

ranges from the freezing point of fresh water to $2\frac{1}{2}^{\circ}$ below it. Between the two is a stratum of intermixture of about 100 fathoms thickness, which marks the transition between the warm superficial layer and the body of frigid water which occupies the deeper part of the channel.

The shortest distance within which these two contrasted submarine climates were observed at corresponding depths, was about 20 miles; but a much smaller distance was sufficient to produce it when the depth rapidly changed. Thus near the southern border of the deep channel, at a depth of 190 fathoms, the bottom-temperature was $48\cdot7^{\circ}$; while only six miles off, where the depth had increased to 445 fathoms, the bottom-temperature was $30\cdot1^{\circ}$. In the first case, the bottom evidently lay in the warm superficial stratum; whilst in the second it was overflowed by the deeper frigid stream.

It seems impossible to account for these phenomena on any other hypothesis than that of the direct derivation of this frigid water from the Arctic basin. And this agrees very well with other facts observed in the course of the exploration. Thus:—(1) The rapid descent of temperature marking the "stratum of intermixture" began about 50 fathoms nearer the surface in the most northerly portion of the cold area examined, than it did in the most southerly, as might be expected from the nearer proximity of the cold stream to its source. (2) The sand covering the bottom contains particles of volcanic minerals, probably brought down from Jan Mayen or Spitzbergen. (3) The Fauna of the cold area has a decidedly Boreal type; many of the animals which abound in it having been hitherto found only on the shores of Greenland, Iceland, or Spitzbergen.

Although the temperatures obtained in the warm areas do not afford the same striking evidence of the derivation of its whole body of water from a southern source, yet a careful examination of its condition seems fully to justify such an inference. For the water at 400 fathoms in lat. $59\frac{3}{4}^{\circ}$ was only $2\cdot4^{\circ}$ colder than water at the same depth at the northern border of the Bay of Biscay, in a latitude more than 10° degrees to the south, where the surface-temperature was $62\cdot7^{\circ}$; and the approximation of the two temperatures is yet nearer at still greater depths, the bottom-temperature at 767 fathoms at the former stations being $41\cdot4^{\circ}$, whilst the temperature at 750 fathoms at the latter point was $42\cdot5^{\circ}$. Now, as it may be certainly affirmed that the lowest temperature observed in the warm area is considerably above the isotherm of its latitude, and that this elevation could not be maintained against the cooling influence of the Arctic stream but for a continual supply of heat from a warmer region, the inference seems inevitable that the bulk of the water in the warm area must have come thither from the S.W. The influence of the Gulf Stream proper (meaning by this the body of superheated water which issues through the "Narrows" from the Gulf of Mexico), if it reaches this locality at all—which is very doubtful—could only affect the most superficial stratum; and the same may be said of the surface-drift caused by the prevalence of south-westerly winds, to which some have attributed the phenomena usually accounted for by the extension of the Gulf Stream to these regions. And the presence of the body of water which lies between 100 and 600 fathoms' depth, and the range of whose temperature is from 48° to 42° , can scarcely be accounted for on any other hypothesis than that of a great general movement of Equatorial water towards the Polar area; of which movement the Gulf Stream constitutes a peculiar case modified by local conditions. In like manner, the Arctic Stream which underlies the warm superficial stratum in our cold area, constitutes a peculiar case, modified by the local conditions to be presently explained, of a great general movement of Polar water towards the Equatorial area, which depresses the temperature of the deepest parts of the great Oceanic basins nearly to the freezing-point.

W. B. CARPENTER

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 3.—The following papers were read:—"Results of the Monthly Observations of Dip and Horizontal Force, made at the Kew Observatory, from April 1863 to March 1869 inclusive." By Dr. Balfour Stewart. "Spectroscopic observations on stars and nebulae made with the Great Melbourne Telescope." By A. Le Sueur. "On the nebula of Argo, and on the spectrum of Jupiter." By A. Le Sueur. We shall return to these papers next week.

Geological Society, February 18.—Annual general meeting, Prof. T. H. Huxley, president, in the chair. The secretary read the Reports of the Council, of the Library and Museum Committee, and of the Auditors. The general position of the society, as evinced by the state of its finances, and by the continued increase in the number of its members, was stated to be very satisfactory. In presenting the Wollaston Gold Medal to John Evans, Esq., for transmission to M. G. P. Deshayes, the president requested him to transmit it to M. Deshayes as an expression on the part of the Geological Society of the high estimation in which his services to palæontology and geology, especially in regard to the classification of the tertiary formation, are held by the geologists of this country; adding, that six years ago the council of this society demonstrated the interest which it took in M. Deshayes's valuable investigations by awarding him the Donation-fund. Now that those researches, commenced just fifty years ago, are completed, and the labours of a life devoted to science are crowned by the publication of five great volumes containing descriptions and figures of all the mollusca of the Paris basin, it has seemed to the Council a fitting opportunity for bestowing the highest honour at its disposal upon the pupil, editor, and continuator of Lamarck, and the worthy successor of his great master in the Chair of Natural History in the Muséum d'Histoire Naturelle. Mr. Evans acknowledged on the part of M. Deshayes, the award of the Wollaston Medal, and read a letter from M. Deshayes expressing his sense of the honour conferred upon him. The president presented the balance of the proceeds of the Wollaston Donation-fund to Mr. Evans, for transmission to M. Rouault, Keeper of the Geological Museum at Rennes, in aid of his researches upon the Palæontology of the Devonian and Silurian Rocks of Brittany, and remarked that the cosmopolitanism of science was well illustrated by the fact that all the honours at the disposal of the society this year are gladly accorded to foreigners.—The President then read his anniversary address, prefaced by biographical notices of deceased Fellows, including Prof. Brayley, F.R.S.; Dr. Hermann von Meyer; Dr. B. Shumard; Dr. Roget, F.R.S.; Prof. Graham, F.R.S.; Prof. Jukes, F.R.S.; Dr. W. Clarke, F.R.S.; Mr. J. W. Salter; the Vicomte d'Archiac, &c. The ballot for the council and officers was taken, and the following were duly elected for the ensuing year:—President: Mr. Joseph Prestwich. Vice-Presidents: Sir P. de M. G. Egerton, R. A. C. Godwin-Austen, Sir Charles Lyell, Bart., Warrington W. Smyth. Secretaries: P. Martin Duncan, John Evans. Foreign Secretary: Professor D. T. Ansted. Treasurer: J. Gwyn Jeffreys. Council: Prof. D. T. Ansted, William Carruthers, W. Boyd Dawkins, P. Martin Duncan, Sir P. de M. G. Egerton, John Evans, David Forbes, J. Wickham Flower, Capt. Douglas Galton, R. A. C. Godwin-Austen, Harvey B. Holl, J. Whitaker Hulke, Prof. T. H. Huxley, J. Gwyn Jeffreys, Sir Charles Lyell, George Maw, John Carrick Moore, Prof. John Morris, Joseph Prestwich, Warrington W. Smyth, Rev. W. S. Symonds, Rev. Thomas Wiltshire, Henry Woodward.

