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Address to the Royal Geographical Society of London

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

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

BY SIR RODERICK IMPEY MURCHISON,  
VICE-PRESIDENT.

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

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GENTLEMEN,

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

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

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

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

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

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### OBITUARY.

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

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

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

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

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

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

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

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

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

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

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

Admitting that no scientific body could have stronger claims upon

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

During many of the last years of his life, this gallant veteran was a frequent attendant at the meetings of the various scientific societies of which he was a member, including the Royal, Royal Geographical, Geological, Astronomical, and Statistical Societies, and was an energetic supporter of our Anniversary Meetings.

Sir Geo. SIMPSON, when a youth, was received into the counting-house of a London firm, largely engaged in the West India trade. His active and energetic habits soon attracted the notice of the late Earl of Selkirk and of the late Mr. Andrew Colville, both of whom took prominent parts in the rivalry then carried on between the Hudson Bay and North-West Companies, in the former of which they were large stockholders. Through their influence Mr. George Simpson was selected to superintend the affairs of the Hudson Bay Company at their settlements in British North America, and he proceeded thither in February, 1820. A coalition of the rival Companies having taken place the following year, he was appointed resident Governor of Rupert Land, an office which he held till the day of his death, in last September. By his address and dexterity he softened, and ultimately removed, the enmity and rancour which rivalry had created between the officers and men of the two Com-

panies, and by his own example taught men to work amicably together to promote the interests of the new association. His experience in the Indian country, his intimate knowledge of its resources, and his influence both with its white and Indian population, tended greatly to facilitate the progress through it of the land Arctic expeditions fitted out by the Government, and to lessen the hardships and privations they had to encounter.

The Arctic expeditions undertaken by the Hudson Bay Company were planned and fitted out under his immediate direction, and the instructions which he gave to their respective commanders, independently of their admirable adaptation to the ends in view, were eminently calculated to promote the objects for which they were issued. For these he received the honour of knighthood in the year 1841; and on the 3rd of March of that year he set out from London on his overland journey round the world, which he accomplished in 19 months and 26 days. Of this journey he published a narrative four years afterwards.

In conclusion we may remark that his suavity of manners, his patience, fortitude, and resolution amidst scenes of trial and difficulty, his unflinching and disinterested devotion to business, the amazing accuracy and extent of his knowledge of the affairs over which he presided, and the masterly readiness and precision with which he invariably applied it, rendered him eminently qualified for the situation he held during 40 years in the service of the Hudson Bay Company.

The late Mr. Matthew UZIELLI died, after a short illness, at Ostend, on 5th October, 1860. Although not a man of science, his memory deserves a passing tribute on this occasion, as having been one of those useful members of the Society whose fortune is ever ready to sustain and promote the cause of art and science. As an illustration of his liberal spirit, the Anniversary Address of 1856 of our President, the late Admiral Beechey, records the following:—

“I cannot quit the subject of this expedition without mentioning an instance of rare liberality in the cause of geographical science which was communicated at one of our evening meetings during this session by Count Strzelecki. When the North Australian Expedition was first planned, and when, owing to the length of time which had elapsed before it started, it was supposed that funds were wanting to carry it out, an associate of this Society, Mr. M. Uzielli, generously offered to place the munificent sum of 10,000*l.* at its disposal. Another of our associates, Mr. W. S. Lindsay, M.P.,

had also previously offered to contribute largely towards the outfit of the expedition. As, however, the Government have taken the matter into their own hands, these gentlemen have not been called upon to fulfil their promises; but we must still look upon the offers as proofs that the labours of the Geographical Society are fully appreciated by practical men, and of the zeal that exists among us for the advancement of geographical knowledge."

But, independent of this offer, and his subscription of 10,000*l.* to the Guarantee Fund for the Exhibition of 1862, Mr. M. Uzielli was a constant promoter of philanthropic objects; and appeals in cases of general or individual distress were seldom made to him in vain.

John Ashley WARRE, M.P., was educated at Harrow and at Christ Church, Oxford, which he entered as a gentleman commoner. His political life extended over thirty years, having first represented Lostwithiel in 1812, and subsequently Taunton, Hastings, and Ripon. He was a steady, consistent Whig, of the old and most confirmed school, and advocated earnestly those great measures of Reform which at first caused so much uneasiness and alarm in the minds of many, but which are now acknowledged to be among the greatest blessings ever conferred on a nation.

That his services were duly appreciated may be inferred by his having been offered office more than once, but which, from an inherent sense of the value of freedom of action, he steadily declined. He knew how to be liberal in support of the principles to which he was attached without illiberality towards those from whom he widely differed; and for many years he enjoyed the friendship of many with whose political principles he had no sympathy.

His was no common mind: it was so well stored on every subject—the result of close study and deep thought—that it would have been difficult to find a topic for discussion on which he was not prepared to offer a ready remark.

His memory of past events generally, but more particularly of the navy, for which he entertained a perfect affection, was very remarkable. The glorious deeds of early naval history were accurately related in the most graphic manner, and he was equally well-informed on all the economy of modern improvements. Indeed he was a living naval chronicle.

In many of the scientific questions of the day, and especially with those advocated by this Society, he took an earnest interest, attaching himself to the gallant leaders in such matters, and enter-

ing warmly into the discussion of their particular theories. Such were ever welcome guests at his hospitable abode, and never left it without feeling that he had not only "entertained" them, but had communicated information well worth their remembrance.

Equally simple and unostentatious in manner, few men were more respected. Where his heart prompted, his hand obeyed; and numbers blessed a generosity that did good far and wide, without pretension and without display.

He was earnest and devout, making religion the principle of life; and none ever heard from his lips a word that lacked charity to others.

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#### ADMIRALTY SURVEYS.\*

The Coast surveys in course of execution, under the orders of the Admiralty, both at home and abroad, have made fair progress during the past year. They are conducted by twenty different surveying parties, one-half of whom are employed on the coasts of the United Kingdom; the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, St. Lawrence, and Vancouver Island; also on the coast of Syria, in the Turkish Archipelago, in Banka Strait, China, and Japan.

*England.*—On the south coast, Commander Cox and Mr. Davis, R.N., carefully sounded the bar of Portsmouth harbour at the end of May, 1860, in order to ascertain the effect produced upon it by the dredging that had taken place during the past year. The soundings were made in sections, with intervals of only 8 yards between each cast of the lead, the lines of section were 17 yards apart, and the whole plotted on a scale of 60 inches to a mile. This operation has just been repeated by Messrs. Taylor and Reed, R.N., the soundings being accurately reduced to the same datum; and it is satisfactory to be enabled to state that a depth of nearly 6 feet has been gained over the greater part of the bar, and that a small amount of further dredging, so as to equalize the surface of the ground, will give a depth of 18 feet into the harbour at low water, or of 27 feet at high-water neaps, and 30 feet at high-water springs, thus greatly increasing the value of Portsmouth as a harbour. In the Channel Islands, Commander Sidney and Mr. Richards, R.N., have completed the survey of the east coast of Guernsey and of Sark, and sounded

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\* Captain Washington, R.N., F.R.S., Hydrographer to the Admiralty.

over an area of 50 square miles ; in the course of their examination it has been found that the depths over the great bank off Guernsey have materially decreased since the year 1821.

On the coast of Devon, Captain Stokes and Mr. Osborne, R.N., have completed 5 miles of open sea-coast to the eastward of the Mewstone, and about 21 miles of the shores of the Yealm River, and partially sounded over an area of 62 miles, including Bigbury Bay, and to a distance of 5 miles off shore ; while the plan of Plymouth Sound and Hamoaze, by Commander Cox, on the scale of 10 inches to a mile, has been published at the Admiralty. In the Scilly Isles, Captain Williams and Mr. Wells, R.N., have been occupied in making and computing the triangulation of the group, during which the positions of 518 stations on the islands and rocks have been fixed and plotted ready for delineating the high and low water features, on the scale of 6 inches to the mile, comprising altogether about 50 miles of coast-line. In the Bristol Channel, Commander Alldridge, with his assistants, Messrs. Hall, R.N., and William Quin, have been employed on the coast of Glamorganshire, during which 21 miles of open sea-coast have been surveyed, and an area of 88 square miles sounded over, in the course of which 18,600 casts of lead were made and recorded, and some small rocks and shoals discovered. A chart of the same coast, from Nash Point to New Passage, on the scale of 1 inch to a mile, and a plan of Swansea and Neath, on the scale of 3 inches, have been published by the Admiralty during the past year. On the coast of Lancashire, Mr. E. K. Calver, R.N., with his staff, Messrs. Inskip and Davison, have re-examined the estuary of the river Ribble, leading up to the town of Preston, with its approaches, and corrected the charts of that part of the coast.

*Scotland.*—In the river Clyde, the same officers, Mr. Calver and his assistants, have made a new survey from Greenock to Glasgow, showing the changes that have taken place during the last thirty years. The river was sounded in sections, in great detail, and laid down on a scale of 15 inches to a mile, so that the plan will form a standard for reference at any future period. It may serve as a specimen of the minuteness with which such works are done, to learn that in the course of this examination and that of the Ribble, 18,657 soundings were taken, and nearly all plotted.

In Argyleshire, Commander Bedford, with his assistants Commander Creyke, Mr. Bouchier, and latterly Mr. Ray, R.N., and Mr. Stafford, have been engaged on the survey of Loch Linnhe, leading

up to the south-west entrance of the Caledonian Canal, and of the outlying rocks Dubh-Artach. In the course of this survey they have examined 70 miles of coast, and sounded over an area of 100 square miles. The western portion of the Isle of Mull has been published, on the scale of an inch and a-half to a mile; the north-west coast, drawn on double that scale, together with a plan of Loch Cuan on the 6-inch scale, is engraving, in order to meet the wants of the trade now springing up between the islands of Mull and Coll.

In Inverness-shire, Mr. Jeffery, R.N., with his assistants Messrs. Donald Matheson and James Hannan, has mapped the coast between Arasaig and Smirserei Points, on the scale of 6 inches, and Lochs Moidart and Kinhay, on the scale of 9 inches to a mile. In the Hebrides, Captain Otter, in the *Porcupine*, with her tender the *Seagull*, Lieutenant Chimmo, aided by his staff, Lieutenants Dent and Hawes and Messrs. Stanley and Boulton, R.N., have been employed on the west coast of North Uist, between that island and St. Kilda, and on part of the Islet of Rum; in the course of which they have mapped 138 miles of coast-line, and sounded over an area of 575 square miles. In their trip to the rarely-visited island of St. Kilda, they found the population, which appears to be stationary at 78 persons, suffering from famine, due to a loss of their crops. On this being made known in Scotland, it was immediately met by a most liberal subscription, that not only sufficed to relieve their hunger, but to establish some more permanent benefits for the use of the poor islanders. In Harris, Commander Thomas, with his assistants Messrs. Morrison and Sharban, has surveyed the Sound of Taransay and the East Bays, on the scale of 6 inches. All the above data have been added to the general chart of the west coast of Scotland, and the detailed charts are in progress of engraving; Loch Tuadh and the isles and Loch Scridain, by Commander Bedford, are already published, on the scale of 3 inches.

*Ireland.*—On the east coast of Ireland, Mr. Hoskyn, with his assistants Lieutenant Aird and Mr. Yule, R.N., have been engaged on the upper part of Lough Strangford, and on the shores of County Down, from Ballyferris Point to Donaghadee. Off the south-west and south coasts, Commander Edye and Lieutenant Horner have sounded over an area of 1450 square miles, carrying their soundings to an average distance of 23 miles off shore, and to a depth of 100 fathoms; so that the navigator, if he will but pay attention to his lead, and compare the depths and quality of the bottom



with his chart, may safely approach that coast by night, or in a fog.

In the course of last year several new charts of Ireland have been published at the Admiralty. Among these are Loch Larne and the entrance of Loch Carlingford, on the scale of 7 inches, by Mr. Hoskyn and staff; the coast from Larne to the Foreland, the joint production of that officer and Captain Bedford; Lough Swilly and Mulroy, Horn Head to the Foreland, and the Foreland to Aran Island; Killibegs, Donegal, and Teelin Harbour, from the surveys of Captain Bedford, and his assistants Lieutenants Sidney, Horner, and Mr. Davis: Broadhaven, Blacksod, Tralee, and Brandon bays, by Commander Beechey and Lieutenant Edye, thus nearly completing the publication of the hydrography of the north and west coasts of Ireland.

*Iceland.*—The project for laying a North Atlantic submarine electric-telegraph cable from Scotland, by the Færøe Isles to Iceland, Greenland, and Labrador, so that no relay should exceed 600 miles in length, has led to the carrying a line of deep-sea soundings by that circuitous route, and a more direct return-line of soundings from Cape Farewell to Ireland. This expedition, equipped by the Admiralty in the most efficient manner, was placed under the command of Captain Sir Leopold McClintock, in H.M.S. *Bulldog*, assisted by Mr. W. H. Reed, R.N., Admiralty Surveyor, and Dr. Wallich, as Naturalist; at the same time Captain Allen Young, McClintock's companion in his memorable Arctic voyage, with Dr. Rae, Colonel Shaffner, U.S., and Mr. J. E. Davis, R.N., Admiralty Surveyor, were despatched by the enterprising Company in the *Fox* yacht, to examine the coasts and landing-places more in detail. The results, in a geographical point of view, which is our mere immediate concern at present, have been highly valuable. The depth of the ocean between Iceland and Greenland was found not to exceed 1570 fathoms, and the bottom to be fairly regular; from Greenland to Labrador, across the entrance of Davis Strait, a depth of 2030 fathoms was reached; and, in crossing the Atlantic on the return voyage, the greatest depth was found to be 1575 fathoms. At all these depths specimens of the bottom were brought up, and on one occasion a cluster of living star-fish was obtained from a depth of 1260 fathoms; a similar occurrence, proving the existence of living animals at that depth, took place in Sir James Ross's Arctic voyage in the year 1829, and in Commander Dayman's line of deep-sea soundings across the Atlantic in

1858. In order that the full benefit to science which may be derived from these specimens of the bottom should be rendered available, the Admiralty have retained the services of Dr. Wallich to examine them carefully, and prepare a full description of them, which it is understood will be published shortly.

