of the gas.—C. Decharme, imitation of the phenomena of electricity and magnetism by means of liquid and gaseous currents. Summarises number of experimental researches.—A. Kundt, electromagnetic rotation of plane of polarisation of light transmitted through films of iron, cobalt, and nickel; an abstract from the Berlin *Berichte*.—E. Bazzi, on the heat developed by a current during the variable period. Experiments show Joule's law still to hold good, assuming Helmholtz's equations true. It has been remarked by Blaserna that this is not incompatible with the existence of oscillations in the extra-current, for Helmholtz's expression, though only a first approximation which omits the terms that would express these oscillations, is probably not far from the mean result.—The remainder of this number consists of abstracts of papers by Amagat, Baille, H. Becquerel (on infused rays), Cornu, Witz, and by Berthelot and Ogier from the *Annales de Chimie et de Physique*.

December, 1884.—E. Villari, new researches on the electric figures of condensers. The ramifications observed in the dust-figures are believed to be due to partial internal discharges.—E. Villari, microscopic researches on the traces of electric sparks engraved on glass, and on the diameter of these sparks. Tinted zones are observable where these sparks have passed over the surface of the glass. These traces vary with the glass, not with the nature of the electrodes; they are not removed by acids, and are probably due to heat. The cross section of the spark is, for a constant potential, proportional to the charge which produces it.—E. Villari, on the total heat developed by one or more sparks generated by the discharge of a condenser.—E. Villari, singular mechanical effect of the electric discharge. Glass plates, even strong thick ones, are easily broken by the spark of a Leyden battery, provided one face be silvered.—A. Righi, on a recent interpretation of Hall's phenomenon. Bidwell's theory of Hall's phenomenon appears to fail in the case of bismuth, in which Hall's phenomenon exists most markedly. It is also to be remarked that the variation of the electric resistance of bismuth, when subjected to the magnetic field, is greater than that of any other metal.—R. Weber, the electric siren. This instrument produces tones in a receiving telephone by causing rheotomes having different numbers of peripheral contacts rotated at a uniform speed to interrupt the circuit of a battery. The author draws a number of conclusions relatively to the partial and resultant tones, which are hardly justified when one considers the non-sinusoidal character of the variations of the current.—F. Melde, acoustical experiments, abstracted from *Wied. Ann.*—P. de Heen, determination of the general law governing the dilatation of any chemically definite liquid. The author assumes that the molecules attract one another in the inverse seventh power of the distance. Whatever may be thought of the hypothesis, there is an interesting coincidence running through his figures.—The remainder of the number is filled with abstracts of papers from the *Nuovo Cimento*, the most important of them being by E. Wiedemann, on the density of the luminiferous ether, and by Profs. Bellati and Romanese, on some remarkable thermic properties of the iodides of silver and copper.

Rendiconti del Reale Istituto Lombardo, December 11, 1884.—Report on the results of the International Medical Congre s held at Copenhagen during the month of August, by Prof. G. Sangalli.—On the influence of high temperatures on the development of microbes, by Prof. L. Maggi.—A study of the earthquake which occurred at Ischia on July 28, 1883, by Prof. Giuseppe Mercalli.—On the secular variation in the elements of terrestrial magnetism at Como, by C. Chistoni.—Descriptive catalogue of sixty-three hitherto unpublished Pontifical coins and medals in the Royal Numismatic Cabinet at Milan, by E. B. Biondelli.—The paintings of the Italian masters in the public museums of Europe, in connection with Senator Morelli's recent work, by Prof. G. Mongeri.—Critical notes on the fourth book of the pseudo-Theophilus, by Prof. C. Ferrini.—Meteorological observations made at the Brera Observatory, Milan, during the months of November and December 1884.

