it is in a certain state of motion, but as soon as the radiation has passed through it, the medium returns to its former state, the motion being entirely transferred to a new portion of the medium.

Now, the motion which we call heat can never of itself pass from one body to another unless the first body is, during the whole process, hotter than the second. The motion of radiation, therefore, which passes entirely out of one portion of the medium and enters another, cannot be properly called heat.

We may apply the molecular theory of gases to test those hypotheses about the luminiferous æther which assume it to consist of atoms or molecules.

Those who have ventured to describe the constitution of the luminiferous æther have sometimes assumed it to consist of atoms or molecules.

The application of the molecular theory to such hypotheses leads to rather startling results.

In the first place, a molecular æther would be neither more nor less than a gas. We may, if we please, assume that its molecules are each of them equal to the thousandth or the millionth part of a molecule of hydrogen, and that they can traverse freely the interspaces of all ordinary molecules. But, as we have seen, an equilibrium will establish itself between the agitation of the ordinary molecules and those of the æther. In other words, the æther and the bodies in it will tend to equality of temperature, and the æther will be subject to the ordinary gaseous laws as to pressure and temperature.

Among other properties of a gas, it will have that established by Dulong and Petit, so that the capacity for heat of unit of volume of the æther must be equal to that of unit of volume of any ordinary gas at the same pressure. Its presence, therefore, could not fail to be detected in our experiments on specific heat, and we may therefore assert that the constitution of the æther is not molecular.

J. CLERK-MAXWELL

## SOCIETIES AND ACADEMIES

### LONDON

Royal Society, Feb. 18.—"On the number of Figures in the Reciprocal of each Prime Number between 30,000 and 40,000," by William Shanks. Communicated by the Rev. Dr. Salmon, F.R.S.

"On the Nature and Physiological Action of the *Crotalus*-poison as compared with that of *Naja tripudians* and other Indian Venomous Snakes," by T. Lauder Brunton, F.R.S., and J. Fayrer, M.D.

It appears that there is little difference between the physiological effects of the crotaline or viperine, and the colubrine virus. The mode in which death is brought about is essentially the same in all; though there are evidences, even when allowing for individual peculiarities, that the action is marked by some points of difference sufficiently characteristic to require notice in detail.

We have already expressed our belief that death is caused by the cobra-, *Daboia*-, and *Hydrophis*-poison, 1st, through its action on the cerebro-spinal nerve-centres, especially on the medulla, inducing paralysis of respiration; or 2nd, in some cases where the poison has entered the circulation in large quantities and has been conveyed more directly to the heart, by arrest, tetanically in systole, of cardiac action, probably owing to some action on the cardiac ganglia; 3rd, by a combination of the two previous causes; 4th, by a septic condition of a secondary nature, and which, being more essentially pathological in its bearings, the details were not considered suitable for discussion here.

There is reason to believe that death is caused in the same way by the *Crotalus*-poison also; and it appears, from the experiments recently performed in Calcutta by Dr. Ewart and the members of the Committee appointed by Government upon *Pseudechis porphyriacus*, or the black snake, and *Hoplocephalus curtus*, or the tiger-snake of Australia, that their virus causes death in the same manner. These reptiles had been sent from Melbourne to Calcutta for the purpose of investigation and comparison. (*Vide* Committee's Report, p. 58 *et seq.*, Appendix.)

But though the actual cause of death is essentially the same, the phenomena which precede and accompany it differ in some degree according to the nature of the poison, the quantity and site of the inoculations, and the individual peculiarities of the creature inoculated, as may be seen in the experiments herewith recorded.

The condition of an animal poisoned by the rattlesnake-venom, then, essentially resembles that of one subjected to the influence of the colubrine or viperine poison of Indian snakes:—

Depression, hurried respiration, exhaustion, lethargy, unconsciousness, nausea, retching, and vomiting.