In the course of the above voyage, in addition to the deep-sea soundings, the Admiralty surveyors, Mr. Reed, in the *Bulldog*, and Mr. Davis, in the *Fox*, took advantage of the opportunities afforded them, to make plans of several of the harbours touched at, as Haldervig and Thorshavn, in the Færøe Isles; with the Fiords of Beru, Hval, and Igalik, on the east and west coasts of Iceland, by Mr. Davis; Julianshaab and part of Godhaab on the west coast of Greenland, and Hamilton's Inlet, Labrador, by Mr. Reed: this latter inlet has assumed an entirely new form in our maps and charts from any that has before appeared. As physical geographers, we cannot but feel gratified that the requirements of submarine telegraphy conduce so much towards a better acquaintance with little known lands, and especially with the bed of the ocean of which we are still so ignorant, and with which, if submarine cables are to succeed, we believe we must be yet better acquainted. Nor can we withhold our tribute of gratitude to those gallant men who, under difficulties and privations of no ordinary character, boldly grappled with storms and ice in pursuit of the required information, Yet, though grateful, we need not be surprised. Were not both the commanders trained in the Arctic school? That school which has produced a Parry, a Franklin, the two Rosses, Scoresby, Beechey, Back, Richardson, Belcher, Bellot, Kane, Kellett, Collinson, Richards, McClure, McClintock, and others, men of all countries, to whom the Geographical Society delighteth to do honour. And I am satisfied that I do but express the general feeling of the members of this large Society in saying that wherever difficult work is to be done, in whatever part of the globe they may be found, whether with Kellett and Collinson in China, Richards in Vancouver, or McClintock in the enervating clime of the coast of Syria, where he now is, there the Arctic navigator will prove the value of the hardy school he has been trained in, and be fully entitled to share in the proud motto of *Nulli secundus*.

*Mediterranean.*—In the Turkish Archipelago, Captain Spratt, with his able assistant Lieutenant Wilkinson and Messrs. Stokes, Drew, and Millard, have completed the surveys of the islands of Astropalaia, Scarpantio, and Kasso, with several small harbours in

Crete, and Sailing Directions for that island, all of which, with the western half of Crete, are in a forward state for publication, the Turkish, Arabic, and Greek names of places having been carefully revised by Viscount Strangford and Mr. W. Spottiswoode. Captain Spratt has also recently carried some careful and valuable lines of soundings between Malta, Tripoli, Benghazi, and Alexandria, with a view to prepare the way for a submarine electric-telegraph cable, which it is hoped will shortly connect Malta with Egypt.

On the coast of Syria, Commander Mansell in H.M.S. *Firefly*, with his assistants Lieutenant Brooker and Messrs. Hull, Skead, and Gray, have completed the survey of the northern portion of the coast from Iskanderún to Markab, with plans of Ruad, Tripoli, Beirút, &c., all of which have been published. In connexion with this nautical survey some travellers took advantage of the presence of a surveying vessel on the coast, and made a journey to the more important spots in the interior, and determined several positions and barometrical heights. The party, consisting of Captain Washington, R.N., Commander Mansell, Dr. Joseph Hooker, F.R.S., the Rev. George Washington, M.A., Mr. Hanbury, and Mr. Gray, R.N., being provided with three chronometers, a theodolite, six barometers (corresponding observations being carried on night and day on board the *Firefly* on the coast), left Beirút in September last, by way of the Nahr el Kelb, Akturah, Afka, and Bisherreh, to the Cedars of Lebanon.

This remarkable group of trees, not exceeding three-quarters of a mile in circuit, stands on an elevated plateau, at the head of Wady Kadisha, and forms the centre of a semicircular basin or recess in the Lebanon, from 6 to 8 miles in diameter, at an elevation of 6400 feet. It is all but encircled by a wall of barren grey limestone mountains, rising some 3000 feet above the plain. The cedars stand alone, upon several small knolls (possibly a broken-up moraine deposited by former glaciers), and there is but one other tree in sight. The trees are about 400 in number, of all sizes; the largest is  $40\frac{1}{2}$  feet in girth, but only a few of the old patriarchs remain; there are not more than eight trees above 20 feet in girth. It is understood that Dr. Hooker is of opinion that, judging from the number of concentric rings and other indications, there is no tree now existing more than 500 years of age, and none less than 30 years.

On leaving the Cedars two of the summits of Lebanon were ascended; the highest Dahar el Khádib, 5 miles to the north, was

found to be 10,400 feet above the sea, and afforded a magnificent prospect which was taken advantage of by Commander Mansell, who planted a theodolite on it and obtained a round of angles to Tripoli, Cape Madonna, and other points on the coast to the west, to Mount Casius very distant in the north, to Ba'albek, Hermon, Sunnín, and other points in the south, and to all the peaks of the Anti-Lebanon in the east and south-east, which were thus connected with the coast survey.

Proceeding onwards the party crossed the elevated plain of Cœle-syria, or El Buka'a, where the water-shed, between the Orontes, flowing to the north-east, and the Leontes to the south-west, is near 4000 feet high, and reached Ba'albek or Heliopolis, with its marvellous ruins, at the western foot of the Anti-Lebanon range, and 3700 feet above the sea. Thence by Zebedani and round the southern end of Anti-Lebanon to Damascus. This city also lies in an elevated plain, but fully 1000 feet lower than Ba'albek, or about 2500 feet above the sea. Returning thence by Zaghleh and the admirable military road from Beirút to Damascus, now in the course of construction by the French, which will cross the Lebanon at a height exceeding 5000 feet, the party went to Beirút, Sidon, Tyre, Akkah, Hhaifa, Mount Carmel, and by Yafa to Jerusalem. Among other elevations measured in the City of David, the highest point of Mount Zion was found to be 2600 feet above the level of the Mediterranean, and the summit of the Mount of Olives, about 100 feet higher, while the lowest point of the Valley of Hinnom was 700 feet beneath. Jericho, Bethlehem, and the Dead Sea, were also visited, and the remarkable depression of the surface of this latter sea of 1300 feet below the level of the Mediterranean, which has been observed by former travellers, was fully verified.

It is right to add that Van de Velde's map of Palestine, by Petermann, based upon the trigometrical survey by our countryman, Lieutenant Symonds, R.E., in 1841, and combining the researches of Eli Smith and Dr. Robinson of the U. S., and other travellers, was found to be generally correct, and the best map of the country published. While Murray's 'Handbook,' here as elsewhere, proved to be invaluable; nor can travellers in these regions adequately express their thankfulness for the aid derived from this work: it is no exaggeration to say that it adds tenfold to the interest, the benefit, and the enjoyment of the tour. Probably, too, the present party was the first who had been enabled to refer on the spot to the 'Biblical Dictionary' edited by Dr. William Smith, and to test,

book in hand, the marvellous accuracy and research displayed by the several learned contributors to that work.

The barometrical heights, by Von Wildenbruck, were found to agree better with the observations of the expedition than the measurements of any other traveller. It may be worth notice that a complete meteorological register for 12 years, from 1848 to 1860, has been kept by the late Dr. McGowan at Jerusalem, and his barometer (one of Newman's) on being compared with a standard, was found to be in good order. The geographical information obtained during the above journey will, it is understood, be embodied in the Admiralty charts of the coasts of Syria and Palestine, now in course of publication.

*Africa.*—On the west coast of Africa six sheets of the Kawara or Niger, by Lieutenant Glover, R.N., on the scale of one inch, and a detailed plan of the port of Lagos, have been published during the past year. At the Cape Colony, Mr. Francis Skead, R.N., has completed a large plan of Table Bay, on the scale of 8 inches; he has also re-examined the lower part of the Kongone, one of the safest entrances of the Zambesi. In the Red Sea, in the Strait of Jubal, Commander Mansell and Mr. Hull, in addition to their services on the coast of Syria, have re-examined the Ashraffi reef, and determined the site for a lighthouse, which it is hoped may be shortly built by the Egyptian Government, as it is much required in the narrow passage of that Strait.

*Asia.*—In the Persian Gulf, Commander Constable and Lieutenant Stiffe, of H.M. Indian Navy, have completed the gaps that were left in the survey of that gulf, revised the whole in position, and the charts are in the hands of the engraver, while Lieutenant Heathcote, I.N., has prepared a new chart of the Bay of Bengal, with a memoir, showing the currents that prevail in that sea during the southern monsoon.

The great pearl fisheries of the gulf of Persia are still in full activity, and as productive as of old. In the summer of 1859 there were employed no less than 2340 Arab boats, with crews of from eight to thirty men, in this branch of industry; the value of the pearls raised being estimated at 200,000*l.*

An admirable survey of part of the Shat el Arab, and of the city of Basrah, has been made by Lieutenant Collingwood, of Her Majesty's Indian Navy. Lieutenant Williams, I.N., in the surveying brig *Euphrates*, having finished the examination of a small portion that was wanting to complete the coast commonly called

the Malabar Coast, has gone to do some work on the coast of Ceylon. A survey of the rivers of the Panj'ab is in progress by Lieutenant Whish, I.N. Two surveying brigs, under Lieutenants Sweny and Jackson, I.N., are at work in the Bay of Bengal.

In Ceylon, Captain Pullen, in H.M.S. *Cyclops*, and Mr. G. F. Macdougall, R.N., have surveyed the dangerous rocks known as the Bassas, and examined the south-east coast of Ceylon, Galle Bay, and a part of the north-east coast of the island, all of which has been inserted in the Admiralty charts. On his passage to England Captain Pullen re-determined the position of the San Lazaro bank, in the Mozambique Strait, said to have only  $3\frac{1}{2}$  fathoms over it; he also obtained several deep-sea casts of the lead, one of 2700 fathoms in the South Atlantic, one of 1800 fathoms on the Equator in longitude  $20^{\circ}$  w., and has swept away the vigia Devil Rock from its usual position in our charts, by dropping his lead on the site, and ascertaining that there is a depth of 2200 fathoms there, thus proving that no such danger can exist within a radius of 30 miles.

Two new charts of Banka and Gaspar straits, embodying all the surveys of Mr. Stanton, and his assistants, in H.M.S. *Saracen*, with the labours of the U.S. squadron, and of the Dutch surveying officers in Batavia, have been published at the Admiralty within the past year, and the Stanton Channel, along the coast of Banka, is now well known to every Eastern navigator.

*China.*—The requirements of the war, and the valuable assistance afforded by the Commander-in-Chief, Vice-Admiral Sir James Hope, have led to great activity in the surveying operations in China and the Korea during the past year. Commander Ward, in the *Actæon*, and Lieutenant Bullock, in the *Dove*, with their assistants Messrs. Kerr, Blackney, Farmer, Bedwell, Ellis, and Robinson, have surveyed Ta-lien-hwang Bay on the northern side of the strait of Pechili, where our fleet and army assembled preparatory to the late successful expedition which terminated in the capture of the Chinese capital, the restoration of peace, and the enlargement of commerce. Also the northern coast of the province of Shantung, with the anchorage off Chifu, the rendezvous of the French force, the Miau-tau group of islands, forming the strait of Pechili, and including the anchorage of Hope Sound, and, in fact, completing the shores of the gulfs of Pechili and Liau-Tung, from Staunton Island at the south-eastern extremity of Shang-Tung Promontory on the south, round to Ta-lien-hwang Bay on the north, embracing a coast-line of about

800 miles, hitherto but vaguely known, and very erroneous in position. On the eastern side of Liau-Tung Gulf occur Niū-chwang, one of the trading ports under the treaty, Hulu-Shan Bay and Port Adams, plans of which are in course of publication. In this latter portion the surveyors had the assistance of Commander Bythesea, v.c., and the officers of the *Cruizer* and *Staney*, and it is gratifying to find that these young officers were ready to take an active and efficient part in the operations of the survey. When we look upon our maps and see the small space occupied by the gulf of Pechili, we are apt to form but a very inadequate idea of the extent of labour required to map its shores, but if it be recollected that in the course of this survey some 800 miles of the coast were examined and the positions of all important points fixed astronomically, those acquainted with the subject will be able to appreciate the material additions to our knowledge of the geography of China, which has thus been obtained, and which could not have been accomplished without the cordial co-operation of the Naval Commander-in-Chief on that station, to whom, as geographers, our thanks are heartily tendered.

*Australia.*—While inland discovery has been making rapid strides, the coast surveys in Australia have been rather in abeyance. Captain Denham, in H.M.S. *Herald*, after a prolonged stay of nine years on the station, has just arrived in England. On the passage through Torres Strait this officer was enabled to clear away some more of the reputed dangers of that passage, and to fix the position of certain shoals, a piece of good service rendered to navigation, as this route is fast becoming the highway between Sydney, Singapore, and China. And the Sailing Directions for this track, just completed by Commander Yule, will be a valuable boon to the mariner. In the new colony of Queensland, Mr. Smith, r.n., has recently examined Port Denison and the mouths of the Burdekin river, while a general chart of Tasmania, prepared under the superintendence of Mr. Fred. J. Evans, r.n., and including the portions surveyed by Mr. Douglas of Adelaide, and one of the southern portion of Australia, have been published by the Admiralty. A fresh impetus is, we trust, about to be given to the coast surveys of these colonies, as they have liberally offered to share the expense of an Admiralty survey, and five separate parties of surveyors have been organized for the purpose. Commander Cox, with a staff of assistants, Messrs. Bourchier and Boulton, r.n., and Mr. McHugh, have already broken ground at Melbourne, and are employed upon a detailed survey of Geelong

Harbour. Lieutenant Brooker and Mr. Guy, R.N., are about to proceed to Tasmania, and other parties will follow shortly, so that, if the Colonies will but continue their support, few years will elapse before their coasts and harbours will be completely examined.

