ultimate speed, nor when it will be reached.—On the discovery of Utica slate graptolites on the west side of the Hudson River, a few miles north of Poughkeepsie, by Henry Booth.—On Becraft's Mountain, near Hudson, Columbia County, New York (one illustration), by William Morris Davis. After describing the district formations, and their relative and absolute positions, the author deals with the question of nonconformity between the Lower and Upper Silurian systems of the locality and the relations of these systems elsewhere. In another communication he discusses the question of nonconformity at Rondout, New York.—Notice of agricultural, botanical, and chemical results of experiments on the mixed herbage of permanent meadows, conducted for more than twenty years in succession on the same land, by D. P. Penhallow. The results are tabulated, and are valuable as showing the influence of different fertilisers upon the character of vegetation and the total produce.—Note on Mr. Backhouse's observations on physiological optics, by W. Le Conte Stevens.

Bulletin of the Belgian Académie Royale des Sciences, des Lettres, et des Beaux Arts, August 5, 1883.—Report on M. Gravis' anatomical researches on the vegetative organs and structure of the *Urtica dioica*, by MM. Ed. Morren and Gilkinet.—Report on M. Paul Albrecht's work on the pelvisternum of the Edentates, by MM. P. J. Van Beneden and Van Bambeke.—Note on a thunderbolt which fell near Gougnies on July 11, 1868, by M. D. Van Bastelaer.—Report on M. Delaey's steam engine of universal application, by M. Maus.—Remarks on some new fossils found in the Belgian Tertiary formations, by M. P. J. Van Beneden.—Note read to the Academy on presenting the two first parts of his work on the theory of the diurnal, annual, and secular movements of the axis of the globe, by M. F. Folie.—Observations on a recent note by M. P. J. Van Beneden, touching the discovery of the Bernissart fossil iguanodons, by M. E. Dupont.—Note on the influence of respiration on blood-pressure, by MM. Em. Legros and M. Griffé.—Report on M. G. Tiberghien's philosophic dissertation on time, by M. A. Le Roy.—Note on M. de Sonnaz's historical studies on the county of Savoy, by M. Rivier.—Communication on some autographs of Grétry, by M. Stanislas Bormans.

Archives Italiennes de Biologie, tome iv. fasc. 1, October 31, 1883, contains:—On the zoological station at Naples, by C. Emery.—On le charbon in birds, by E. Perroncito.—On a true diffused kidney in certain mollusca, by S. Trinchese.—On the optic lobes of birds, by J. Bellonci.—On the oscillations of the typhoid fever epidemic at Paris in connection with the rainfall and sewage of that city, by L. Pagliani.—On paraldehyde as antagonistic to strychnine, by V. Cervello.—On the active properties of *Nigella sativa*, by P. Pellacani.—On the genesis of Ptomaines, by F. Coppola.—Researches as to the poison of *Triton cristatus*, by A. Capparelli.—Embryological researches as to the mammalian kidney, by C. Emery.—Histological researches as to the nervous centres, by C. Golgi.—Obituary notices of P. Pacini, N. A. Pedicino, and Victor Colomiatti.

Zeitschrift für wissenschaftliche Zoologie, Bd. xxxix., Heft 1, September 28, 1883, contains:—Researches on the interstitial connective tissue in mollusca, by Dr. J. Brock (plates 1 to 4).—On the germinal layers of the tail end of *Lumbriculus variegatus*, with a contribution to the anatomy and history of this worm, by Dr. C. Bulow (plate 5).—On the histogenesis of the bones in Teleostei, by Carl Schmid-Monnard (plates 6 to 9).—Remarks concerning the blood lacunæ and the connective tissue in Najadæ and Mytilidæ, by W. Flemming.—Contributions to the histology of the Echinoderms, No. 1, the Holothuria (Pedata) and the nervous system of the Asteridæ, by Dr. Otto Hamann (plates 10 to 12).

