

this country last year. We have also a continuation of the "Insecta Scotica," in instalments of the Lepidoptera of Scotland, by Dr. Buchanan White, and the Coleoptera of Scotland, by Dr. D. Sharp.

THE *Journal* of the Royal Geological Society of Ireland, vol. iii. part 2, n. s. (vol. xiii. part 2) contains:—Reply to the observations in Mr. Kinahan's paper "On the Carboniferous Rocks of Iceland," by Prof. Ed. Hull, F.R.S. (Abstract); On *Phaneropleuron Andersoni* (Huxley) and *Uronemus lobatus* (Agas.), by Prof. Traquair, M.D. (plate v.); Additional Notes on the fossil Flora of Iceland; On *Filicites plumiformis* (Baily) from carboniferous limestone near Wexford, by W. H. Baily (plate vi.); Notes on the Carrara marble quarries, by Prof. E. Hull; On a remarkable fault in the New Red sandstone of Rainhill, Lancashire; and observations on the results determined by the Royal Commission into the Coal Resources of Great Britain and Ireland, by Prof. E. Hull; Sketch of the physical geology of North Clare, by W. H. S. Westropp; On tertiary iron ore in the County of Londonderry, by G. H. Kinahan; and Notes on Woodwardite, by Prof. J. E. Reynolds.

THE *Monthly Microscopical Journal* for April is an excellent number, containing several valuable papers. Mr. Wenham gives his new formula for microscope object-glasses, recently read before the Royal Society. Till recently high objectives have been formed of eight lenses, a front and back triplet with a middle doublet, consequently the rays of light are subject to error arising from sixteen surfaces of glass. The author some time ago substituted a single thick plano-convex for the anterior triplet, and in so doing reduced the number of reflecting surfaces to twelve, improving the instrument so much that his system has been generally adopted. In the new object-glass the number of lenses is still further reduced to five, and the surfaces consequently to ten; in it the front plano-convex remains, the back triplet is made the centre of the system, and the over corrected rays which leave it are rendered parallel at the point of emergence by a long focus plano-convex glass. In this combination therefore the whole correction is performed by a single concave of dense flint, and therefore two single lenses of crown, whose foci bear a definite relation to each other. Dr. Urban Pritchard's excellent observations "On the structure and function of the Rods of the Cochlear in man and other animals" are given *in extenso*. Dr. E. Hofman's paper on "Hair in its microscopical and medico-legal aspects" is translated, forming a concise summary for the student of forensic medicine. Dr. Maddox makes "Some remarks on a minute plant found in an incrustation of carbonate of lime," which he considers to be of the genus *Betrydium*, and names *B. minutum*.

THE *American Naturalist* for March contains an article by Mrs. Mary Treat, on "Controlling Sex in Butterflies." The authoress, as the result of an accident, observed that the larvæ of *Papilio asterias* when underfed almost invariably developed into male butterflies, but that when freely supplied with their favourite diet, they almost as certainly developed into females. She repeated these experiments on large numbers with the same result, and has verified them on *Vanessa antiopea* and the moth *Dryocampa rubicunda*. Mr. A. S. Packard criticises these results, and shows that the earliest indications of the sexual glands appear when the larva is but little developed, and that they are often fully formed when it is adult. There are papers by Profs. Marsh and Cope on the extinct Ungulata of the Wyoming district, in which some dates of publication are fully discussed. Among the other papers are, Prof. Perkins on "The Flying Squirrel;" C. Ran, on "Indian Netsinkers and Hammerstones;" and R. Ridgway, on "The Vegetation of the Lower Wabash Valley."

