—On the analogy observed by Warming between Koch's comma bacillus and *Spirillum tenue*, Ehr., by Prof. Leopold Maggi.—On an integer more general than that of living forces, for the movement of a system of material points, by Dr. Giovanni Pennacchietti.—On the psychological action of *attention* in the animal series (continued), by F. T. Vignoli.—On Grimaldi's proposed agrarian credit to relieve the distress of the Italian peasantry, by P. Manfredi.—Remarks on the *legatum optionis* of Roman jurisprudence, by Prof. C. Ferrini.—Critical inquiry into the new Italian Penal Code, by Prof. A. Buccellati.—Meteorological observations made at the Brera Observatory, Milan, during the month of February.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 19.—"The Paralytic Secretion of Saliva." By J. N. Langley, M.A., F.R.S.

It has been shown by Claude Bernard and by Heidenhain that section of the chorda tympani nerve on one side, causes a slow continuous secretion from both sub-maxillary glands. Since the secretion which takes place on the side of the body on which the nerve is cut is called the "paralytic" secretion, that which takes place on the opposite side may be called the "anti-paralytic" or "antilytic" secretion. The author finds that the antilytic secretion becomes slower when the chorda tympani nerve is cut, and stops when, in addition, the sympathetic nerve is cut. It is, then, caused by nervous impulses sent out by a secretory centre in the medulla oblongata. This centre is in a state of increased irritability, for dyspnœa causes a much more rapid flow of saliva, and causes it sooner than it does normally. The paralytic secretion during the first day or two of its occurrence is also caused by stimuli proceeding from the central secretory centre; since the paralytic secretion is more copious than the antilytic secretion, and since dyspnœa causes a greater increase of the former than of the latter, it follows that the increase of irritability in the central secretory centre is greater on the side on which the chorda tympani has been cut than on the opposite side. In this state of increased irritability the central nerve-cells are probably stimulated by the blood supplied to them. The paralytic secretion in its later stages is probably brought about by a similar state of increased irritability in nerve-cells in the gland itself, *i.e.* of a local secretory centre. In its later stages the secretion continues after severance of all the nerve-fibres proceeding from the central nervous system to the gland; it is, however, increased by dyspnœa, stopped by apnœa, and by large doses of anæsthetics, which indicates that it is brought about by nerve-impulses. The peripheral end of the chorda tympani remains irritable for two to three weeks, which is a further indication that the secretory nerve-fibres are connected with some, at any rate, of the many nerve-cells present in the gland. Notwithstanding the continuous paralytic secretion, the gland-cells become slightly more mucous than normal; except for this and a decrease in size they remain normal. They secrete as usual when the sympathetic nerve is stimulated.