Muscular twitchings, ataxy, paralysis, and convulsions, the latter probably chiefly, though not entirely, due to circulation of imperfectly oxygenated blood, the result of impeded respiration, and, finally, death.

Hæmorrhages or hæmorrhagic extravasations and effusions, both local and general, occur in all varieties of snake-poisoning.

But we observe (and in this our observations are in accord with those of Weir Mitchell) that there is a greater tendency to both local and general hæmorrhage and extravasation of blood and of the colouring matter of the blood, especially as observed in the peritoneum, intestines, and mesentery, and also probably to a more direct action on the cord than in poisoning by either cobra or viper.

The viscera and other tissues after death are found congested and ecchymosed, and in some cases to a great extent, seeming to show that either a preternatural fluidity of blood or some important change in the vessels, favouring its exudation, has occurred.

Several experiments were made on the physiological action of the virus of the rattle-snake, with the view of comparison with that of the cobra and *Daboia*.

We are indebted to Dr. Weir Mitchell, of Philadelphia, for a supply of the virus. He was good enough to send about six grains of the dried poison of *Crotalus*—the species not named, but it is believed to be of *Crotalus durissus*.

It has the appearance of fractured fragments of dried gum-arabic and of rather a darker yellow colour, but otherwise resembling the dried cobra-virus sent from Bengal.

There were no very marked differences to be observed in the action of the poison except in the energy with which the cobra exceeded the *Crotalus*.

It appears that the direct inoculation of large doses of the virus, whether viperine or colubrine, into the circulation have the power in some cases of annihilating almost instantaneously the irritability of the cord and medulla, as in others they have of arresting the heart's action.

The local as well as the general effect of the cobra- and *Crotalus*-poisons, *i.e.* colubrine and viperine, is to cause hæmorrhage, ecchymosis, and sanguinolent effusions into the areolar tissue, not only at the seat of inoculation and its neighbourhood, but also in the mucous membranes and other vascular parts. It is obvious also that the *Crotalus*-poison acts more energetically in this respect than the cobra-poison, and that this is perhaps one of the most marked distinctions between them.

Cobra venom is a muscular poison, and the gastrocnemius of a frog immersed in a watery solution of it contracts immediately upon immersion, and loses its irritability very much sooner than one placed in pure water.

In our experiments cobra-poison appeared first to stimulate and then to paralyse the motions of cilia from the mouth of a frog.

It arrests very rapidly the movements of infusoria and of the cilia upon them, but the cilia upon the mantle of a fresh-water muscle continued to move for many hours in an extremely strong solution of dried cobra-venom. In the case of white blood-corpuscles no very distinct action was observed. When applied to a piece of *Vallisneria spiralis* it appeared to have almost no effect, for the motion of the granules within the cells continued with undiminished rigour for two hours afterwards.

Feb. 25.—"On the Forms of Equipotential Curves and Surfaces and Lines of Electric Force," by W. Grylls Adams, M.A., Professor of Natural Philosophy and Astronomy in King's College, London.

The paper contains an account of certain experimental verifications of the laws of electrical distribution in space and in a conducting sheet, such as a sheet of tinfoil. When two battery poles are attached to any two points of an unlimited plane sheet, or to two points on the edge of a circular disc, or if the disc be bounded by arcs of circles passing through the two battery poles, the lines of force and also the equipotential curves are circles. The equipotential circles have their centres on the straight line joining the battery poles, and the lines of force pass through these poles. In any limited space, whether in the plane or in the solid, which is bounded entirely by lines of force, no alteration is made in the distribution of the current when that limited space is entirely removed from the conducting space around it.

Several cases are taken in a sheet of tinfoil 18 inches square, with several battery poles about 3 inches apart near the centre of the sheet, and the equipotential curves traced out by means of two poles attached to a delicate galvanometer, these poles being at points of the same potential when the galvanometer needle is at zero; a sheet limited in size by cutting along lines of force is then taken, and in each case it is shown that there is no alteration of the equipotential curves. The forms of these curves are traced out for one positive, and four negative poles at equal distances from it at the corners of a square in the centre of a large sheet of tinfoil; also the curves for one positive and two negative poles at equal distances on either side of it on the same straight line.