Ocean Highways, New Series, No. 1.—The new form of this valuable journal is a great improvement on the original unhandy form, though we do not think the increase in bulk is very great. This number is a particularly interesting one. The first article is called forth by the Khiva expedition, and gives a summary of the commercial and political history of the Caspian, and the region to the eastward; it is illustrated by two good maps. "The Great Rivers of China" is the title of a short article by Dr. F. Porter Smith, while Mr. C. E. Austen, C.E., contributes a useful article, accompanied by an excellent map, on "Railways in Asia Minor." Mr. D. Hanbury has a short article on myrrh, the object of which is to induce travellers to collect data for its botanical elucidation. Prof. Mohn describes the origin and history of the Meteorological Institute of Christiania; a map by

the same gentleman is given, illustrating the explorations by Norwegian Captains about Spitzbergen in 1872; accompanying which is a short editorial paper on Wiche's Land, defending the name given to it by Edge in 1617. One very interesting paper is by Mr. T. F. Hughes, on "Formosa and its southern Aborigines." "In this fair island of the distant eastern seas," he says, "there is still a mine of discovery and information awaiting the cunning hand of the scholar and traveller." Reviews, notes, reports, correspondence, &c., complete this interesting number.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, April 3.—"On the Structure of Muscular Fibre," by E. A. Shafer.

"Note on the Synthesis of Marsh Gas, and the Electric Decomposition of Carbonic Oxide," by Sir B. G. Brodie, F.R.S.

"On an Air Battery," by Dr. Gladstone, F.R.S., and A. Tribe.

Chemical Society, April 3.—Dr. Odling, F.R.S., &c., president, in the chair.—A paper on "A method of determining with great exactness the specific gravity of liquids," was read by the author, Dr. Sprengel. The instrument, consisting of a U-shaped glass tube terminating in capillary tubes bent at right angles, is very delicate when proper precautions are taken.—The second paper, entitled "Researches on the action of the copper-zinc couple on organic bodies:—No. II. on the iodides of methyl and amyl," by J. H. Gladstone, F.R.S., and A. Tribe, is a continuation of the authors' researches on this subject, an account of which they communicated to the Society some short time ago.—Dr. C. R. A. Wright then read a memoir "On Cymene from various sources," in which he gives the results of his examination of cymene prepared from eight different sources, showing them to be identical.—The last paper was by Dr. H. E. Armstrong, being No. XI. of "Communications from the Laboratory of the London Institution; and action of the acid chlorides on nitrates and nitrites—Part I. Acetic chloride."

Zoological Society, April 1.—Mr. R. Hudson, F.R.S., vice-president, in the chair.—A communication was read from Dr. J. S. Bowerbank containing a description of the brain and of a portion of the nervous system of *Ptiliculus capitis*.—A communication was read from Dr. J. E. Gray, F.R.S., containing remarks on the genera of Turtles (*Testudines*), and especially on their skeletons and skulls.—A second communication from Dr. Gray contained the description of the skull of *Sternotherus*.—Dr. A. Günther, F.R.S., read descriptions of three new species of Flying Squirrels, proposed to be called *Pteromys tephronulus*, from Penang, *P. phocomelas*, from Borneo, and *Sciuropterus pulverulentus*, from Penang and Malacca.—Mr. O. Salvin made some remarks on the tail-feathers of the birds of the genus *Momotus*, and on the mode in which their peculiar form had originally arisen.

Geological Society, March 26.—His Grace the Duke of Argyll, K.T., F.R.S., president, in the chair. The following communications were read:—I. "Synopsis of the younger formations of New Zealand," by Capt. F. W. Hutton, F.G.S., of the Geological Survey of New Zealand. In this paper the author gave a summary of the Tertiary and later Secondary formations of New Zealand. He stated that he had been able to determine 375 species of true Mollusca, 12 of Brachiopoda, and 18 of Echinodermata from the Tertiaries; and under each of the formations which he recognises he gave the number of species of true Mollusca found in it, indicating the number of recent species, and of those belonging to other formations occurring in each. He also noticed the range and distribution of the various formations. The Tertiary groups of strata distinguished by the author are, in descending order, as follows:—I. Pleistocene. II. Pliocene: 1, the Newer Pliocene or Whanganui group; 2, the Older Pliocene or Lignite group. III. Miocene: 3, Upper or Arvater group; 4, Lower or Kanieri group. IV. Oligocene: 5, Upper or Hawke's Bay group; 6, Lower or Waitewata group, V. Eocene: 7, Upper or Ototara group; 8, Lower or Brown Coal group. As belonging to the Mesozoic series, the author also described beds of Danian age, under the name of the Waitara formation. A species of *Belemnites* occurs in beds belonging to the Ototara group, and also in the Waitara formation. Volcanic action commenced in the North Island during the deposition of the Waitewata group, and has since been almost continuous in the northern, western, and central parts of the