Geological Society, March 25.—Prof. T. G. Bonney, D.Sc., LL.D., F.R.S., President, in the chair.—Charles De Laune Faunce De Laune and William Hill were elected Fellows of the Society.—The following communications were read:—On the relationship of *Ulodendron*, Lindley and Hutton, to *Lepidodendron*, Sternberg, *Bothrodendron*, Lindley and Hutton, *Sigillaria*, Brongniart, and *Rhytidodendron*, Boulay, by Robert Kidston, F.G.S.—On an almost perfect skeleton of *Rhytina gigas* = *Rhytina Stelleri* ("Steller's sea-cow") obtained by Mr. Robert Damon, F.G.S., from the Pleistocene peat-deposits on Behring's Island, by Henry Woodward, LL.D., F.R.S., F.G.S. The author spoke of the interest which palæontologists must always attach to such animals as are either just exterminated or are now in course of rapid extirpation by man or other agents. He referred to the now rapid destruction of all the larger Mammalia, and expressed his opinion that the African elephant, the giraffe, the bison, and many others, will soon be extirpated unless protected from being hunted to death. The same applies to the whale- and seal-fisheries. He drew attention to a very remarkable order of aquatic animals, the *Sirenia*, formerly classed with the Cetacea by some, with the walruses and seals by others, and by De Blainville with the elephants. He particularly drew attention to the largest of the group, the *Rhytina*, which was seen alive and described by Steller in 1741. It was then confined to two islands (Behring's Island and Copper Island). In forty years (1780) it was believed to have been entirely extirpated. It was a toothless Herbivore, living along the shore in shallow water, and was easily taken, being without fear of man. Its flesh was good, and it weighed often three or four tons. The author then described some of the leading points in the anatomy of *Rhytina*, and indicated some of the characters by which the order is distinguished. He referred to the present wide distribution of the Sirenia:—*Manatus* with three species, namely, *M. latirostris*, occupying the shores of Florida and the West Indies; *M. americanus*, the coasts of Brazil and the great rivers Amazon and Orinoco; *M. senegalensis*, the west coast of Africa and the rivers Senegal, Congo, &c. *Halicore*, with three species, namely, *H. tabernaculi*, the Red Sea and east coast of Africa; *H. dugong*, Bay of Bengal and East Indies; *H. australis*, North and East Australia. The fossil forms number thirteen genera and twenty-nine species, all limited to England, Holland, Belgium, France, Germany, Austria, Italy, Malta, and Egypt, and to the United States and Jamaica. The author gave some details as to the dentition of fossil species, of which *Halitherium* and *Prorastomus* are the two most remarkable types. Lastly, with regard to the geographical area occupied at the present day by the Sirenia, the author pointed out that two lines drawn 30° N. and 30° S. of the equator will embrace all the species now found living. Another line drawn at 60° N. will show between 30° and 60° N. the area once occupied by the twenty-nine fossil species. He looked upon *Rhytina* as a *last surviving* species of the old Tertiary group of Sirenians, and its position as marking an "*outlier*" of the group now swept away.

Physical Society, March 28.—Prof. Guthrie, President, in the chair.—The President announced that the meeting on May 9 would be held at Bristol; further particulars would be communicated to the members.—Mr. Hawes was elected a member of the Society.—The following papers were read:—On calculating-machines, by Mr. Joseph Edmondson. Calculating-machines are of two classes—the automatic and the semi-automatic. The former were invented by Mr. Charles Babbage between 1820 and 1834, and were designed mainly for the computation of tables. The difficulties against which this inventor contended and the perseverance he displayed in the construction of part of the "difference-engine" he had imagined are now a matter of history. On account of the great cost and high degree of complexity of this machine it was never completed, and the calculating-machines of the present day belong to the semi-automatic class the first example of which is found in a rough and incomplete instrument by Sir Samuel Morcland in 1663. From 1775 to 1780 the Earl of Stanhope invented machines which were a great advance upon those of Sir S. Moreland. In these is found the "stepped reckoner," the basis of all modern instruments. This "stepped reckoner" was improved by M. Thomas de Colmar, who, in 1851 produced a machine which is now largely in use. This machine, somewhat improved in detail and construction, is now made by Mr. Tate of London, and Mr. Edmondson has patented a modification in which the form of the instrument is circular, by which means an endless instead of a limited slide is obtained. A collection of various valuable instruments, which had been kindly lent for the occasion, were exhibited. A discussion followed in which Gen. Babbage, Mr. Tate, Prof. McLeod, Dr. Stone, the Rev. Prof. Harley, Mr. Whipple, Prof. Ayrton, and other gentlemen took part.—On the structure of mechanical models illustrating some properties in the ether, by Prof. G. F. Fitzgerald. The author had recently constructed and described before the Royal Society of Dublin a model illustrating certain properties of the ether (NATURE, March 26, p. 498). This model was one-dimensional, but the author now showed how a tri-dimensional model might be imagined, though probably mechanical difficulties would render its actual construction impossible. Each element of the ether is to be represented by a cube on each edge of which there is a paddle-wheel. Thus on any face of the cube there will be four paddle-wheels. Now, if any opposite pair of these rotate by different amounts, they will tend to pump any liquid in which the whole is immersed into or out of the cube, and if the sides of the cube be elastic there will be a stress which will tend to stop this differential rotation of the wheels. If however the other pair rotate by different amounts, they may undo what the first pair do, and thus the stress will depend on the difference between the differential rotations of these opposite pairs of wheels. If η represent the angular rotation of one pair, and ζ that of the