Zoological Society, February 24.—Dr. E. Hamilton, V.P. in the chair. A communication was read from Mr. R. Swinhoe containing some information on the subject of the exact locality of the Amherst's pheasant (*Thaumalea amherstiae*), which was stated to be the mountains between the Chinese province of Sechuen and Tibet.—A letter was read from Sir George Grey in reference to Professor Owen's communication of a letter from Dr. Haast read at the previous meeting. Sir G. Grey was of opinion that there were good grounds for believing that the *Dinornis* had been extirpated by the direct ancestors of the present race of Maories.—A second letter was read addressed to the Secretary by Mr. W. H. Hudson on the ornithology of Buenos Ayres.—Mr. Sclater exhibited a specimen of a new lemur, which had been lately discovered by Mr. Van Dam in North-eastern Madagascar, and had been named by Mr. Pollen *Propithecus damanus*.—Messrs. C. H. T. and G. F. L. Marshall read some notes on the classification of the birds of the family *Capitonidae*.—Two communications were read from Mr. R. Swinhoe on the white wag-tails (*Motacilla*) of China, and on a new species of *Accentor* from Northern China proposed to be called *A. erythropygius*.—Mr. P. L. Sclater read a paper on the deer living in the Society's menagerie, amongst which there were stated to be examples of several recently described and very little known species. Mr. Sclater concluded his paper with remarks on the arrangement and the geographical distribution of the *Cervidae*, and in particular of the species of the genus *Cervus*. The total number of *Cervi* recognised as probably

valid species were twenty-three in the Old World and seven-teen in the New World.

Chemical Society, March 3.—Prof. Williamson, F.R.S., president, in the chair. Mr. Ch. P. Sandberg, of Stockholm, was elected a fellow of the society. The first paper was by Dr. Gladstone on "Refraction Equivalents," to which we shall return. The next paper was by Dr. Thudichum, on "Kryptophanic Acid," a normal ingredient of human urine. The substance is obtained from the primary material by first forming its lime salt, transforming this by neutral lead-acetate into lead-kryptophanate, and decomposing the latter by sulphuretted hydrogen. Kryptophanic acid is an amorphous, gummy mass, transparent and nearly colourless. It forms salts with the alkalis, the alkaline earths, and other metals. Mercuric nitrate produces in the aqueous solutions of its earthy salts a white precipitate; the ordinary analysis for urea is thus shown to be liable to error; The acid is dibasic, and has the formula $C_5H_5NO_5$, but in some instances it may be viewed as tetrabasic and in that case its formula must be written $C_{10}H_{10}N_2O_{10}$.

Linnean Society, March 3.—Mr. J. E. Howard read a paper by Mr. Broughton, chemist to the cinchona plantations in the Madras Presidency, "On hybridisation among cinchonas." He believes that the sub-varieties of *Cinchona officinalis* are permanent, but that hybrids can be artificially obtained, although they do not occur in nature. The cinchona has long been known to belong to the class of dimorphic plants. In the discussion which followed, Dr. Anderson, superintendent of the Botanic Gardens at Calcutta, gave some interesting particulars of the cultivation of cinchona at the Darjeeling plantations.—Dr. Hooker read a very interesting and important communication from Sir Henry Barkly, Governor of Mauritius, on the "Fauna and Flora of Round Island," a very little-known dependency of that colony. Although only about twenty-five miles from Port St. Louis, and the intervening sea not more than 400 feet deep, both plants and animals differ not only in species, but also in genera, from those of the Mauritius. The exploring party were only in the island one day, but during that time they captured four species of snakes and several lizards, no species of either family being found in the Mauritius. The insects and shells obtained were also peculiar, one of the latter being a *Cyclostoma*. Of flowering plants only twenty-four species were collected, but of these more than half were not natives of the Mauritius, including three species of palm, a *Pandanus*, or screw-pine, and two species of ebony. One of the palms is between thirty and forty feet high; another is similar to the Mauritian *Areca alba*, but different; and a third has a most remarkable bottle-shaped stem. Round Island is only about three miles in circumference and one and a quarter across. It consists of a mound of tufa about 1,000 feet in height, very little vegetation being found in the lower part. Sir H. Barkly believes the area to be one of elevation rather than subsidence.