*British Columbia.*—The surveying party under Captain George Richards, in H.M.S. *Plumper*, consisting of Messrs. Bull\* and Pender, Lieutenant Mayne, and Messrs. Bedwell, Gowlland, and Browning, have, as usual, worked hard during the past season. They have surveyed Johnstone Strait, Jervis Inlet, and Home and Quatsimo sounds, in the course of which they have mapped 1100 miles of coast-line, and sounded thoroughly over an area of 350 miles, and partially over 50 square miles, chiefly between Vancouver Island and the mainland. Lieutenant (now Commander) Mayne also has explored the country between Jervis Inlet and Port Pemberton. The chart of Frazer River and Burrard Inlet, on the scale of one inch, and Nanaimo Harbour and Departure Bay, on the scale of 4 inches, by Captain Richards and his staff, have been published at the Admiralty during the past year. Also a new plan of the harbour of San Francisco, from the United States survey; and five sheets containing 15 plans of San Lorenzo, Santa Cruz, and other small ports on the west coast of South America, by Captain Kellett and Commander Wood.

*Newfoundland.*—There being no sufficient survey of the coast of Newfoundland, Captain Orlebar, with his assistants Commander Hancock, Messrs. Carey, Clifton, and Des Brisay, has been employed during the past season in examining the south coast of the island, in the course of which they mapped 190 miles of coast, including Burin and Placentia harbours, and sounded over an area of 2700 miles. The charts of the Upper St. Lawrence, from Montreal to Quebec, in 13 sheets, on the scale of 2 inches, and of the harbours of those two cities on the scale of 8 inches, have been published during the past year; and Liscomb, Marie-Joseph, Sheet, and Mushaboon harbours, in Nova Scotia, have also been published.

*Bay of Fundy.*—Captain Shortland, with his staff, Lieutenant Scott and Messrs. Pike, Scarnell, Mourilyan, and Archdeacon, has been chiefly employed at the upper end of the Bay of Fundy, and

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\* Captain Washington regrets to add that this was Mr. Bull's last work. On his return from a fortnight's absence in a boat sounding a bay, the fatigue and exposure proved too great for his constitution, and he died suddenly on the 13th November, 1860, and her Majesty's service was thus deprived of a good officer, a valuable surveyor, and an exemplary man.



in the Basin of Mines. In the course of the past season they have examined 60 miles of open coast and 100 miles of river and harbour shores, sounding over an area of 250 square miles. An useful Coasting-chart of these regions has recently been published by the Admiralty, extending from the eastern limits of the Bank of Newfoundland by Halifax to the Delaware. Some charts and plans taken from the admirable United States Coast-survey have also been published during the past year; as Long-Island Sound, leading up to New York, the Chesapeake as far as the survey has been made public, with Norfolk, Charleston, Savannah, and Pensacola harbours.

*West Indies.*—Mr. Parsons, and his assistants Messrs. W. B. Calver and Clifton, have completed a chart of the Grenadines, and are now at work in the Island of St. Vincent. An important correction in the position of some capes on the north-east coast of Cuba has been made by Commander Hamilton in H.M.S. *Hydra*, by order of Rear-Admiral Sir Alexander Milne, Commander-in-Chief on the West India station. Punta Lucrecia is shown to be in long.  $75^{\circ} 40' w.$ , instead of long.  $76^{\circ} w.$ , as in many charts, and this correction of 20 miles of longitude gradually decreases east and west till it vanishes at Cape Maysi on the east, and Punta Maternillos on the west. The first volume of the 'West India Pilot,' comprising the coast of the mainland from the Orinoco, round by Yucatan and the Gulf of Mexico to Florida Strait, compiled by Captain Barnett, and revised and completed with a Table of Positions by Mr. James Penn, R.N., of the Hydrographic Office, has just been published at the Admiralty.

*Variation.*—Researches in the field of magnetism, in connexion with the security of navigation, are still engaging the attention of the Compass Department of the Admiralty. The causes of certain anomalies which existed in the compensation of some iron ships' compasses have been detected by an elaborate series of experiments undertaken by Mr. F. J. O. Evans, R.N., the superintendent, during the past year, and which have been ably investigated by the well-known mathematician, Mr. Archibald Smith of Lincoln's Inn. The combined results have been laid before the Royal Society, and will be doubtless published for the benefit of navigators of all nations. Terrestrial magnetism, in its relation to the progress of navigation, and thus indirectly to the advancement of geography, is a science deserving the cordial assistance of geographers, and we hope to see our travellers, especially when promoting their researches in the

remoter regions of the globe, devoting attention to the determination of its elements, in connexion with other objects of inquiry. Observations, chiefly for that primary element to the seaman and the traveller, the variation of the compass, are being made with much assiduity by the officers of the Navy. An elaborate series, by Captain Denham, has been brought up to the present time in H.M.S. *Herald*, from Australia, through the Indian Ocean, by the Cape of Good Hope to England; another series has just been made by Captain Pullen, in H.M.S. *Cyclops*, in the Red Sea, coast of Arabia, Indian Ocean, and Atlantic; and a third series off the west coast of Africa, between the Equator and the Cape of Good Hope, has been made under the auspices of Rear-Admiral Sir Frederick Grey, late Commander-in-Chief on that station.

Besides the surveys above enumerated, as in progress in different parts of the world, the labours of the Hydrographic Office, during the past year, have consisted in the publication, under the immediate superintendence of Mr. Michael Walker, Assistant-Hydrographer and chief Draughtsman, of about 90 new and corrected charts and plans, some of which have been already mentioned. It is with regret I add that increasing years have deprived the Admiralty of the valuable assistance of Mr. Walker, who, after 50 years of faithful public service, wisely retires into private life to spend the remainder of his days in peace and quietness. Those who can remember the state of our maps and charts half a century ago, will be best able to appreciate the labours of Mr. Walker. As Chief Draughtsman it was his duty to construct charts, often out of conflicting materials, and to reconcile longitudes which even some of our most skilful travellers and surveyors are too apt to leave in a state of uncertainty, as doubtless our excellent fellow-labourer, Mr. John Arrowsmith, would readily bear testimony. During the long period that Mr. Walker held this responsible post he had gained the entire confidence of Captain Hurd, Sir Edward Parry, Admiral W. H. Smyth, Sir Francis Beaufort, and the present Hydrographer, and served his country with a zeal, intelligence, and strict integrity, that cannot be too highly praised. And although he retires from official life, it is to be hoped that we shall long have the benefit of his counsel and co-operation as a Fellow of the Geographical Society, of which he was one of the earliest members.

## ORDNANCE SURVEY.\*

The progress of the Ordnance Survey in the north of England and in Scotland has been greatly retarded during the last year in consequence of the numerous detailed surveys in the south of England, which have had to be made for the purchase of land and for the laying out of the fortifications for the defence of the Royal arsenals, and upon which upwards of 400 surveyors and draftsmen, brought from the northern parts of the kingdom, have been employed.

The plans of Northumberland and Cumberland, on the  $\frac{1}{25000}$  scale, are in course of publication, but, for the reason above stated, these counties will only be finished in about twelve months from the present time.

The plans of Perthshire and Forfarshire are also in course of publication, and the survey of these counties will also be finished about the same time.

*England.*—Yorkshire and Lancashire are published on the 6-inch scale, and Durham and Westmoreland on the  $\frac{1}{25000}$  and 6-inch scales. The surveys made for military purposes at Portsmouth, Plymouth, Chatham, Sheerness, Dover, Pembroke, the environs of London, and several other places, have all been made and published on the same scales as those adopted for the National Survey, and as parts of the counties in which they are situated; should it therefore be decided by Government and Parliament to extend the Cadastral Survey to the south of England, these plans will form integral portions of the complete surveys of the several counties.

*Scotland.*—These counties have been published on the 6-inch scale:—Edinburgh, Fife, Kinross, Haddington, Kirkcudbright, Wigton, and Isle of Lewis; and the following on the 6-inch and  $\frac{1}{25000}$  scales:—Linlithgow, Lanark, Ayr, Renfrew, Dumfries, Peebles, Selkirk, Roxburg, Berwick, Dumbarton, and Stirling; in fact, the Cadastral Survey of all the south of Scotland is finished.

In *Ireland* every county has been published on the 6-inch scale, and eight of the northern counties, which were not complete in all the details subsequently found necessary for the valuation and registration of property, have been revised and made complete.

The general map of the kingdom on the 1-inch scale has been retarded by the causes already stated, but the whole of *Ireland* has

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\* Colonel Sir Henry James, Superintendent of the Ordnance Survey.

been engraved in outline, and several sheets with the hill-features on them have also been published. In *Scotland* the progress of the 1-inch map proceeds *pari passu* with the survey for the larger scales, the plans being immediately reduced to the 1-inch scale and engraved. In *England*, the whole, with the exception of the five sheets which will include the portions not yet surveyed in Northumberland and Cumberland, have been engraved.

The great *trigonometrical operations* of the survey may be said to be closed, the "principal triangulation," the levelling taken in England and Wales, and in Ireland, have been published, and the levelling taken in Scotland is in the press, and in part printed, and will be published very shortly. The three volumes containing the levelling have indexes showing the lines which have been levelled throughout the kingdom, and along which marks  $\overrightarrow{\text{N}}$  (a broad arrow with a horizontal line, to mark the exact point to which the levels are given) have been cut upon permanent objects, such as churches, bridges, &c., for reference. These volumes therefore contain very valuable information for all who are engaged in practical engineering operations, and for many other purposes.

The publication of the principal triangulation, with the figure, dimensions, and mean specific gravity of the earth derived therefrom, has been received in all parts of the world with the highest satisfaction. It has been described as an epoch-marking work in the higher branches of geodesy, and in Russia it has given rise to an interesting and valuable discussion between General Schubert and M. Otto von Struve, in communications to the Academy of Sciences at St. Petersburg, on the importance of making those corrections to the observed latitudes for the local attraction at the trigonometrical stations used in the measurement of arcs of meridian, which were first given in the principal triangulation of this country.

In the principal triangulation the figure and dimensions of the earth have been given as derived from our own measured arc of a meridian, and also as derived from the combined results of all the measured arcs in different parts of the world. In the estimates for the present year the sum of 1000*l.* has been taken to enable the Director of the Ordnance Survey to connect the triangulation of this country with that of Belgium, and with the triangulations of Prussia and Russia through that country. This will furnish the data for the measurement of an arc of parallel from Valentia, in the west of Ireland, to Oursk, on the river Oural, in Russia, of no less than 75 degrees in length, along the parallel of 52°.

This is the greatest geodetic operation that has ever yet been undertaken, or which could before have possibly been undertaken, and the result will put to a severe proof the determination of the figure and dimensions of the earth from the measured arcs of meridians.

From the Topographical Dépôt we have received the map of Montenegro, which has been recently made from the surveys of the Commissioners sent by our Government to mark the boundaries of that country, in conjunction with officers from the Government of Austria.

We have also received several lithographed sketches illustrative of the actions fought in China, and of the route followed by the allied armies in their advance upon Peking.

The accuracy and perfection of the maps reduced by photography at the Ordnance Survey Office is well known to the public, and has been officially reported upon. The method of printing the reduced maps from zinc or stone, which the Superintendent of the Ordnance Office has named photozincography, has also been brought to great perfection, and promises to be of the greatest value for purposes not originally contemplated, viz., the printing of fac-simile copies of ancient MSS., an example of which has just been published in the copy of the part of Domesday Book relating to Cornwall.

A work on meteorology for observers, and especially for travellers, which should contain precise instructions as to the manner of reading and recording their observations, and with the necessary tables for their correction, has long been a desideratum, and this has now been supplied by the publication, by the Superintendent of the Ordnance Office, of a small work entitled 'Instructions for taking Meteorological Observations, &c.' which has been adopted as the text-book for the Army Medical Department; all the officers belonging to which, wherever stationed, are now directed to make regular meteorological observations, and whose reports, when properly digested, will probably throw great light on this branch of science. A copy of this work will be found in the Library. The Superintendent has also presented the Society with a copy of his recently published 'Quadrant Atlas,' containing two maps of the world on his projection of two-thirds of the sphere, and on which the lines of equal magnetic declination are shown, and also four maps of the stars, two for the northern and two for the southern hemisphere, the central meridians being at six hours' intervals. These are circular maps, so folded as to form a quadrant, and are intended for the use of sailors and travellers.

## GEOLOGICAL SURVEY OF BRITAIN.\*

The connexion of the sciences of geology and geography is palpable, and there can be no doubt that every geographical surveyor will give a much truer character to his hills, escarpments, slopes, and valleys if he be well acquainted with their internal structure.

In the last Report presented to Parliament we learn from the explanation of the Director-General, Sir Roderick Murchison, that with the view of completing the classification of the older rocks of the British Isles, in which he had been assisted by Mr. Geikie, he was occupied during the last summer in more firmly establishing the views he had before propounded of the existence of a clear ascending series in the crystalline rocks of the Highlands, from vast basement-rocks of gneiss, which are of higher antiquity than any rock in England, Wales, or Ireland. The feature which renders this older or fundamental gneiss of singular interest to the physical geographer is that whilst the outline or external form of its chief masses, as seen in the Long Island and other parts of the Hebrides, are elongated geographically from N.E. to S.W. ; the range of the strata is from N.W. to S.E., or transverse to the form of the land. A new sketch-map of Scotland, which is about to issue, as based on the original observations of Sir Roderick in the Highlands, and published in the Quarterly Journal of the Geological Society, has been prepared by Mr. Geikie, and in it will be shown for the first time that the upper portion of the crystalline rocks of the Highlands is the altered representative of the Lower Silurian rocks of the south of Scotland.

In the extension of the Geological Survey of England from the south to the north of England and Scotland, the insertion on the maps of the 6-inch scale of the subterranean knowledge obtained, is in no respect more interesting than in the correct delineation of the various altitudes to which the shore-deposits of antecedent periods have been carried up above the present sea-level. This is particularly conspicuous on all those sheets on which the contour lines have been laid down. It is out of place here to enter into details of the progress of this survey, so important in developing the mineral wealth of Britain ; but it is gratifying to be able to state that the public are taking so much interest in the subject, that they now purchase threefold the number of geological maps which

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\* Sir Roderick Impey Murchison, Director-General of the Geological Survey of the United Kingdom.

they did two years ago. It would, indeed, be strange if such a result had not followed the labours of those who are continuously occupied in unfolding the mineral resources of their country.

