying the Lahore Report contained a praiseworthy endeavour by Captain Lumsden, of the Quartermaster-General's Department in India, to embody the information contained in these routes; and Colonel Walker, Superintendent of the Trigonometrical Survey, has also very recently made large use of that information in his 'Map of Turkistan, on four sheets, based on the Surveys made by the Russian and British Officers up to 1867, and on the most recent Itineraries.' This work of Colonel Walker's

does not enter into great topographical detail, but it is invaluable as a combined view of the sound results obtained up to the latest date, and marks a step in our cartography of that region such as has not been made for nearly thirty years. In fact, between the deviations introduced by the Schlagintweits and the misleading guidance of the anonymous MS. of the Russian archives, discussed at our meetings by Sir Henry Rawlinson and the late Lord Strangford, the maps of Central Asia published by some eminent foreign geographers of late years had in some important points rather retrograded than advanced in accuracy.

One result of the new information which Col. Walker has coordinated in his map has been greatly to enlarge the width of the little-known mountain country between the Upper Oxus Valley and the basin of Eastern Turkistan, and to throw new light upon the territories occupying this interval, which, according to Colonel Walker's map, expands to 386 miles. "Hence it is now much easier," says Colonel Yule, "to account for the great number of days assigned by Marco Polo, Benedict Goës, and all the Oriental itineraries, to the passage between Eastern and Western Turkistan."

"Between Yarkand and the plateau of Pamir, again," as Colonel Yule reminds me, "our maps had nothing to show implying human occupancy beyond one or two names resting on questionable authority, and representing one knew not what, of which *Karchu** was the most prominent. Nor had we any knowledge of settled towns and villages in those mountain recesses. Yet the old Chinese pilgrims to India, whose route often lay this way, speak of principalities which must have lain in this region. Such, in particular, is the kingdom of *Khiepuanto* (*Khavandha*), visited by Hœi-seng in 518, and by the more celebrated Hiuen-thsang in the following century, when descending from Pamir.† The country, according to his description, produced little rice, and few fruits and flowers, but abundance of wheat and pulse. The population was small, and the people somewhat rude and violent. But they must have attained some degree of civilisation, for they possessed a written character and some ten Buddhist convents. Their Prince styled himself *China-Deva-gotra*, 'Son of China and of the God'—a title accounted for by a romantic tale like that of the paternity of Romulus."

* The *Karchu* of our maps appears to represent *Kara Su*, "Black water," the name of one of the rivers running down from Pamir.

† Ritter, vii. 498, 563; *Hiouen Thsang, Mém. sur les Contrées Occidentales*, by Julien, ii. 209 seq.

“ This kingdom, which was reckoned very ancient in the seventh century, was doubtless identical with the modern province of Tashkurghan, formerly called Sarikul, which appears in Mahomed Amin's Routes, and is described by Pundit Munphul in one of the valuable Appendices to the Lahore Report.* That a district bearing the name of Sarikul existed on the eastern face of Pamir was known indeed, for it is mentioned by Moorcroft, and appears in the Tables of the Jesuit Missionaries, but any distinct knowledge regarding it appears first, I believe, in the Lahore documents.

“ These inform us that Tash Kurghan (which is properly the name of the chief place of the province) contains several fertile valleys, flanked by high mountains, whose peaks bear up perpetual snow, or by lower ridges subject to snow-falls only in the depth of winter, and affording fine pasture to large herds of shawl-goats, sheep, yaks, cows, camels, and horses. The province is stated by the Pundit to extend 250 miles from the Karakorum Range, on the south, to the Kizil-art Range, on the north, and 100 miles from the Pamir Range, on the west, to Chiraghtang, on the banks of the Yarkand River, on the east. These dimensions require modification; for, according to Colonel Walker's draught of the province, from the slender data yet attainable, the greatest extent from north to south will be about 112 miles, and that from west to east about 140. The capital, Tashkurghan, is stated to be a very ancient city, round in form, more than a mile and a half in circumference, and with walls built of unusually large blocks of hewn stone, situated in a plain. Its crops consist of wheat, *Bájra* (one of the tall Indian millets, *Holcus spicatus*), and peas; its fruits, a few apples and apricots.