SOCIETIES AND ACADEMIES

LONDON

Linnean Society, November 15.—Sir John Lubbock, Bart., F.R.S., president, in the chair.—Messrs. Philip Crowley and J. Murray were elected Fellows of the Society.—Mr. Charles B. Plowright exhibited a young pear tree showing *Rœstelia cancellata*, Jacq., produced from *Podisoma sabinæ*, therefore supporting the observations of A. S. Œrsted in *Botaniska Notiser* for 1865; also examples of *Puccinia graminis* on wheat produced from Œcidium on *Mahonia aquifolia*; the Œcidiospores were sown June 2, 1883, the Uredospores were sown June 10, and the ripe *P. graminis* was gathered September 10, 1883. He likewise called attention to examples of *Œcidium rumicis* on *Rumex obtusifolius*, *R. hydrolapathum*, *R. conglomeratus*, and *Rheum officinale*, the same being produced from *Puccinia phragmitis*.—Prof. P. Martin Duncan showed a specimen of coral (*Desmophyllum crista-galli*) which had grown upon an electric telegraph cable off the shores of Spain; it possessed radicles, apparently due to the presence of a worm close beneath the base of the coral.—Mr. E. P. Ramsay exhibited a series of rare New Guinea birds, and Mr. R. B. Sharpe made remarks thereon.—Mr. T. Christy exhibited a fine living and healthy specimen of *Trevesia sundaica*, Miq. (the so-called *Gastonia palmata*), or probably a new species. This peculiar and handsome plant has rarely been seen in this country, and of late years almost been lost sight of.—Dr. J. Murie showed and made remarks on specimens of *Ascaris bicolor* from the living walrus at the Westminster Aquarium.—Mr. F. I. Warner drew attention to a series of specimens of *Orchis incarnata* from Hampshire.—A paper was read by Mr. A. W. Bennett, on the reproduction of the Zygnemaceæ, as a solution of the question, Is it a sexual character? De Bary twenty-five years ago, and since then Wittrock, have instanced what they have deemed sexual differences between the conjugating cells, though most later writers rather ignore essential physiological distinctions. Mr. Bennett has directed his investigations chiefly to the genera *Spirogyra* and *Zygnema*, and from these he supports the inference of the above-mentioned authors. He finds there is an appreciable difference of length and diameter in the conjugating cells, that deemed the female being the larger. The protoplasmic contents he also finds pass only in one direction, and change first commences in the chlorophyll bands of the supposed male cells, with accompanying contraction of the protoplasmic material. The genera *Mesocarpus*, *Staurospermum*, and the doubtful form *Craterospermum* have likewise been examined, and, though showing differences, yet on the whole substantiate the view above enunciated of cell sexuality.—There followed the reading of notes on the antennæ of the honey bee, by Mr. T. J. Briant, in which he describes the minute structure of the segments, the joints and certain rod and cone like organs, previously referred to by Dr. Braxton Hicks, of highly sensitive function.—A paper was read on the Japanese Languriidæ, their habits and external sexual characteristics, by Mr. G. Lewis. He remarks that a representative of the family has been found in Siberia, lat. 46° (*L. menetriesi*); there are none in Europe, and one is known from Egypt. Others inhabit the Malay Archipelago, Ceylon, and the American continent. The author infers from the geographical distribution of these beetles that they have emanated from a tropical area. Some in the imago state cling to the stems of brushwood; others sit on the leaves of the moist shade-loving plants in the forests, while still others frequent debris on hill sides. Their colours are all dull, their bodies elongate and not structurally adapted for boring. The sexes show peculiar differences in size, and monstrous enlargement and obliquity of the head, volume of tibia, &c.—A paper was read by Prof. P. Martin Duncan on the replacement of a true wall or theca by epitheca in some Serial Coralla, and on the importance of the structure in the growth of incrusting corals. After alluding to the discussions which have taken place regarding the value of epitheca in classification, the author states that one form of this structure is simply protective, and that another form is of high physiological value, for it replaces entirely the usual theca or wall. The anatomy of the hard structures of a Cœloria illustrates the second proposition, for the broad base is covered by an epitheca, within which is no wall or "plateau commun," the septa, remarkable nodular walls (described in detail), and the columellæ arise from the epitheca directly, and it limits the interseptal loculi inferiorly. In a Leptoria the the same replacement of a wall by epitheca is seen. In incrusting Porites and such Astræidæ as Leptastræa the majority of the corallites of the colony arise from this basal epithecate structure, and grow upwards, budding subsequently from their sides.