island. In the South Island the volcanic formations appear to belong to the later Cretaceous, Oligocene, and Miocene periods. The volcanic rocks of the Chatham Islands belong chiefly to the Upper Oligocene.—2. "On the Tree-ferns of the Coal-measures, and their relations to other living and fossil forms," by Mr. W. Caruthers, F.R.S., F.G.S. The author pointed out that there existed in the Coal-measures two very distinct kinds of fern-stems, each represented by several species. The first group had a stem-structure like that of living tree-ferns. In them the vascular elements of the stem formed a closed cylinder round the pith; and the vascular bundles for the leaves were given off from the out-turned edges of the cylinder, where, at regular intervals, corresponding to the position of the leaves, narrow meshes occur for this purpose. In the second group the stems differed from the other group chiefly in having the ends of the vascular plates, as seen in the transverse section, turned inwards, and having the bundles of the leaves formed in a complete condition in the axis of the stem.—3. "Notes on the Geology of Kazirun, Persia," by Mr. A. H. Schindler. In this paper, which accompanied a series of specimens presented to the Museum of the Society, the author described the section presented by the hills in the neighbourhood of Kazirun. The general surface was described as consisting of nearly unfossiliferous Post-tertiary deposits, immediately beneath which is an unstratified marine deposit containing a great abundance of fossils, among which are species of *Ostrea*, *Pecten*, and *Cidaris* (?). Below this deposit is a succession of strata, repeated several times in the hills, and at the bottom of the series in each case is a bed of gypsum. The spaces between the recurrent series are filled up with conglomerates. Beneath the gypseous series is a formation of compact limestone, which rises to a height of about 1500 feet both north and south of the plain of Kazirun; its beds dip 25°, and their strike is from N.E. to S.W.

Royal Microscopical Society, April 2.—Mr. Charles Brooke, F.R.S., president, in the chair.—A paper was read by Mr. Henry Davis on a new species of *Callidina* (*C. vaga*), the distinctive characteristics of which were fully described and living specimens exhibited. Mr. Davis also detailed a series of experiments upon the dessication of rotifers, the results of which tended to prove that although they could not be revived after having been once actually dried up, it was quite possible for them to survive what was generally accepted as actual dessication, and that they would resist not only a sustained temperature of 200°, but also exposure for a long period in the exhausted receiver of an air-pump with sulphuric acid. He pointed out and proved by experiment, that during the process of drying the gelatinous matter which was secreted by these rotifers contracted around them, forming an impervious envelope and effectually preserving within it sufficient moisture to sustain life.—A communication was read from Mr. Parfitt, of Exeter, descriptive of a presumed new animal, apparently related to the annelids.—A fine preparation of malpighian capsules from the kidney, was exhibited and described by Mr. Stewart.

Anthropological Institute, April 1.—Prof. Busk, F.R.S., president, in the chair. The president read "Remarks on a Collection of Ancient Peruvian Skulls presented to the Anthropological Institute, by Mr. T. J. Hutchinson, H.B.M. consul at Callao." The skulls were collected by the Consul from the "Huacas" near Santos, to the north of Callao, which were considered by him to be those of Chinchas, or Huancas, or perhaps of Quichmas, or Aymaras, all of which tribes are now probably absorbed into the Cholas, a Mestizo race; from Ancon, from Pasamayo, about thirty miles north of Callao, and from Cerro del Oro in the Canete Valley—in all 156 specimens. After giving further detailed descriptions on the authority of Consul Hutchinson, the author passed to the consideration of the characters presented by the crania exhibited. Such of the specimens as he had been able to measure yielded the following results:—"The mean length was about 6.25 in., and the breadth 5.6 in., giving a cephalic or latitudinal index of .905, only two falling below .800. In that estimate were included both normally-shaped and artificially compressed skulls. The cephalic index of the supposed normally shaped, was .873, the greatest being .935, and the least .812; and of the clearly artificially deformed, .979; the greatest being 1.32, and the least .861. Those figures showed how very much the latitudinal index was exalted by the fore and aft compression of the skull. The altitudinal index of the normal skulls was .843, that of the compressed .878. The mean capacity of the larger and male skulls appeared to show a result of about 80 cubic in. equivalent to brain of about 45 oz. roughly estimated, which

result indicated that the crania were of small size.—The president communicated a paper by Mr. J. M. Reade, "On a human skull and fragments of bones of the Red Deer found at Birk Dale, Southport."