“ The name of *Tashkurghan*, meaning the ‘ Stone Fort,’ is apt to suggest the possibility of its being Ptolemy's famous *Turris Lapidea*, which was so notable a point in the mercantile route to ancient China. It is difficult, however, to reconcile the geographer's indications with a position so far to the south, and the name is too common a one in Turkistan to be of value in identification.

“ I may here refer to the report which Mr. Johnson brought back from Khotan of the existence of an open road from Ilchi, round the eastern extremity of the Kuenlun Mountains, by which wheeled carriages could pass from the Himalayas direct into the plains of Central Asia. Now, there is a very curious passage in Moorcroft's ‘ Posthumous Papers ’ which records the same report as to a cart-road,

* *Report, &c., Append. p. cccxxvi. seq.*

and gives even greater extension to it. I quote from the first volume of our 'Journal' (p. 243):—'The trade between Hindostan and Khotan was formerly very extensive; and it is even said, though, I presume, rather figuratively, that a loaded cart could go all the way from Nugeebad (*Nujibabád*, near Hardwár?) to Sureekeea, in the mountains of Khotan.' And, in a note, Moorcroft adds that this road was reported to have passed by Rudokh and Gartokh. The details of Moorcroft's information on this matter were probably incorrect, for it does not seem consistent with ascertained facts, as exhibited in Colonel Walker's map, that there should be a road passable for carts from Rudokh, on the Plains of Chanthang, to Surikia* (which is the valley of the Karakash River, below Suget), and the direction indicated by Johnson, *viâ* Polu and Kiria, is quite different.

"Moorcroft's note proceeds to mention a remarkable relic of a regularly made and *paved* road, which he came upon in Gurwál, in 1812, on the Indian side of the Himalaya, and which was attributed by an old peasant to an unknown Badshah or Emperor. He had heard, he said, that in ancient times much commerce was carried on by it between Hindustan and some very distant countries. Moorcroft suggests the possibility that this might be a relic of a former imperial road to Khotan. His indication of the site is that it lies 'a few *kos*, as far as memory serves, to the north-east of the village of Bundalee, which lies (he conceives) to the north-west of the ruined fort of Chandpoor,' and not very far, apparently, from the Pindar River. It would be worth while to call the attention of Colonel Walker to this notice of Moorcroft's."

Burmah and China.—The Bhamó Expedition.—The expedition despatched last year by Colonel Fytche, the Chief Commissioner of British Burmah, to communicate with the new Mahomedan rulers of Yunan, and to endeavour to re-open the trade between that province and the Irawadi River, by way of Bhamó, met with many difficulties and delays. Captain Sladen and his party eventually reached Momein, the frontier city of the Mahomedan Government, and were received with great cordiality by the Governor. But he so strongly discouraged their advance to Talifu, on account of the still disturbed state of the country, that Captain Sladen felt apparently that he could not, consistently with the strict injunctions of

* This, however, is not quite certain, looking to Mr. Johnson's observations in the 'Journal of the Royal Geographical Society,' vol. xxxvii. page 2, line 6.

his own Government, risk the complications that might result from an advance in opposition to the Governor's advice. Nevertheless, as Captain Sladen resided seven weeks at Momein, we may look for much valuable information when his Report is received. One somewhat surprising fact we learn, viz., that Momein is estimated to stand at some 8000 feet above the sea-level. The only Report of the expedition which has yet reached us is one printed at Rangoon, by Lieutenant Bowers, apparently a retired officer of the navy, who accompanied the expedition as representative of part of the commercial community of British Burmah. It is not a document of much lucidity or intelligence, and does not at all diminish our desire to see Captain Sladen's own Report.*