Journal of the Russian Chemical and Physical Society, vol. xvi. fasc. 7.—On the heat of combustion of organic matters, by W. Longuinine; being a description of the methods resorted to by the author in his series of determinations preliminary to the subsequent publication of the results obtained. The paper is accompanied by several plates.—Analysis of a saltpetre earth from Turkestan, by N. Lubavin. It is taken from the ruins of Kunya-Urgench, the climatic conditions being altogether very favourable for its formation, and its abundance explains the cheapness of gunpowder at Khiva. It contains 6 per cent. of azotic anhydride. The remarks of the author as to the connection between the formation of saltpetre and the inundations of the Amu are worthy of notice.—Review of the Russian chemical literature for the year 1883 and first quarter of 1884.—We notice the appearance of a fifth edition of the excellent manual of analytic chemistry by M. Menshutkin, as also of his lectures on organic chemistry (lithographed), which are now in print; a third edition of P. Alexeyeff's organic chemistry; and a second edition of the principles of chemistry, by A. Potylitsin, not to speak of several translations. As to separate monographs, besides those already mentioned by NATURE, the following are worthy of notice:—The organic compounds in their relations to the haloid salts of aluminium, by G. Gustavson—a work which has obtained the premium of the Chemical Society; on the relations between the compositions and refractory power of organic compounds, published at Kazan, which has raised a serious and useful discussion between Russian chemists; and an inquiry into the atoms and the measurement of their size, by O. Troyanovski (Warsaw).—On the electrical discharge in gases, by M. Goldhammer; being a series of experiments for determining the temperature in Geissler tubes. When rarefied air is taken for the experiment, its heating does not depend on its elasticity so long as this last remains within the limits of 8·4 to 38 millimetres; but it decreases with the decrease of the electrical current. The distribution of temperature on the surface of the tube is shown by a series of curves. An interesting observation made by the author is that phosphorescent light on the surface of the glass, such as Prof. Crookes considered as appearing only at pressures equal to millionth parts of an atmosphere, appeared also at pressures from 1·3 to 0·8 millimetres, the glass of the tube not belonging to the category of uranic glass, and the phosphorescent light appearing invariably on the calode, even when the direction of the current has been changed.—Preliminary report on the influence of compression of iron and steel on their magnetisation, by P. Bakhmetieff.—On the hail of July 11, 1884, at Kharkoff, by N. Piltchikoff—a description, with figures, of the hailstones.—On the shock of absolutely rigid bodies, by N. Joukovsky; being a mathematical critique of the theories advanced on this subject by MM. Matson, Prof. Shiller, at Kieff, and M. Garrigou-Lagrange.—On the dilatation of liquids, by M. Avenarius, against Prof. Mendeléeff's formula and in favour of the expression $v = a + C \log. (T - t)$.—On the regular forms taken by powders, by Th. Petrushevski.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 8.—"Experimental Researches in Magnetism." By Prof. J. A. Ewing, B.Sc., F.R.S.E., University College, Dundee. Communicated by Sir William Thomson, F.R.S.

The paper describes in detail experiments of which preliminary notices have already been published in the *Proceedings* of the Royal Society, vol. xxxiv. p. 39, and in the *Philosophical Magazine*, November, 1883. The experiments relate to—

(1) The magnetic susceptibility of iron and steel, the form of the magnetisation curve, and the changes of magnetism caused by cyclic changes of magnetising force.

(2) The influence of vibration on magnetic susceptibility and retentiveness.

(3) The influence of permanent strain on magnetic susceptibility and retentiveness.

(4) The energy expended in producing cyclic changes of magnetisation.

(5) The ratio of residual to total induced magnetism.

(6) The changes of induced and residual magnetism caused by changes of stress.

(7) The effects of constant stress on magnetic susceptibility and retentiveness.

(8) The changes of magnetism caused by changes of temperature.

(9) The effect of temperature on magnetic susceptibility.

The experiments were conducted on pieces of metal which gave as near an approach to the condition of uniform magnetisation as is practically attainable.

Curves are given which show the behaviour of iron and steel in various states of temper when subjected to a first application

of magnetising force, and also to subsequent cyclic changes of magnetising force, such as complete or partial removal and re-application, or reversal. The curves are drawn by plotting either $\mathfrak{I}$, the intensity of magnetisation, or $\mathfrak{B}$, the magnetic induction, in relation to $\mathfrak{H}$, the magnetising force: the characteristics of these curves and their relation to the physical state of the piece under examination are pointed out. Curves so drawn invariably exhibit the static lagging action to which the author (in a former paper) gave the name "hysteresis," any cyclic change of $\mathfrak{H}$ giving rise to a more or less nearly closed *loop* in the curve. Attention was previously drawn to these loops by Warburg, who also anticipated the author in pointing out their important physical meaning, namely, that the area of a loop, or $-\int \mathfrak{I} d\mathfrak{H}$, is the measure of the energy expended in performing the cycle of magnetisation which the loop describes. In the present paper numerous absolute measurements of this energy are given, especially of the energy which is thus dissipated in each reversal of the magnetism of a piece of iron or steel. These show that while the dissipation of energy by reversal of magnetism is very much smaller in soft iron than in hard iron or steel, even in the latter its amount is very trifling, so that the principal part of the heat which is produced in the cores of electro-magnets must be due chiefly to other causes than this static hysteresis, and is, in fact, due almost wholly to the induction of so-called Foucault currents in the cores. The relation of this hysteresis to Weber's theory of molecular magnets, as extended by Maxwell, is discussed, and the insufficiency of Maxwell's extension noticed.

By vibrating a piece of soft iron during the application and removal of magnetising force, the effects of hysteresis are almost entirely removed, and the iron is then found to possess almost no retentiveness. But when the application and removal of magnetising force are effected without mechanical disturbance, the retentiveness of soft iron is found to be even greater than that of steel. In some cases 93 per cent. of the whole induced magnetism of a piece of annealed iron was found to remain on the complete removal of the magnetising force. It is pointed out that there is no discrepancy between this result and the well-known fact that a *short* iron core of an electro-magnet retains almost no magnetism when the current in the magnet is interrupted. In that case the ends of the magnet itself, after the interruption of the current, exert a sufficient reversed magnetising force to destroy almost entirely the residual magnetism. But when tested under the conditions which give uniform magnetisation and avoid the demagnetising influence of the ends, soft annealed iron is more retentive than even the hardest steel.