When there are four electrodes, two of each kind on an unlimited sheet, an equipotential curve is given by the equation,

$$rr' = cr_1r_1'.$$

If the four points lie on a circle, and the complete quadrilateral be drawn through them, the circles which have their centres at the intersections of opposite sides of the quadrilateral, and which cut the first circle at right angles, will also cut one another at right angles. One of these circles is shown to be an equipotential curve for the four electrodes, and the other is a line of force.

Hence, if we cut the unlimited sheet along the edge of this latter circle, we shall not alter the forms of the equipotential curves; and within it we shall have one electrode of each kind, the others being their electric images, the product of the distances of an electrode and its image from the centre being equal to the square of the radius of the disc. If an electrode is at the edge of the disc, then the electrode and its image coincides, and the equation to the equipotential curve is

$$r^2 = cr_1r_2.$$

When one pole is at the edge and the other is at the centre of a circular disc, since the electric image of the centre is at an infinite distance, the equation to the equipotential curve is

$$r^2 = cr_1.$$

This is an interesting case, as showing that the equipotential curves do not always cut the edge of the disc at right angles.

On placing one of the galvanometer electrodes at the extremity of the diameter through the battery electrodes, and tracing with the other, it is found that the equipotential curve through that point cuts the edge of the disc at an angle of 45°, and that there are two branches cutting one another at right angles.

These peculiarities are explained on tracing the curve

$$r^2 = 4ar_1$$

corresponding to this case. The extremity of the diameter is a point through which two branches of the curve pass at right angles to one another.

The forms of the equipotential surfaces and lines of force in space may be determined experimentally by taking a large vessel containing a conducting liquid and placing two points, the ends of two covered wires, for battery electrodes at a given depth in the liquid and away from the sides and ends of the vessel, taking similar covered wires immersed to the same depth for galvanometer electrodes.

For two electrodes the equipotential surfaces will be surfaces of revolution around the straight line joining them, and so will cut any plane drawn through this straight line or axis everywhere at right angles.

Hence we may suppose sections of the liquid made along such planes without altering the forms of the equipotential surfaces. This shows that we may place our battery electrodes at the side of a rectangular box containing the liquid, and with the points only just immersed below the surface of the liquid, and the equipotential surfaces will be the same as if the liquid were of unlimited extent in every direction about the electrodes.

We shall obtain the section of the equipotential surface by taking for galvanometer electrodes two points in the surface of the liquid, keeping one fixed and tracing out points of equal potential with the other.

The potential at any point in space, due to two equal and opposite electrodes, is

$$A\left(\frac{1}{r} - \frac{1}{r_1}\right)$$

where $r$ and $r_1$ are the distances of the point from the electrodes, so that for an equipotential surface

$$\frac{1}{r} - \frac{1}{r_1} = \text{constant.}$$

These surfaces are cut at right angles by the curves

$$\cos\theta - \cos\phi = c,$$

which are also the magnetic lines of force, $\theta$ and $\phi$ being the angles which the distances from the electrodes make with the axis. That the lines of force in a vessel of finite size should agree with the lines of force in space, the form of the boundary of the vessel in a plane through the axis should everywhere be a line of force; but the ends of a rectangular vessel coincide very closely with certain lines of force, either when the electrodes are at the ends, or when there are two electrodes within the vessel, and two supposed electrodes at their electrical images at an equal distance outside the ends of the vessel.

The equipotential surfaces are given in this case by the equation,

$$\frac{1}{r} + \frac{1}{r'} - \frac{1}{r_1} - \frac{1}{r_1'} = \text{constant,}$$

and the lines of force by the equation,

$$\cos\theta + \cos\theta_1 - \cos\phi - \cos\phi_1 = c.$$

The curve, for which $c = 2$ coincides very closely with the ends of the box.