Meteorological Society, March 19.—Dr. Tripe, president, in the chair.—The president informed the meeting that at the last meeting of Council a letter was read containing Mr. Glaisher's resignation of the Secretaryship, and that after much consideration the Council had accepted it with great regret; that they had then appointed Mr. Cator to the vacant office for the remainder of the session, and elected Mr. Glaisher to the seat on the Council thus rendered vacant, which he was glad to say Mr. Glaisher had accepted.—The first paper read was by Mr. R. H. Scott, F.R.S., "On some results of weather telegraphy," in which he laid before the Society some of the special circumstances connected with that service. He stated that the information received was insufficient, both in quantity and quality, to give a complete idea of the weather, and showed how any serious extension of the system would entail greatly increased expenditure, citing the very large cost (50,000*l.* per annum) of the American signal service, the most perfect in existence. He drew attention to the frequency of telegraphic errors, and the serious results arising therefrom. He next proceeded to discuss the probability of our deriving benefit from additional reports from the Azores, &c., and showed by actual investigation that such reports would not be of immediate use to these islands in regard of giving notice of advancing storms. The modes of conveying warnings to ships were next mentioned, and Mr. Scott stated his belief that ultimately Admiral Fitzroy's drum and cones would be adopted, though not perhaps in the significations originally attached to them.—The other paper was by Mr. W. Marriott, "On the Barometric Depression of January 24, 1872." This depression occurring in the early morning hours, very few observations had been made at the time of lowest pressure; but from those which he had received, the depression appears to have first touched the English coast near Falmouth about midnight, and to have passed along the coast to Upwey, which was reached about 3 A.M.; it then took a northerly course and passed near Birmingham at 6 A.M., after which it crossed Derbyshire, Nottinghamshire, and Lincolnshire, and passed out of the Humber between 10 and 11 A.M. He stated, however, that the evidence was insufficient to prove that this was its actual course, or whether it merely passed over England in a N.E. by N. direction at a uniform rate of about 30 miles an hour. The lowest readings of the barometer were 28.18 in. at 4.30 A.M. at Clifton, and 28.179 in. at 5.20 A.M. at Evesham. The paper concluded with a few remarks on former depressions.

Institution of Civil Engineers, March 25.—Mr. T. Hawksley, president, in the chair.—"The Mont Cenis Tunnel," by Mr. Thomas Sopwith, jun., M. Inst. C. E. This communication might be considered as supplementary to a former paper read in 1864—(Min. Proc. Inst. C. E., vol. xxiii., p. 255)—and described, (1) the Tunnel, as completed, with statistics obtained either by actual observation or from the Engineers in charge, or from official publications of the Italian Government; (2) the principal changes which had been introduced in the works and machinery underground and at the surface since the summer of 1863.

MANCHESTER

Literary and Philosophical Society, March 18.—Dr. J. P. Joule, F.R.S., president, in the chair.—"Observations on the Rate at which Stalagmite is being accumulated in the Ingleborough Cave," by W. Boyd Dawkins, F.R.S. He thinks it evident, from his researches, that the value of a layer of stalagmite, in fixing the high antiquity of deposits below it, is comparatively little. The layers, for instance, in Kent's Hole, which are generally believed to have demanded a considerable lapse of time, may possibly have been formed at the rate of a quarter of an inch per annum, and the human bones which lie buried under the stalagmite in the cave of Bruniquel are not for that reason to be taken to be of vast antiquity. It may be fairly concluded that the thickness of layers of stalagmite cannot be used as an argument in support of the remote age of the strata below. At the rate of a quarter of an inch per annum 20 feet of stalagmite might be formed in 1,000 years.—"On Methyl-alizarine," and Ethyl-alizarine," by Edward Schunck, Ph.D., F.R.S.—"On the Transition from Roman to Arabic numerals (so-called) in England," by the Rev. Brooke Herford.—"Notes on the Vic-