Examples are given showing that the influence of permanent set in the curve of magnetisation is so marked as to give a criterion by which a strained piece may be readily distinguished from an annealed piece of metal, and that strain diminishes very greatly the magnetic retentiveness of iron.

Numerical values of the coefficients of permeability (μ) and of susceptibility (κ) are given for a number of samples of iron and steel, and the relation of these coefficients to $\mathfrak{B}$ and $\mathfrak{I}$ is exhibited graphically after the manner of Rowland. The greatest value of μ refers to soft annealed iron while under mechanical vibration, and is about 20,000.

The next part of the paper deals at great length with the effects of stress (consisting of longitudinal pull) on the magnetic susceptibility and retentiveness of iron; and the last part deals more briefly with the effect of temperature on magnetism, a subject already largely treated by G. Wiedemann and others.

The experiments, which have been of a very extended character, were made during 1881-83 in the laboratory of the University of Tokio, Japan, with the help of Japanese students, Messrs. Fujisawa, Tanakadate, Tanaka, and Sakai, to whom the author is indebted for much valuable assistance. The results have been, almost without exception, reduced to absolute measure, and are for the most part presented graphically in curves which accompany the paper.

January 22.—"On the Origin of the Proteids of the Chyle and the Transference of Food Materials from the Intestine into the Lacteals." By E. A. Schäfer, F.R.S.

The most important result obtained by the author is the establishment of the fact that, during absorption of food from the intestine, the lymph corpuscles migrate in large numbers into the lacteals, and for the most part become disintegrated and dissolved in the chyle. This is the case not only after a meal containing fat, but also after feeding with substances devoid of that alimentary principle; it is, therefore, a phenomenon of general occurrence during absorption, and the carrying of fatty particles into the lacteals after a meal containing fat by the immigrating leucocytes, must be regarded as merely incidental to a more general function.

The immigration and solution of numerous leucocytes in the contents of the lacteals must be the means of conveying a large amount of proteid material, derived from their dissolved protoplasm and nuclei, into the chyle. And any other material which may be mechanically or otherwise incorporated with their protoplasm must also be set free. In this way the fatty particles which they contain during absorption of a meal containing fat become released and suspended in the chyle, and it is probable that amyloid matters are also in part thus conveyed to that fluid.

A fuller account of the whole subject, furnished with illustrations and containing the necessary references to other articles dealing with the same question, will appear in the forthcoming number of the *Monthly International Journal of Anatomy and Histology*.

Geological Society, January 14.—Prof. T. G. Bonney, F.R.S., President, in the chair.—Ewan Cameron Galton, Henry Brougham Guppy, Henry G. Hanks, and William Elliott Howe were elected Fellows of the Society.—The following communications were read:—The metamorphism of dolerite into hornblende schist, by J. J. Harris Teall, F.G.S.—Sketch of the geology of New Zealand, by Capt. F. W. Hutton, F.G.S., Professor of Biology in the Canterbury College, University of New Zealand. The paper commenced with some general remarks on the importance and variety of the geology of New Zealand, and on the progress made in the investigation of the islands. The author then proceeded to the question of the classification of the sedimentary strata, which the author arranges in the following local systems:—

Systems	Probable age
Recent	Recent
Pleistocene	Pleistocene
Wanganúi	Newer and Older Pliocene
Pareóra	Miocene
Damarú	Oligocene
Waípara	Upper Cretaceous
Hokanúi	Lower Jurassic and Triassic
Maítaí	Carboniferous
Tákaka	Silurian and Ordovician
Manapoúri	Archæan

Most of these systems are divided into several local series. The general geological structure was then treated. The south island of New Zealand was shown to be traversed from near the southern extremity to Tasman's Bay by a curved anticlinal, convex to the westward; and the strata to the east of this axis are thrown into secondary folds, which mainly affect the beds older than Tertiary. A great north and south fault occurs west of the anticlinal. The north island is very different. It is traversed by a narrow ridge, the country northward of which is broken by three great volcanic cones, Mount Egmont, Ruapehu, and Tongariro near the centre of the island. The oldest rocks seen south of Cook's Straits are not repeated to the north, and a fault may traverse the Straits. The rock systems up to the Hokanúi, inclusive, are similar in lithological character throughout New Zealand, and appear to have been formed on the shore of a continent with large rivers. The higher systems, with the exception of a few coral-reef limestones, are locally variable, and may be considered insular. The relative distribution of sedimentary and eruptive rocks was briefly noticed, and the occurrence of some useful minerals mentioned. No workable coal is found below the base of the Waipara system. A description of the different systems and of the series into which they are divided followed, commencing with the oldest. The distribution, lithology, and thickness of each system were noticed briefly, and lists of the most important fossils were added. The eruptive rocks associated with each system were next noticed in the same order, and the paper concluded with notes on the distribution of volcanic rocks in the north island, on hot springs, and on the minerals found in New Zealand.—The drift deposits of Colwyn Bay, by T. Mellard Reade, F.G.S.