Royal Meteorological Society, November 21.—Mr. J. K. Laughton, F.R.A.S., president, in the chair.—The Earl of Dalhousie, K.T., T. H. Davis, D. C. Embleton, J. Hargreaves, and J. L. Lewington were elected Fellows of the Society.—The following papers were read:—Report on temperatures in two different patterns of Stevenson screens, by E. Mawley, F.R.Met.Soc. The screens employed were an ordinary Stevenson screen obtained from Casella, and a new Stevenson screen made in accordance with the recommendations of a committee appointed by the Council of the Society. The new screen is two

inches wider and deeper than the old screen. It has also an upper sloping roof, and, at a little distance below, a flat, inner roof pierced with holes for ventilation; while the old screen has a single flat roof with only a narrow slit beneath on each side for ventilation. Observations were made during the three months July to September, and the results are given in the paper. From these it appears that the new screen is, of the two, slightly cooler and better ventilated, and retains the heat of the sun for a less time than the old screen; also, having a double roof and overlapping boards below, it is bettter suited for extreme climates.—On the storm which crossed the British Isles between September 1 and 3, 1883, and its track over the North Atlantic, by C. Harding, F.R.Met.Soc., of the Meteorological Office. This storm caused considerable havoc in the south-west and south of England, owing not only to its exceptional violence, but also to its occurrence before the completion of the harvest. The storm is traceable, in the first instance, to two centres of disturbance, one being first shown at about 450 miles to the south of Bermuda on August 26, and the other to the east of the Rocky Mountains on the 27th; these two disturbances afterwards merged on the 29th, at about 300 miles to the north of Bermuda, and formed one great and destructive gale, which continued to grow in violence as it crossed the Atlantic until it reached the coasts of the British Islands. The average speed at which this storm crossed the Atlantic was fully forty miles an hour, which is more than double the usual speed of storms which traverse that ocean.—On the influence of the moon on the height of the barometer within the tropics, by Robert Lawson, Inspector-General of Hospitals.—The great ice-storm of July 3, 1883, in North Lincolnshire, by J. Cordeaux. The direction of the storm was nearly south-east to north-west, and travelled from Caistor along the higher ridges of the hills to Barton-on-Humber. The storm commenced at about 9.20 p.m. with heavy drops of rain, and increased to a downpour, speedily followed, amidst the blaze of lightning and the constant roll of thunder, by the rush of hail, or rather lumps of ice. An eye witness remarked that they were not like hailstones, but "salt-cellars"; another that they resembled "ducks' eggs"; in fact they were solid lumps of ice of every shape and size, weighing from two to six ounces, and some were measured six inches in circumference. The injury done to the growing crops cannot be estimated at less than 20,000*l*.