Royal Archæological Institute, March 4.—The following papers were read:—"Remarks on a piece of Roman sculpture, found at Sens, and representing fresco painting." By Mr. J. G. Waller.—"On the Emerald Vernicle of the Vatican, with notices of other ancient portraits of Our Saviour." By Mr. C. W. King, M.A.—"On an ancient Alms-box, found at Browne's Hospital, Stamford." By the Rev. C. Nevinson, warden of the hospital. Among the objects exhibited were a drawing of a leaden vessel containing Roman coins, found in Cornwall, by the Hon. W. O. Stanley, M.P.—Fragment of Anglo-Saxon M.S., found at Stamford Court, Worcester, by Sir T. E. Winnington, Bart.—Silver plate engraved with historical and allegorical subject, three portraits in Dresden porcelain, by Mr. Octavius Morgan, M.P.—Stone and bronze implements, found in Lincolnshire, by the Rev. E. Jarvis.

Anthropological Society, March 1.—Dr. Beigel, V.P., in the chair. Mr. Robert Wright and Dr. Hilliard, were elected Fellows. "On the Circassian slaves and the Sultan's harem." By Major Millingen. The author showed by what means the Turks insured to themselves in former days a supply of white slaves, so as to recruit their armies and their harems. The facts stated by the author with regard to the slave-trade seemed to prove that, from the highest to the lowest, all the ladies of Constantinople, those at least who have capital to invest, are regular slave-dealers. The author subsequently showed that the use of white slaves is a necessity for Mussulman nations on religious, social, and state-policy reasons, as slavery serves to keep women under subjection and in a state of seclusion; while politically it

is indispensable for the maintenance of the reigning dynasty, whose matrimonial alliance with any other but slaves is against the statutes of the empire. A description of the seraglio then followed, its organisation being accurately exposed, while ample details were given concerning the wives and odalisks of the Sultan. In the seraglio the lot of the Circassian slaves was said to be better than that which befalls the generality of slaves; there they are provided with everything, and can attain high honours and power. The system was condemned by the author on account of its being a source of ruin and depravity for both slave and master. The author maintained that it is impossible that the Turks should seriously think of doing away with slavery for the reason that it is so much a part of the social and political edifice, that an attempt to alter the existing state of things would inevitably hasten its downfall. In conclusion, he said that if the Turks, instead of importing women and good-for-nothing slaves, had given their minds to peopling their half-deserted country with an emigration of hardy and industrious men, Turkey might be now at the head of the civilised countries of the earth.—Mr. E. Charlesworth exhibited some remarkable flint implements from Honduras.

Royal Geographical Society, February 14.—Sir R. Murchison, president, in the chair. "On the Runn of Cutch and neighbouring regions." By Sir Bartle Frere. The author defined the region as a broad belt of country between the Indus on the west and the Arivalli Mountains on the east, extending from the Himalaya to the Peninsula of Cutch on the Indian Ocean; the length was about 600 miles, and its breadth varied from 100 to 150 miles. The southern portion, called the Runn of Cutch, forms a level plain 150 miles in length, distinguished by the total absence of vegetation. It forms, during the greater part of the year, a plain of firm sand, saturated with salt, on which the hoofs of horses and camels in passing make scarcely any impression. It is so level that a heavy rainfall remains like a vast slop on the surface, and is blown about by the wind until it evaporates. During the south-west monsoon, however, the high tides flow into it and cover it with water to the depth of one or two feet. Travellers and caravans pass over it, but are sometimes lost, for there are absolutely no landmarks; the danger is somewhat lessened on the side of the hills of Cutch by a beacon-fire which is regularly lighted by a Mahomedan family there settled, to whom has descended the religious duty of thus guiding the wandering traveller over this desolate waste. The surface remains damp even in the driest season, and the soil never pulverises. Mirage and other surprising atmospheric phenomena are common in this singular district. North of the Runn the desert waterless tract is called the Thurr. The whole region slopes very gradually from the sub-Himalayan ranges, between the Jumna and the Sutlej, towards the south-west. The rivers descending from these lower ranges disappear as they advance into the desert, and none of them reach the Indus. The Thurr is covered with a constant succession of sandy ridges, rising as high as 200 feet above the valleys, and the aspect of the country is that of a billowy ocean converted into sand. In districts where rain falls and where the inhabitants have dug wells, some of which are 300 feet deep, there are cultivation and settlements; but the soil is throughout sandy, and over the whole region not a stone can be found that is not imported. That part where there is a hard level plain with abrupt sandhills, is called the "Put." Sir Bartle believed that the native terms of "Runn," "Thurr," and "Put," might be adopted in physical geography as denoting varieties of plain which are totally unlike savannah, prairie, steppe, pampa, or any other known description of land-surface. Travellers in attempting to cross the Thurr are subject to sudden death, not, as might be supposed, from the effects of sunstroke, but from some peculiar condition of the atmosphere connected with the intense heat and the nature of the soil, most of the fatal attacks occurring after sunset. The Runn of Cutch and the region north of it are much subject to volcanic disturbance. The great earthquake of 1819 is still remembered by the inhabitants; it was described by Lieutenant Burns, in an admirable paper on the Indus, read before the Royal Geographical Society in 1833. Sir Bartle was inclined to attribute the singular levelness of the salt-plain of Cutch to the great frequency of slight shocks or tremors. During earthquakes, mounds are thrown up some ten or twelve miles in length, and of considerable height, formed, Sir Bartle believed, by a crack or fissure of the surface at right angles to the direction of the earthquake wave, one lip of the fissure being tilted up and overlapping the