Zoological Society, January 20.—Prof. W. H. Flower, F.R.S., President, in the chair.—Mr. Sclater called attention to the breeding of a pair of the Chinese Blue Magpie in the Society's Gardens in 1884, and exhibited specimens of their eggs.—Prof. Bell exhibited some models illustrating the paper of Rathke on the development of the great blood-vessels in the

Vertebrata.—Mr. Tegetmeier exhibited a specimen of the Wild Cat (*Felis catus*) from Donegal, and an example of a singular variation in plumage of the Black Grouse (*Tetrao tetrix*).—A paper was read by Dr. P. Pelseneer on the coxal glands of *Mygale*. Dr. Pelseneer's observations had been made on a large specimen of *Mygale* of the subgenus *Theraphosa* received from the Society's Gardens. The form and position of this organ in the Arachnides had not been previously described or figured.—Mr. E. J. Sidebotham read a description of the muscular system of the Water-Opossum (*Chironectes*), as observed in a specimen of this Marsupial which he had recently dissected.—A paper was read by Mr. G. A. Boulenger containing the description of a new species of Frog from Asia Minor, belonging to the section *Ranæ temporariæ*. This was proposed to be called *Rana macrocnemis*.—A communication was read from Dr. O. Boettger containing the descriptions of five new species of shells of the genus *Buliminus*. The specimens upon which these descriptions were based had been collected by Vice-Admiral T. Spratt in various parts of the Levant.—A communication was read from Mr. J. H. Thomson, C.M.Z.S., containing the description of a new species of Mollusk of the genus *Hyalina*, obtained at the island of Vaté, New Hebrides, by Mr. E. L. Layard, F.Z.S., which he proposed to call *Hyalina* (*Conulus*) *layardi*.—Dr. Gwyn Jeffreys, F.R.S., F.Z.S., read the ninth of his series of papers on the Mollusca of the *Lightning* and *Porcupine* Expeditions. This part included the representatives of the families from Ianthinidæ to Cerithiopsidæ, with seventy-five species, of which twenty-three were new to science. One new genus (*Stilus*) was also described.

Anthropological Institute, January 13.—Prof. Flower, F.R.S., President, in the chair.—The election of Daniel Wilson, LL.D., of Toronto, as an honorary member, and of W. E. Darwin and M. A. Rouffignac as ordinary members, was announced.—The President exhibited the photograph of a "tailed" boy from Saigon. The child was about eight years old, and the appendage from six to eight inches long.—Dr. Garson exhibited, on behalf of Dr. Arthur Thomson, some composite photographs of skulls.—Mr. Oldfield Thomas read a paper on a collection of skulls from Banks, Mulgrave, and Dauan Islands, Torres Strait, recently received by the Natural History Museum from the Rev. S. McFarlane, who obtained them from a sacred skull-house on Jervis Island. The skulls were shown to be of the most pronounced Melanesian type, being characterised by their elongated shape, heavy frowning brow-ridges, low orbits, long, narrow palates, and exceeding prognathism. The various numerical indices showing these points were fully worked out and compared with those of the Fijians, Australians, and other allied races. A new index, the "naso-malar index," was proposed to show the relative prominence of the central as compared with the lateral parts of the face, and the terms *pro-opic*, *mesopic*, and *platyopic* were suggested for skulls or races showing various degrees of development in this respect. Full measurements of the thirty-eight adult skulls in the collection were given, and the averages both of the measurements and indices were worked out in detail.—The Director read a paper by Mr. A. L. P. Cameron on some tribes of New South Wales.