Expedition of Mr. T. T. Cooper.—A persevering and intrepid explorer, Mr. T. T. Cooper, made an attempt, early in the year 1868, to traverse the unknown region between the Chinese province Sze-chuen and Assam, but was turned back by the Chinese authorities at Bathang, after making a successful journey up the Yang-tsze and Tai-tow-ho rivers, and through the frontier town of Taisian-loo. In August, 1867, he communicated his plans to the Council, in a letter written at Shanghai before starting, and a letter of instructions was drawn up by a Committee called for the purpose; but unfortunately these instructions, together with a letter I wrote myself, did not reach China before he started on his journey. They have since been returned through the Post-office; and Mr. Cooper, to the present time, is probably unaware of the interest we have taken in his movements. We learn that after his compulsory return from Bathang, he endeavoured to cross to Burmah *via* Yunan, and, finding this also impracticable, has gone round to Calcutta with the resolute purpose of exploring the routes between India and Western China from the side of Assam. A letter from Calcutta states that it is Mr. Cooper's intention to proceed slowly and to make a long sojourn, if needful, among the interior tribes; ingratiating himself with the chiefs and people, remaining months with one tribe, and then moving forward a stage to the territory of the next. Once at Bathang, he says, there will be no further difficulty. Although not a scientific man, Mr. Cooper seems to have many of

* On this subject of communication with the South-Western, and now independent, Chinese Province of Yunan with Burmah, *via* Momein, I received some valuable information from Colonel Ripley, who has been for many years Political Resident in Burmah. I regret to say that the notes with which he furnished me, in the form of a commentary on the Mission of Dr. Williams, have been mislaid.

the necessary qualifications for a traveller in difficult regions like that he is now attempting to penetrate. The Calcutta merchants have raised a subscription to pay his expenses.

French Exploration of the Great Cambodia River, and of Yunnan.—

It is but recently that distinct information regarding this remarkable journey has come before me,* and I gladly take the opportunity of doing some justice to one of the most remarkable and successful exploring expeditions of the nineteenth century. The one great cause of regret connected with this enterprise is that its indefatigable leader, Captain de la Grée, did not survive to carry to Europe the results of his labours and hardships.

The expedition was constituted, in 1866, under the order of the Imperial Minister of Marine, M. Chasseloup de Laubat. It was placed under the command of Captain Doudard de la Grée, of the Navy, with Lieut. Francis Garnier, of the same service, as second in command, Messrs. Joubert and Thorel as surgeons and observers in natural science, and two junior officers. They left Saigon 5th June, 1866.

The highest point previously fixed by the French on the Great Cambodia River was Cratieh, about 280 miles from the mouth, and standing in 12° 28' of N. latitude, where the tide is still slightly felt. Beyond this a long succession of rapids was encountered, occurring in a scarcely inhabited region of splendid forest which separates Laos from Cambodia; and 125 miles above Cratieh actual cataracts, some 50 feet in height, were met with. These will be an absolute interruption to the continuous prosecution of steam navigation, even so far indeed difficult to maintain.

It is worthy of notice that these rapids and cataracts are specially mentioned in the old Dutch narrative of Gerard van Wusthof, the leader of the last expedition (so far as we know precisely) that ascended this river—a journey that took place more than two centuries ago (1641).

Above the cataracts the river narrows and deepens between mountains; the width being reduced at some points so low as 300 feet, whilst the depth attains as high a dimension.

Between Khemarat and Vienchang (the ancient capital of Laos, which was visited by the Dutch Envoys, and is called by them *Winkjan*) the Great River again flows through a plain country, but

* Contained in the 'Bulletin de la Société de Géographie,' 1869, p. 97 *et seq.*; and in the 'Revue Maritime et Coloniale,' Avril, 1869.

at the last point mountains are again entered, and in all probability continue to its remote source. At Luang Prabang the travellers met with pleasing memories, and visited the grave of our lamented correspondent Henri Mouhot; but the latitude assigned by him to places on the route thither prove to have been more than 1° in excess.

It proved impossible to prosecute the journey up the course of the Cambodia River beyond Xieng Hong, or Kiang Hung, as we are more used to call it; the terminus of Lieut. Macleod's remarkable journey in 1837. It is satisfactory to find that the latitude of Kiang Hung observed by the French party is in perfect agreement with Macleod's, allowance being made for a transfer of the exact situation of the town since his journey.

From Kiang Hung the travellers struck northward through Southern Yunan, passing the much-talked-of Esmok, now deserted, and made their way through that *terra incognita* to the city of Yunanfu, where they arrived 24th December, 1867, eighteen months and a half after leaving Saigon.