Physical Society, November 24.—Prof. R. B. Clifton in the chair.—Prof. Reinold read a paper by Mr. J. W. Clark, on the purification of mercury by distillation in vacuo. The advantages of Mr. Clark's apparatus are—the small quantity of mercury in use at a time, and the fact that no auxiliary Sprengel pump is required. This is avoided by having a movable reservoir of mercury, on raising which the distiller is filled with mercury. The apparatus was described in detail, and illustrated by a figure. It is probable that zinc, cadmium, magnesium, &c., may be distilled and thus purified by the same apparatus.—Mr. A. P. Chattock then read a paper on a method of determining experimentally the constant of an electrodynamometer. In existing methods it is necessary to measure the areas of the coils, which is a difficult matter to do with a finished instrument; by the new method this is unnecessary. It depends on the accurate determination of the speed of the movable coil. Mr. Chattock exhibited an instrument whose constant had been determined by him in the laboratory of Prof. Foster, University College, with the assistance of Mr. Grant.—Prof. G. C. Foster then took the chair, and Prof. R. B. Clifton, president, read a paper on the measurement of the curvature of lenses. With very small lenses the spherometer cannot be used, and the author's method is based on the Newton's rings formed between the lens and a plane surface, or a curved surface of known radius. From the wave-length of the light employed in observing, and the diameter of a ring, the radius of curvature can be determined. He places the lens on a plane or curved surface under a microscope, and lights it by the sodium flame (wave-length 5892×10^{-7}); he measures the approximate diameters of two rings a distance apart (in practice the tenth and twentieth rings are found convenient), takes the difference of their squares, and divides it by the wave-length, and the number of rings in the gap between to find the radius of the lens. The formula is—

$$\rho^1 m \lambda = \left(x^2_{m+n} - x^2_n\right)$$

where x_{m+n} and x_n are the diameters of the nth and $(m+n)$th rings; λ is the wave-length of the light, and ρ^1 the radius of curvature of the lens. The method with proper care gives accurate results. Prof. Clifton has also used it to determine the refractive index of liquids in small quantities; Mr. Richardson having found it for water = 1·3335 by this method, which is usually correct to two places of decimals. It can also be used to determine if the lens is uniformly curved and spherical. Prof. Perry suggested that it might be also used to measure a surface without touching it, say the surface of a water drop, or a strip of glass when bent. In this way it might throw light on the laws of capillarity or bending.

MANCHESTER

Literary and Philosophical Society, October 2.—H. E. Roscoe, F.R.S., president, in the chair.—On the change produced in the motion of an oscillating rod by a heavy ring surrounding it, and attached to it by elastic cords, by James Bottomley, F.C.S.

October 16.—H. E. Roscoe, F.R.S., president, in the chair.—On the leaves of *Catha edulis*, by C. Schorlemmer, F.R.S.—Dr. Schuster, F.R.S., gave an account of meteoric dust, and exhibited some specimens found in Himalayan snow.—On the duality of physical forces, by James Rhodes, M.R.C.S.

October 30.—J. P. Joule, F.R.S., vice-president, in the chair.—On the action of water upon beds of rock salt, by Thomas Ward.

CAMBRIDGE

Philosophical Society, October 29.—On the structure of the cells of secretory glands, by Mr. J. W. Langley.—Note on the fibrin-ferment, by Messrs. A. S. Lea and J. R. Green.—On the structure of the epidermis of the ice-plant (*Mesembryanthemum crystallinum*), by Mr. M. C. Potter.—On the physiological significance of water-glands, by Mr. Walter Gardiner.