toria Cave, Settle," by William Brockbank, F.G.S. For various reasons, he submitted, there is no ground for the theory of glacial action as put forth by Messrs. Boyd Dawkins and Tiddeman, but on the contrary that the filling of the Victoria Cave was the work of long ages, by the action of running water, and that there is no reason to suppose that the remains found in it are older than the glacial epoch.—The President exhibited a syphon barometer, the peculiarity of which consisted in the introduction of a small quantity of sulphuric acid over the ends of the mercurial column.—Mr. Spence, F.C.S., communicated to the Society the result of an experiment in heating a diamond, which will considerably modify the general impression as to that gem being combustible only at an extremely high heat. A friend of his had brought over a number of diamonds from the African mines. Some of these were what is called "off colour," not being purely white, and he put one of these into Mr. Spence's hands to try some experiments for displacing the colour if practicable. This diamond, the size of a small pea, was immersed in fire-clay in a small crucible, the clay being mixed with a little carbonate of soda and hydrate of lime; and the crucible was then placed in a muffle, and for three days and nights exposed to a heat, which at no time was beyond a low cherry red. After cooling, the crucible was broken, and the lump of hardened fire-clay was carefully broken up to extract the diamond; after two or three fractures of the lump an impression or hole in the indurated clay was discovered just at the spot where the diamond should have been, but not a vestige of the precious stone remained.

DUBLIN

Royal Irish Academy, March 15.—The Rev. Prof. Jellett, B.D., president, in the chair. The annual report of the council was read by Dr. Ingram, secretary to council. The election of the president and members of council was proceeded with, when the Rev. J. H. Jellett, B.D., was re-elected President.

Royal Geological and Zoological Societies of Ireland. A joint meeting of these societies was held on Wednesday evening, March 12. Colonel Meadows Taylor read a paper on the coal fields of Central India.—Prof. Edward Hull, F.R.S., read a paper on the Microscopical Structure of the Limerick Carboniferous Trap Rocks.—A Geological Map of New Zealand, and a fine recent specimen in spirits of *Pentacrinus Mulleri* Orst were exhibited.

PARIS

Academy of Sciences, March 31.—M. de Quatrefages, president, in the chair.—The following papers were read:—On the theory of the normal magnet, and on the means of indefinitely increasing the force of magnets, by M. J. Jamin.—On the capillary theory of the Ranunculaceæ, by M. A. Trecul.—On the proposed apparatus for pumping out and elevating water by means of the action of waves on the shores of the Mediterranean, by M. A. de Caligny. The author has suggested a means of utilising the force of the waves for the above purposes.—New papers on the shock of earthquake in Italy, observed on the 12th of March, 1873, by M. P. de Tchiatchef.—The Academy then proceeded to elect a member in the place of the late Marshal Vaillant. After two votings, in which no candidate obtained an absolute majority, a ballot was proceeded with, when M. Cosson obtained 31 and M. de la Gourmerie 30 votes. M. Cosson was then declared duly elected.—A report on two memoirs on the silicified vegetables of the Autun coal measures, by M. B. Regnault, was then read, and followed by M. Roger's fourth memoir on capillary phenomena, which dealt with the mathematical nature of the subject.—On a new method of optically determining the velocity of projectiles, by M. M. Deprez. The method consists in attaching a magnesium fuse to the projectile and observing its flight by means of two telescopes. The method is an application of that used for meteors.—The Secretary read a number of extracts from a paper on a new classification of clouds, by M. Poey.—On certain points in M. Faye's theory of the solar spots, by M. Tacchini. Father Tacchini thinks that the hydrogen carried down by cyclones, according to M. Faye's theory, would become so violently heated that it would rush back with such force as to destroy the cyclone, and also that if such a process really occurred the gas would carry up with it metallic vapours; as these are not generally visible in prominences, he thinks the explanation untenable.—On the foci (*faisceaux*) of circles, by M. Ribaucour.—On the spectrum of boric anhydride, by M. Lecocq

de Boisbaudran.—On alcohol and normal acetic acid from milk considered as products of the functions of microzymes, by M. A. Béchamp.

