

copulative act," from which free-swimming ciliated germs might eventually issue. "On the Connection of Nerves and Chromoblasts," by M. Georges Pouchet. The inference drawn from an examination of the pectoral fin of a young flat-fish is that there is a reality of connection between the nervous and sarcoid elements, but that the nature of this connection is unknown.

THE *Revue Scientifique*, Nos. 19—25, contains, among others, the following articles, translations, and reprints:—General Morin's eulogy on Piobert and his inventions in artillery; Dr. Carpenter's lectures at the Royal Institution; the continuation of Grehan's course of lectures on Experimental Physiology; M. Lorain on primary and secondary instruction in France; Berthelot on the union of alcohols with bases, and on the history of carbon; Moleschott on the regulators of human life; Saus-sire on the life and works of Claparède; Valentin on the electric properties of nerves during embryonic life, and during putrid decomposition; a summary of the most important papers read at the Bologna International Congress of Anthropology and Prehistoric Archaeology; Comtejean on the origin of sedimentary deposits; Mr. Bentham's last anniversary address to the Linnæan Society; Fonvielle on aerial navigation; Prof. Huxley's article in the *Contemporary Review* on English Critics of Darwin.

THE twentieth volume (1870) of the *Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien*, although a stout octavo, is hardly equal in bulk or in the variety of its contents to some of its predecessors; nevertheless its readers will find in it an abundant supply of valuable papers on zoological and botanical subjects. As usual, entomological articles are in the majority under the former head, and here Dr. Winnertz leads off with two papers on Diptera, containing descriptions of species belonging to the *Lestremiinae*, a sub-family of Cecidomyiidae, and of the species of *Heteropeza* and *Miastor*—two genera of the same family. Singularly enough these, and a short notice by M. von Bergenstamm on the metamorphoses of *Platypeza holosericea*, are the only papers on Diptera in the volume.—The Lepidoptera also receive but little notice, but on the Rhynchota we have some important papers:—M. P. M. V. Gredler furnishes a list, with notes, of the Heteropterous Rhynchota of the Tyrol, and Dr. F. X. Fieber the characters of twelve new genera and twelve new species of the same group. The forms described by the latter are from various parts of Southern Europe.—M. C. Tschek describes a number of Austrian Ichneumonidae belonging to the group of the Cryptoides, Dr. G. Mayr a number of new species of ants, and Dr. J. Kriechbaumer four new South European species of humble bees.—A paper on the Orthoptera of the Syrian valley in Hungary by M. V. Graber, which includes an interesting description of the district, is the only other entomological paper to which we shall refer.—The malacologist will find a list of the land and freshwater mollusca of Galicia by Dr. J. Jachno, a monograph of the genera *Emmerida* and *Fossarulus* by M. Brusina, and an important paper on the anatomy of *Tribonophorus* and *Philomyces*—two forms of naked Pulmonata; whilst for the ichthyologist we have the first part of a descriptive synopsis of the fishes of the Red Sea from Dr. C. B. Klunzinger, who also notices the animals observed upon a coral reef in the Red Sea.—M. D. Dybowski describes a new form of Salamander from Siberia under the name of *Salamandrella Keyserlingii*, and Dr. Burmeister gives a description of the pelvis of *Megatherium*. The botanical papers are to a considerable extent of the nature of local lists, but some of these contain a good deal of descriptive matter. Thus in M. Schulzer von Muggenburg's "Mycological Observations in North Hungary" we find many descriptions of fungi; Glowacki and Arnold's "Lichens from Carniola" contains descriptions of species, as does also the latter's "Lichenological Excursion into the Tyrol," and the contribution to the moss-flora of East by MM. Juratzka and Milde. M. F. Hazslinsky describes the *Sphaeria* which are parasitic upon the rose; M. Julius Klein's mycological communications contain a description of a new genus of Mucorine fungi, and of some other forms which grew with its representative; and M. Schulzer von Muggenburg, above-mentioned, has also his mycological contributions, which consist almost entirely of descriptive matter. The papers which treat of the higher forms of plants, and those describing the natural history journeys of their authors, are not numerous. We may mention especially a long paper by M. F. Krasan on the periodical phenomena of vegetable life, and an article by Dr. A. Unterhuber on the position of the scales of the fruit in *Ceratostamia mexicana*. This list of papers will be sufficient to show how much there is in the proceedings of the Vienna Zoologico-Botanical Society to interest both the zoologist and the botanist.