The Society is aware that, for some fourteen or fifteen years past, the Mahomedans, who have formed an important part of the population of Western Yunan since an early date in the middle ages, have been in revolt against China, and have succeeded in establishing an independent state, under a certain Sultan Suleiman, with their capital at the old city of Talifu, itself a chief point in the great commercial route between Burmah and China. It was to the French party an object of high interest to reach Tali, both on account of its geographical position and its present political importance. But when they were at Yunan the two parties were in open war, and direct passage from Yunan city to Tali was out of the question. Their resolution, however, was not easily baffled. Leaving his chief, whose rapidly failing health incapacitated him for further exertion, under charge of one of the medical officers at Tongchuan, in northern Yunan, Lieutenant Garnier turned the scene of active hostilities by a venturous *détour* across the gorges of the Kinsha, or Upper Yangtze, and actually succeeded in penetrating to the Mahomedan capital. Though appearances at first were flattering, the party had to leave next day in circumstances of great peril, and their leader had the satisfaction of bringing them all back in safety to Tong-chuan, where, however, they had the grief to find their gallant leader in his grave. This episode in the journey could not have been achieved without remarkable courage and address on the part of Lieutenant Garnier.

Carrying the leader's body with them, the party at length reached Sucheufu, on the navigable Yangtze; here their perils and fatigues were at an end, and they were able to embark on the river for Shanghai, which they reached on the 12th June, 1868.

No Asiatic journey for many years, that I know of, has traversed so great an amount of absolutely new country. We need not take much account of the scanty old Dutch narrative, already alluded to, nor of the missionaries of the Roman Church, who have long been familiar with remote corners of the Chinese empire, but whose familiarity has brought little to bear in augmenting the public store of geographical knowledge. The whole journey of the French explorers from the tides of the Mekong to Sucheu, on the Yangtze, with the solitary exception of Kiang Hung, where they touched the terminus of Macleod's journey, may be regarded as on virgin soil. 6200 miles were travelled by the party between Cratieh and Shanghai, of which 2480 were accomplished on foot! Route-surveys have been made of 4176 miles of the journey, corrected by the determination of 58 points by astronomical observation. Much other knowledge has been accumulated in philology, antiquities, zoology, botany, and geology, and several hundred sketches have been brought away. The narrative of the journey and its results is under preparation by Lieutenant Garnier, and will be published by the Imperial Government on an important scale. This most remarkable exploration will, I trust, be rewarded at our next Anniversary by the award of a Gold Medal.

SOUTH AMERICA.—Our indefatigable Gold Medallist, Mr. Chandless, having been unsuccessful in his attempt to ascend the Beni, has turned his attention to other affluents of the Amazon, and has completed the examination of the River Juruá, which, rising in the dense forests on the left bank of the Ucayali, falls into the Amazon between the mouths of the Ucayali and Madeira. Mr. Chandless has done his work with his usual scientific accuracy, and has fixed upwards of sixty positions along the banks of the Juruá.

The Peruvian Government has lately been displaying much energy in the exploration of the magnificent fluvial highways which traverse the eastern half of the republic. A sort of dock has been formed at Yquitos on the Amazon, and a steamer has recently ascended the Ucayali and Santa Ana to within a short distance of the ancient city of Cuzco. Our Associate, Señor Raimondi, is pursuing his researches with unabated energy, and we have received another valuable communication from him since the date of my last

Address, on some of the tributaries of the Ucayali. Señor J. G. Nystrom has also been employed in Peru, during the spring of 1868, in exploring the unknown forest-covered region to the eastward of the Andes. He has penetrated into the *montaña* of Paucartambo, and it appears from his very able Report that he fixed several positions by means of meridian altitudes and lunar distances, and also took a series of carefully registered meteorological observations. This is the country that was explored by Mr. Markham in 1853, and it is satisfactory to find that the topographical details in the maps prepared by Mr. Markham and those of Señor Nystrom fairly agree. I am gratified to place on record that, when Mr. Markham made his observations in 1853, by meridian altitudes, and with sextant and artificial horizon, he was only twenty-two years old, and was quite single-handed, being accompanied by two Indians only. It is, indeed, creditable to him that, in a vast unknown forest-region, he should have been able to register so much topographical knowledge, and even to insert many more names in his little map than are to be found in that of Nystrom, who was accompanied by a strong body of soldiers and two educated South Americans. We have also received a new edition of the Atlas of the Republic of Peru by that enlightened philanthropist Don Mariano Felipe Paz Soldan, whose introduction of an improved system of constructing gaols and of prison discipline has conferred a great blessing on his native land. His new atlas contains 44 maps, 28 plates, and 78 printed pages.