other, the stress will depend upon $\frac{d\eta}{dx} - \frac{d\zeta}{dy}$. In order that these four wheels may not similarly work with any other wheel, it is necessary to place diaphragms dividing the cube into six cells, each a pyramid standing on a face of the cube. They must be so made that liquid may not be able to pass from one cell to another through the diaphragm or beside the paddle-wheels; to effect this the floats on the paddle-wheels would have to be drawn down while passing the diaphragms. Thus the energy of distorsion of such a medium would depend upon

$$\left(\frac{d\zeta}{dy} - \frac{d\eta}{dz}\right)^2 + \left(\frac{d\xi}{dz} - \frac{d\zeta}{dx}\right)^2 + \left(\frac{d\eta}{dx} - \frac{d\xi}{dy}\right)^2.$$

And Maxwell has shown that this is also true for the ether. The faces of the cubes should be filled up with diaphragms, past which the paddles should pump liquid, and whose elasticity should be the means of storing electrostatic energy in the medium. The most complicated results follow from supposing the faces of the cubes of which the medium is constructed to have different elasticities. Such a structure represents a crystalline medium, and vibrations would be propagated in it according to laws the same as those regulating the transmission of light in crystalline media. If the cubes were twisted, the structure would be like that of quartz or other substances rotating the plane of polarisation. To represent magnetic rotation of the plane of polarisation it would be necessary to introduce some mechanism connecting the ether with matter. The author, in conclusion, insisted upon a view which regards the vibrations constituting light to be of the nature of alterations of structure, and not of displacements executed in a medium possessing the properties of an elastic jelly.—At the close of the meeting the following instruments were exhibited and described in a conversational manner by their makers: a chrono-barometer and a chrono-thermometer by Mr. Stanley. These instruments consisted of clocks regulated by pendulums formed in the first instrument of a mercurial barometer, and in the second of a similar barometer inclosed in a hermetically-sealed air-chamber, the inclosed barometer thus acting as an air-thermometer. Increase of pressure in the one case, and of temperature in the other, causes the mercury to rise, and thus accelerates the pendulum. By the gain or loss of time the mean pressure or temperature can be calculated for any period.—A heliostat and a galvanometer, by Mr. Conrad W. Cooke. The galvanometer is intended to show the internal current in a cell. The battery plates are in two cells connected by four glass tubes in multiple arc coiled around an astatic needle. The glass work is by Mr. Gimingham.—A spherometer, by Mr. Hilger, was made of aluminium, and combined lightness with rigidity. By an electrical contact the maker asserted that measurements could be made to one-millionth part of an inch.—Col. Malcolm exhibited a spectroscope and a binocular field-glass in which the two eyepieces were separately adjustable; and Dr. Watts exhibited a simple modification of a quadrant electrometer.