Royal Microscopical Society, January 14.—Rev. W. H. Dallinger, F.R.S., President, in the chair.—Mr. Beck exhibited a very simple electric light apparatus for microscopic work, the battery being very readily set up and worked, and the materials harmless and cheap. He also showed a simplified form of the Caldwell automatic microtome, by which long ribbons of sections were automatically cut and received on an endless band in their exact order, the new form being a little more than a third only of the price of the original.—Dr. Van Heurck sent photographs further illustrating his resolution of *Amphipleura pellucida* into "beads"; also specimens of the same object burnt on the slide and then coated with a very thin film of silver, both by Dr. A. Y. Moore's original process and by an improved method of his own. Dr. Moore also sent one of his slides.—Mr. Swift exhibited a condenser made in 1883, which he claimed to be identical with that of Dr. Wallich.—Mr. H. L. Brevoort desired information as to investigations on the fur of animals as distinguished from hair, it being a matter of great practical importance in the manufacture of felted goods to understand the method by which the fur-fibres act upon another.—Mr. H. G. Hanks announced the discovery at Santa Monica of a deposit of diatomaceous earth like the celebrated fragment found in 1876, and sent a portion for distribution.—Dr. Gray warned mounters against the use of balsam of Tolu, which formed crystals in a comparatively short time.—Dr. Anthony, in reference to Mr. Wright's note on a new structure in the tongue of the blowfly, showed that it was the same as that discovered by him in 1874.—Dr. J. D. Cox further criticised Dr. Flögel's researches on thin sections of diatoms, and stated that he differed from him (1) in finding a thin but indisputable film covering the outer surface of the hexagons of *Triceratium*, as well as on the inner surface; (2) he thinks there should be no doubt of the existence of a film on the outer convex surface of *Coscinodiscus*; the real dispute has been as to the "eye-spot" film, which is the inner one, Dr. Flögel reversing the relative positions of the two films. The idea of the existence of solid spherules must clearly be abandoned from any method of examination.—Mr. Cheshire described and exhibited the spermatozoa from the queen wasp and hive bee, and Mr. Curties exhibited his improved form of the Hardy collecting bottle and Abbe condenser as fitted to second-class English stands.—Mr. A. D. Michael read a paper on the life-histories of some of the little-known Tyroglyphidæ. In 1873 Riley published a report on the ravages of the apple-bark louse (*Aspidotus conchiformis*), and described an acarus which was supposed to destroy that pest, and which he thought might be the *Acarus malus* of Shimer. Riley only describes the female. Mr. Michael has found the Acarus in England under the bark of reeds, destroying the reeds, not feeding on any insect, and concludes that it is probably a feeder on various kinds of bark, not on animal life; he has traced the whole life-history. The male (previously unknown) presents the exceptional features possessed by *Tyroglyphus carpis*, discovered by Kramer in 1881, and the hypopial nymph has been figured by Canestrini and Fanzago in 1877, under the name of "parasite of an Oribata," but without explanation. Mr. Michael finds in the life-history of this hypopus a confirmation of his views that the hypopial stage is not caused by exceptional adverse circumstances, as Mégnin supposes, but is an ordinary provision of nature to insure the distribution of the species, which it is intended to call *T. corticalis*.—Mr. Michael also called attention to the prevalence of *Rhizoglyphus Robini* on Dutch bulbs imported into England in 1884, and to the destructive nature of that species and the damages it did to hyacinth, dahlia, and eucharis bulbs, &c., and recommended that imported bulbs should be carefully examined.—Dr. Maddox read a paper on some unusual forms of lactic ferment (*Bacterium lactis*), of which he showed drawings and photo-micrographs. Some of the chains had the different joints increased largely in size in different parts of the chain in an irregular manner, whilst in others some joints had become more or less globular, as well as very enlarged. Dr. Maddox inclined to consider the enlarged cells as the result of a generative effort (by which the organism can be tided over such conditions as would otherwise lead to its destruction) rather than as a degenerative state or return to a primary phase.—Mr. C. Thomas read a paper on a new species of *Acineta*, which, however, Mr. Badcock considered to be *Trichophrya epistylidis*. Mr. Crisp exhibited and described Robinson's photo-micrographic camera, Gibbe's membrane stretcher, live cell for keeping objects cool, and other apparatus.—The death was announced of Dr. F. Ritter v. Stein, the author of "Der Organismus der Infusionsthiere," and an Honorary Fellow of the Society.—The nominations for the new Council were read, the Auditors appointed, and five new Fellows elected.

Royal Meteorological Society, January 21.—Mr. R. H. Scott, F.R.S., President, in the chair.—The Secretary read the report of the Council, which showed the Society to be in a very satisfactory condition. The Council equipped a typical climatological station in the grounds of the International Health Exhibition, in order that persons desirous of organising a station might see one arranged in accordance with the regulations of the Society. A conference on meteorology in relation to health was arranged for by the Society, and held at the Health Exhibition on July 17 and 18. The Council have appointed committees to investigate the subjects of the brilliant sunrises and sunsets of 1883-84, and of the local phenomenon known as the helm-wind of Cross Fell, Cumberland. The observing stations of the Society now number eighty-five, the results from which are printed in the *Meteorological Record*. The whole of the stations in the south of England have been inspected during the year, and found to be generally in a satisfactory state. The number of Fellows on the roll of the Society is 552, of whom thirty-