The equipotential surfaces were traced out in sulphate of copper and in sulphate of zinc by the following method:—

A rectangular box was taken, and the battery electrodes attached to pieces of wood which could be clamped at the centre of the end of the box, and could be brought to any required point in the line joining the middle points of the end of the box. The galvanometer-electrodes were attached to T pieces which rest on the ends and side of the box, and the position of the electrodes read off by millimetre-scale placed on the ends and sides of the box.

When the electrodes are parallel lines extending throughout the depth of the liquid the equipotential surfaces are cylindrical, and their sections are given by the equation,

$$\log(r r' \ldots) - (\log r_1 r_1' \ldots) = \log c,$$

where there are several positive and several negative electrodes, $r \,.\, r' \ldots$ &c. being measured from the points where the electrodes cut the plane of the section.

Hence the forms of these equipotential curves are the same as in a plane sheet, so that the forms traced out in tinfoil will be the same as the corresponding forms in space for line electrodes. These forms may be traced out in sulphate of copper with copper electrodes, or in sulphate of zinc, with amalgamated zinc electrodes.

The results of these investigations show how closely the experimental determination of equipotential surfaces and lines of force agrees with the theory of electrical distribution in space.

Linnean Society, March 4.—Dr. G. J. Allman, president, in the chair.—Messrs. W. W. Scofield and T. Atthey were elected fellows.—Mr. Hanbury exhibited a fungus from South America, a species of *Phallus* allied to *P. impudicus.*—Mr. J. G. Baker exhibited specimens of the two species of plane-tree, *Platanus occidentalis* and *orientalis*, and of the variety of the latter known as *acerifolia*, and pointed out the distinctions between them; also a curious modification of bulb-form in a species of *Drimia.*—Mr. J. R. Jackson read a paper on plants in which ants make their homes; exhibiting specimens of two of the most remarkable of these, *Myrmecodia* and *Hydnophyllum.*—Prof. Thiselton Dyer read a brief note on the structure of the so-called *membrana nuclei* in the seeds of Cycads. Heinzel had described this as a cellular structure, the cells of which had thick walls penetrated by ramifying tubes. There was reason, however, for believing that the membrane only represented the wall of a single cell, and was in fact probably the greatly enlarged primary embryo-sac. What Heinzel had taken for tubes seemed really to be solid. They were arranged all over the membrane after the fashion of what carpet-manufacturers call a "moss-pattern." They were possibly the débris of the thickened walls of the cells of the nucleus which had been destroyed by the enlargement of the primary embryo-sac.—Prof. Dickson exhibited and described a series of microscopic slides illustrating the mode of growth of *Tropæolum speciosum.*—A paper was taken as read by Mr. Bentham, on the classification of the natural orders Campanulaceæ and Oleaceæ.

Geological Society, Feb. 24.—Mr. John Evans, V.P.R.S., president, in the chair.—Before proceeding to the business of the meeting the President spoke of the death of Sir C. Lyell.