other, so as to form a ridge. Small craters and hillocks of ejected sand are sometimes formed on the surface of the Runn, and afterwards subside again to the level of the plain. Dry beds of rivers are traceable throughout the desert tract to the north. From the difficulties of access to the Thurr, it had been for centuries the place of refuge to remnants of various races and nations who had invaded Hindoostan, or succumbed to the fortunes of war. Here are still found specimens of the wild Bheels who claim to be the autochthones and whose blood is essential to ratify every solemn ceremony of the Rajpoot dynasties; Coolies, who are anterior to the earliest Hindoo immigrants; Jutts, who are said to be of Scythian origin and are hardly ever known to forsake their ancestral occupation as breeders of cattle. Hindoos of every tribe and caste are here found, and many representatives are seen of later immigrations—Belooches, Afghans, Kurds, Arabs, and even Turcomans. One tribe of Rajpoots in the Desert, the Sodas, retain their primitive custom of bringing up all their female children, and, in consequence, all the chiefs in Rajpootana, where female infanticide had become established, have had for ages to take their wives from the humble Soda settlements. The poor Soda chiefs have therefore powerful connections among their wealthy sons-in-law; but, though they often pay a round of visits among them, they are said never to exchange their lives of freedom and simplicity, in the desert, for the palaces of Rajpootana. In the discussion which followed, Lord Napier of Magdala stated his belief that if the improvements Sir Bartle Frere suggested, when Commissioner of Scinde, had been put in execution at the time, a great alteration for the better would by this time have taken place in the desert tract which he had described.—The following new fellows were elected:—Rev. T. H. Braim, John E. Dawson, E. Hutchins, J. Irvine, M. H. Lackersteen, Joseph Moore, Commander Noel Osborn, J. N. Robertson, Joseph Starling, Henry Stilwell, Charles Stenning, John Wilton.

February 28.—Sir R. I. Murchison, president, in the chair. The following Fellows were elected:—Donald Butler, Commander George M. Balfour, W. A. M. Browne, W. L. Barclay, F. W. Buxton, Lieutenant E. F. Chapman, Colonel D. Carleton, Dr. R. H. Hilliard, R. A. Hankey, W. M. James, Colonel Charles E. Law, the Hon. Henry Lyttelton, John Markham, W. C. Midwinter, Major-General W. C. McLeod, Lieutenant-Colonel George W. Raikes, Right Hon. Sir John Rose, W. A. Whyte.

“A Visit to Yarkand and Kaskgar.” By R. B. Shaw. The author commenced by saying that the common idea of Tartary was that of a succession of vast plains, over which hordes of barbarians wandered at will with their cattle and tents. He had found the reality widely different. It was a well-cultivated country, containing flourishing cities of more than 100,000 inhabitants, where many of the arts of civilisation are carried on. Security of life and property exists, commerce is protected, the roads are full of life and movement, and markets are held on a fixed day of the week, even in the smallest villages. In the towns extensive bazaars, covered in against the rays of the sun, contain rows of shops, where goods of every kind and from every country are exhibited. In Yarkand alone there are sixty colleges, with endowments in land, for the education of students of Mussulman law and divinity, while every street contains a primary school attached to a mosque. There are special streets for the various trades. In one street will be found the silks of China, in another the cotton goods and prints of Russia, while a third will contain robes made of both materials, three or four of which make up the ordinary dress of the Turki inhabitants. In some streets all kinds of groceries are sold; others are set apart for the butchers, who offer a choice of horse-flesh, camel, beef, or mutton. The first is rather a luxury, but the two last are most abundant, selling at about one penny a pound. The bakers make most excellent light loaves by a process of steaming the bread. The greengrocers present abundant supplies of vegetables in great variety, besides cream nearly as thick as that of Devonshire, and delicious cream-cheeses. Everywhere sherbet made of fruit is sold, which you can get cooled at any street corner, where there are stalls for the sale of ice. There are tea-shops where the great urns are ever steaming, and eating-houses in abundance. Such is the manifold life of this little-known nation; living a life of its own, making history very fast, and looking upon European politics with the same indifference with which its own have been regarded by us. The author, who made his journey with the view of opening the way for trade, especially in tea, between India and Eastern Turkistan, described