Royal Microscopical Society, March 11.—Rev. Dr. Dallinger, F.R.S., President, in the chair.—Mr. Crisp exhibited Winkel's class microscope with movable stage, Tolle's clinical microscope, Seibert's portable microscope, and Swift's microscope for examination of skin of sheep having a very long working distance, Griffiths' and Bertrand's objective adapters and a new form of "finder."—Mr. H. G. Madan exhibited some new kinds of glass, having found that a combination of ordinary blue glass with a peculiar bluish-green glass, known as "signal-green" glass, was much more convenient than the usual glass cell filled with solution of cuprammonium sulphate.—Mr. Baker exhibited some object-boxes in book-form for placing on a shelf with books, the objects then lying flat.—Dr. C. v. Zenger's letter was read describing a new mounting medium consisting of tribromide of arsenic in bisulphide of carbon, and giving a refractive index of from 1·6696 to 1·7082. An improved slide for viewing the object on both sides was also described.—Mr. C. H. Hughes's description was read of a stage for use with high powers to prevent the decentring of the condenser, especially when used with immersion contact. Vertical, horizontal, and oblique motions are given to the slide, while the stage remains stationary but can be rotated.—Mr. E. M. Nelson exhibited a drawing of comma bacillus showing the flagella.—Mr. J. Mayall, jun., described the original ruling machine of the late Herr F. A. Nobert, which was exhibited to the meeting. The foundation of the machine was a dividing engine calculated to produce parallel divisions far finer than could be marked by any ruling point yet discovered. The division-plate had twenty circles of "dots," and these were supplemented by extremely fine graduations on two bands of silver imbedded near the edge, which were viewed by means of two compound microscopes, each provided with eyepiece screw micrometers of special construction. The movement of rotation was effected by a fine tangent screw acting on a worm on the vertical edge of the division-plate. The method employed by Herr Nobert for obtaining the minute divisions of his test-plates (ranging from 1-1000th to 1-20,000th of a Paris line) was to convert the radius of the division-plate into a lever to move the glass plate on which the rulings were made at right angles to the motion of the ruling point. For this purpose he attached to the centre of the rotating division-plate a bent arm, on which slid a bar of silver, having at one end a finely-polished steel point which could be adjusted by a scale and vernier so as to project more or less beyond the centre of the division-plate or axis of rotation. The radius of the division-plate thus became the long arm of the lever, whilst the radius of the projection of the polished steel point beyond the axis of rotation formed the short arm, the centre of the division-plate being the fulcrum. The motion of the short arm of the lever was communicated by contact with an agate plate to a polished steel cylinder adjusted to slide at right angles to the movement of the ruling point in V-shaped bearings of agate. The steel cylinder carried a circular metal table, on which the glass plate to be ruled was fixed by wax and clamps. The arrangement for carrying the diamond point was, he believed, wholly designed by Herr Nobert, and was a most ingenious combination of mechanism.—Mr. Mayall referred briefly to the preparation of the glass plates for the rulings, which, he said, were of specially "mild" composition. It was abundantly proved by Herr Nobert's work that the perfection of the mechanical part of the dividing-engine was not the only difficulty which he had understood, and conquered. There was a still greater difficulty which he had understood, and in which he had met with a success that gave him pre-eminence in this department of micro-physics, and that was the preparation of the diamond ruling-points. The description of these was deferred until the next meeting.—Mr. C. Beck exhibited a modification of the "complete" lamp fitted with a shallow glass reservoir instead of the original one of metal, also a vertical illuminator with a new form of diaphragm.—Dr. Van Heurck's note was received, sending a copy of Prof. Abbe's opinion on the photographs of the "beads" of *A. pellucida*, in which he stated that he had no reason to doubt the reality of the beads.—Dr. J. D. Cox's note was read as to actinic and visual foci.—Mr. F. Kitton's remarks in commendation of balsam of Tolu for mounting were read.—Dr. Ord exhibited and described some objects illustrating the erosion of the surface of glass when exposed to the action of carbonate of lime and a colloid.—Mr. J. W. Stephenson read his paper, on a new catodioptric illuminator, having an aperture exceeding that of any existing objective, or equal to 1·644 N.A. in flint glass, and 1·512 N.A. in crown glass.—Mr. Cheshire and Mr. E. Chayne's paper on the pathogenic history of a new bacillus (*B. alvei*) was then read, in which it was shown that the disease attacking bees, and known as "foul brood," was due to a bacillus. They had also discovered that the disease yielded readily to treatment which consisted in feeding the larvæ with a syrup containing 1·600 per cent. of phenol. A detailed explanation was given of the methods adopted in tracing out the life-history of the bacillus, and a series of tubes and bottles in which its propagation had been carried on were exhibited.—Mr. Fowke read a paper on the first discovery of the comma bacillus of cholera. He showed that the bacillus was known and recognised thirty-five years ago by two Englishmen, Messrs. Brittain and Swayne. It was pointed out that it was by the breaking up of the rings discovered by original observers that the so-called "comma" bacilli were formed.—Sixteen new Fellows were proposed and elected.