## SOCIETIES AND ACADEMIES

LONDON

Geological Society, December 6.—Mr. J. Prestwich, president, in the chair. Prof. Giovanni Capellini, of Bologna, was elected a Foreign Correspondent of the Society. 1. "On the presence of a raised beach on Portsdown Hill, near Portsmouth, and on the occurrence of a Flint Implement at Downton." By Mr. Joseph Prestwich, F.R.S., President. The author noticed a section observed by him in a pit ten miles westward of Bourne Common and five miles inland in a lane on the north side of East Cams Wood. It is situated at an elevation of 300 feet above the sea level, and shows some laminated sands with seams of shingle, overlying coarse flint-shingle with a few whole flints, which the author regarded as a westward continuation of the old sea-beach which has been traced from Brighton, past Chichester, to Bourne Common. A flint flake was found by the author at the bottom of the superficial soil in this pit. The author also noticed the occurrence of a flint implement of the type of those of St. Acheul in a gravel near Downton in Hampshire. This gravel capped a small chalk-pit, and its elevation above the River Avon was about 150 feet. Two gravel terraces occur between this pit and the river, one 40 by 60 the other 80 by 110 feet above the level of the latter. Mr. Codrington stated that, according to the Ordnance Survey, the level of the pit at Cams Wood was not more than 100 feet above the sea, so that it was at about the same level as the gravels of Titchfield and elsewhere. Mr. Evans remarked that the flint flake from Cams Wood presented no characters such as would prove it to be of Palæolithic age. He was, on the contrary, inclined to regard it as having been derived from the surface. He commented on the height at which the Downton implement had been discovered, which was, however, not so great but that the containing gravels might be of fluviatile origin. Mr. Gwyn Jeffreys thought that if the beds at Cams Wood were marine, some testaceous remains might be found in them. If these were absent, he should rather be inclined to regard them as fluviatile. Mr. J. W. Flower contended that the gravel at Downton could not be of fluviatile origin. He thought, indeed, that the gravel was actually at a higher level than the present source of the river. If this were so, he maintained that the transport of the gravel by fluviatile action was impossible. He further observed that gravels precisely similar, also containing implements, had now been found, as well in the Hampshire area as elsewhere, the transport of which, in his view, could not possibly be attributed to any existing rivers. At Southampton they occur 150 feet above the River Itchen and the sea, and considerably inland; at Bournemouth, on a sea cliff 120 feet in height; and at the Foreland (at the eastern extremity of the Isle of Wight), on a cliff 82 feet above the sea, and far remote from any river. If, therefore, these deposits were effected by fluviatile agency, it was evident that all traces of the rivers were afterwards effaced by some great geological changes, or, in the alternative, some great geological change, not fluviatile, must have caused the deposit. Upon the whole he was disposed to conclude with the French geologists as well as with many eminent English authors that the accumulation of all these superficial drifts was, as the late Sir Roderick Murchison had said, sudden and tumultuous, not of long continuance; and thus it was such as would result from some kind of diluvial action, rather than from the ordinary long-continued action of water. Mr. Judd pointed out, in contravention to Mr. Jeffreys' views, that in the Fen district, over large tracts of deposits of undoubtedly marine origin, not a trace of marine shells could be found. Mr. Prestwich, while willing to concede that the implement-bearing gravel-beds had been deposited under more tumultuous action than that due to rivers of the present day, was still forced to attribute the excavation of the existing valleys and the formation of terraces along their slopes to river-action. He showed that Mr. Flower's argument as to the present level of the source of the river was of no weight, as the country in which it had its source was formerly, as now, at a much higher level than the gravel at Downton. As to the absence of marine shells at Cams Wood, he cited a raised beach in Cornwall which, in company with Mr. Jeffreys, he had examined for a mile without finding a trace of a shell, though for the next half-mile they abounded. There was the same difference between the raised beach at Brighton and at Chichester. He was obliged to Mr. Codrington for his correction as to the level at Cams Wood, though the pit was at a higher elevation than the one to which Mr. Codrington had alluded.—2. "On some undescribed Fossils from the 'Menevian Group of Wales.'" By Mr. H. Hicks. In