From Bolivia, as I am informed by Mr. Markham, we have notice of a voyage of so peculiarly adventurous and enterprising a character that I cannot pass it without notice. Last year a Bolivian gentleman named Rada conceived the idea of collecting chinchona bark on the slopes of the Andes, and, instead of consigning it to some agents in a port of the Pacific, of taking it himself to England by descending the rivers Mamoré and Madeira. This was in itself almost a voyage of discovery. He embarked his valuable cargo in canoes, and, accompanied by his young wife, descended to the mouth of the Amazon, arrived safely at Liverpool, and, I am glad to be able to add, realised a handsome profit. The River Amazon has been remarkable for the adventures of fair ladies. The fate of Inez de Atienza is one of the wildest and most thrilling tales in the history of Spanish conquest in America. Madame Godin's voyage alone in quest of her husband, who was one of the members of Condamine's French expedition, is equally romantic. And now we have a third Amazonian heroine, in the person of this brave young Bolivian lady.

From Brazil we have received several valuable and well-executed maps, amongst which I may specially mention an Atlas of the Empire by Dr. Candido Mendes de Almeida, who has, in consideration of this important geographical work, been elected a Honorary Corresponding Member of our Society. Our Medallist, Captain Burton, who, since his residence as Her Majesty's Consul at Santos, has lost none of the zeal for geographical science which he displayed so signally in former years in Africa, has also given to the public the detailed and curious results of his Brazilian explorations since the date of my last Address.

At Buenos Ayres, Don Saturnino Salas, the Head of the Topographical Department in the Argentine Republic, continues his valuable labours, and we have this year received from him an excellent plan of the city of Buenos Ayres on four sheets.

THE FORMER AND PRESENT PHYSICAL CHANGES OF THE SURFACE OF THE EARTH COMPARED.—Towards the conclusion of my last Address, I called attention briefly to the dependence of geography on geology, or what was then termed the “oldest comparative geography.” It was then shown that many of those ancient features were absolutely dependent on subterranean movements, which from the earliest periods had been chiefly concerned in bringing about the broad outlines of the earth. I then endeavoured to carry the mind's eye back to ages long anterior to the creation of man, and pointed to the various changes which the surface had undergone before the earlier rude contours of land and water were established, to be brought, at subsequent periods, into their present forms by denudation, both sub-aqueous and sub-aërial, as well as by the wear and tear of centuries. I further showed that, during the incalculably long eras when the various sedimentary strata constituting the largest portion of the crust of the globe were accumulating, abrupt changes of form took place at intervals, whether due to shrinkage or contraction of the outer crust, or to the expansion of internal heat and gases, which produced great breaks and foldings in the various outer layers of the earth. These phenomena, I argued, were sufficiently attested by the enormous dislocations of its crust, which have taken place in many parts of the globe. As I then inferred that there are regions where some of the prominent features, as determined in primeval days, are still maintained (though doubtless since much modified by the diurnal atmospheric action), so I now wish to proceed somewhat further in explaining how, in my opinion, some of the most recent of these grand geological pheno-

mena, which severed into separate fragments great masses of land, and have, in fact, made our country into its present insular condition, were among the greatest of all these changes.