PARIS

Academy of Sciences, November 26.—M. Blanchard, president, in the chair.—On the treatment of plague-stricken swine by vaccination with the fatal virus itself in an attenuated form, by M. Pasteur and the late M. Thuillier.—On the hydratation of crotonic aldehyde, by M. Ad. Wurtz.—Propagation across the Indian and Atlantic Oceans of the great earthquake wave caused by the recent disturbances at Java, by M. de Lesseps. From the observations taken at Colon by the engineers engaged on the Panama Interoceanic Canal, the wave would appear to have made its way in about thirty hours from Java, round the Cape of Good Hope to the east coast of Central America.—Theoretical considerations on the action of floats kept in tow at divergent angles, by M. E. de Jonquières.—On the secular variation in the direction of the terrestrial magnetic force at Paris, by M. L. Descroix.—On the successive parthenogenetic reproduction of phylloxera for nine generations, and on the results obtained by various methods of treatment of vines attacked by phylloxera made by M. P. Boiteau.—Observations of the planets 233 and 234 at the Paris Observatory (equatorial of the west tower), by M. G. Bigourdan.—On a formula of M. Tisserand connected by the celestial mechanism, by M. O. Callandreau.—On the algebraic integration of linear equations, by M. H. Poincaré.—On an induction magnetic needle, by M. Mascart.—On the electric synchronism of two relative movements, and its application to the construction of a new electric compass, by M. Marcel Deprez.—A study of earth currents, by M. E. E. Blavier.—Measurement of the differences of potential of electric layers on the surface of two liquids in contact (four illustrations), by MM. E. Bichat and R. Blondlot.—Wave-lengths of the optical rays A and *a*, by M. W. de W. Abney.—Description of a microthermometer for gauging very slight variations of temperature, by M. F. Larroque.—Studies on the chemical action of light; decomposition of oxalic acid by the perchloride of iron (three illustrations), by M. G. Lemoine.—Dissociation of the anhydrous carbonate of ammonia caused by excess in one or other of its elements, by M. Isambert.—On the fusibility of salts; nitrates, by M. E. Maumené.—On hydronicotine and oxytrinicotine, by M. A. Étard.—On the relative velocity of the sensations of sight, hearing, and touch, by M. A. Bloch. This paper consists of three distinct parts, each dealing with the comparison of two sensations—(1) hearing and touch; (2) hearing and sight; (3) sight and touch. The author concludes that of the three sensations sight is the most rapid; then hearing, the transmission of which sensation lasts 1/72 of a second longer than that of

sight; lastly, touch, the transmission of which takes 1/21 of a second more than sight.—On the nervous system and the classification of the Phyllodoceæ, a hitherto little-studied family of Annelidæ, by M. G. Pruvot.—On the axis of *Œnanthus crocata* and *fistulosa*, and on abnormal vegetable productions in general, by M. R. Gérard.—On the propagation of the earthquake waves caused by the late volcanic eruption at Java, by M. Bouquet de la Grye.—A contribution to the volcanic theory, by M. Stan. Meunier.