the manner of his reception by the Governor of Yarkand, and by the Ataligh Ghazee, the ruler of the country, then resident in Kashgar, who now seems firmly established as king over a productive region containing a population variously estimated at from 20 to 60 millions. The Andijanians occupy the chief places in the administration, and form the strength of the army; but their attitude towards the native Yarkandis is very conciliatory, and they are looked upon, not as conquerors, but as brothers in faith and blood, who have delivered them from the yoke of unbelievers and idolaters. The Yarkandis are naturally addicted to commerce and the arts of peace, while the Usbeks of Andijan find their most congenial occupation in administration and arms. Both peoples speak the same language, which is essentially that of the Turks of Constantinople. The Ataligh, Yakoob Beg, impressed Mr. Shaw as a man of remarkable intelligence and energy. Merchants from India are beginning to frequent Yarkand, and it only required the removal of a few obstacles in the hill countries subject to our own influence to open out a field for trade, of which it would be difficult to over-estimate the importance. The whole region forms a vast elevated basin, in Central Asia, about 4,000 feet above the sea-level, surrounded on three sides by a wall of snow-covered mountains, reaching in many places an altitude of more than 20,000 feet. On the east it passes into the sandy desert of Gobi, which separates it from China. All the rivers which descend from the snows of the mountain, flowing eastward, are lost in the sands, and, as there is little or no rain, the soil has to be fertilised by canals and irrigation. The beautiful cultivation and luxuriance of the thickly-peopled parts are entirely due to these irrigating canals, which are exceedingly numerous and carefully kept. Mr. Shaw stated that the King himself superintended the works at a new canal whilst he was there, and even laboured at it himself. The country is separated from the plains of India by the mountain-system of the Himalaya, forming an elevated belt 500 miles broad, with eleven more or less elevated parallel ridges of mountains lying along it. The most northerly of these ridges was styled Kuen-lun by the Chinese, but was not a distinct chain from the rest of the mountains. Mr. Shaw concluded by describing his return journey over the Karakorum Pass. Sir Henry Rawlinson said that the Government of India had considered Mr. Shaw's discoveries of so much importance that they had entered into negotiations with the Maharajah of Cashmere for the purpose of encouraging trade with Eastern Turkistan, and arrangements had been entered into by which all transit duties through Ladak would be abolished. The difficulties of the route northward from Ladak over the Karakorum would probably be obviated by the adoption of the much easier road to the east *via* Changchenmo, or, still better, by the elevated level plains of Rudok still farther east. The difficult Sanju Pass over the Kuen-lun would also be avoided in future by the adoption of the Yenghi Pass, all that was necessary being the establishment of a fort at its foot to protect caravans from the depredations of hordes of robbers who frequent that district.—The President reminded the meeting that Mr. Shaw was the first European since the days of Marco Polo who had penetrated to Yarkand, and been allowed to return from that wonderful country. The Society's envoy, Mr. Hayward, had reached the place a few days after him; but the two were not allowed to see each other until they were on the way back again.—A second paper was read, “On a Journey through Shantung and a visit to the Tomb of Confucius,” by Mr. J. Markham, Consul at Chefoo. The paper contained a most interesting account of the author's reception at Kio-foo, the city of Confucius, and his examination of the monuments and temples connected with the fame of the Chinese sage. The great majority of the inhabitants of the city are descendants of Confucius and bear his surname, and the magistrate's office is hereditary in the family. The result of the author's experience acquired in journeys throughout the length and breadth of this important province was that the middle and lower classes of China were, as a rule, inclined to be friendly to strangers, and that all acts of offence are instigated by the governing class of mandarins.

Royal Institution of Great Britain, March 7.—Colonel P. J. Yorke in the chair. His Royal Highness the Prince Christian of Schleswig-Holstein was elected an honorary member, and W. H. Barlow, A. J. Booth, F. W. Buxton, J. T. Clover, Rev. J. Congreve, G. H. Darwin, F. Galton, Lord R. Gower, R. Grubb, J. Gurney, H. Hoare, J. Houldsworth, Lieut.-Colonel G. Ives, T. Jacob, E. C. Johnson, Sir J. J. T. Lawrence, F. M'Clean, J. O'Halloran, H. Pechell, F. Pennington, G. Phillips, M. R. Pryor, Dr. J. Rae, Rev. D. M. Salter, A. G.

Sandeman, G. Stone, A. A. de Lille Strickland, C. B. Thurston, the Hon. J. G. P. Vereker, Mrs. Michael Wills, and H. Woods, were elected members of the Royal Institution.

CAMBRIDGE

Philosophical Society, March 7.—The following communications were made to the society:—"On the Centro-surface of an Ellipsoid," by Prof. Cayley. "On the correct expressions for the resistance which bodies experience whilst moving in gases and liquids: with a description of the verifying experiments," by Mr. Potter.

DUBLIN

Royal Irish Academy, February 14.—Rev. J. H. Jellett, president, in the chair. The president read a paper entitled "Researches in the application of Optics to Chemistry," No. 1, "Combinations of Nitric Acid with Quinia."—A letter from M. De Vismes Kane, was read, describing the circumstances under which the large stone implement and the curious wooden vessel, which he had presented to the Academy's museum, through Dr. Stokes, were found.—The secretary read a description by Mr. R. R. Brath, of an Ogham inscribed stone at Kiltena, county Waterford.

PARIS

Academy of Sciences, February 28.—M. A. Trécul presented the third part of his memoir on the position of the tracheæ in the ferns. His object in this important paper is to show that there is "no unity of constitution, circulation, and symmetry" in the vascular Acrogens, and in illustration of this view he describes the arrangements of the tracheæ in the following forms:—*Athyrium filix-femina*, several species of *Aspidium* and *Asplenium*, *Struthiopteris germanica*, *Adiantum tenerum*, *Scolopendrium officinale*, *Ceterach officinarum*, and *Gymnogramme chrysophylla* and *calomelanos*.—A letter by Father Secchi on the modifications produced by magnetism in the light emitted by rarefied gases, was read. In this the author described some experiments made by him with a powerful electro-magnet upon Geissler's tubes. He stated that when a tube is placed between or close to the poles of the electro-magnet the light is condensed towards the part of the tube most distant from the magnet, so that instead of a diffused light a bright streak is visible. The effect was said to be very curious, appearing as if the gas itself was displaced, and resembling the great movements of the streamers in the Aurora Borealis. The more brilliant light gives a more brilliant and distinct spectrum, and the author stated that when the gas has a double spectrum, the two spectra are produced separately—one from the brilliant part of the tube, the other from the parts nearer the magnet. The author remarked that the effect of magnetism was as if it narrowed the tubes. He ascribed it to a repulsion of the rarefied gases, due to diamagnetism. M. Dumas remarked that M. de la Rive had been carrying on some experiments of a like nature, the results of which are not yet published, but he believed that in some points they coincided with Father Secchi's.—In a memoir on the spectra of various kinds of simple bodies, M. Dubrunfaut ascribed the double spectra obtained from some vacuum tubes to impurity in the gases employed, and indicated some other sources of error. He referred especially to hydrogen. He also noticed that variations of temperatures may cause anomalies in spectrum analysis, and remarked that the line K α of potassium may be made to appear and disappear by raising and lowering the temperature.—Notes of a further investigation of propylic, butylic, and amylic aldehydes were presented by MM. I. Pierre and E. Puchot. Their researches related chiefly to the temperatures of ebullition and densities of these bodies, as to which their results differ considerably from those of former writers.—In a memoir by M. Gustave Lambert on the experimental determination of the form of the earth, that gentleman proposed a simplification of the method of observation by means of the pendulum, and a ready means of measuring a base-line. He submitted his methods to the judgment of the Academy, intending to employ them, if approved, in the projected French Arctic expedition.—M. Delaunay communicated a report by MM. Wolf, André, and Capitanéano, on a bolide observed by them at the Paris Observatory on the 26th February.—This meteor started from between α° and β *Canis minoris*, and passed as a yellow streak between Sirius and β *Canis majoris*, when it took the form of a very brilliant, bluish white ball about 5' in diameter, followed by a broad yellow tail; near ν *Canis majoris*, it burst into several fragments and disappeared. The phenomena commenced at 9^h 35^m 20^s