Although Colonel (now Sir Henry) James, who so ably superintends the Topographical Survey, gave evidence 5 years since before a Committee of the House of Commons that in ten years the whole map of Scotland would be completed, it is, alas! now too probable that a very long period may elapse before North Britain will possess such a general geographical map as is already possessed by France and Germany. But this lamentable state of things is in nowise to be laid to the charge of the Map Office and its able superintendent, but is mainly due to the oscillation in the views of different Governments, and the sudden diminution this year of the Parliamentary grants (see also p. 179), coupled no doubt with an unwillingness to grant large sums for surveys on that stupendous scale, which, according to the mode adopted by the Map Office, were to serve as the basis for the construction of a *real map* on the 1-inch scale. It is for the latter or only manageable map that we, as geographers, have been calling out for thirty years, or ever since this Society was founded.

#### PROGRESS IN METEOROLOGY.\*

Meteorology is not a science in which much progress can be made in so short a time as that which elapses between our Annual Reports. Nevertheless, since the last Anniversary Address from this chair, remarkable steps have been taken by Government tending to utilise this branch of knowledge in a general and important manner.

In 1857 it was arranged that simultaneous observations should be made daily at a large number of selected stations in the British Isles, in and around the Atlantic, and at places on the European continental coasts. By combining these observations in synchronous charts, and otherwise, it was seen that, irregular as changes of wind and weather seem to our usual apprehension, there is really so much uniformity and similarity of character in successive variations, that by means of a comparatively small number of observations, made daily at a few selected stations sufficiently far apart, and by the use of an "atmoscope" (or self-registering barometer) at a central station, to which meteorological telegrams may be sent from the other outlying stations; it was seen that

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\* Admiral FitzRoy, Director of the Meteorological Department, Board of Trade.

by such means a distinct intimation of marked changes of weather, and warning of dangerous storms, might be given at the centre, and thence to all other points of any telegraphic combination.

The idea of giving warnings of storms, by telegraph, was familiar to many meteorological observers—in America as well as in Europe. It was suggested before the year 1836, with a reference alone to the semaphoric telegraph, but directly electricity was made man's messenger, its applicability to this object occurred immediately. Yet the subject attracted too little popular interest to be taken up by any influential body until in September 1859, at Aberdeen, the British Association resolved to express to Government their view of its importance. The Prince Consort, then President of the British Association, directed steps to be taken. Communications were made to the Board of Trade. The Treasury and the Admiralty were consulted, and the result was the establishment of a system, experimentally, by means of which it is hoped that much loss of valuable property, and a much more serious loss of *invaluable* lives may be prevented. This system, known through the newspapers, was commenced last September. Until January it was limited to receiving reports from practising observers.

#### *Memorandum on Storm Warning Signals.*

A staff and two canvas shapes being provided, the following use will be made of them occasionally, perhaps once or twice in a month:—

One shape, that of a drum (or cylinder), has the appearance of a black square of three feet (seen from any point of view), when suspended.

The other shape, a cone three feet high, appears triangular (from any point of view), when suspended.

A cone with the point upwards shows that a gale is *probable* from the northward.

A cone with the point downwards shows that a gale is *probable* from the southward.

A drum, alone, shows that dangerous winds may be expected from nearly opposite quarters successively.

A cone and drum give warning of dangerous wind, its probable *first* direction being shown by the position of the cone; point up and above the drum for polar or northerly wind—down and below for southerly.

Whenever such a signal is shown (in consequence of a telegram from London), it will be kept up—shown distinctly—till dusk of *that day only*, unless otherwise instructed afterwards.

These cautionary or warning signals advert to winds during part of the next following two or three days; and, therefore, due *vigilance* should prevail from the *beginning* of such time until the weather is again finally settled.

No further steps are necessary for these objects at the telegraph-stations for the present. Other organization may follow when the coast-guard have prepared arrangements for repeating these signals along the coast to certain distances.

A conspicuous place should be selected for signalling, near the telegraph-station.

If conveniently practicable, the signal pole or staff should be in view of some seafaring persons and of the nearest coast-guard.

When both these objects cannot be conveniently attained without too great distance from the telegraph-station, one only—that of visibility to some of the seafaring community—should be secured.



In this case a message should be sent to the nearest coast-guard, and charged at the Company's tariff.

Further *local* notice will be given, it is hoped confidentially, by *local interests* and *authorities*. London can warn the outports. The coast-guard may repeat the warning as far as means allow, and *completion* of such cautionary notices may be effected by *private* assistance along the most frequented shores.

It should be remembered that only the greater and more *general* disturbances of the atmosphere are to be made known by this method (warning signals), not merely local or sudden changes (however violent or dangerous), which are not felt at a certain distance, and do not therefore affect other localities. Such changes are indicated to observers at these places by their own instruments, by signs of the weather, and by consideration of the weather reports for a few previous days.

Much inequality of atmospheric pressure or temperature, great depression or elevation of the barometer, sudden or rapid alternations, great falls of rain or snow, indicate more or less change, more or less wind, with its usual accompaniments, either in some places only or throughout an extensive area of hundreds of miles, if not thousands.

Speaking *generally*, there is far less occasion to give warning of *southerly* storms by signal than of northerly, because those from the southward are preceded by notable signs in the atmosphere, by a falling barometer, and by a temperature higher than usual at the season; whereas, on the contrary, dangerous storms from a polar quarter (N.W. to N.E.) are sometimes sudden and usually are preceded by a *rising* barometer, which often misleads uninformed persons, especially if accompanied by a temporary lull of perhaps a day or two, with an appearance of fine weather.

On the 6th of February the first warnings were given, on the foregoing principle, after which eight other warnings followed between that date and March 19th; since when, no general or remarkably windy atmospheric disturbance has occurred.

The warning of February 6th was disregarded at Shields by a fleet of vessels, and many were wrecked on the 8th or 9th.

Subsequently, whether from having appreciated these storm-signals, or from some other reasons, the *fact* is that very few, if any, wrecks occurred *on our* coasts during all the notoriously tempestuous weather of last February and March.

It is well known that M. Leverrier and numerous scientific authorities on the Continent, especially M. Buys Ballot in Holland, have for some time had their attention directed to simultaneous meteorological observations, and their utilisation for maritime, commercial, and geographical interests.

But the range of M. Buys Ballot's stations is small, and, on the other hand, that of M. Leverrier is so extensive that great difficulty has hitherto been found in grouping, combining, and concluding from them for practical use.

M. Leverrier's letter to his British colleague at Greenwich, in April 1860, arrived opportunely at the time our Government had under consideration these suggestions of the British Association (which originated at Aberdeen) and, undoubtedly, had the weight due to such an authority as himself.

The British Islands have very peculiar facilities for meteorolo-

gical communication by telegraph between outlying stations, on the sea-coast, and a central place—all at nearly the same level, and all similarly uninfluenced by mountain ranges, which are well known to alter or impede the horizontal movements of atmospheric currents. Great distinctions should be marked between those ever alternate, often conflicting *main* currents, tropical and polar, and the *local effects* of their union or antagonism—namely, mixed winds, whether westerly or easterly, with occasional cyclones or circulating eddies on a large or small scale.\*

During the month of April this year, and to this time,† a polar current, very extensive and uniform, has swept or flowed *near* or along the surface of our islands and adjacent area, while its counter or *super* current has moved in a more or less contrary direction, usually above, but at times intermixing with, and often affecting or influencing the lower and normal “*abpolar*” movement by here and there pushing down and onwards. Considering that the lower current does not extend very far upwards (only a few thousand feet) and that high land mountains, and especially ranges of mountains alter or impede its progress, a variety of eddy winds, or, as it were, streams, with local and apparently anomalous effects, must be frequently caused.

Electrical action, condensation of vapour in hail, snow, rain or fog, or its other changes—namely, evaporation, rarefaction and expansion—absorbing heat and therefore causing cold, immediately affect currents of air in a degree proportional to their influence.

The polar current always *advances* direct from the northward toward the southward, or the south-westerly quarter, while *laterally* moving eastward (like a ship making leeway), pressed toward the east by the tropical flow which advances from the south-westward, usually above, and at an angle with the polar stream or current of air, often mixing with it but, at times, separately sweeping and warming the earth's surface, uncombined with the polar current, even while feeling its approaching influence, and, as it were, forcing a passage between streams of the chilling polar air, that at the same time are moving in opposite, and nearly parallel or slightly angular directions.

Sometimes their opposition is so equal, and equilibrium is so complete, that a calm is the result, and then there is no sensible movement horizontally along the earth's surface.

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\* See last Report, Royal Geog. Soc., 1860.

† 13th May, 1861.

The "atmoscope" is found to be an exceedingly useful instrument. It was invented by Admiral Milne, and, though considerably modified, as its use has suggested, in principle it is the same as his self-registering barometer. It shows the alterations in pressure, or the pulsations, so to speak, of atmosphere, on a large scale, by four hourly marks; and the diagram expresses, to a practised observer, what the indicator-card of a steam cylinder shows to a skilful engineer, or a stethoscope to a physician. It may trace its curve, hourly if required, by night and day, for a week or more.

For *travellers*, attention should be drawn to improved aneroids, some on more correct principles of construction, some much smaller than previous to the expiration of the French patent (taken out by their ingenious inventor, M. Vidi); others very suitable for measuring heights not exceeding about 4000 feet.

New constructions of mountain mercurial barometers have been lately suggested, but not proved yet by practical use. Perhaps it will be difficult to devise a better one than that of Gay Lussac, if made stronger, with the glassblower's work better executed, than has been the case with some that have been found too delicate for mountain ascents.

Travellers should not be influenced, in such cases, by the very precise refinement desirable in an instrument for the observatory (to which superlativeness many an opportunity of observation, with sufficient accuracy, has been sacrificed by accidents in travelling), but should endeavour to secure a reliable, though less minutely accurate means of ensuring results, within *known limits* of moderate error. A tenth of an inch alteration in the Torricellian column is caused by nearly 100 feet of change in elevation. What is this compared with some 20,000 feet, and the yet little known atmospheric influences at such a height, where the mercury falls to about 12 inches? And yet to attain a nicety of measurement, to the thousandth of an inch, instruments are offered to zealous travellers or voyagers, suitable only for use at convenient stations. This defect, if it may be so called (though really an excess of goodness in one direction), has been too general in marine barometers, also, of late years: excellently made, admirable in principle respecting accuracy and permanent reliability, but too finely graduated for an ordinary observer at sea, or by night, and too delicate in structure to bear the common shocks unavoidable in a ship of war. These objections have been lately obviated by a less minute graduation on a porcelain, instead of a metal scale (liable

to tarnish or rust), and by "packing" the glass-tube with vulcanised India-rubber. Thus constructed, the accuracy and reliability of a Kew model marine-barometer is obtained, to the nearest hundredth of an inch, having the quality of withstanding even heavy gunfire (as proved on board H.M.S. *Excellent*), and a facility for adapting spare portable tubes, boiled and fixed in their cisterns, capable of adjustment to *any* similar barometer, *without the aid of an optician*.

In using these invaluable instruments (which some voyagers would rather have than a chronometer, though one costs three pounds and the other about forty), it is well to have some definite idea of the amount of change which indicates unusually violent wind, such as the *St. Kilda* cyclone of October, 1860, the *Camilla* typhoon of the same time nearly, and the *Royal Charter* gale of October, 1859. In each of those very similar storms the barometer fell at the rate of a tenth of an inch an hour before the shift of wind occurred, before which it ceased falling, then began to rise, and while the violence of the tempest prevailed, rose as rapidly as it had previously fallen.

Generally speaking, and adverting to *numerous other* instances, *sudden* changes at the rate (nearly) of a tenth of an inch in one hour, are indicative of immediate and great atmospheric commotion. On the other hand, when the column does *not* rise or fall rapidly, that is to say, at an hourly rate of about the hundredth of an inch or less, any change of wind or weather of an extensive or general nature, however remarkable it may be, if the movement continue *long*, will be gradual and lasting.

#### RECENT GEOGRAPHICAL PUBLICATIONS IN EUROPE.\*

*Britain*.—The Royal Atlas of Geography, which has now reached an advanced state, as published by Mr. A. Keith Johnstone is, as might be supposed from the accurate knowledge of the author, and his perspicuous method of applying it, a most desirable addition to our works. The clearness of the coast lines and river drainage, as defined in blue tints, is particularly to be commended. This Royal Atlas, of which eight Parts are already issued, is to be completed in ten Parts; and, in approving the execution of the maps, we cannot avoid calling special attention to the tabular and alphabetical lists of names of places, and the good arrangement by which the position of any place is at once found upon the map.

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\* Sir R. Murchison, Vice-President, R.G.S., &c.

In addition to his other maps, Mr. Keith Johnstone is about to publish a new Geological Sketch-Map of Scotland, by Sir Roderick Murchison and Mr. Geikie, which is alluded to in the account of the progress of the Geological Survey.

The Rev. H. Mackay, a minister of the Free Church of Scotland, and resident at Rhynie, in Aberdeenshire, who is a Fellow of our Society, has in the last year brought out a Geological Manual, which does him great credit. For, when we reflect on the difficulties under which a pastor who is most zealous in the performance of his clerical duties, in a remote and inland tract of Aberdeenshire, must labour, and who, in the employment of his leisure hours, has compiled this work, we must admire the ability and persevering research with which he has succeeded in imparting to his Manual so much freshness and originality. In no respect is this character more apparent than in the plan of arrangement by which the author commences his description of the physical geography of each tract by a sketch of its true basis or geological structure. The work is largely sold in Scotland, but has not been sufficiently spoken of in England. It is, indeed, a most useful school-book in opening out geographical knowledge.