No one fact has been better established by geological research than that after the close of all the great submarine accumulations of Primary, Secondary, and Tertiary age (with intercalated masses of fluviatile and terrestrial origin), the various formations, which had been elevated at some periods into dry lands, and depressed at others under the waters, at length were raised into great continental masses, which were eventually tenanted by races of numerous terrestrial quadrupeds and other animals, congeneric but not identical with those now existing. The period when a variety of such animals as the elephantine mammoth, the lion, the bison, the bear, the hyæna, and herds of extinct oxen ranged over northern Europe, before England was separated from the continent, is attested by the abundant relics of such animals, which could only have migrated from a common centre when our islands were united as parts of the *terra firma* of France and the adjacent countries, where such fossil *reliquiæ* are found. Knowing, then, that the separation of England from France, as well as that of Ireland from Great Britain, was effected after the migration of these ancient quadrupeds, I am confirmed in the belief by the evidences which geological inquiry has recently yielded, that some of the most powerful explosions of volcanic force of which we have evidence also took place in the very latest tertiary periods. For example, the discoveries of the Duke of Argyll, Mr. Geikie, and others, which have shown that the outpouring of the enormous basaltic and other volcanic rocks of the Hebrides and the north of Ireland took place after the Miocene tertiary period, and buried under their *coulées* the plants of that epoch, affords the strongest indication of the sudden nature of the forces. These eruptions may well have been accompanied and followed by those disruptions which, separating England from France, formed the Straits of Dover, and let in the Irish Sea, in place of lands which formerly connected Ireland with England. Of this latter opening and depression, indeed, during pre-historic times, we have the most pregnant proofs in the fact that the Isle of Man, lying midway between the two countries, contains remains of the same gigantic elk, the *Cervus megaceros*, which so abounds at the bottom of many bogs of Ireland. For, as remains of this huge animal have also been found in Cheshire, the only reasonable inference we can

draw is that the formation of the Irish Channel was caused by a great destruction and denudation of the *terra firma* which once united the two countries, when the great elk was the inhabitant of both. For on no reasonable hypothesis can it be even suggested that an original and separate creation of this huge elk took place in the little Isle of Man; still less can the idea be tolerated that a herd of these unwieldy animals swam over a broad sea to the Isle of Man, if it be supposed that this spot had then been an island.

Again, the separation of England from France by a great geological break between those two countries after they had been one *terra firma*, is quite in accordance with the character of the abrupt cliffs on either side of the Channel, as well as with their composition and fossil contents. So in the Irish Channel we see that the headlands of Bray, near Dublin, and those of North Wales must once have formed a continuous whole.

Certain writers of eminence, indeed, who strive hard to account for all the diversities in the outlines of the earth by causes of no greater intensity than those which prevail at the present day, maintain that, if time enough only be granted, the seas and rivers, now actually flowing, combined with atmospheric influences, may have done all the necessary work of abrasion, to account for such breaks and cavities.

These authors opine that the long-continued action of water, as we now see it act, whether by seas or rivers, would account for the sweeping away of all débris from rocks which are now bare and smooth. They also explain the formation of vast subterranean caverns by the long-continued erosion of the limestone or other rocks by rivulets which once flowed in them.

I will offer some other reasons for dissenting from this view. First, let us revert to the broken and abrupt cliffs which face each other on the opposite sides of great marine channels, or those in the hard mountain limestone which forms the gorge of the Avon at Clifton, near Bristol, and countless other river-gorges; how shall we explain these precipices by gradual wearing away? If the operation had been gradual, instead of the coast cliffs presenting proofs of dislocation and fracture, as they do, we ought, on the contrary, to find sloping dunes in their places!

Again, the western sides of the Welsh mountains tell the tale of prodigious elevations, by which sea-shells of modern Arctic species have been heaved up to heights of 1600 feet above the sea. In that tract (Mont Tryfane) we have the correlation established of a great

upheaval of the sea-bottom into high lands, in juxtaposition to an adjacent deep sea, each dependent upon a fracture and great oscillation of the crust, followed of necessity, as I say, by intense denudation, through the power of huge waves.

My hearers who may be inclined to believe that, if a sufficient lapse of time be granted, much of the result may be explained by the gradual erosion of ages, will be pleased to recollect that the enormous depressions and denudations I am alluding to have been formed, as I have shown, since the great quadrupeds, now extinct, travelled over all these lands, and before they were broken up and disunited, and therefore these great solutions of continuity occurred in what may be considered one of the last units in geological time. This reflection, coupled with manifold proofs of rupture, as contrasted with long erosion, seem to me to lead irresistibly to the conclusion that, not long before, and possibly even after the creation of the human species, there took place some of those greatest disruptions of the crust of the globe of which its surface presents innumerable physical records.

I must here take the opportunity afforded me, perchance for the last time, of saying to geographers a few words on the subject of denudation; which is, indeed, a subject well worthy of their consideration.