and lasted about 3 seconds. No sound was heard.—M. F. Lucas presented a note relating to the physical state of bodies; M. H. Montucci a memoir on Gauss's method for the reduction of trigonometrical equations; and M. H. Sainte-Claire Deville a note by M. A. Martin on Léon Foucault's "method of autocollimation" and its application to the investigation of parabolic mirrors.—M. H. Caron communicated a note on the solution of reductive gases by iron and carburets of iron in fusion, in which he suggested a cause of the spitting of cast-steel and iron in cooling.—M. H. Sainte-Claire Deville made some remarks on this paper.—A memoir on the oxidation of iron by Mr. P. Crace Calvert, was read; from his experiments he concludes that it is the presence of carbonic acid in the air that causes the rusting of iron.—M. Chevreul made some remarks upon this paper.—A note on the dissociation of ammoniacal compounds, by M. F. Isambert, was presented by M. H. Sainte-Claire Deville.—The author noticed the compounds formed by the sulphates of zinc and cadmium with gaseous ammonia, and the tensions of the ammoniacal gas set free from these compounds by the action of heat, which are constant at given temperatures.—M. Campana communicated a note "On the texture and differential character of the Lungs in Birds," in which he described the mode of origin and distribution of the secondary bronchial tubes, which, he stated, terminate in a single tertiary tube, and this in its turn unites with the extremity of another secondary tube. This applies also, according to the author, to the lateral tertiary tubes.—M. Elie de Beaumont communicated an extract from a letter of M. Probst giving an account of earthquake shocks experienced at Nice, and containing a journal of shocks observed during the years 1866—1869.—M. H. Sainte-Claire Deville presented a note by Father Denza on an Aurora borealis and some other meteorological phenomena observed in Piedmont on the 3d of January, 1870.

BERLIN

German Chemical Society, February 29.—C. Liebermann communicated the result of his researches on chrysene, of which large quantities have lately been obtained from coal tar. He has specially devoted attention to the chinone of chrysene, obtained by oxidising this hydro-carbon. The colouring properties of this substance are very inferior to those of its analogous anthracene.—C. Scheibler reported on betain, a base he obtained from beetroot-juice, or molasses. The young roots contain considerable quantities of this substance, and certain molasses furnish as much as 3 per cent. of it. The base has been found identical with oxycneurin, lately discovered in the brain, in eggs, &c., by Leibrich. It is not poisonous, and yields well crystallised salts.—H. Wichelhaus has determined the vapour-density of chloronitride of phosphorus, thus proving the correctness of the formula $P_3N_3Cl_6$, which had already been fully established by Gladstone and Holmes.—C. Rammelsberg delivered a lecture on meteorites, giving a succinct and interesting history of these remarkable bodies, the existence of which had been regarded as a superstition up to the end of the last century.—Mr. Gordon has prepared Reiset's and Magnus' salts containing ethylamine, aniline, and toluidine in the place of ammonia.—T. Thomsen of Copenhagen sent a paper on the heat of combination. The heat produced by adding an acid to a base attains the maximum when the latter is neutralised by the former. Based upon this observation, the author concludes that sulphuric acid must be monobasic, a startling fact, which in order to be fully confirmed appears to need further examination.—Two papers were sent in after the last meeting of the society, and printed in the abstracts of that meeting. One is by Kekulé, on the substance described as chloracetene. The author proves the non-existence of this substance, a solution of oxychloride of carbon in para-aldehyde having been taken for a chemical individual. The other paper is by Ceck, describing the combustion of part of the Bohemian diamond, and removing any uncertainty concerning its nature.

German Geological Society.—At the February meeting Dr. Lossen reported on the composition of Karpbolithe from the metamorphic slate of Biscaroda, in the Harz Mountains. Hauchecorne and Meyne reported on borings made at Stade for rocksalt. Its discovery was anticipated with certainty. Lindig reported on the borings made at Spurenborg (thirty miles from Berlin), where an immense saltlayer was discovered two years ago. The boring is now 2,630 feet deep, 2,347 of which go through one layer of pure rocksalt! The temperature was found to be 31° 5' C. at the bottom.