this communication the author gave descriptions of all the fossils hitherto undescribed from the Menevian rocks of Wales. The additions made to the fauna of the Lower Cambrian rocks (Longmynd and Menevian groups) by the author's researches in Wales during the last few years now number about fifty species, belonging to twenty-two genera, as follows:—Trilobites, 10 genera and 30 species; Bivalved and other Crustaceans, 3 genera and 4 species; Brachiopods, 4 genera and 6 species; Pteropods, 3 genera and 6 species; Sponges, 1 genus and 4 species; Cystideans, 1 genus and 1 species. By adding to these the Annelids, which are plentiful also in these rocks, we get seven great groups represented in this fauna, the earliest known at present in this country. By referring to the Tables published in M. Barrande's excellent new work on Trilobites, it will be seen that this country also has produced a greater variety, or, rather, representatives of a greater number of groups from these early rocks than any other country. The species described included *Agnostus*, 5 species; *Arionellus*, 1 species; *Erinnyis*, 1 species; *Holococephalina*, 1 species; *Conocoryphe*, 2 species; *Anopolenus*, 2 species; *Cyrtotheca*, 1 species; *Stenotheca*, 1 species; *Theca*, 2 species; *Protocystites*, 1 species, &c. The author also entered into a consideration of the range of the genera and species in these early rocks, and showed that, with the exception of the Brachiopods, Sponges, and the smaller Crustacea, the range was very limited. A description of the various beds forming the Cambrian rocks of St. David's was also given, and proofs adduced to show that frequent oscillations of the sea-bottom took place at this early period, and that the barrenness of some portions of the strata, and the richness of other parts, were mainly attributable to these frequent changes. Mr. Gwyn Jeffreys suggested that the term Polyzoa might be adopted in preference to that of Bryozoa, as being the more ancient term, and that the name *Proserpina* should not be applied to the new genus of Trilobites, as it had already been appropriated to a tropical form of land-shell.

Royal Geographical Society, December 11.—Major-Gen. Sir H. C. Rawlinson, president, in the chair.—A paper was read by Mr. Keith Johnston, "On the Rev. Thomas Wakefield's Map of Eastern Africa," the subject being limited to the form of Speke's Lake Victoria Nyanza, which Wakefield's native travellers had decided to consist of at least two lakes.—Capt. R. F. Burton followed with a paper on "Lake Ukara or Ukarewe," in which he argued from the new information gleaned by Mr. Wakefield at Mombaz, and Captain Speke's own data, that Victoria Nyanza consisted of many separate lakes, and that it was a "Lake Region," and not a single lake.

Sunday Lecture Society, December 17.—"On the Optical Construction of the Eye," by Dr. Dudgeon. The early part of the lecture was occupied with a description of the optical construction of the eye. In order to ascertain the precise focal length of aqueous humour, the lecturer immersed his eyes in water, which, being of the same refractive power as the aqueous humour, extinguishes it as a lens. He then ascertained what power of lens was required to restore perfect vision under water, which he found to be affected by an artificial lens, whose focus was exactly  $1\frac{1}{2}$  inch under water. He constructed a pair of spectacles fitted with air lenses, formed by very concave watch-glasses placed back to back, and united round their edges by a ring of wood or vulcanite. In this way he formed air lenses which had a focus of  $1\frac{1}{2}$  inch in water, but which offered no obstruction to vision in the air. With these spectacles perfect vision both for near and distant objects below the water was obtained, and on coming to the surface these spectacles allowed of perfect vision in the air. He then explained the construction of the eyes of fishes and amphibia, which have no anterior aqueous lens, but only a nearly spherical crystalline lens. He next explained the mechanism of the accommodation of the eye from distant to near vision. He showed that this was not effected by any increase of the convexity of the anterior surface of the crystalline lens, as is generally supposed, but by a slight rotation of the crystalline lens from without inwards, whereby the focus of the crystalline lens was shortened to the degree necessary to throw the image of a near object accurately on the retina. Finally, he pointed out that some of the principal discoveries of modern physicists already existed in the eye. Thus, the principle of achromatic lenses by the combination of two lenses of different refractive power was seen in the eye when a water lens was combined with the crystalline lens; the discovery of Descartes, that an elliptical surface of a lens obviated spherical aberration, was also found in the eye; and Herschel's discovery that a combination of the meniscus with the double