"By every one of us," he said, "he was regarded as the leader of our science, by most of us as our trusted master, and by many of us as our faithful friend. He has lived to see the truth of those principles for which he so long and earnestly contended accepted by nearly all whose opinions he valued; and in future times, wherever the name of Lyell is known, it will be as that of the greatest, most philosophical, and most enlightened of British, if not indeed of European geologists."—The following communications were read:—On the Murchisonite beds of the estuary of the Ex, and an attempt to classify the beds of the Trias thereby, by Mr. G. Wareing Ormerod. This paper may be regarded as a continuation of one read by Mr. Ormerod before this Society in 1868. After noticing the mineralogical character of the Murchisonite, Mr. Ormerod described, first, the Red Sandstone beds by the sea-shore. To the east of Exmouth he considered that they were "Keuper," which extended inland to a fault running to the south of Lympstone. A conglomerate rock at the Beacon at Exmouth was probably the upper bed of the "Bunter," and this he considered to be the same rock that occurred at Cockwood on the right bank of the Ex. This overlay soft red rock, containing occasionally fragments of various rocks, and in the upper part a slight trace of Murchisonite. At Dawlish a soft conglomerate containing Murchisonite in great abundance occurred; this extended inland about two miles. On the westerly side of Dawlish conglomerate beds cropped out, containing fragments of granitic and porphyritic rocks, quartz, Lydian-stone; and here the limestone fragments containing animal remains first occurred. After passing the Parson-and-Clerk Tunnel, these conglomerate beds ceased until reaching Teignmouth, and the cliffs consist of soft beds. At Teignmouth the conglomerates, with limestone, again commenced, and continued to near St. Mary Church, in this part alternating with soft sandy or clayey beds. To the north of the fault at Lympstone the Keuper did not appear by the Ex, and the conglomerate with limestone had not been noticed, being possibly buried under the Greensand of Haldon. The beds north of this point on both sides of the Ex were the soft Red Sandstone, with a trace of Murchisonite, and the underlying Murchisonite conglomerates, and near Haldon House beds that it was considered were possibly those to the west of Dawlish occurred. These beds were broken up by various faults running in both north and south and east and west directions. In the district under consideration it was shown that the soft sandy beds, with a trace of Murchisonite, and the underlying bed of Murchisonite conglomerate, occurred in various places, and in such a manner that there could not be any doubt of their identity; these the author considered as marking a clear division in the Red Sandstone. The paper was illustrated by a map and three sections, and photographs of the cliffs, and by numerous specimens.—On some newly exposed sections of the "Woolwich and Reading beds" near Reading, Berks, by Prof. T. Rupert Jones, F.R.S., and Mr. C. Cooper King. The authors described the section of the lowest Tertiary beds lately exposed at Coley Hill, Reading, Berks, comparing it with other sections in the neighbourhood described by Buckland, Rolfe, Prestwich, and Whitaker. At one point in the section oyster-shells are wanting in the bottom bed, as observed also by Whitaker at Castle Kiln. At the same part of the section the leaf-bearing blue clays are also absent, but are continued by irregular thin seams of derived clay and clay-galls, with broken lignite, occasional grey flints, and by at least one green-coated flint and pebble of lydite. At another point, where the blue clay still exists, very numerous and large lumps of clays, rolled and often enclosing sub-angular flints, lie in the sand over the leaf-bed. Some of these clay-galls have passed into concentric nodules of ochre and limonite. The probable derivation of the two sets of clay-galls is from pre-existing clay beds—probably the blue shale, one from its worn end, and the other (upper one) from a terrace or ledge in its thickness—by the action of varying currents in an estuary at different levels. The clay-galls of the upper series vary much in character; some are of dense dark brown and light coloured clays, others of sandy blue and grey clays, many have involved sand and flints from an old shoal or beach. A probably analogous band of flints has been noticed at Red Hill, Berks, by Prestwich. The direction of the currents wearing away the clay bands and depositing the galls and sands was suggested; and these observations were offered as further materials in working out the hydrography and history of the Lower Tertiaries.—On the origin of Slickensides, with remarks on specimens from the Cambrian, Silurian, Carboniferous, and Triassic formations, by Mr. D. Mackintosh. This paper was founded on specimens a selection of which was exhibited. The author stated that his observations led him to believe that true slickensides are produced by the movement of one face of rock against another, accompanied by partial fusion. He indicated that in many cases the slickensided surfaces are not only polished and striated, but also hardened, and that there is an imperceptible gradation from this hardened film to the ordinary structure of the rock.