*Germany.*—The country which gave birth to a Humboldt and a Ritter may well be proud of the efforts which are made to do honour to the memory of these illustrious geographers, by the establishment of foundations under their respective names, by which researches in distant lands are to be aided and encouraged. We trust that, with such an eminent African explorer as Dr. Barth, resident in Berlin, and with the knowledge we possess of his powers of writing on geographical subjects, the loss of Karl Ritter may be not inadequately supplied.

The well-deserved success of that admirable periodical, the 'Mittheilungen,' of Justus Perthes and Co., as edited by M. Petermann, is a satisfactory proof of the profound interest taken by our German contemporaries in every branch of geographical inquiry, Referring to that work for many valuable details, and most clear and accurate analyses of maps and volumes which are constantly issuing from the continental press, it is a satisfaction to us to see how through the pages of the 'Mittheilungen' the public in Germany are regularly and promptly made acquainted with all the most important of our British explorations.

Among the publications which are issuing from the press of Austria it is incumbent on us to notice with full approbation the

narrative of the Circumnavigation of the Globe, by the frigate *Novara*, in the years 1857-8-9. Commanded by Commodore von Wullerstorf-Urbair, the description of the voyage has fortunately fallen to the lot of Dr. Karl Scherzer, one of the scientific members of the expedition, who has executed his task with great ability. Already an English edition of the first volume has appeared. The physical and geognostic suggestions which were written out by Humboldt for the guidance of the scientific inquiries of the voyagers, and which are prefixed to the narrative, are full of that love of nature which, to the last, animated the great and illustrious traveller.

In the volume which is to follow we shall doubtless have good descriptions of the natural history of the regions visited, for, as respects the geological structure of some of those tracts, Dr. Hochstetter has already published excellent detached notices.

The woodcuts, as executed at Vienna, and which are spread throughout the first volume, are of first-rate excellence.

*Russia*. \*—Russia has always claimed our special attention, and our Presidents have always considered it an important duty to place before the Society a sketch of the Researches of Russian Geographers during the past year, which, being published in a language very little known, are accessible to but few of our members.

The *Compte-Rendu* of the proceedings of the Imperial Society, during the year 1860, is indeed already before the public in the French language, and does great credit to the Secretary, M. de Thörner, who has prepared it. For, as the detailed descriptions of the countries examined are published in the Russian language, this resumé of the proceedings of our old allies is really most important. Established, as this Imperial Society was, on the same basis as our own body, the Secretary commences, as we do, their last year's Report with sketches of the lives of the recently deceased geographers of Russia. M. Savelieff, M. P. Kalmykoff, and General Tanner, are spoken of in terms of well-merited praise. The last of these is indeed one of those eminent practical geographers whose labours have been before enlarged upon by Sir R. Murchison, and whose measurement of the great Russian arc of the meridian, in conjunction with Struve, has rendered his name famous for all time among geographers.

The attention of Russian geographers has recently been much

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\* Thomas Michell, Esq., F.R.G.S.

divided between the country of the Amùr, definitively ceded to Russia by General Ignatief's treaty, and those regions of Central Asia which Russia has been so long engaged in exploring.

English geographers have already been informed that a scientific expedition was despatched to the Amùr, under the auspices of the Imperial Geographical Society. Mr. Schmidt, the chief of the geological section of that expedition, made some very important observations during a voyage from the new town of Blagovestchensk, at the mouth of the Zeya River to the port of Nicolaefsk, at the mouth of the Amùr. He denies the existence of volcanic rocks reported by other travellers, and found nothing but sedimentary deposits.

Early in June of last year Mr. Schmidt visited the island of Sahalin, held jointly by Russia and Japan, though virtually, and notwithstanding the treaty of Simoda (1855), in the sole possession of Russia. On landing Mr. Schmidt at once recognised the rocks of the banks of the Amùr as belonging to the carboniferous formation which prevails in the island, as well as in the basin of the Amùr. Mr. Schmidt has been authorised by the Imperial Geographical Society to devote the whole of this summer to the exploration of the island of Sahalin.

The expedition will return to St. Petersburg in the autumn of 1862, after passing the summer of that year in a minute exploration of the Amùr basin. Two assistants have been sent out to Mr. Schmidt; Mr. Plehn, who replaced Baron Maidel, and Mr. Brylkin, despatched by the Siberian Section of the Geographical Society; the latter being a gentleman well known as an explorer of the rivers Ussuri and Amùr.

Mr. Schwartz, the chief astronomer of the Mathematical Section of the Amùr expedition, is busily completing his calculations, and his assistant, Captain Rajkof, whose name already appears in our Transactions, has been thanked by the Council of the Imperial Geographical Society for the remarkable manner in which he has fulfilled the various duties with which he was entrusted.

The Imperial Geographical Society is now engaged in preparing a map of Eastern Siberia, including a portion of the Trans-Baikal country, the government of Irkutsk, and a part of that of Yeniseik, also in compiling an account of the labours of the Siberian expedition, and a work on the meteorological data now collected by the latter.

We cannot but appreciate the indefatigable exertions of the

geographers of Russia in throwing the light of science over such a vast country, and we should indeed be sorry if so much labour, so many hardships and privations, and so much money, were not requited by some of the material advantages at first expected, though as yet but little realized.

The geography of Central Asia has been enriched by several communications by Fellows of the Imperial Geographical Society of Russia, travellers in that interesting country.

Mr. L. Venuikof, one of the best modern authorities on the countries adjoining the south-eastern frontier of Russia, read a memoir in October last on the lake of Issyk-kul, from which he had just returned. After giving a short account of the topographical labours of his expedition on that lake and the Kashkar River, and pointing out the valuable additions thereby made to the works of Nifantief, Kiepert, Semenov, and Fakharof, Mr. Venuikof entered into some particulars respecting the lake Issyk-kul and its immediate neighbourhood. His attention was more particularly directed towards the south-west part of the lake, and the valley of the Kashkar, a portion of the country which had never yet been explored by scientific travellers. This gentleman has, to a great extent, dissipated the illusions hitherto entertained by some persons in Russia as to the great fertility of the country in the vicinity of the Ili River, and its adaptability to cultivation, and especially in reference to colonization. He also gave a very interesting description of the Kuté-Mandakh River, uniting the river Chu, which forms to some extent the boundary of Russia, with the lake of Issyk-kul. His researches at the source of the Chu afford much valuable information. The Kashkar rises in the Celestial or Tianchan Mountains, and flows through a natural pass in that chain, issuing from gorges which terminate in the valley of the Naryn and at the Alpine Lake of Son-kul, hitherto but vaguely known to geographers. Mr. Venuikof has further contributed some observations on the Sary-Baguiche tribe inhabiting that part of Central Asia.

Mr. Kuléwein, who accompanied General Ignatief in his late mission to Khiva and Bukhara, has given an account of his journey, which will be published in the Journal of the Geographical Society of Russia. He describes the Khanat of Khiva as it was under the administration of Seid-Mohammed-Khan (1856-1860), and traces the journey of the mission across the steppe of Orenburg, along the western shore of the Sea of Aral, as far as the lake of Aiboughir; the passage over that lake near the promontory of Urga, the arrival



of the mission at Kungrad on the Amu or Oxus, and a voyage of 18 days on that river, in native boats, as far as Khiva. Mr. Kuléwein proceeds to describe an audience of the Khan Seid-Mohammed, the administration of that chief, and the events which preceded his election, and to throw some light on the relations which then existed between Russia and that Khannat. Much valuable information has been obtained respecting the rising of the Turcomans, with whom Persia is now at war, the revolt of Kungrad, and the election of Mahommed-Fannah. As soon as Mr. Kulléwein's memoir appears in print many of us will, no doubt, eagerly apply to it for information regarding the limits of the Khannat of Khiva, its population, agriculture, and commerce, subjects which are extremely well treated by this able diplomatist. M. Kuléwein has presented to the Imperial Geographical Society photographic sketches of the country, and its native types, as well as of the coins in circulation in Khiva and Bukhara.

The explorations of a party sent by Dr. Bergstreusser to inquire into the practicability of uniting the Caspian with the Sea of Azof, and which were mentioned in the Address of last year, having resulted in a very favourable description of the country, and of the facilities which it afforded for colonization, the minister of the Crown domains of Russia despatched another expedition with the view of exploring scientifically the low valleys of the Kuma and Manych, and the Kalmuck steppe, which extends between the Don and the Volga. Instead of finding a navigable stream, the exploring party walked dry-shod along the so-called valley of the Manych from the Mojar salt-works, 60 miles from the Caspian to the very course of the Don. At the cost of great fatigue and many hardships this party ascertained that the Manych is nothing but a channel or bed eroded by the waters of spring, watered during a very short period of the year, and then left dry with a few intervening lakes or pools. Moreover the saline properties of the soil preclude all possibility of peopling these solitudes; and the absence of any population, added to the difficulty of collecting and retaining the spring waters in artificial reservoirs, are obstacles which can never be surmounted.

The geological researches of M. Barbet de Marny, a member of that expedition, have proved that the existence of the strait which united the Caspian with the Black and Azof seas, can only be referred to a period beyond the reach of history, and that its disappearance is to be attributed to that upheaval of the soil which pro-

duced the low country of the Manych, the country of the Cossacks, of the Black Sea, and raised up the steppe limestone of the Kuma and Volga, or country of the Don Cossacks. The examination of a canal would therefore necessitate the removal of those obstacles which the powerful hand of nature has placed between the two seas.

The officers of the Russian Surveying Expedition in the Caspian were enabled during the course of last summer to make a geodesical measurement of the peak of Demavend from two astronomical points, namely, from great Ashur Island, in Astrabad bay, a Russian naval station, and from the mouth of the Tedjen River, near Ferahabad, about 40 miles to the west of Ashur. The geographical position of those two points was determined astronomically, and by means of 17 chronometers used in the Caspian survey. The azimuths of the hill were determined at the two stations by one of Repsold's circles. The measurement from Ashur Island gave 18,551·0 Russian (or English) feet, above the level of the Caspian, and that from the point near Ferahabad 18,547·5; the mean altitude being 18,549·2 feet.

These measurements were apparently made with great care, and Captain Ivastchinzof, the chief of the expedition, is persuaded that, even under the most unfavourable circumstances, the altitude thus obtained must be quite within, at most, 130 feet of the truth.

It will be recollected that Mr. Thomson, Lord H. Schomburg Kerr, and Mr. St. Quentin, estimated the height of Demavend at 20,192 feet; and that Baron Minutoli and Dr. Burgsch, who, in July, 1860, likewise measured it by means of barometers, give figures almost similar, viz., 19,000 to 20,000 French feet.

The Surveying Expedition will probably have several other opportunities of measuring the height of Demavend. Captain Ivastchinzof expresses a wish that a similar measurement should be made from the Persian Gulf by means of stations, an undertaking which would decide the interesting question of a difference in level between the Caspian Sea and the Persian Gulf.

An article on the measurement of Demavend is contained in the 'Morskoi Sbornick,' or Naval Magazine, for the month of April, a work in the Russian language which is regularly received at the Hydrographic Department of the Admiralty.

While on the subject of mathematical geography attention must be directed to the proposal of Mr. K. Struve, Director of the Nicholas Observatory, at Pulkova, to effect a vast measurement of a meridional arc passing by the 52° of latitude, to extend from Valentia

in Ireland,\* across the whole of Europe, to the fortress of Orsk, situated on the confines of the Government of Orenburg, and to embrace, therefore, 69 degrees of longitude. Last year Mr. Otto Struve was commissioned by the Russian Government to enter into communication on this subject with the Governments of Prussia, Belgium, France, and England; in each of which countries the project was most favourably received. Forty of the degrees of longitude to be embraced in this measurement belong to Russia, 12 to Prussia, 4 to Belgium, 2 to France, and 10 to Great Britain. It is also proposed to measure two other meridional arcs on the 47° of latitude as a means of checking the other operation: the first extending over 13 degrees in France, and the second over 20 degrees in Russia, from Kishenef to Astrakhan. Thanks to the careful triangulations already effected all over Europe, this gigantic work may be completed in the course of a few years. The necessary preparations are already being made in Russia and elsewhere.

Great as the activity of the Imperial Geographical Society of Russia would appear to have been, even from this imperfect sketch of its labours during the past year, a considerable portion of the attention of that industrious body has been devoted to statistics and political economy; branches of learning which belong to a distinct section of the Imperial Geographical Society. In the absence of a special Statistical Society at St. Petersburg, it is obvious that the labours of that section must be of immense advantage to Russia at a moment when the development of her vital resources is receiving the most serious attention of all classes, under the philanthropic inspiration and guidance of an enlightened Monarch.

Although not within the strict province of geography the very interesting labours of the Political Economy Committee of the Geographical Society of Russia must be noticed. This committee has held several meetings during the last winter, attended by some of the most enlightened men in Russia, including His Imperial Highness the Grand Duke Constantine, who, by taking an active part in the proceedings, has proved himself a real friend to the intellectual progress of his country.

This committee have had under consideration the causes of the financial difficulties of Russia, the recent stagnation in the trade of that country, the colonization of the Amùr and Central Asia, the emancipation of the serfs (as a "fait accompli"), and the subject of an international decimal system of measures, weights, and coins.

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\* See page 180 of this Address.

Lastly, it must be stated, that under the auspices of the Imperial Geographical Society of Russia, all those important resolutions were carried by powerful majorities of the committee in a truly liberal spirit, and in consonance with the doctrines of Adam Smith, J. Stuart Mill, and other economists, of whose principles England has so long been the practical exponent.