convex lens prevented spherical aberration also obtained in the eye.

Photographic Society, December 12.—A paper was read by Lieut. Abney, R.E., F.R.A.S., on albumen applied to photography. He first referred to the use of albumen as a substratum for collodion films. Taking different proportions of albumen and water, and iodising part of each, he found that with the best collodion process the iodised substratum as a whole gave neither increase nor diminution of sensitiveness, whilst with the uniodised substratum the sensitiveness was slightly diminished. He next pointed out the cause of blisters in developing dry plates, and traced them to the expansion of the albumen; the substratum rising from the glass at the smoother portions. He lastly touched upon the uncombined sulphur always present in albumen, as much as 1.2 grains being found in a whole sheet of paper, whilst but  $\frac{1}{4}$  grain of metallic silver was found in prints of the same area. He argued from this that silver prints must fade, apart from the imperfect washing, unless the sulphur be removed. He recommended the makers of albumenised paper to try to do this, first forming albumenate of potash by the addition of potash to the albumen. The unprecipitated part contained the sulphur. This might be removed and the albumen once more dissolved by the addition of acid.—A paper on M. Dagrou's microphotographic despatches was also read, detailing the methods of preparation; as many as 50,000 messages were received in Paris during the Siege upon these films, conveyed to the capital by pigeons.

#### MANCHESTER

Literary and Philosophical Society, November 14.—E. W. Binney, F.R.S., president, in the chair. The president said that, on Friday the 10th inst., he observed at Douglas in the Isle of Man, a splendid display of the aurora borealis. At 8 P.M. it appeared as an arch of a greenish colour, extending from west to east, through the tail of the Great Bear. Afterwards, at ten o'clock, the same kind of arch was observed with another higher up, which ranged west and east through the Pole star. At this time numerous streamers and flashes of light of a green and yellowish-white colour flashed up from near the horizon to the zenith, from east, south, and west; those towards the west had a reddish hue. The sky was beautifully clear, and the light from the aurora was greater than ever previously observed by him.—"On the Origin of our Domestic Breeds of Cattle," by William Boyd Dawkins, F.R.S. There are at the present time three well-marked forms inhabiting Great Britain. 1. The hornless cattle, which have lost the horns which their ancestors possessed through the selection of the breeder. The polled Galloway cattle, for instance, are the result of the care taken by the grandfather of the present Earl of Selkirk, in only breeding from bulls with the shortest horns. The hornless is altogether an artificial form, and may be developed in any breed. 2. The *Bos longifrons*, or the small black or dark brown Welsh and Scotch cattle, which are remarkable for their short horns and the delicacy of their build. 3. The red and white variegated cattle, descended from the urus, and which have on the whole far larger horns. These two breed freely together, and consequently it is difficult to refer some strains to their exact parentage. The large domestic cattle of the urus type are represented in their ancient purity by the Chillingham wild oxen, as they are generally termed, but the exact agreement of their colour with that specified in the laws of Howel Dha proves that they are descended from an ancient cream-coloured domestic ox with red ears. The animal was introduced by the English invaders of Roman Britain, and was unknown in our country during the Roman occupation. The *Bos longifrons*, on the other hand, was the sole ox which was domestic in Britain during the Roman occupation, and in the remote times out of the reach of history it was kept in herds by the users of bronze, and before that by the users of polished stone. This is proved conclusively by the accumulations of bones in the dwelling-places and the tombs of those long-forgotten races of men. The present distribution of the two breeds agrees almost exactly with the areas occupied by the Celtic population and the German or Teutonic invaders. The larger or domestic urus extends throughout the low and fertile country, and indeed through all the regions which were occupied by Angle, Jute, Saxon, or Dane; while the smaller *Bos longifrons* is to be found only in those broken and ragged regions in which the unhappy Roman provincials were able to make a stand against their ruthless enemies. The distribution, therefore, of the two animals corroborates the truth of the view taken by Mr. Freeman, that the conquest of Britain by the