VIENNA

Imperial Academy of Sciences, January 20.—The Ministry of Commerce called upon the Academy to appoint a member to arrange the reproduction of the French standard meter, and also forwarded a nautical instrument for the correction of the course of vessels, invented by Carl Zamara.—A note by Prof. G. Hinrichs of Iowa, on the structure of quartz, was communicated by Prof. von Haidinger.—Prof. E. Mach communicated the results of an investigation by M. C. Neumann upon the vibrations of a string under the bow. His results for the most part confirm Helmholtz's theoretical views.—Dr. Boué presented a geographico-geognostic map of the valley of Sutchesa, and remarked upon its peculiarities.—Dr. A. Friedlowsky communicated a memoir on three cases of augmentation of the carpal and tarsal bones in man.—Prof. F. Simony gave a comparative account of the conditions of temperature in the Lakes of Hallstatt, Gmund, and Langbath, at different depths, and Dr. J. Hann presented a memoir on the decrease of temperature with elevation on the surface of the earth.—The table of the meteorological and magnetic observations at the Central Observatory during the month of December last was also communicated.

February 3.—Memoirs were read by Prof. Rochleder "On some colouring matters from Madder," and by M. A. von Miller-Hauenfels on "The dualistic functions," and "On the electrical current which appears to stand in relation to endosmose." Dr. L. J. Fitzinger communicated the second and concluding portion of his "Critical revision of the family of the *Rhinophylli*," in which he treats of the genera *Ariteus*, *Rhinolophus*, *Rhinomyxeteris* and *Aguias*.—"Investigation of the white mustard seed." By Professor H. Will. In place of the myronate of potash found in black mustard seed there is in white mustard seed an analogous body sinalbin which splits up into sugar or sulphocyanogen compound and acid sulphate. The sulphocyanogen compound is not volatile, it contains an oxygenated radicle akrinyl C₇H₇O. The acid sulphate contains in place of potassium sinapisin. The sulphocyanide of akrinyl freed from sulphur and treated with alkali when in the state of nitril yields ammonia and a salt of the acid C₆H₅O₂, which melts at 136° C, and is not identical with any known acid of the same formula.

Geological Institution, February 15.—Herr von Hauer in the chair. Prof. von Ettingshausen communicated the results of his study of the fossil flora from the environs of Berlin, Bohemia. Nearly five hundred species have been determined from six beds of different age. The oldest of them—the freshwater-chalk of Kostenblatt and the strata of Kutschlin—correspond with the Aquitanian series; the plastic clay of Priesen, as well as the clay and spherosiderit of Languagey, belong to the middle part of the Miocene formation. The menilites and opales of the Sichrow valley, as well as the shists of Sobrusan, contain the plants of the Oemingen series. Herr Flanenschild pointed out that the existence of large layers of the so-called Alpine chalk (Alpenkreide), the mud of glaciers, which eroded the dolomitic rocks, indicates the existence of old glaciers in the Alm- and Steierling valleys, Upper Austria. This mud consists, therefore, of carbonate of lime and carbonate of magnesia, and, when burnt at a low temperature, gives a good hydraulic cement.—Herr. Ch. Paul exhibited detailed sections of the small mountain range near Homonna, North-eastern Hungary, consisting of different layers of the triassic, rhetic, liassic, jurassic, and cretaceous formations. Of high interest is the discovery of marls with fossils of the *Gault* series, which are so very rare in the eastern Alps and Carpathians.—Herr Stache exhibited geological maps of the environs of Ungvár and Mandak, North-eastern Hungary, which he had surveyed last summer. Trachytes with their tufts, and Carpathian sandstones of Eocene age, are the prevailing formations.

DIARY

THURSDAY, MARCH 10.

ROYAL SOCIETY, at 8.30.—On some Elementary Principles in Animal Mechanics (No. III.): Rev. S. Haughton.—On the Contact of Conics with Surfaces: W. Spottiswoode.—On the Spotted Area of the Sun's Visible Disc from the Commencement of 1832 up to May 1868: W. De la Rue, B. Stewart and B. Loewy.—Tables of the Numerical Values of the Sine-Integral, Cosine-Integral, and Exponential-Integral: J. W. L. Glaisher. SOCIETY OF ANTIQUARIES, at 8.30.—Roman Inscription in the Disney Collection: Mr. H. C. Coote. ZOOLOGICAL SOCIETY, at 8.30.—Dinornis (Part XV.): Professor Owen.—New species of *Ampullaria*: Dr. J. C. Cox.—Birds of Veragua: Mr. O. Salvin.—New birds from the Yantze-kiang: Mr. R. Swinhoe. MATHEMATICAL SOCIETY, at 8. ROYAL INSTITUTION, at 3.—Chemistry: Prof. Odling. LONDON INSTITUTION, at 7.30.—Swiney Lecture: Dr. Cobbold.

FRIDAY, MARCH 11.

ROYAL INSTITUTION, at 8.—On Art: Mr. Westmacott. QUEKETT MICROSCOPICAL CLUB, at 8. ASTRONOMICAL SOCIETY, at 8.

SATURDAY, MARCH 12.

ROYAL INSTITUTION, at 3.—Science of Religion: Prof. Max Müller. ROYAL BOTANIC SOCIETY, at 3.30.

MONDAY, MARCH 14.

MEDICAL SOCIETY, at 8.—Anniversary. SOCIETY OF ARTS, at 8.—Cantor Lecture: Dr. Paul.

TUESDAY, MARCH 15.