#### HINDUSTAN, SIAM, BURMAH, CHINA, AND JAPAN.\*

On the subject of India Proper or Hindustan no communications have been made to the Society, but the name suggests a duty which has often fallen to former Presidents, of referring to the triumphant scientific career of Sir Andrew Scott Waugh, late Surveyor-General of India, now happily returned to his native country, after the active service of two-and thirty years. As the worthy successor of Lambton and Everest, Colonel Waugh brought to a conclusion the great achievement of the Trigonometrical Survey of India. The value of his services may be judged by the single fact, that in seventeen years' time he executed the triangulation of 316,000 square miles, an area nearly equal to the united areas of France and Spain, while he effected the topographical survey of 94,000 square miles, but little short of the surface of the British Islands. Colonel Waugh's operations were sometimes carried on at an elevation of 20,000 feet above the level of the sea, and sometimes over swamps almost on the sea-level; the air, from its rarity, difficult to breathe in the first case, and, from its deleterious quality, dangerous in the last. The combination of high qualities necessary to conquer these difficulties may readily be imagined, and they met in the person of the late Surveyor-General of India, now Sir Andrew Waugh.

Respecting Persia, the only contribution we have during the season, is the Narrative of a Journey across the Eastern Frontier of that country to Afghanistan, by Captain Claude Clarke. The journey extended from Meshed to Herat, a country seldom visited by Europeans. It embraces a portion of the great Salt Desert of Khorassan, a tract of small fertility and greatly infested by predatory hordes of Turcomans.

On the subject of the little known but vast region which lies between India and China, we have had several interesting and instructive communications. Captain Sprye and Dr. McCosh furnished to the Society elaborate Papers respecting the countries

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\* John Craufurd, Esq., F.R.S.

which lie between the British frontiers, respectively, of Bengal and Pegu and the Western confines of China, suggesting routes for the establishment in this direction of a commercial intercourse with the Chinese empire. It is only necessary to say that the subject gave rise to a lively and interesting discussion at the meeting at which the Papers were read.

On the kingdom of Siam we have had two valuable communications, both from Sir Robert Schomburgk, her Majesty's consul. These are narratives of his own journeys over parts of the kingdom seldom if ever visited by intelligent Europeans. Siam, after being for a century and a half almost as much excluded from European intercourse as Japan itself, has of late years, chiefly owing to the enlightened character of its present sovereign and the large commerce which has resulted from it, become an object of interest and importance to all the European nations, and more especially to ourselves.

The great Asiatic Archipelago, including the Malay and Philippine Islands, has been brought under the notice of the Society by two original and valuable Papers, describing portions of them hitherto little or very imperfectly known. One of these, by Mr. Spencer St. John, her Majesty's Consul-General in Borneo, gives an elaborate account of the physical and political geography of the north-eastern portion of the great island of Borneo. The other is by the eminent naturalist, Mr. Alfred B. Wallace, and gives by far the completest account hitherto rendered of the trade of New Guinea and the adjacent islands inhabited by the Papuas or Oriental Negroes. The importance of the Great Archipelago in question may be judged by the facts, that its population is computed at not less than twenty-five millions, while its external commerce, as conducted by the Dutch Spaniards and ourselves, is of the yearly value of thirty-six millions sterling.

Several interesting contributions to our knowledge of the vast empire of China have been made during the season. Thus, we have had an account of the survey of the Si-kiang, or Western River, by Lieutenant Lindsay Brine, R.N., while her Majesty's Ministers have supplied us with the Admiralty directions for the navigation of the rivers Si-kiang, Yang-tse-kiang, and Pei-ho, with that of the gulf of Pechili. It may here be mentioned that, for the prosecution of geographical knowledge, two expeditions are at present in progress; the one from the British territory in India into Chinese Tartary, and the other into the north and western

provinces of China, passing from the eastern side of China by the Great River into the provinces in question, and from them into Tibet, ending with the neighbouring British Indian territory.

It would be superfluous in this place to expatiate on the importance of China to our own well-being, but a few facts may be noted, which are both striking and illustrative. The joint amount of our own trade, export and import, amounts to 14,000,000*l.* a-year, exclusive of the trade with our Indian possessions. This trade is furnishing us with 76 millions of pounds yearly of a commodity—tea—which no other country can supply, and without which we could not, from long habit, live comfortably. Through that commodity, from five to six millions sterling are placed in the public treasury. China pays a yearly tribute to India of not less than five millions, without which our Indian dominions could not be conveniently held. And, finally, it contributes one half of the raw material of one of our great manufactures, silk, which is even more than Australia does for the woollen manufacture, great as is its assistance.

The empire of Japan, with its singular population, equal at least in number to that of our own island, and, among Asiatic nations, second only to China in civilization, is now fairly open to us, after an almost total isolation of two centuries; the unquestionable work of steam navigation. On this interesting and important country we have valuable and original communications. One of these is by our able and experienced minister, Mr. Rutherford Alcock, describing a journey into the interior of the main island, Nippon, and another to the Sacred Mountain Fusi-yama, which may be called the Olympus of the Greeks or the Meru of the Hindus. The second communication is by Mr. Pemberton Hodson, her Majesty's consul at Hakodadi, the chief town and port of the Island of Yesso, a conquest of the Japanese made within the last three centuries, and whose native population, its Japanese inhabitants being but colonists, consist of a distinct and peculiar race. It is satisfactory to think that already the trade of Japan holds out good promise, for we find that in the course of last year we received from it no less than 7000 bales of raw silk, being three times the quantity which China furnished forty years ago, the quality being equal to the best Indian.

## ARCTIC REGIONS.\*

There are at present two expeditions occupied in attempts to reach the Pole. One, under Dr. Hayes, sailed from Boston on July 10th, 1860, in a vessel of 140 tons, called the *United States*, and arrived at Upernavik on August 12th. Here he obtained dogs and furs, and an interpreter named Mr. Peter Johnson. The last accounts from him are dated Tessinsak, August 23rd: he hopes to reach Cape Frazer, in lat.  $79^{\circ} 42'$ , on the east side of Peabody Bay, where he intends to establish his winter-quarters, and then pursue his explorations northerly along the shore of Grinnell Land.

The second expedition, under Dr. Forell, with several volunteers of education, assembled in April at Tromsø where they would be joined by Petersen, who carries up with him 20 cases of pemmican remaining from the store of that article supplied by our Government to the *Fox*. They then proceed to Spitzbergen, where they will winter, and follow Parry's route to the northward. These two expeditions will, in all probability, settle the question of an open sea in the vicinity of the Pole, and afford meteorological and tidal observations of great importance in high latitudes.

Renewed search for the *Erebus* and *Terror*.—Mr. Hall, a native of Cincinnati, has started in a whaler called the *George Henry*, on board which vessel he intends to winter in Cumberland Inlet, and in the spring to start in a boat manned by Esquimaux, following up the east coast of Fox Channel to the Strait of the Hecla and Fury, and so round the bottom of Prince Regent Inlet. The latest account from him is dated from his winter-quarters in lat.  $62^{\circ} 51'$  and long.  $65^{\circ} 5'$ , when he claims to have discovered that Frobisher's Strait is an inlet.

Captain Parker Snow is fitting out a small schooner, the *Intrepid*, of 45 tons, in which he hopes to get away in June, and, following up McClintock's track, endeavour to push through Bellot Strait and reach King William Land.

The operations connected with the proposed route for the North Atlantic telegraph has appeared in the Proceedings of the Society; and a translation of a Paper on the currents and ice-drifts on the coast of Iceland has been forwarded by its author, our Corresponding Member, Captain Irminger, of the Royal Danish Navy, which

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\* Captain Richard Collinson, C.B., R.N.

will also find a place in our Proceedings, as it contains a succinct account of the ice-drifts round the shores of that island from the thirteenth century.

Sir John Richardson's account of the Polar Regions, reprinted from the *Encyclopædia Metropolitana*, has become so popular that there is perhaps no occasion to call the attention of the Members of this Society to it, unless it be to pay a just tribute to the author for the comprehensive view he has given of those portions of the globe which have of late years been the scene of so much exploration.

#### BRITISH NORTH AMERICA.\*

The map of the country from Lake Superior to the Pacific coast, at Vancouver Island, which has been recently published in our Proceedings, to illustrate the various reports of PALLISER'S EXPEDITION, gives a clear view of the great additions which have been made within the last few years to our previously scanty knowledge of the geography of this region.

It is now placed beyond doubt that, within the British possessions, there are extensive areas, with good and varied soil, adapted for agricultural colonization, but at the same time subject to all the defects as well as the advantages of a temperate continental climate.

Within the territories of the United States, the Eastern Prairies, which have been so justly celebrated for their wonderful fertility, are succeeded to the west by a more or less arid desert, occupying a region on both sides of the Rocky Mountains, and interposing a barrier to the continuous growth of settlements between the valley of the Mississippi and the rich states of the Pacific coast. It is not therefore probable that, under such conditions, any line of route for heavy or rapid transport will be remunerative, while, in the present disturbed state of America, its construction may be indefinitely delayed. It is thus highly satisfactory for us to know that this central arid tract extends but a short way to the north of the boundary-line; and even there derives its character rather from the nature of the soil than from any climatic conditions. Further, along its northern border, there lies between it and the sub-Arctic forests a belt of land, from which the woods have been cleared by the agency of successive fires, the first and most arduous labour of removing the timber being thus spared to the future settler. This

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\* Dr. Hector, F.R.G.S.



“fertile belt,” the first recognition of which most important feature is due to Palliser’s Expedition, stretches from the southern end of Lake Winnipeg in a north-western direction continuously to the base of the Rocky Mountains, and affords throughout land which may be profitably cultivated; so that settlement within our territories will not meet with the same obstacle to its westward progress that it meets within the United States.

In this region the winter, though severe, is not more so than that experienced in Canada; and, in the western districts of the Upper Saskatchewan, the spring commences nearly a month earlier than on the shores of Lake Superior, six degrees farther to the south. On the other hand, in summer, owing to its higher latitude and altitude above the sea, the sun is less powerful; so that many crops which are readily raised in Canada will not meet with equal success here. All the ordinary cereals and green-crops have, however, been grown successfully, though severe frosts at night are occasionally experienced even late in the season. The depth of the snow is never excessive; while the pasture is so rich and abundant that cattle and horses may be left to obtain their own food throughout the greater part of the winter; and, with proper care and attention, there is no doubt that even sheep might be safely reared. It is only during the month of March, when the snow acquires a glassy crust, from the heat of the midday sun succeeded by hard frost at night, that stock would require to be fed.

While thus in some respects this country may bear comparison with Canada, we must not forget the total want of all the finer kinds of timber, which are such a valuable source of wealth to that province. To the settler deficient in capital, but content with the easy life and moderate gains of simple agricultural occupations, the Saskatchewan country offers a most desirable field; and it is only the difficulty of access to it that, for the present at all events, prevents its immediate occupation.

But upon this point we are no longer without abundant and accurate information. The route hitherto used by the Fur Company, which enters the country by Hudson’s Bay, is so inferior that it has within the last few years been almost abandoned by them; that which they have now adopted, and which physically forms the natural entrance into the country, is through the American territory, from the valley of the Mississippi to that of the Red River of the north. A large portion of the fertile prairies of the latter valley lie to the south of the boundary-line, and will be “settled up” by

American citizens, and traversed by a line of railway; so that, whatever other route may be likewise opened, this will remain permanent, and will in all probability be preferred to any other by the emigrant. The only other route which, for political reasons would doubtless be the most desirable, is that which would connect the Red River settlements directly with Canada, without leaving British territory, by following the canoe-route from the shores of Lake Superior, in a north-west direction, by Rainy Lake and the Lake of the Woods. The united testimony, however, of the many exploring parties which have traversed this region shows that the construction of any such line of communication would be almost impracticable from its expense. This has been rendered only the more apparent by the minute survey of that district by the recent Canadian Expedition, the report of which, although excusably partial, affords small hope of obtaining any means of transport sufficiently inexpensive to be useful to the emigrant, by which stock could be conveyed into the country, or produce find its way thence to the Canadian marts.

There is no doubt that if the country of the Prairies were once inhabited by a large and producing population, this object could be obtained by a line of railway which would connect it directly with Canada; but at present such a line could only be made as part of a great national enterprise, with much wider aims in view than the mere extension of the Canadian settlements westward; as, for instance, the connection of the Canadian provinces with our new colonies on the Pacific coast. From Red River westward such a line, by following the "fertile belt," would pass through country that can be easily settled. The Rocky Mountains themselves, we now know, may be much more easily traversed than was formerly supposed, as they only present a narrow strip between 50 and 60 miles broad, beyond which commence the auriferous valleys of British Columbia. In reaching the Pacific coast from the Rocky Mountains, the difficulties to be overcome by the engineer are far more serious than any to be encountered along the eastern slope; but the mineral wealth of the country, necessitating the construction of roads, affords more inducement to the laying out of money on this than in any other part of the route.

The search for superficial gold ensures the active though temporary settlement of this country; while its buried, but more lasting, mineral products will retain a considerable permanent population, and give that solidity to the wealth of the country which alone

would warrant the construction of such a line of railway through a difficult and otherwise unproductive country.

The advantage of Vancouver Island as the western terminus for such a magnificent work, possessing as it does perfect natural harbours, and abundance of coal of good quality, are already well known to us all. Next year, however, we shall have an opportunity of becoming better acquainted with the resources of our new colonies, as, by advices just received, we learn that the colonists are energetically engaged in preparing a collection of samples of their mineral and other products for the Exhibition of 1862.

In connection with this subject, I may remind the Members, that on the islands of Japan and Formosa there exist extensive deposits of coal, which would thus form valuable stations between the north-west coast of America and our Indian dependencies and China—a natural fitness not to be overlooked in a scheme for communication with these countries by the Canadas, Saskatchewan, and British Columbia.

#### SOUTH AMERICA.\*

We have received from Dr. V. Martin de Moussy the first two volumes of his work entitled 'Description Géographique et Statistique de la Confédération Argentine,' recently published at Paris,—the result of four years' travels through the fourteen provinces of the Rio de la Plata for the express purpose of collecting for the Government, of that republic, and with their aid, details relative to the physical geography and statistics of their population, agricultural, industrial and commercial capabilities, their geology, mineralogy, and natural history; in fact, to use the author's own words, he has had to form a general encyclopædia of the great basin of the Rio de la Plata, for which a residence of 12 years previously in the neighbouring state of the Uruguay seems to have well qualified him. We shall look with interest for the conclusion of this work, and especially for the atlas which is to accompany it; and in the mean time recommend Dr. de Moussy's book to all persons desirous of the most minute and detailed information regarding the countries of which he treats, and which seem only to require the aid of European emigration on a large scale to develop their vast natural resources, and to make them the most important of all the Spanish American states in South America.