English was not a mere invasion of one race by another, but as complete a dispossession as could possibly be imagined. The *Bos longifrons* lingers in Wales, after having once occupied the whole country, just as its Celtic owners still linger, while the urus is an invader just in the same sense as their English possessors. The *Bos longifrons* is of a stock foreign to Europe, and the urus was most probably domesticated in some other region by those Neolithic people. Both these animals have probably been derived from an area to the south and east of Europe, and were introduced by the Neolithic herdsmen and farmers at a very remote period.

DUBLIN

Royal Dublin Society, November 20.—Prof. R. Ball, M.A., in the chair. Mr. Maurice Cole exhibited and explained a working model of an improved seed sowing machine.—Prof. Edward Hull, F.R.S., read some notes of a recent visit to Vesuvius.—Dr. Emerson Reynolds exhibited a new apparatus for gas analysis, and Mr. A. G. More exhibited some specimens of well-stuffed birds from the museum of the Society.

Royal Irish Academy, November 30.—Rev. J. H. Jellet, president, in the chair. The Secretary read a paper by M. Donovan on Earl Stanhope's alleged imperfections of the tuning fork; also for Dr. Whitley Stokes a paper on a fragment of Cormac's glossary.—Mr. G. H. Kinahan read a paper on and exhibited sketches of what appeared to him a new type of Clocháin, observed in the county of Mayo, South of Louisburgh. The structure was composed of large flags inclining inwards to form sloping sides and roof, the very apex of which was covered by horizontal flags. He also exhibited a sketch of a form of cross observed in the same neighbourhood, and which was unlike anything he had ever seen.

PARIS

Academy of Sciences, December 11.—M. J. Boussinesq read a paper on a remarkable property of the points where the lines of greatest slope of a surface have their osculatory planes vertical, and on the difference which generally exists at the surface of the earth between the lines of the ridge or the thalweg, and those along which the slope of the soil is a minimum.—M. Becquerel presented a third memoir on the discoloration of flowers by electricity, and on the cause of the phenomenon, in which he shows that electricity acts in this case by destroying the envelopes of the cells containing the coloured materials. Heat produces the same effect. The author remarked upon some general applications of these facts.—A paper on the diffusion and deleterious influence of mercurial vapours, by M. Merget, was read. The author disputed the conclusions of Faraday, founding his opposition upon experiments and observations which show that the vaporisation of mercury is a continuous phenomenon not even interrupted by the solidification of the metal, and that the vapours emitted by it are capable of great diffusion, nearly in accordance with the dynamic theory of gases. M. Dumas called attention to some observations on this subject by M. Boussingault.—M. C. A. Valson presented a note on the part played by space in the phenomena of solution, in which he discussed the contraction produced by the solution of various salts in water.—A note on different acoustic phenomena observed during balloon-ascents, by M. W. de Fonville, was read. The author remarked upon the fact that certain acute but very feeble sounds are often heard in balloon ascents, and accounts for the phenomenon by the reverberation of the balloon itself.—M. Serret presented a note by M. de Tastes on a new propeller, consisting of a plate or fan worked in the manner of the tail of a fish or whale.—M. A. Barthélemy presented a memoir on the vibrations communicated to mercury and liquids in general, in which he described and figured the curious effects produced by these vibrations in vessels of various forms.—M. Delaunay read a note on the cold of the 9th December, containing some interesting observations on the range of this extreme cold over the Continent of Europe; and M. C. Sainte-Claire Deville presented a second note on the precocity of the cold in the present year.—M. P. P. Dehérain presented a memoir on the intervention of the nitrogen of the atmosphere in vegetation, in which he demonstrated by experiment the absorption of the atmospheric nitrogen by decomposing organic matters, and suggested that by this means nitrogen may be absorbed by the soil.—M. Wurtz presented a note by MM. C. Friedel and R. D. Sylva, on the action of chlorine upon chloride of isopropyl; and a note by M. E. Grimaux on derivatives of chloride of tolylene.—A note was read by M. Dubrunfaut on the combustibility of carbon, in which he maintains that carbon