Some geologists have, indeed, of late years appealed to ordinary diurnal erosion in a most liberal manner to account for many of the leading features of the surface of lands, whether in the excavation of valleys or the sweeping away of all detritus from plains and hills. But if we merely interrogate existing nature, and mark the enormous difference between an occasional modern catastrophe and the ordinary action of the ocean or the atmosphere, we must, I think, admit that the clean sweeping denudation by the grand waves which must necessarily have followed every great terrestrial movement in geological times, is fair and reasonable geological reasoning. Agreeing, as I do, with the main doctrine of the Huttonian theory, so admirably illustrated by Lyell, that denudation is essentially the removal of solid matter by water in motion, and that it has performed enormous works, I deem it to be essential to the right estimate of such power not to restrict the erosions which took place, in past geological times, to the ordinary action of the waves and currents of the sea and rivers. For, granting that the results of the present riverine and atmospheric action, as measured by the detritus carried down by great rivers to the sea, must, in certain

countries where the rocks are soft or incoherent, eventually carry away such lands, as in the region watered by the Mississippi, no such forces, if continued for countless ages, will account for the complete denudation and clean sweeping which has taken place in innumerable plateaus, deep valleys and gorges of hard rocks. Still less will any ordinary currents of the sea transport blocks of rocks from one tract to another. Yet this, as geological evidence teaches us, has often occurred in periods when, and in localities where, no ice-bearing agency can have acted. In short, it is a well-ascertained fact that deep sea-currents exert no transporting agency whatever, and that the smallest fragments only of sand, mud, and shells, remain at the bottom of such deep seas, and lie in an unruffled state. It is the action of wave-breakers alone that abrades coast cliffs, and if such lands had not presented cliffs to the waves, no serious wearing away of them would occur. Hence it follows, that in order that the ocean should have power essentially to reduce continents or islands, these masses must have been first broken up though internal forces in such a fashion as to present precipitous escarpments on which waves could act.

Admitting, then, that dislocations produced such cliffs in former geological periods, we have, it appears to me, a "vera causa" which sustains the inference that such movements were accompanied by intensely powerful aqueous denudations. Let us then compare such convulsive changes as have been brought about in historic times (and recently, indeed, in startling activity) with those which must have been produced by the much larger bodies of water which were set in motion when great upheavals of sea-bottoms and lands took place in geological times. Look to that which is or has been effected by ordinary currents of the ocean or waves in our day, and compare the results with the effects produced by a *single wave of translation* when set in motion by an earthquake. Thus, we know that the recent small movements of the crust of the earth, of only a few feet upwards, which occurred on the coast of Peru, heaved back the sea for a few minutes! and then look at the stupendous effects produced by that one returning wave resulting from so slight an oscillation of land, when backed by the whole pressure of an ocean. Did it not instantly destroy a fine city, and, scouring the shore, transport a ship and hurl blocks of stone far inland?

To us dwellers on the earth this was truly a catastrophe. But, let my brother geographers go back with me into former, and not

very distant, geological times, when the proofs of the sudden upheaval of coasts and sea-bottoms are to be seen in the effects of those great vertical heaves which threw up masses of sea-pebbles and shells into clean-cut and separate terraces at different heights. For, each of these terraces — as seen around many parts of our islands, on the coasts of Europe and America, and particularly on the flanks of the great lakes of America and Asia — affords to my mind the clearest evidence of great upheavals.

As these terraces of sands, gravel, and shells, separated often from each other by hundreds of feet, are convincing proofs of sudden upheavals of vast magnitude, so it follows that the bodies of water which were propelled on each of these occasions must have produced denudation and dislocation a thousandfold more grand than those of which the wave of South America or of any existing volcanic and earthquake region has afforded evidence in our days.

In short, it is quite conceivable that the renewal of any one of the great upheavals of former periods would not only sweep away most of the inhabitants of our continents, but would deepen our valleys by laying bare the rocks, which are now covered with various loose deposits, and all this without involving that long lapse of time which, with some modern writers, is the sole specific employed to account for and explain away all former changes of the surface of the globe.