ROYAL INSTITUTION, at 3.—Nervous System: Dr. Rolleston. ANTHROPOLOGICAL SOCIETY, at 8.—On Strange Peculiarities observed by a Religious Sect of Moscovites, called Scopis: Dr. Kopernick and Dr. Barnard Davis.—Phallic Worship: Mr. Hodder Westropp.—Consanguineous Marriages: Mr. George C. Thompson. STATISTICAL SOCIETY, at 8.—The Financial System of the Free Church of Scotland: Rev. D. Buchanan. PATHOLOGICAL SOCIETY, at 8. INSTITUTION OF CIVIL ENGINEERS, at 8.—1. Discussion upon Mr. Fox's paper "On the San Paulo Railway," 2. and if time permits, the following paper will be read, "On the Conditions and the Limits which govern the Proportions of Rotary Fans:" Mr. Robert Briggs.

WEDNESDAY, MARCH 16.

SOCIETY OF ARTS, at 8.—Surface Decoration: Mr. Pitman. ROYAL HORTICULTURAL SOCIETY, at 1.30. METEOROLOGICAL SOCIETY, at 7.

THURSDAY, MARCH 17.

ROYAL INSTITUTION, at 3.—Chemistry: Prof. Odling. ROYAL SOCIETY, at 8.30. LINNEAN SOCIETY, at 8.—The Flora and Fauna of Round Island: Sir Henry Barkly.—Algae found in the North Atlantic Ocean: Dr. Dickie. CHEMICAL SOCIETY, at 8. ZOOLOGICAL SOCIETY, at 4. NUMISMATIC SOCIETY, at 7. ANTIQUARIES' SOCIETY, at 8.30.

BOOKS RECEIVED

ENGLISH.—The Bottom of the Sea: B. Z. Sonrel; illustrated. Translated and edited by Elihu Rich (Sampson Low and Marston).—Weapons of War: A history of arms and armour from the earliest periods to the present time: A. Demmin; illustrated. Translated by C. C. Black (Bell and Daldy).—Sketches of Life and Sport in South Eastern Africa: C. Hamilton; illustrated (Chapman and Hall).—The North British Review (Williams and Norgate).—A Search for Winter Sunbeams in the Riviera, Corsica, Algiers, and Spain: S. S. Cox (Sampson Low and Marston).—The Natural History of Man: Rev. J. G. Woods; illustrated (Routledge and Sons).—Our Iron-clad Ships: E. J. Reed (Murray).—Physical Geography: D. T. Ansted.—The Earth's History; or, First Lessons in Geology: D. T. Ansted.—The World we live in; or, First Lessons in Physical Geography: D. T. Ansted (W. H. Allen & Co.).—The Science and Art of Arithmetic: Sonnenschein and Nesbitt (Whittaker and Co.).—Treatise of Medical Electricity: J. Althaus. FOREIGN.—Nachrichten der K. Gesellschaft der Wissenschaften, 1869. Petermann's Mittheilungen.—Manuel des Humeurs: F. Papiillon.—Die Parasiten der weiblichen Geschlechtsorgane des Menschen und Einiger Thiere nebst Beiträge: Dr. D. Haussmann.—Archiv für die Landes durchforschung-Böhmen.—Neue Untersuchungen über den elektrisirten Sauerstoff: Dr. G. Meissner.—Lehrbuch zur Bahnbestimmung der Kometen und Planeten: T. Oppolzer.—Beiträge zur Petrographie der plutonischen Gesteine: J. Roth.—Handbuch der Physiologisch-und Pathologisch-chemischen Analyse: F. Hoppe-Seyler.—Chemismus der Pflanzenzelle: Dr. H. Karsten. (Through Williams and Norgate.)

CONTENTS

SCIENCE EDUCATION IN GERMANY. II. THE POLYTECHNIC SCHOOLS. PAGE
By Prof. H. E. ROEGGE, F.R.S. 475
VON SCHLICHT ON FORAMINIFERA. By H. B. BRADY, F.L.S. 477
ENCKE THE ASTRONOMER. By R. A. PROCTOR, F.R.A.S. 479
OUR BOOK SHELF 480
LETTERS TO THE EDITOR:—
Prismatic Structure in Ice.—Rev. T. G. BONNEY 481
A Probable Cause of Malaria.—J. GAGLIARDI 481
The Motion of a Free Rotating Body.—Prof. J. J. SYLVESTER, F.R.S. 482
"Engrais Complet."—ONLY A CLOUD 482
The Preservation of Mollusca.—J. R. CROTCH 482
Frankland and Düppa on the Action of Sodium on Acetic Ethel.— J. ALFRED WANKLYN 482
Sir W. Thomson and Geological Time.—G. H. 482
Little Gull.—JOHN CORDEAUX 482
THE MICROSCOPIC FAUNA OF THE ENGLISH FEN DISTRICT. (With Illustrations) By G. S. BRADY 483
THE NEW NATURAL SCIENCE SCHOOLS AT RUGBY. (With Illustrations.) By Rev. T. N. HUTCHINSON 485
NOTES 486
ON THE TEMPERATURE AND ANIMAL LIFE OF THE DEEP-SEA. By Dr. W. B. CARPENTER, F.R.S. 489
SOCIETIES AND ACADEMIES:—
LONDON—Royal Society; Geological; Zoological; Chemical; Linnean; Royal Archeological Institute; Anthropological; Royal Geographical; Royal Institution of Great Britain 490-492
CAMBRIDGE—Philosophical 493
DUBLIN—Royal Irish Academy 493
PARIS—Academy of Sciences 493
BERLIN—German Chemical; German Geological 493
VIENNA—Imperial Academy of Sciences; Geological Institution 494
DIARY, BOOKS RECEIVED 494