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\* Sir Woodbine Parish, F.R.G.S.

On *Paraguay* another French writer, M. Demersay, has presented to the Society the first volume of a work he is now publishing, entitled ' *Histoire Physique, Economique, et Politique du Paraguay, et des Etablissemens des Jesuites* ' (Paris, 1860).

The author was sent to South America in 1844 to collect information relative to the least known parts of the interior of Brazil and Paraguay, of which this work professes to give the results. The present volume is divided into chapters upon the political boundaries, the orography, hydrography, and climate of Paraguay, its fauna and zoology, and, lastly, on the ethnological characters of its inhabitants.

At the outset of his travels in South America M. Demersay had the good fortune to find M. Bonpland, the venerable companion of Humboldt, still living at San Borja, who received him with the greatest kindness, and gave him access to the journals and diaries of his own travels and researches during the thirty years previous.

In alluding to M. Bonpland, M. Demersay supplies some information, which will, I am sure, be of interest to the members of this Society, regarding the fate of his papers and collections of natural history. He has no hesitation in stating that M. Bonpland had no work prepared or preparing for publication, although he left a voluminous collection of notes upon his travels in South America, including extensive geological and botanical observations on Paraguay, the Rio Grande du Sud, the province of Corrientes, and the Missions, in which he so long resided. Two chests full of these MSS. it appears have been forwarded to France, and are now claimed by his heirs.

With regard to his collections of minerals and natural history, M. Bonpland had made a special bequest of them to the Museum at Corrientes, which he had himself founded. The Government of Corrientes, however, have offered to give them up to that of France in exchange for books and instruments, which they are more in need of; and, as this offer has been accepted, they will probably be sent to Paris, where they will be most prized and rendered available for the sciences to which they pertain.

#### AUSTRALIA.\*

Since the last anniversary the march of discovery in the hitherto unexplored portions of this vast mass of land has been most

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\* Sir R. Murchison, Vice-President, R.G.S., &c.

remarkable. In the adjudication of one of our Royal Medals to Mr. MacDouall Stuart, allusion has been already made to the value of travels, which, though undertaken under discouraging prognostics, were carried out with such perseverance and ability as to have thrown a new light on the condition and capabilities of large tracts of the interior.

The public must not, however, be led away by the success of this adventurous and successful traveller to adopt the belief that there are vast internal tracts of great *continuous extension* where colonists can settle. The data ascertained by Stuart amount simply to this—that, at considerable distances from each other, there exist *oases*, refreshed by springs, in and around which good pasturage for sheep and cattle are to be obtained. On the other hand, these oases are separated from each other by broad tracts of bushy scrub, often saline, most difficultly permeable, and in which no trace of springs has been detected. Such intercalated waterless tracts present, therefore, considerable but by no means insuperable obstacles: for, if Stuart could traverse and retrace them with his appliances, how much less will be the difficulty when the scattered and well-watered oases become so many centres of occupation by the location of herdsmen and the erection of rural habitations, such, for example, as Messrs. Chambers and Finke, the spirited employers of MacDouall Stuart, propose to establish.

So soon, indeed, as interest points out the road, most surely then will our adventurous colonists push their flocks northwards, and thus render South Australia mistress of many a tract in the interior.

This once accomplished, and the shores in the vicinity of Cambridge Gulf reached (which Stuart is now endeavouring to effect), we shall then have in our hands the means of establishing a ready line of telegraphic communication across the great continent from the south to the north, to which attention has been specially called by Sir Richard Macdonnell, and by which we may place our Australian colonies in direct communication with our East Indian possessions.

This view of the subject necessarily leads us to the main desideratum towards the completion of the successes of our great Australian colonies, by the establishment of a port in one of the numerous deep and capacious roadsteads on the coast of Northern Australia. This desideratum has been earnestly pointed out to this Society on previous occasions by Sir R. Murchison, who has for

many years taken a keen interest in the development of the resources of Australia; and now that we see our way to the formation of direct pathways thither across the continent, our Government may, if unwilling to lead, still deem it desirable to lend a fostering hand towards the formation of a settlement in tropical Australia. The surveys of Captain Stokes, followed by the expedition of Mr. F. Gregory, have completely proved that the eastern inlets of Cambridge Gulf and the mouth of the northern Victoria river are spots well adapted to receive a new colony.

Let it not be said that the heat of the climate, about 15° s. latitude, is a fatal impediment to the flourishing condition of any colony of which Englishmen are the leaders, but not the operatives. Nor let the example of Port Essington, which was occupied for a few years and then abandoned, be cited as a warning against the success of a better chosen settlement on that coast. Port Essington, besides being four degrees nearer to the Equator than the head of Cambridge Gulf, was so ill-selected a spot, so exposed to tornados and malaria, that its failure might *à priori* have been predicted. On the other hand, such a site as that near the mouth of the Northern Victoria, where Gregory's camp was pitched, would ensure a good result. For there our countrymen lived during many months without the loss of a man, and were surrounded by a rich vegetation, including native cotton. To such a settlement Malays, Chinese, and Coolies would easily be attracted by English wages, and, under the influence of the sea-breezes, fine cotton plantations might arise, and thus secure for us in our own Australia the very staple on which the chief manufacture of our country relies.

That North or Tropical Australia is destined to be occupied by our countrymen seems to be no longer doubtful, when we look to the advance made towards it by the other colonies of the continent as well as by South Australia.

Thus, Mr. F. Gregory, whose explorations in the interior of West Australia have already shown to how great an extent flocks may be pastured to the eastward of that colony, and have made us acquainted with the subsoil of large districts, is now at the head of an expedition supported jointly by the British and local governments, which, disembarking to the north-east of the Murchison and Gascoigne rivers, is proceeding towards the same goal whither Stuart is tending from the south.

At the same time we learn from Victoria, that with the hearty approbation of Sir H. Barkly, a great land expedition is proceeding

across the interior aided by camels—animals for the first time employed in Australia.

Again, if we turn to the remarkably flourishing new colony of Queensland, we know from the Governor, Sir G. Bowen, that its most forward northern settlers are already pushing on towards the Gulf of Carpentaria, whilst others are working their way gradually westwards into the interior. By such means therefore we cannot doubt that, as the material interests of the colonists lead them to extend their locations, we shall, ere a quarter of a century has elapsed, have so taken possession of the northern coast that no other nation can occupy grounds on which the British flag was first hoisted by Flinders, and whither we have since sent several explorers. In short, Britain being in actual possession of three sides of this continent can never permit any other nation to set foot on the remaining coast, facing as it does her great Eastern possessions.

In speculating, as many persons have, on the probable sterile and saline condition of a large portion of the interior of Australia, it is fair to say that many solid grounds existed to favour that hypothesis. The absence in the interior of any great rivers announces the non-existence of lofty ranges of mountains, and this fact constitutes the great difference between the central region and the eastern fringe of the continent, where a rocky cordillera, rising to a considerable altitude in its southern extremity, is the source of the mighty Murray river. As this chain arrests the clouds fleeing from the Eastern Ocean, it was naturally inferred that the interior on the west, if unprovided with high hills, must be sterile. And so, indeed, to a great extent, it has proved to be. For, although MacDouall Stuart has shown that along one devious path a traverse can be made from south to north, no sooner did he turn eastwards and follow the small streams which rise in the low ridges on the west as they flow to the central depression, than he found them becoming saline at their mouths, and terminating in a great salt lake ranging from south to north.

That this saline lacustrine depression must have a certain width is demonstrated by the fact, that when Sturt explored northwards to latitude  $24\frac{1}{2}^{\circ}$ , he found himself in a stony, arid desert, which was evidently the eastern side of that great watery saline north and south depression of which Stuart has defined the other side in a lower latitude.

Judging, then, from our present stock of information, it would seem rational, in the absence of any mountains of sufficient altitude

to condense vapour, and with the knowledge that certain waters flowing from low hills tend to a central depression, to infer that other low saline tracts besides those which we already know of will be detected in Central Australia. This view is, indeed, sustained by the exploration of Mr. F. Gregory in his memorable explorations in North Australia, when, after proceeding from the higher grounds near the northern coast, he descended into a lower interior country, and was stopped by its saline character.

But if such should prove to be the case in the internal tracts immediately to the north of Lake Torrens in South Australia, it is quite within the bounds of probability that the views of Colonel Gawler respecting the valuable and well-watered character of a very large region lying between Western and Southern Australia may be realized. In the mean time enough is already known to enable us to express a confident belief that, ere a generation shall have passed away, all the colonies of Australia will be united, if not by internal roads, at all events by electric telegraphs, whilst through her northern ports she will enjoy a direct communication with India and China.

#### AFRICA.\*

The past year has been characterised rather by the publication of previously completed journeys, and by the outset of new expeditions, than by any accomplished work of actual exploration.

Livingstone is almost the only traveller who has advanced far into Africa since our last Anniversary; and even his journeyings, in which he took back to their home the remnant of that faithful Makololo body-guard whom their chief had confided to his honour, lay too near his previously-described route to afford much geographical novelty. We have, however, from his pen and from that of his brother an exceedingly graphic re-description, careful measurements, and a small map of the unique cataract of Mosioatunya, popularly called in England the Victoria Falls. They show that Livingstone, in his previous journey, had so anxiously avoided exaggeration as to fall into the opposite error, and that he had considerably underrated the scale of this marvellous cataract. It now appears that the river is upwards of a mile in breadth, and that, when flowing over a level country, it comes suddenly upon a connected series of deep and narrow chasms running in abrupt zigzags athwart its bed, but hardly extending beyond it: these finally

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\* F. Galton, Esq., Hon. Sec., R.G.S.



widen out, and lead away in the general direction of its course. Into the first of the chasms, which happens to be less than 100 yards across, the entire Zambesi tumbles at a single leap (but in many divisions, at least at the time of extreme low water) to a depth of 400 feet, and thus disappears from the surface of the land. After its fall, the river is visible from occasional points of view, struggling in those strangely-contracted and tortuous depths through which it has to make its further way.

By our last intelligence Livingstone's new steamer had reached the mouth of the Zambesi, and he had started in her to explore the Rufuma River, which may prove the most convenient highway from the coast, to the Shirwa and Niassa lakes. Bishop Mackenzie accompanied Livingstone. He had arrived, with about ten members of the Oxford and Cambridge mission, ready to commence operations at such point as Livingstone might recommend. Yielding to his urgency, he has postponed fixing on any locality until the Rufuma shall have been examined: in the mean time the other members of the Bishop's party are located in healthy quarters, in the Comoro Islands. Sad news has been received of the mortality among a party of missionaries who were despatched to the Makololo overland from the Cape.

Between the Rufuma River and the latitude of Zanzibar, we have to lament the failure of two expeditions undertaken with great zeal. The scientific German traveller Roscher was murdered close to the Niassa Lake, and the Baron von Decken, who started from Zanzibar in prosecution of Roscher's discoveries, and in search of his papers, has been robbed, repulsed, and compelled to return. However, in despite of this mischance, his energy is unabated, and he proposes a fresh attempt on a more northern district of Eastern Africa.\*

Captain Speke has taken the first step on his adventurous journey towards the sources of the White Nile. At the date of his last letters † he had attained the high plateau of the interior, over which an unobstructed course lay along his old route to the Nianza Lake. Beyond its southern shore that district of mystery begins, whence we shall anxiously watch for his emergence into the basin of the White Nile. But lest he might arrive in distress at those bar-

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\* Intelligence has just been received by Sir R. Murchison, that the geologist, Mr. Thornton, formerly attached to Dr. Livingstone's expedition, had, after recent travels in the neighbourhood of the Zambesi, arrived at Zanzibar, and undertaken to accompany the Baron Von Decken, who was on the point of starting for the snowy mountains of Kilimandjaro.

† See postscript to the Address, p. 217.

barous outposts of North African commerce during the dead season of the year, when no civilized help is to be hoped for, and when adverse winds and heavy rains make further progress impossible either by water or by land, the Council of this Society has made every effort to utilise the proffered services of Mr. Petherick. That gentleman, H.B.M.'s Vice-Consul at Khartum, who is eminently capable from his position and his experience to render the desired assistance, offered to station himself at Gondokoro until July next, with well-armed and provisioned boats, to await the coming of Captain Speke. On our appealing for the necessary funds to the public, by a circular, in which the urgency of the case was explained, we must all have been gratified to witness the liberal response which that appeal elicited. A sufficient sum was speedily subscribed to carry out the above objects, and Mr. Petherick started last month on his journey.

Two travellers, stimulated by the first news of Speke's discovery of the Nyanza Lake, have anticipated him by a whole year in his present attempt. Both M. Legean and Dr. Peney left Khartum last summer, on the same errand, but by different routes—the former by Kordofan, and overland to the south; the latter in company with a large Egyptian expedition, by boats, to Gondokoro. Dr. Peney appears to have finally set at rest a long-disputed geographical fact, namely, the altitude of Khartum above the sea-level. By the published results of a large number of barometrical observations, he describes it to be 1100 English feet.

Lastly, some allusion must be made to the travels and sketch-map of Miani, who describes his route far beyond Gondokoro through a rugged and mountainous country traversed by the White Nile.

There is yet another traveller, the Austrian Consul at Khartum, Dr. Heuglin, in whom German geographers take an especial interest. He has started for Wadai, in search of the lost papers of Dr. Vogel, and with the intention of further research.

*West Africa.*\*—In Western Africa the energies of England during the past year have unhappily been more engaged in hostile collisions than in geographical research. The interesting republic of coloured men in Liberia has, like our own Australian colonies, encouraged exploration into the unknown interior behind their settlements which produced the results obtained by Seymour and

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\* Dr. Hodgkin, Hon. Foreign Sec., R.C.S.