**Chemical Society**, March 4.—Prof. Odling, F.R.S., in the chair.—A paper on the dissociation of nitric acid, by Messrs. P. Braham and J. W. Gatehouse, was read by the former, and an experiment performed showing the action which takes place.—Dr. Thudichum then addressed the meeting on the chemical constitution of the brain, exhibiting a large number of the products obtained from that organ.—There were also papers on calcic hypochlorite from bleaching powder, by Mr. C. T. Kingzett; and on a simple method of determining iron, by Mr. W. Noel Hartley.

**Zoological Society**, March 2.—Mr. Osbert Salvin, F.R.S., in the chair.—An extract was read from a letter addressed to the Secretary by Dr. W. Peters, pointing out that the *Sternothæus* figured by Dr. Gray in the Society's "Proceedings" for 1873, to which neither specific name nor locality had been assigned, was *S. niger*, and that its habitat was the Cameroons, from which place Dr. Peters had received specimens.—Mr. H. E. Dresser read some notes on the *Falco labradorus* of Audubon, *Falco sacer* of Forster, and *Falco spadiceus* of the same author.—Mr. A. Boucard communicated a monographic list of the Coleoptera of the genus *Plusiotis* of North America, and gave the description of several new species.—A communication was read from Mr. E. P. Ramsay, giving the descriptions of some rare eggs of Australian birds.—Mr. G. B. Sowerby, jun., communicated the descriptions of ten new species of shells from various localities.—Dr. A. Günther, F.R.S., communicated on behalf of Dr. T. Thorell, of Upsala, the description of a collection of spiders made by Dr. Vinson in New Caledonia, Madagascar, and Reunion, amongst which were a few new species.—A communication was read from Mr. E. L. Layard, H.B.C., administering the government at Fiji, giving the description of some supposed new species of birds from the Fiji Islands.—Mr. A. H. Garrod read a paper containing the description of the lower larynx in some of the rarer species of Anatidæ. To this was added an account of the tracheal arrangement in *Platalea ajaja*, which differs much from that of the common Spoonbill. Reference was also made to the manner of development of the tracheal loop in those of the Cracidæ which have recently died in the Society's Gardens.

**Royal Microscopical Society**, March 3.—Mr. H. C. Sorby, F.R.S., the new president, having been formally introduced by Mr. Chas. Brooke, expressed his sense of the honour conferred upon him, regarding it as a mark of approval of new methods and kinds of investigation, to which, rather than to the more ordinary and general subjects of microscopical inquiry, he had for many years devoted his attention.—Mr. H. J. Slack read some notes translated from Von Baer, &c., which described an organism closely allied to that recently exhibited by Mr. Badcock and assumed to be a species of *Bucephalus*.—A paper by Dr. Royston Pigott, on the principle of testing object glasses by means of images produced by reflection from globules of mercury, &c., was read by the Secretary.—Mr. H. J. Wenham described, by means of black board illustrations, a new method of viewing objects at extreme angles, and the value of this new mode of examination was explained.—Mr. C. Stewart called attention to some new and beautiful specimens of Polycistinæ exhibited in the room by Mr. John Stephenson.

**Anthropological Institute**, Feb. 23.—Col. A. Lane Fox, president, in the chair.—Mr. R. B. Holt exhibited a collection of models of Esquimaux: Caïques, baidars, winter huts, summer huts, sleighs, and other objects of native manufacture.—Capt. Harold Dillon exhibited and described a series of flint arrow- and spear-heads found by him near Ditchley, Oxon. The following papers were read:—On the Milanows of Borneo, by Lieut. C. C. de Crespigny, R.N.; Further notes on the rude stone monuments at the Khasi hills, by Major Godwin-Austen; Report on the Congress of Anthropology and Prehistoric Archæology held at Stockholm in 1874, by H. H. Howorth; History of the Heung-Noo in their relations with China, translated by A. Wylie, of Shanghae, with notes by H. H. Howorth.

**Physical Society**, Feb. 13.—The report of the President (Prof. Gladstone, F.R.S.) and Council shows that a gratifying number of physicists responded to the circular issued by Dr.