BERLIN

Physiological Society, November 9.—Dr. Friedländer two years ago had communicated to the Society how in eight different cases of genuine croupous pneumonia, which ended fatally on the disease reaching its height, he had constantly found in the lungs a micrococcus, mostly in the form of diplococcus, which seemed to be a characteristic of genuine pneumonia. Since then the cases of croupous pneumonia he had examined amounted to over fifty, and with but very few exceptions the same description of cocci had been found in all the lungs affected. The few cases in which pneumonic cocci failed to show themselves were regularly such in which death had set in after the eighth day of the disease, that is after the disease had finished its course. In all other kinds of pneumonia, such, for example, as follow in the train of typhus, or attack old persons, &c., diplococci did not appear. It was beyond doubt, therefore, that they were a characteristic of genuine croupous pneumonia alone. That micrococci had not been perceived by many observers in the case of genuine pneumonia was owing to the fact that it was difficult to make them visible in the tissues; for only when they were highly coloured while the surrounding tissue remained colourless did they become distinctly visible. To render them apparent it was of advantage to colour thin sections of the lungs with methylic-violet or gentian-blue, and then to apply a diluted solution of iodine by means of which the tissues which were at first also coloured would become clear and so bring out the strongly-coloured cocci. Quite recently two cases had been published in which pneumonic cocci had been found *intra vitam*—one case by Prof. Leyden, the other by Dr. Günther. The latter observer invariably found the cocci inclosed in a pale and sharply-defined envelope, which, on the application of colouring-matter, likewise became highly coloured. Cocci having in both the cases referred to been obtained by means of punction, and thus their presence in the fluid of the lungs demonstrated, Dr. Friedländer set himself also to examine the fluid of the lungs in the bodies of persons who had died from pneumonia, and found there large quantities of pneumonic cocci, which were particularly well adapted for examination, being in a free state. He was now in a position to prove that they all possessed envelopes, which, by their reactions (they came out most distinctly on being subjected to acids, and disappeared under distilled water or an alkali), appeared to consist of mucin, and to be very essential to the life and activity of the cocci. According to the experience acquired down to the present date, the pneumonic cocci were the only ones which possessed this kind of slimy capsule. The problem now presented was, by means of experiments in the way of cultivation and inoculation, to determine the distinguishing characteristics and the pathogenic nature of these cocci. This task Dr. Friedländer, in conjunction with Dr. Frobenius, had undertaken with positive results. According to the methods of Prof. Koch, the cocci taken from the lungs of persons who had died from genuine pneumonia were disseminated on stiffened gelatine (consisting of gelatine, an infusion of flesh and common salt). From these proceeded invariably and in all generations perfectly characteristic organisms distinguished from all other fungous products of cultivation by their peculiar nail-like shape. No other kind of micro-organism showed the same nail-like form under cultivation as did that taken from persons pneumonically affected who had died on the disease reaching its acme, and whose lungs were afterwards examined; nor did any other species of pneumonia ever yield this form of cultivated organism. Experiments in the way of inoculation had been made on mice, guinea-pigs, rabbits, and dogs. The mice were subjected to injections either of cultivated cocci which had been obtained by dissemination of fresh lung-fluid containing cocci. Almost all these mice died after twenty to twenty-eight hours, under symptoms of violent dyspnœa; and on a section being made, extensive pleurisy and pneumonia were observed in each case; in the blood, likewise, diplococci were found to be very abundant, as also in the pleural exudations and in the tissues of the lungs. Were the cocci thus found disseminated on gelatine, they then yielded the nail-like cultivated organisms already referred to, exactly in the same way as did the cocci of genuine pneumonia in the case of man. Were again these cultivated cocci injected into other mice, these mice died of pneumonia on the second day after the inoculation. If, however, the fluid containing cocci were heated to about 70° C. before being injected into the mice, it was thereby rendered inefficacious, and the mice received no harm from it. On the pleural cavity of the mice being examined, many cocci were indeed still found in the fluid, but when these were strewn on gelatine they either remained sterile or developed other than the nail-like cultivated organisms. Not only, however, by injection of pneumonic cocci through Pravaz's syringe could pneumonia be produced in mice, but likewise also by means of inhalation. If mice, shut up in a chest, were compelled to breathe an atmosphere saturated by means of a spray with pneumonic cocci, then did a number of the mice die under the same symptoms as followed injection, though in this case not till the fourth or fifth day after the operation; the blood in the lungs of those mice who had died from experimental genuine pneumonia also contained characteristic pneumonic cocci. The results obtained from analogous experiments in inoculation with guinea-pigs were less decisive. About a half of the guinea-pigs inoculated by means of injection of pneumonic cocci remained in a perfectly healthy state, showing that they were proof against cocci. The other half, however, perished of dyspnœa, and their blood, lungs, and pleural exudations were found to contain double micrococci, which being sown on gelatine produced the characteristic nail-like organisms, and on being injected gave rise to pneumonia in the creatures so inoculated. The same experiments were next tried on five dogs. Four of them remained unscathed, but one sickened and died of dyspnœa. On a postmortem being made, this last dog showed symptoms of pneumonia and the presence of the characteristic diplococci in its blood and lungs. In the four healthy dogs, on the other hand, the injected cocci had all suffered destruction. In the case of the rabbits the experiments in inoculation were wholly without effect. They showed themselves completely proof against pneumonic cocci, and the cocci injected into their lungs were, after a few days, no longer traceable. From the invariable discovery of diplococci in the lungs of bodies that had died of genuine pneumonia before the disease had run its full course, and from the experiments with cultivated cocci, as also by inoculation of mice, Dr. Friedländer drew the conclusion that the cocci found by him were the cause of the genuine croupous pneumonia which had also before been recognised as infectious. On a future occasion Dr. Friedländer will again take up this subject, so important both from a scientific and a practical point of view.

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