Sims, which were referred to in the last Address. The first of these enterprising travellers started on a fresh expedition, hoping to penetrate still further into the interior; but he has fallen a sacrifice to the hardships and dangers to which he was exposed. He was a man whose name ought not to be consigned to oblivion. As one of the generally unfortunate class of persons of mixed African race, by birth Americans, he had not the advantage of early education, but he zealously improved such opportunities for self-instruction as came in his way; and it is doubtless to this cause that much of the value of the information which his energy and perseverance enabled him to collect is to be ascribed. Although he did not pretend to assign or correct latitudes and longitudes, he was able to note the character of the country, its soils and productions, in a manner well suited to advance the interests of commerce and civilization. His companion, James L. Sims, has for the present settled down, devoting himself to agricultural pursuits.

Some really interesting and valuable information regarding Western Africa, not however strictly geographical, is given by Robert Campbell, who appeared before the Geographical Society last year, in his pamphlet on Lagos, Abbeokuta, &c., printed in Philadelphia; and Alexander Crummell, a coloured graduate and ordained minister of Oxford, now a resident of Cape Palmas, and whose name appears in the President's Address of last year, has also published an important article in relation to the productions and capabilities of the same part of the world.

*Du Chaillu.*\*—Among the great problems which remained to be solved in South Africa, one of striking interest, which was alluded to at our last Anniversary, has been answered by M. Du Chaillu, a Frenchman by birth and education, and now a naturalized citizen of the United States. We have since had an opportunity of hearing from the traveller himself an account of his strange experience, of seeing his collection of huge anthropoid apes, quadrupeds, reptilia, and numerous birds, and of reading the detailed narrative of his eventful wanderings.

Livingstone was the first to reveal to us the great and important fact, that the region of Central Africa, extending northwards from the Cape Colony to 8° of s. lat., is a plateau-land occupied by great lakes, the waters of which, as previously suggested by Sir R. Murchison, would be found to escape to the

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\* Sir R. Murchison.

sea through gorges in subtending mountain-chains of greater altitude than the central watery plains. Du Chaillu, on his part, has so extended his adventurous explorations from the Western coast, north and south of the equator, as to describe for the first time the complicated river-drainage near the coast, which he has laid down on a map, and also to demonstrate that a lofty wooded chain extends so far into the heart of the continent as apparently to form a band of separation between Northern and Southern Africa. In many a tract to the north of this lofty zone, Mahomedanism has extended its sway; but to the south of it, in these meridians at least, no green flag of the Prophet has yet been unfurled; while a few zealous missionaries, living on the coasts under the Equator, and on both sides of the mouth of the river Gaboon, have established centres whence to propagate the Gospel of Christ. It was in one of those seats of the missionaries that young Du Chaillu, taken thither by his father who traded in the products of the country, first learnt the rudiments of the languages of the adjacent tribes, and obtained sufficient information to induce him, on his return to his adopted home, to fit himself out with presents, medicines, and arms, and then to enter upon one of the boldest ventures which man ever undertook. In vain had the missionaries and trading blacks dissuaded him from such an undertaking by depicting to him the savage character of the tribes of men (some of them cannibals) among whom he must trust himself, to say nothing of the ferocity of the quadrupeds and the impenetrable nature of the densely-wooded jungles and forests he would have to traverse. An intense love of natural history led him to plunge into these hitherto unexplored wilds. The giant anthropoid ape gorilla,\* specimens of which had some years ago been for the first time brought to Europe by traders on the coast, was known to flourish in all his pristine vigour in the interior, and many a curious quadruped and bird were described as being common to that region. The die was therefore resolutely cast by the young naturalist; and, with a few black carriers and canoes, and without one white attendant, he dashed into thickets where no European had ever put his foot. Gaining the goodwill of chief after chief, and being probably con-

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\* Though a few years only have elapsed since specimens of the great *gorilla* ape were first brought to Europe, there seems to be no doubt that Hanno, a Carthaginian navigator who reached the western coast of Africa southwards, did bring back the skins of the females of certain hairy creatures called Γορίλλαι, and suspended them in the temple of Juno at Carthage, as evidences of the discoveries he had made. (See the Periplus of Hanno, and Du Chaillu's 'Equatorial Africa,' p. 343.)

sidered by their sable majesties as a white spirit whose wrath might be fatal to them, and whom they must therefore propitiate, he has been enabled not merely to describe the singular habits both of the people and of the wild animals, but also to make a sketch-map of the region, and to define the course of the chief rivers, before and after they unite in a network of streams near the coast. When at the extreme eastern point of his tours, the information he derived from the natives led him to believe that the rocky and densely-wooded mountains really extended for so great a distance to the east that they might be supposed to send out embranchments into those highlands north of the Unianyembe Lake of Burton and Speke, which these authors called the Mountains of the Moon. Including periods of return to his friends the missionaries on the coast, and his voyages to and fro, he occupied nearly four years in these arduous explorations, and got together a greater quantity of apes, quadrupeds, and birds (some of them never before seen) than probably ever fell to the lot of one unassisted traveller. It is not our province here to estimate the scientific value of these animals, but we know that, in the opinion of Owen and some of the first zoologists of Europe and America,\* M. Du Chaillu has not only added greatly to their previous acquaintance with the fauna of South Africa, but has by his clear and animated descriptions, convinced them that he has been as close an eye-witness of the habits of the gorilla and his associates as he proved himself to be their successful assailant. Strikingly attractive and wonderful as are his descriptions, they carry in themselves an impress of substantial truthfulness.

He has introduced us to many novelties in a hitherto unknown land, partly mountainous and partly plain, deluged with heavy rains lasting nine months in the year, overgrown with gloomy forests, and sparsely inhabited by man or beasts. Although its native tribes seem to be similar in their superstitions, their ordeals, and their customs to those we read of elsewhere in African negro-land, the startling fact is presented to us of an avowed system of cannibalism among at least two tribes, who do not appear to be otherwise remarkable for brutality of character. Some passages

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\* See Hartlaub's 'System der Ornithologie West Africas,' 8vo., Bremen, 1857 (Preface). Also Cassin's 'Description of New Species of Birds from Western Africa;' 'Proceedings of the Academy of Natural Sciences, Philadelphia, during the years 1855-6-7-8-9.' Appended to these papers, extracts have been printed in his absence from letters to his correspondents—thus furnishing an independent record in the United States of the several journeys of Du Chaillu.

in Du Chaillu's work throw light on the probable origin of this revolting practice. Thus we learn that animal food is exceedingly scarce, and that, while an abundant supply of the vegetables which these negroes cultivate is barely sufficient to supply human wants in their depressing climate, their improvidence constantly reduces them to feed on the still less nutritious produce of the forest. Hence an uncontrollable craving for meat attacks individuals, and constitutes a recognised malady called *gouamba*, characterised by a pitiable state of nervous exhaustion. When this state of things prevails among numerous tribes, each of whom develops its own barbarous customs unchecked by the opinion of the rest, it is credible enough that cannibalism should have been resorted to in many instances, and that its practice should now and then take permanent root and become an established custom. In fact, the same want of animal food in New Zealand led, it is well known, to a similar system of cannibalism, before that country was colonized by Britain.

Aware that the faithful description of a region so exuberant in many natural productions, and inhabited by gigantic apes, and in one part by cannibal races, might probably be doubted, M. Du Chaillu is quite prepared to meet all cavillers and objectors. He knows as well as we do that although many of the discoveries of Bruce in the last century were repudiated and treated as fables, yet that, with the advancement of geographical research, the detractors of Bruce have had their own names consigned to oblivion, while the wonderful and so-called "travellers' tales" of the great Abyssinian explorer have been verified by his followers. Knowledge is indeed much more diffused than in the days of Bruce, and, to the honour of the contemporary press, the narrative of M. Du Chaillu has generally met with fair criticism, while most of the periodicals of the last fortnight have awarded to his work that praise to which, in the opinion of Professor Owen, as well as of many geographers, it is eminently entitled. His numerous friends have now only to express a hope that the work on Equatorial Africa may bring much profit as well reputation to the undaunted explorer, who, despite of numerous fevers, has gone over some thousands of miles of hitherto unknown lands, and has brought to us what most will admit to be unanswerable evidences of his fidelity of observation—evidences which the Council of this Society has considerably allowed him to exhibit in our own apartments in Whitehall-place.

Reverting then to what M. Du Chaillu has accomplished as a geographer, and to the sketch-map which he has prepared, let it be well understood that he never claimed to be a man of science. Far from pretending to have made astronomical observations, or to have determined either distances or altitudes with precision, he has simply told the tale of an adventurous explorer, and has laid down, as well as he could, the outline of his marches and canoe voyages. And when we consider the difficulties he had to overcome, surely we ought to make due allowance, if in the compilation of a work from his rough notes of several years, and in the endeavour to condense the account of so many curious and dangerous wanderings, there are one or two mistakes of dates.

But notwithstanding these defects, no one who reads the work of M. Du Chaillu can doubt, that he did hunt and kill the gorilla in the rocky woodlands of the interior, that he lived among cannibal tribes, and that he has graphically described the physical outlines and vegetation of tracts never before visited by any European. The truthfulness of his statements is indeed borne out by the printed records of the eminent ornithologist, M. Cassin, in the Proceedings of the Academy of Sciences of Philadelphia, at the request of which body he made his second and longest expedition of three years and eight months, and also by references to the very missionaries from whose dwellings he made his excursions.\*

Let us therefore unite with our practical geographers, Arrow-smith, Findlay, and others, in attaching due merit to the sketch-map on our walls which has resulted from such labours, and let us join the ethnologists in thanking M. Du Chaillu for his vivid description of wild and barbarous natives. Above all, let us thank him for the indomitable energy and courage with which he has successfully played the part of a bold geographical pioneer.

#### CONCLUSION.

In the preceding summary of the progress of Geography during the past year, I regret to say that, notwithstanding the various able contributions of my associates, there are still omissions of great import-

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\* Whilst these pages are passing through the press, an unexpected and unsought-for testimony to the truthfulness of M. Du Chaillu's narrative has been produced by Mr. P. Lund Simmonds, F.S.S., in two letters from his brother-in-law, Mr. Walker, the missionary, who wrote in 1858 and 1859 from the Gaboon country, and who was himself acquainted with the explorations of our traveller, of whose deeds and character he speaks in terms of high commendation. (*See* the 'Critic,' weekly journal, July 6, 1861, p. 17, for the letters from Mr. Walker to Mr. Simmonds.)

ance which must be supplied at our next Anniversary. Thus, as respects Europe, I have not been enabled to lay before you a notice of the advance of our science in Scandinavia, France, Spain, Switzerland, Italy, Greece, and Turkey.

In our past Session we have, indeed, been favoured, as noted at p. 196, with some accounts of various Asiatic regions, of which the sketch, already alluded to, of the environs of Yeddo, and a journey to the celebrated volcanic mountain of Fusiñana by Mr. Alcock, Her Majesty's Minister at the Court of Japan, is singularly attractive and interesting, and will form a rich addition to our next volume. For this memoir is not confined to a lively description of the customs and habits of the people, but gives us also a clear insight into their very peculiar political and social condition, which seems to have been permanent for at least three centuries.

Thanks to the triumph of the combined forces of England and France, the natural features of the interior of the Chinese empire are now fairly laid open for the first time to geographical explorers.

Among the efforts which our countrymen may make to penetrate these unknown lands, we have every reason to anticipate most striking and original results from the journey which Major Sarel and Captain Blakiston are now carrying out, by ascending to the sources of the Yang-tse-Kiang, and thence traversing the lofty chain which separates China from Hindostan—a project worthy of a Humboldt.

Again, we are informed that the Government of India, being desirous of ascertaining the real nature of the route between Burmah and China, are about to send a party to determine the position of the hitherto somewhat mythical city of Esmok, to the importance of which, and to the best line of commercial intercourse, our attention has been drawn by Captain Sprye. The re-consideration of these interesting subjects will probably form prominent features of the next Anniversary Address.

In now taking leave of you, gentlemen, for the eighth time, as your acting President, I cannot but feel highly gratified in having witnessed the surprising manner in which our Society has attained its present degree of popularity, and in seeing that it has acquired an influence which is vigorously exercised in promoting the highest behests of geography and travel.

When I bade you farewell in 1859, I prided myself on the fact that our body had increased from 600 to 1200 members, and now I rejoice to announce, that our numbers have further been swelled to



1550; so that we thus actually double the amount of any other scientific body in the metropolis. On a former occasion I had also to congratulate you on having obtained a Royal Charter, in which my efforts to promote your interests were more than fully repaid by the kindness with which you incorporated my name in that important document.

In the distinguished noblemen who succeeded me, we were unfortunately deprived of the valuable services of one, by his being called to take an active part in the administration of the country; whilst our present leader has, through ill health alone, been less among us than it was his earnest desire to be. But whenever Earl de Grey and Lord Ashburton have been able to preside, we have felt that we made a just selection in placing such men at our head, whilst it was pleasing to observe that persons of their social distinction esteemed it a high honour to be our chiefs.

Lastly, let me repeat, that had our actual accomplished President been able to attend this Anniversary, I feel assured he would have rendered better service in advancing our cause than I have been able to do in this emergency; and I therefore earnestly trust that at our next Annual Meeting we may welcome him in such good health, that he will then have it in his power to prove to you how truly he has it at heart to promote the continuous prosperity of the Royal Geographical Society.

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P.S.—*July 15th.* The last accounts of the expedition of Captains Speke and Grant, communicated by Lieut.-Colonel Rigby from Zanzibar, are dated Dec. 12th, 1860, from Khoko, in Western Ugogo. The travellers had encountered heavy rains, and had lost some of the native followers and mules; but, nothing dispirited, they had killed rhinoceroses, buffaloes, many varieties of antelope, zebras, pigs, and a giraffe, and were proceeding to Tura and Kazeh.