seven were elected in 1884. The President, Mr. R. H. Scott, then delivered his address, in which he stated his intention to treat of the general state of the science of meteorology over the globe as compared with the programme sketched out by Prof. James Forbes in the *Report* of the British Association, 1840. He said there were now six meteorological societies publishing journals, and, in addition, six periodicals almost exclusively devoted to the science. He went on to say:—"With all this wealth of literature there is one particular in which, in this country at least, our science labours under a great disadvantage. So far as I am aware, no instruction is given in it except at the Royal Naval College, Greenwich. In Germany, in the current half year, no less than eleven courses of lectures are announced at as many Universities or high schools." Mr. Scott exhibited a large map showing all the observing stations over the globe, and also the distribution of information as to ocean meteorology as contained in the Meteorological Office. He then alluded to the different classes of observations proposed by Prof. Forbes for different classes of stations and the degree to which his suggestions had been carried out.—The next subject was the attempts which have been made by balloon ascents, mountain stations, &c., to gain a knowledge of the condition of the upper atmosphere; and Mr. Scott stated that, on inquiry from the various foreign institutions which possessed affiliated mountain stations, he had found that, except in the case of Mount Washington, none of the observations were practically much used in forecasting. No telegrams are received from Pike's Peak. In one particular all authorities are agreed, that no one has yet suggested any mode in which the barometerical readings could be used, owing mainly to the uncertainty about their reductions to sea-level from great heights. Mr. Scott concluded his address with a notice of the important work by Padre Viñes, S.J., of the Havannah, on the West Indian hurricanes of 1876 and 1877.—The following gentlemen were elected the Officers and Council for the ensuing year:—President: Robert Henry Scott, F.R.S.; Vice-Presidents: William Morris Beaufort, F.R.A.S., John Knox Laughton, F.R.A.S., Edward Mawley, F.R.H.S., Charles Theodore Williams, M.D.; Treasurer: Henry Perigal, F.R.A.S.; Trustees: Hon. Francis Albert Rollo Russell, M.A., Stephen William Silver, F.R.G.S.; Secretaries: George James Symons, F.R.S., John William Tripe, M.D.; Foreign Secretary: George Mathews Whipple, F.R.A.S.; Council: Edmund Douglas Archibald, M.A., George Chatterton, M.Inst.C.E., John Sanford Dyason, F.R.G.S., Henry Storks Eaton, M.A., William Ellis, F.R.A.S., Charles Harding, Richard Inwards, F.R.A.S., Baldwin Latham, M.Inst.C.E., Robert John Lecky, F.R.A.S., William Marcet, F.R.S., Cuthbert Edgar Peek, F.R.G.S., Capt. Henry Toynbee, F.R.A.S.

SYDNEY

Linnean Society of New South Wales, November 26, 1884.—C. S. Wilkinson, F.L.S., F.G.S., President, in the chair.—The following papers were read:—On a new and remarkable instance of symbiosis, by William A. Haswell, M.A., B.Sc. *Phoronis australis*, found by the author in Port Jackson, and briefly described in a preliminary note in the *Proceedings* of this Society (vol. vii. p. 606), forms colonies, the individuals of which inhabit chambers or tubes in a common soft matrix formed of fine felted filaments. The whole colony grows round a large sea anemone in such a way as to form a complete tube for it, the *Phoronis* doubtless profiting by the action of the thread-cells in the tentacles of the anemone, in killing or stunning any minute organisms that come in contact with them.—On the Pycnogonidæ of the Australian coast, with descriptions of new species, by William A. Haswell, M.A., B.Sc. In this paper, which is a review of all the Australian species, seven new species are described: *Nymphon validum* and *æquidigitatum*; *Nymphopsis armatus*, a new genus and species; *Ammothea longicollis* and *assimilis*; *Colossendeis tenuissima* and *Phoxichilidium tubiferum*.—Notes on the Port Jackson Crustacea, by Charles Chilton, B.A. Some new species are here described, and observations are made on the sexual and other peculiarities characterising certain genera.—Descriptions of Australian micro-Lepidoptera, by E. Meyrick, B.A.; No. xii. Œcophoridæ (continued). This paper continues the *Œcophoridæ* as far as the genus *Oecystola*; fifty additional species are described, of which forty-six are new to science.—A monograph of the Australian Sponges, Part iii., by R. von Lendenfeld, Ph.D. The author gives a complete description of the known Australian species of Calcareous Sponges, fifty-two in number. To the species described by Carter, Haeckel, Poléjaeff, and Ridley, numerous new ones are added. A new classificatory system is established in this paper. The Calcispongiæ as an order are divided into Poléjaeff's two sub-orders, the meaning of which has, however, been slightly changed. To Haeckel's three families and Carter's Teichonidæ three new families are added.—Notes on the direction of the hair on the back of some kangaroos, by N. de Miklouho-Maclay. The peculiarity of inverted hair on the back of some of the kangaroo tribe is traced by the Baron in the genera *Dorcopsis*, *Dendrolagus*, and in one species of *Osphranter* (*Osphranter rufus*). The paper also contains some remarks on the dentition of *Dendrolagus Dorianus*.—Note on *Tribrachycrinus Clarkei*, M'Coy, by F. Ratte, M.E. The previous descriptions of this fossil were taken from imperfect inner casts only. Mr. Ratte has now been enabled to describe thoroughly and illustrate this beautiful crinoid from an outer cast of the calyx in the Australian Museum. The most important additions to previous descriptions are the ornaments of the surface of the calyx, the attachment of the first brachial article, and the plates of the roof of the calyx.—On the larvæ and larva cases of some Australian Aphrophoridæ, by F. Ratte, M.E. This paper describes the larval state of some small species of *Rhynchota* closely allied to the genus *Aphrophora*, and belonging probably to the genus *Ptyelus*. They are as yet imperfectly known; but the description of their larva cases and of some of the larvæ discloses a feature probably quite new to the science of entomology. These cases, unlike those of insects generally, are true shells, containing at least three-fourths of carbonate of lime, and resembling in shape some fossil and recent serpulæ, some being conical, others serpuliform, or helicoidal. The conical shells are fixed on the branches of some species of Eucalyptus, the mouth turned upwards, the larva being placed in it with the head downwards. It introduces its suctorial apparatus into the bark of the stem, sucks the sap of the tree, and emits from time to time, by its anus, drops of clear water. This property of emitting water is possessed by all the family.