No geologist, past or present, is more ready than myself to avow that the growth and increment of the former great accumulations of detrital matter call for and demand incalculably long periods, during which the successive races of animals and plants came into being, perished, and were followed by other races. But, though never parsimonious of time to account for the stupendously long history of succession, I am equally convinced, from the nature of the contortions, fractures, and dislocations of the crust of the earth, that these must have been accompanied by diluvial and transporting waves of incomparably greater power of translation, and consequently of denudation, than any force which man has ever witnessed.

I dwell with emphasis on these phenomena of former physical changes, as compared with those with which modern geographers are acquainted, because from this comparison we may reasonably infer that, if an earthquake and oscillation of the land of our period can produce such wondrous effects by one wave as on the Peruvian coast during the last year, the effect of the infinitely

grander waves of translation, which must often have been put into play during the former gigantic oscillations of the crust, must well have cleared the hills and valleys of all those broken materials which were left there by the sudden upheavals of former times; * whilst no ordinary diurnal atmospheric action, and no currents of the sea as they now act, could have produced such remarkable results.

CONCLUSION.—This Address has reached much larger dimensions than I intended, and has, I fear, fatigued many of you who have honoured me by sitting through this meeting. My apology is, however, that I have endeavoured to show you that my duties have been performed, by laying before you as clear a view as I can of the progress of geographical research in various countries, whilst I trust that in all previous sessions I have kept you well together in the bonds of continuous good feeling.

The ballot having terminated before I conclude this Address, I find that I am once more placed at your head for the usual official period of two years, and I have, therefore, to thank you heartily for this proof of your confidence in your old President. But the duration of my health and life during such a term is not to be relied upon, and if at the end of the first of these two years I should find that I am incapacitated to serve you with the same zeal as heretofore, you will, I am sure, permit me to retire with your thanks for my devotion to your cause. In truth, I had resolved to cease to hold office at this anniversary; but when the Council unanimously urged me to remain at my post, and declared that I must be found in this Chair at a time when it may be expected that my dear friend Livingstone will return to this country, acquiescence on my part became a sacred duty: and so, gentlemen, I hope to live to see the ardent hopes of the British public realised, and to be able on my own part to preside for a second time over a grand national Livingstone banquet.

Lastly, Gentlemen, it affords me the highest gratification to inform you that our Vice-Patron the Prince of Wales signified to me, whilst these sheets were passing through the press, that he would attend the Anniversary Dinner of this day. The words in the letter addressed to me evince such a true geographical

* For a much more expanded view of this subject, see the last chapter of the 4th edition of 'Siluria,' p. 489 *et seq.* Also Hopkins on the 'Elevation and Denudation of the Weald of Sussex,' and Whewell on the 'Powers of Waves of Translation,' as given in the 1st edition of the 'Silurian System,' p. 538.

spirit that I transcribe them as a most encouraging and satisfactory conclusion to this Address.

“I can assure you (writes His Royal Highness) that nothing will interest me more, or give me greater pleasure, than attending this Dinner at which you preside. My only regret will be, that our mutual friend, Sir Samuel Baker, will not be present. I have taken great interest in the grand project of the exploration of Equatorial Africa, which is to be effected under his guidance, and I heartily wish him all success.”

This language of the Heir Apparent may well be recorded in our Volumes, as our eminent Medallist, Sir Samuel Baker, himself has told me that it was mainly through the active personal exertions of the Prince of Wales that the Viceroy of Egypt was led to carry out in a munificent manner this great and laudable undertaking.

POSTSCRIPT.—*Discovery of the true Mouth of the Limpopo or Bembe River.*—I am able to add, as my Address is being finally printed off, that the great desideratum in South African geography, to which I adverted in a former Address, has been at length accomplished through the meritorious exertions of Mr. St. Vincent Erskine, a son of the Colonial Secretary of Natal, the Hon. D. Erskine. The great distances traversed on foot by this adventurous and undaunted young explorer, the resolution with which he overcame the most serious difficulties and dangers, the numerous astronomical and physical observations which he made, and the excellent map he has constructed, of the vast region extending from the north of Natal to the Limpopo, combine to render this communication one of the deepest interest. The subject will be brought before the Royal Geographical Society on the 14th June.

1st June, 1869.