DIARY

THURSDAY, APRIL 10.

MATHEMATICAL SOCIETY, at 8.—On Systems of Porismatic Equations, Algebraical and Trigonometrical; Note on Epicycloids and Hypocycloids; Locus of point of concurrence of perpendicular Tangents to a Cardioid; Elliptic motion under acceleration constant in direction: Prof. Wolstenholme.—On the calculation of the Value of the theoretical unit-angle to a great number of decimal places: Mr. J. W. L. Glaisher.

SATURDAY, APRIL 12.

ROYAL BOTANIC SOCIETY, at 3.45.

TUESDAY, APRIL 15.

STATISTICAL SOCIETY, at 7.45.

WEDNESDAY, APRIL 16.

SOCKETY OF ARTS, at 8.—On the Condensed Milk Manufacture: L. P. Merriman.
METEOROLOGICAL SOCIETY, at 7.—On a proposed new form of Rain Gauge, "The Atmospherometer." J. J. Hall.—Discussion on the Report of the Proceedings of the Meteorological Conference at Leipzig.
LONDON INSTITUTION, at 7.—Third Musical Lecture: Prof. Ella.

THURSDAY, APRIL 17.

LINNEAN SOCIETY, at 8.—Burmese *Orchideæ*, from the Rev. C. P. Parish: Prof. Reichenbach.—Perigynium of *Carex*: Prof. McNab.
CHEMICAL SOCIETY, at 8.—On Heat produced by Chemical Action: Dr. Debus, F.R.S.
NUMISMATIC SOCIETY, at 7.
ZOOLOGICAL SOCIETY, at 4.

BOOKS RECEIVED

ENGLISH.—A Manual of Photography. 8th edit.: G. Dawson (Churchill).—Electricity and Magnetism. 2 vols.: C. Maxwell (Macmillan).—Flies and Fly-fishing: Capt. St. J. Dick (R. Hardwicke).—A Catalogue of the Collection of Cambrian and Silurian Fossils in the Geological Museum of the University of Cambridge: J. W. Salter, Prof. A. Sedgwick, Prof. Morris (University Press, Cambridge).—Fever and Cholera from a new point of view: A. Smith (Calcutta).—Illustrated Guide to the Fish Amphibian. Reptilian and supposed Mammalian remains of the Northumberland Carboniferous Strata, with Atlas; T. P. Barkas (Hutchings).—A Journey through the Caucasus and the interior of Persia: A. H. Mounsey (Smith and Elder).—A Journey to the Source of the River Oxus. 2nd edit.: Capt. J. Wood (Murray).—Turning for Amateurs.—Birds of the Humber District: J. Cordeaux (Van Voorst).—A General System of Botany, Descriptive and Analytical: Emm. de Mout and J. Decaisne. Translated by Mrs. Hooker, Edited by Dr. Hooker (Longmans).—The Principles of Animal Mechanics: The Rev. S. Haughton (Longmans).—Field and Forest Rambles: A. L. Adams (H. S. King & Co.).

PAMPHLETS RECEIVED

ENGLISH.—The Agricultural Returns of Great Britain for 1872.—Quarterly Weather Report of the Meteorological Office, Pt. 2, April-June, 1872.—A Message to the British Entomologists by the Ghost of the Rector of Barham: E. W. Janson.—Journal of Mental Science, No. 49, April: H. Maudsley and Thos. Clouston, M.D. (Churchill).—The Potato Disease, its cause and its remedy: S. Smith (Smart & Allen).—General Report on the Operations of the great Trigonometrical Survey of India during 1871-2: Major Montgomerie, R.E., F.R.S.
FOREIGN.—Anales del Museo Publico de Buenos Aires, 1872-73.—Report of the Commissioners of Fisheries of the State of New York.—Recherches expérimentales sur l'influence que les changements dans la pression barométrique exercent sur les phénomènes de la vie (8th note): M. P. Bert.

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