Guthrie in the autumn of 1873, and that the formation of the Society has been attended with much success in every way. The meetings were commenced under singularly favourable circumstances, as the Lords of the Committee of Council on Education generously placed the physical laboratories and lecture-rooms at the disposal of the Society, which was thus afforded unusual facilities for experimental illustrations. The first paper was on the new contact theory of the galvanic battery, by J. A. Fleming, B.Sc., and it was followed by many valuable communications. Two papers may be mentioned as being of special interest, these are: "On the combination of colours by polarised light," by Mr. W. Spottiswoode, F.R.S., and "On the application of wind to stringed instruments," by Mr. J. Baillie Hamilton.—The Society has already lost a very able member by the death of Dr. W. S. Davis, of Derby, at the early age of thirty-two.—The following is the list of officers and Council for the present year:—President, Prof. J. H. Gladstone, F.R.S. Vice-presidents: Prof. W. G. Adams, F.R.S.; Prof. G. C. Foster, F.R.S. Secretaries: Prof. A. W. Reinold, M.A.; W. Chandler Roberts. Treasurer, Dr. E. Atkinson. Demonstrator, Dr. F. Guthrie, F.R.S. The other members of the Council are:—Latimer Clark, C.E., W. Crookes, F.R.S., Prof. A. Dupré, Prof. O. Henrici, F.R.S., W. Huggins, F.R.S., Prof. M'Leod, W. Spottiswoode, F.R.S., Dr. H. Sprengel, D. W. Stone, E. O. W. Whitehouse.

**Royal Horticultural Society**, Feb. 9.—Annual Meeting. Viscount Bury, K.C.M.G., president, in the chair.—The Report of the Council, which dealt principally with the financial position of the Society, was taken as read. The statement of accounts for 1874 showed an expenditure of 11,673*l.* 3*s.* 2*d.*, against an income of 10,877*l.* 9*s.* 11*d.*, leaving a deficit of 795*l.* 13*s.* 3*d.* This did not include rent, on account of which 2,400*l.* must be paid to H.M. Commissioners for the Exhibition of 1851 during 1876, otherwise the lease of the gardens at South Kensington will be avoided. On the other hand, the income was increased by a sum of 768*l.* 17*s.* 6*d.* paid to the society for the use of the arcades during the International Exhibition of last year. The result of the ballot for officers and council for the ensuing year was as follows:—President, Viscount Bury, K.C.M.G.; Treasurer, Bonamy Dobree; Secretary, W. A. Lindsay. New members of Council, Hon. and Rev. J. T. Boscawen, W. Longman, J. D. Chambers, F. Campion. On the motion of Mr. Godson the discussion of the report was adjourned to March 9.

### EDINBURGH

**Royal Society**, March 1.—Sir William Thomson, president, in the chair.—The Chairman announced that the Council had awarded the Makdougall Brisbane Prize for the Biennial Period, 1872-74, to Prof. Lister for his paper on the germ theory of putrefaction and other fermentative changes, communicated to the Society, 7th April 1873. The following communications read:—Obituary notice of Mr. William Euing, by Prof. W. P. Dickson, Glasgow, communicated by the President; on a faulty construction common in skewed arches, by Mr. Edward Sang; on the mode of growth and increase amongst the corals of the Palæozic Period, by Prof. H. Alleyne Nicholson, M.D.