PARIS

Academy of Sciences, January 19.—M. Bouley, President, in the chair.—On the approximate degree of accuracy of the differential formulas employed in Paris, Lyons, Kew, &c., in the reduction of the meridian observations, by M. M. Lœwy.—Remarks on the nervous system and embryonic forms of Gadinia Garnotii, by M. de Lacaze-Duthiers.—On the existence of glycyrrhizine not only in *Glycyrrhiza glabra* and *G. eclimata*, where it was first discovered by Robiquet, but also in *Polypodium vulgare*, and several other families of plants, by M. E. Guignet. From a protracted study of this substance the author infers that it plays a great part in the vegetable kingdom, and is associated with the principal series of organic chemistry.—On the oscillations occurring at long intervals in machines set in motion by hydraulic agency, and on the best means of preventing these oscillations, by M. H. Léauté.—Statistical studies on the cholera epidemic in the Paris hospitals, and especially on the circumstances attending the outbreak in the Asylum for the Aged in the Avenue de Breteuil, by M. Emile de Rivière. From November 4, 1884, when it made its first appearance, till January 15, 1885, when the last patient was discharged, there were recorded altogether 1080 cases, of whom 636 were males and 444 females. Of these, as many as 587, or 54·15 per cent., succumbed, that is to say, 340 males, or 53·46 per cent., and 247 females, or 55·63 per cent. But in the Asylum, out of 215 inmates 79 were attacked (55 men and 24 women), and of these 65 perished (47 men and 18 women), or 82·278 per cent. This excessive mortality is attributed mainly to the great age of the pensioners in the Asylum, ranging from 58 to 90 years.—On the advantage of destroying the winter egg of Phylloxera in vineyards infested by this parasite, by M. Balbiani. The paper is supplemented by a note on the employment of a wash of sulphate of iron, by M. Faudran, who finds this remedy extremely efficacious in destroying not only the winter eggs, but also the insects adhering to the plant.—On Encke's Comet; observations made at the Observatory of Algiers with the 0·50m. telescope, by M. Ch. Trépied.—Supplement to two preceding notes on the theory of the figure of the planets and the earth, by M. O. Callandreau.—On the last results of solar statistics, by M. R. Wolf. The paper is accompanied by a table and diagram showing the number of days in each month of the years 1883 and 1884 when it was found possible to take solar observations at the Observatory of Zurich.

The author considers that a careful study of these tables will suffice to convince the most incredulous of the intimate relation existing between the solar phenomena (spots, faculæ, &c.) and the oscillations of the magnetic needle.—On some new transformations of partially-derived linear equations of the second order, by M. R. Liouville.—On the laws of evaporation as determined by the measurements recorded with ordinary evaporometers at the various meteorological stations, by M. Berthelot.—On oxygenated water, by M. H. Henriot. The results are given of experiments made to distil oxygenised water under a reduced pressure of 3 cm. of mercury.—On an easy method of obtaining measurable crystals of the peroxide of cobalt, CO^3O^4, by M. Friedel. The method consists in submitting the liquid chloride to the action of a current of moist air in the same apparatus in which he has already succeeded in obtaining artificial hausmannite.—On the formation of the nitrate of tetramethylammonium, by MM. E. Duvillier and H. Malbot.—On a method for regulating the chemical action of solar radiation, the intensity of which is constantly changing on the surface of the earth, by M. L. Olivier.—On the origin of the Microzymas and of the Vibrionians everywhere present in the atmosphere, in water, and the ground, in connection with M. Duclaux's recent communication, by M. A. Béchamp. The author argues against M. Pasteur that these germs are to be sought originally, not in the air, where they are disseminated by the winds, but in the ground and water, where they are deposited by the disintegration of the neozoic and palæozoic rocks, and by decomposing animal and vegetable matter of all sorts. He holds this, not as a mere hypothesis, but as a conclusion actually determined by strict experiment, by facts discovered by himself, verified and controlled by former opponents of his views.—Note on the vitality of the germs of microbes preserved in the liquid in which they were developed, by M. E. Duclaux. The persistence of these germs for a period of twenty or twenty-five years is clearly determined by the author's researches.—On some physiological phenomena associated with the lesion of certain parts of the animal organism, by M. H. de Varigny.—Contribution to the study of the glands yielding byssus, and of the water-bearing pores in the family of the Lamellibranchidæ, by M. Th. Barrois.—Remarks on some new crepuscular glows recently observed in Central America, by M. F. de Montessus.—On some of the phenomena observed in connection with the recent earthquakes in the south of Spain, by M. A. Germain.—Observations collected on earthquakes during a residence of forty-six years in Chili, by M. Domeyko.—Observations on the earthquakes that occurred in Andalusia on December 25, 1884, and the following weeks, by M. F. de Botella.—Earthquake shocks felt at the Azores on December 22, 1884, by M. da Praia.