MANCHESTER

Literary and Philosophical Society, February 10.—Prof. W. C. Williamson, LL.D., F.R.S., President, in the chair.—On some undescribed tracks of invertebrate animals from the Carboniferous rocks, and on some inorganic phenomena, simulating plant remains, produced on tidal shores, by Prof. W. C. Williamson, LL.D., F.R.S., President. Prof. Williamson's memoir first contained descriptions and figures of a new form of Chrossocorda, which he named *C. tuberculata*, from the Yoredale rocks of Stonyhurst, in Lancashire, which genus has hitherto been found only in Palæozoic rocks of much older age than the Yoredale beds. Reciting the views of Schimper and

others, who believe that the genus Chrossochorda represents some fucoidal form of Palæozoic life, the author regards the various modifications of it as consisting of tracks of marine animals, probably crustaceans. He assigns the name of *Chrossochorda tuberculata* to that now described. A second form of track, of a different type, was found by Mr. J. W. Davis, F.G.S., of Chevinedge, near Halifax. It consists of a line of curved footprints in groups of eight—four on each side—the successive groups varying from five-eighths of an inch to two inches apart from each other. The specimen described was found in a quarry of Yoredale beds, near Hawes. The author assigns to it the name of *Protichnites Davisi*, after its discoverer. Casts of two series of markings, produced by water, were exhibited and described. One of these series represented branching forms easily mistaken for fucoidal remains. They were in reality casts, made in plaster of Paris, of remarkable drainage lines left by the retiring tide, on the sandbanks at Llanfairfechan, in North Wales. The second series consisted of allied objects, but in this case drainage lines had combined with ripple marks to produce an effect easily mistaken for the geometrically arranged scale-leaves of some cycadean stem. These casts were obtained from sandbanks to the north of Barmouth. The author called attention to the controversy bearing on these subjects still in progress, especially between Prof. Nathorst and the Marquis of Saporta, and renewed an objection, recorded in more than one of his previous publications, to such anomalous objects as those in dispute being made use of, when attempting to frame, from Palæontological evidences, a pedigree of the vegetable world.

CAMBRIDGE

Philosophical Society, March 16.—Prof. Foster, President, in the chair.—The following communications were made:—Further remarks on the urea-ferment, by Mr. Lea.—On some points in the anatomy of Nebalia, by Mr. Weldon.—Observations on the constitution of callus, by Mr. Walter Gardiner.—Observations on vegetable proteids, by Mr. J. R. Green.—On the development of K', E', J', G' in powers of the modulus (Part II.), by Mr. J. W. L. Glaisher.