### PARIS

**Academy of Sciences**, March 1.—M. Frémy in the chair.—The following papers were read:—On the generalisation of the theory of the normals of geometrical curves, where for every normal a number of straight lines is substituted, by M. Chasles.—On some problems of molecular mechanics, by M. Berthelot. This paper was based principally on the experiments of MM. H. Sainte-Claire Deville and Debray, with perruthenic acid and oxide of silver, of which an account was read at the last meeting; it treats of certain facts, newly discovered and relating to the direct formation of compounds, which upon decomposition evolve a considerable degree of heat; these facts are quoted with special reference to butyrate of soda, and from them some general deductions are made with regard to molecular mechanics.—On the capillary theory applied to Tiliaceæ, by M. A. Trécul.—Experiments on the artificial imitation of native magneto-polar platinum, by M. Daubrée.—A note on magnetism, by M. Th. du Moncel.—M. Leverrier then explained to the Academy the new organisation of the meteorological service of ports, which came in force on March 1. Reports are made twice daily, morning and evening, and it is expected that the evening reports will be specially beneficial to fishing vessels.—Don Pedro II., Emperor of Brazil, is nominated correspondent to the section for Geography and Navigation, in lieu of the late Admiral de Wrangel. A telegram was read from his Majesty expressing thanks for the distinction.—A memoir by M. Cabieu, on a new manure, consisting of the ashes of Medusæ, picked up on the coasts, and fæcal matter.—A note, by M. Chapelas, in defence of the phenomenon observed by him on Feb. 10, at Paris, which was supposed by others to be a large bolide.—On the geometrical solution of some problems relating to the theory of surfaces, and depending from infinitesimals of the third order, by M. A. Mannheim.—On the simplest modes of limit equilibrium, which can be present in a body without cohesion and strongly compressed, by M. J. Boussinesq.—A note by M. G. Fouret, on the geometrical construction of the moments of bending power acting upon the supports of a beam with several joists.—A note by M. V. Feltz, on experimental researches on the toxical principle in putrefied blood; account of experiments made upon dogs into whose veins putrefied blood was injected.—A memoir by M. Macario, on the employment of electricity in hydrocele, iliac passion (*ileus*), and paralysis of the bladder; accounts of cases that were successfully cured by electricity.—A memoir on the chemical manure for beet, by MM. H. Woussen and B. Corenwinder.—M. de Maximowitch then presented a note on a theory of integration of equations with partial derivatives of the second order.—M. P. P. Mestre made a communcation respecting Phylloxera.—A note by M. H. Renan, elements and ephemerides of planet (141).—On a purple colouring matter derived from cyanogen, by M. G. Bong.—On the separation of boracic acid from silica and fluorine, by M. A. Ditte.—On the reciprocal substitution of the volatile fatty acids, by M. H. Lescœur. The author maintains that he has permanently established the following facts, namely, that acetic acid can displace formic acid from its compounds in considerable quantity, that this displacement can take place in the cold, that the presence of water does not notably affect the phenomenon, and the quantity of formic acid displaced varies according to the excess of acetic acid added.—A note by M. G. Hinrichs on the calculation of the moments of maximum inertia in the molecules of the chloro-derivatives of toluene.—Note by M. W. Louguinine on the quantities of heat evolved in the formation of the potash salts of some acids of the fatty series.—On a new psychrometer which avoids all calculation, called *hygrodeik*, by M. Lowe.—On a new pouret for volumetric analysis, by M. A. Pinchon.—Finally, five letters from different correspondents were read, all with regard to the bolide of Feb. 10, first mentioned by M. Chapelas, who afterwards thought it was only the strongly illuminated edge of a cloud.

## BOOKS AND PAMPHLETS RECEIVED

COLONIAL.—The Pathological Significance of Nematode Hæmatozoa: T. R. Lewis, M.B. (Calcutta).—Report of Microscopical and Physiological Researches into the Nature of the Agent or the Agents producing Cholera. Second Series: T. R. Lewis and D. D. Cunningham (Calcutta).

FOREIGN.—Principes des Sciences Absolues: James Thomson (J. Rothschild Paris).—La Terre Végétale, Géologie Agricole: Stanislas Meunier (J. Rothschild, Paris).—Sulle Variazioni periodiche e non periodiche della temperatura nel Clima di Milano: Giovanni Celoria (Milan, Ulrico Hoepli).

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