BERLIN

Physical Society, January 9.—Dr. Kayser reported on measurements of the electromotive force and of the resistance of an improved Noë thermo-generator, which in its essentials resembled the old Noë generator, differing from it only in that, instead of the wires connecting the bismuth alloy pieces with one another, strips of an unknown alloy were taken, which opposed greater resistance to heat than did the wires. The electromotive force of the generator increased proportionally with the quantity of the gas consumed for heating, that is, proportionally with the temperature. The curve of the electromotive force formed a straight line, and showed a bend only in proximity to the terminal temperature, where the metallic parts began to melt. The resistance of the generator, which, at the temperature of the room, amounted to about 0·9 Siemens unit, rose with increasing consumption of gas, reached a maximum of about 1·2 Siemens unit under a consumption of about 60 cc. gas per hour, and then, under a consumption of 100 cc. gas, sank below the initial value. On repetition of the measurement, the resistance was found to become less and the curve flatter. After a repose, however, of several days, the resistance again grew greater, without, however, reaching the value of the newly-examined battery. On a comparative estimate of the costs of generating electricity by means of a thermo generator and a Bunsen battery, it was ascertained that a current of 1 ampere per hour with the Bunsen battery cost about 3 pfennigs, but with the thermo-battery only somewhat over 1 pfennig. The current of the thermo-battery proved itself, in conclusion, highly constant, no change in the current having been observed in the course of twenty-four hours' uninterrupted heating with the Bunsen flame.—Prof. von Helmholz confirmed the last-mentioned fact. For the purpose of the electrolytic purification of quicksilver, he had made incessant use for a fortnight long of a thermo-battery, and on intercalating a galvanometer had discovered only inconsiderable variations in the current. He described the various methods he had made trial of, for the complete purification of quicksilver, all which, however, turned out ineffectual, till at last he adopted the electrolytic method, applying it in the following manner:—The impure quicksilver lay at the bottom of a glass vessel, and on the quicksilver swam a second vessel for the reception of the pure metal. An isolated platinum wire dipped into the quicksilver, connecting it with one pole of the battery, while the other pole was connected with a platinum plate placed in the empty vessel. The vessel then was filled with nitric acid, and the nitric oxide of quicksilver which was formed became decomposed by the current. The quicksilver separated itself, chemically pure, on the platinum strip, in the form of little globules, which dropped into the swimming vessel, and after covering the bottom in a cohering layer, it formed itself the electrode, at which the pure quicksilver further precipitated itself.—Prof. Neesen reported on a series of thermo-batteries and galvanic elements which had been quite recently patented for Germany, but which presented no innovations in principle. The only element deserving any special notice was Pabst's, consisting of carbon impregnated with oxide of iron, solution of chloride of iron, and iron, a material said to remain long constant for weak currents.—Prof. von Helmholz related that this cell had been sent to the Physical Institute, and for four months had proved itself pretty constant for weak currents. Following this up, he described the arrangement he had very recently given to the Daniell cell for the common purposes of the laboratory. At the bottom of a deep glass goblet lay a copper spiral connected with an isolated platinum wire in a glass tube. Above the spiral was placed a solution of blue copperas, which could be filled in by means of a funnel reaching to the bottom. On the solution of copper lay the lighter water-clear acid, or white sulphate of zinc, in which was placed the zinc cylinder. A siphon, the outer leg of which was directed from below upwards, dipped into the fluid as far as the bounding plane of the two fluids, so that, on filling in a fresh solution, only the solution of white vitriol immediately above the blue copperas, and contaminated by it, flowed off. This arrangement had the effect of keeping the upper fluid constantly water-clear, though, indeed, after a while, some copper was found precipitated on the zinc cylinder. The constancy, however, of the cell was not thereby perceptibly impaired.

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