is combustible only in gases containing water; and another by M. F. Jean on the quantitative determination of glucose, recommending a process depending on the precipitation of metallic silver by protochloride of copper, prepared from the protoxide precipitated by glucose.—The deposits of phosphate of lime in France formed the subject of three papers, namely, a note on the composition of that recently worked in the Departments of Tarn-et-Garonne and of the Lot, by M. A. Bobière; an account of the deposits of Saint-Antonin and Caylux, in the former department, by M. Trutat; and a short note on the organic origin of the deposits in the Quercy, by M. Malinowski. M. Trutat described the structure of the deposits, and noticed the remains of certain mammalia found in them.—M. Daubrèe communicated a note by M. P. Fischer on the existence of Lower Tertiary strata in Madagascar. These beds, belonging apparently to the great Nummulitic formation, occur on the west and south-west coast of the island. No nummulites have been found in them.—M. E. Blanchard presented a note by M. A. Milne-Edwards on the structure of the placenta in the Tamandua. The author describes this placenta as differing in various respects from those of other Edentata, and remarked that the diversity in the foetal envelopes of those mammals would lead to the supposition that either the characters derived from them are not so important among the Edentata as in other groups, or the forms united in the Edentata are less nearly related than is generally supposed. He is inclined to the latter opinion.—M. Duchartre communicated a note by M. J. de Seynes on *Penicillium bicolor*, Fr.; and M. Robin presented a note by M. Rabuteau on the physiological properties of various chlorides.

BOOKS RECEIVED

ENGLISH.—Nature; or, the Poetry of Earth and Sea: From the French of Madame Michelet (T. Nelson and Sons).—The Mountain: From the French of J. Michelet (T. Nelson and Sons).—Beautiful Birds in Far-off Lands: M. and E. Kirby (T. Nelson and Sons).—Text Books of Science: Theory of Heat: J. Clerk Maxwell (Longmans).—A Manual of Zoology: H. A. Nicholson; 2nd edition (Blackwood).—Comparative Metaphysics; Part II.: S. H. Hennell (Trübner).  
 FOREIGN.—(Through Williams and Norgate).—Handbuch der vergleichenden Anatomie: E. O. Schmidt.—Mineralogische Mittheilungen, Jahrg. I., Heft 1: G. Tschermak.

DIARY

THURSDAY, DECEMBER 21.

ROYAL SOCIETY, at 8.30.—Contributions to the History of Orcin. No. II. Chlorine and Bromine Substitution Compounds of the Orcins; Note on Fuedsol: Dr. Stenhouse, F.R.S.—On some recent Discoveries in Solar Physics; and on a Law regulating the Duration of the Sunspot Period: W. De La Rue, F.R.S., B. Stewart, F.R.S., and B. Loewy.  
 LINNEAN SOCIETY, at 8.—On the Anatomy of the American King-Crab (*Limulus polyphemus*, Latr.): Prof. Owen, F.R.S.  
 CHEMICAL SOCIETY, at 8.  
 LONDON INSTITUTION, at 4.—The Philosophy of Magic. 1. The Magic of Modern Conjurers: J. C. Brough, F.C.S.

FRIDAY, DECEMBER 22.

QUEKETT MICROSCOPICAL CLUB, at 8.

THURSDAY, DECEMBER 28.

ROYAL INSTITUTION, at 3.—On Ice, Water, Vapour, and Air. No. I. Prof. John Tyndall, F.R.S.  
 LONDON INSTITUTION, at 4.—The Philosophy of Magic: 2. The Magic of the Theatre: J. C. Brough, F.C.S.

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ERRATA.—P. 123, col. 2, line 36 from top, for "or D1 . . . or D2," read "on D1 . . . on D2."