SYDNEY

Linnean Society of New South Wales, January 28.—Annual General Meeting.—The President, C. S. Wilkinson, F.L.S., in the chair.—The President delivered an address upon the Pleistocene period, and its influences upon the present distribution of the fauna and flora of Australia. He gave also a short review of the work of the Society during the past year.—It was resolved that ladies may be admitted upon election as associates of the Society, with all the privileges of ordinary members except the right to attend the monthly meetings, at the reduced subscription of one guinea, without entrance fee.—The following papers were read:—A monograph of the Australian sponges: Part iv., the Myxospongiæ, by R. von Lendenfeld, Ph.D. In this paper the Australian species are described. (The author partly adopts the view of Sollas regarding the separation of the Halisarcidæ and Gumminæ.) The structure of Bajalus, a new genus of Halisarcidæ, is described. The subdermal cavities are remarkably developed. Amœboid wandering cells were found in a dense layer beneath the outer skin. Gland cells are described. Sexual products mature only in the innermost part. The gastral cavity serves as a marsupium. The anatomy of *Chondrosia Ramsayi*, n.sp., *Chondrilla papillata*, n.sp., and *corticata*, n.sp., shows some points of interest. Peculiar subdermal cavities are described in the former. The two latter possess a special cortical skeleton.—The method of section-cutting with some improvements, by R. von Lendenfeld, Ph.D.—*Amœba parasitica*, a new parasitic Protozoan infesting sheep, by R. von Lendenfeld, Ph.D.—The meteorology of Mount Kosciusko, by R. von Lendenfeld, Ph.D.—The Glacial period in Australia, by R. von Lendenfeld, Ph.D. The author gives the results of his recent expedition to the central part of the Australian Alps in this paper, as far as they bear on the above question. He ascended the two highest peaks in Australia, and found on the plateau which surrounds them undoubted glacial remains in the shape of *roches moutonnées* in many places above 5800 feet. He concludes that Australia was affected by a glacial period at the same epoch as New Zealand, but that, owing to the lowness of the mountains (only 7256 feet the highest peak), the low latitude, and the warm and dry winds from the interior, the glaciers attained but small dimensions, and only covered an area of about 100 square miles. He considers it probable that no other glaciers existed in Australia at the time, as even those on the highest elevation of the continent were so small.—On the Proteaceæ, by the Rev. W. Woolls, Ph.D., F.L.S.—On a new snake from the Barrier Ranges, by William Macleay, F.L.S., &c. The description is here given of a species of *Furina*, to which the specific name of *Ramsayi* is affixed. Some specimens of it were exhibited, as well as specimens of *Vermicella*, *Typhlops*, and *Delma*, from the same locality.

PARIS

Academy of Sciences, April 6.—M. Boulay, President, in the chair.—Obituary notice of M. Rolland, Member of the Section for Mechanics, who died on March 31, by the President.—Remarks on the agreement between geological and cosmogonic epochs, by M. Faye. These remarks are made in connection with his work, "Sur l'Origine du Monde," recently presented to the Academy, in which he develops his theory on the cosmic evolution of the solar system. Here this theory is supported by fresh arguments drawn from thermodynamics, biology, and solar physics.—On the artificial and supplementary manures proper for soil of different qualities, by M. de Gasparin. It is shown by numerous examples that such manures should be selected, not only according to the nature of the crops to be raised, but also according to the character of the lands requiring to be enriched.—On the resistance offered by a fluid in repose and without weight to the varied movement of a solid sphere immersed in it when the velocities are continuous, but so slow that their squares and products may be neglected, by M. J. Boussinesq.—On the "polhodie," a curve introduced by Poinsot into his new theory on the rotation of bodies, by M. A. Mannheim.—On the liquefaction and solidification of formene and of the deutoxide of nitrogen, by M. K. Olszewski.—On the amides of the oxaloadipose group, by M. L. Henry.—Funeral orations pronounced at the obsequies of M. Rolland on April 7, by MM. Phillips and Schlösing.

STOCKHOLM

Royal Academy of Sciences, March 11.—Prof. Gylden communicated a paper by A. Shdanow on the computation of the intermediate orbit of the comet of Faye-Möller when it was in the vicinity of Jupiter in 1841.—Prof. Mittag-Leffler presented papers (1) on periodical functions with a discontinuous period-system of the first kind, by himself; and (2) annotations on the mathematician, Petrus de Dacia, and his writings, by G. Engström.—The Secretary, Prof. Lindhagen, presented (1) the doctrine of Linnæus on the species of plants determined and permanent in the nature, represented according to the works of Linnæus and compared with the corresponding views of Darwin, by Prof. T. G. Agardh; (2) Desmidiæ collected during the expedition of Nordenskiöld to Greenland in 1870, by Prof. Berggren, and described by Dr. O. Nordstedt.

CONTENTS