clear as to the method of formation of lightning and auroral discharges, the phosphorescent glow of the clouds, ball lightning, and other every-day phenomena. Is a cloud to be considered as one big conductor, or does it insulate and separate the electrified masses on either side of it? Are the great displays to be seen on the summits of the Rocky Mountains due to the influence of the atmosphere or to something going on in the earth beneath? Are large drops really made up by the agglomeration of small cloud particles, or are both the drops and electricity formed simultaneously by the sudden dissipation of unstable molecular equilibrium that exists in supersaturated cloudy air (as suggested by the editor in his article of 1891 in *Agricultural Science* on the "Artificial Production of Rain")? Do the larger drops of rain really possess a greater electrical density on their surfaces than the small drops and particles, or do they not rather lose their charges immediately either by evaporation or by gentle discharge to the neighbouring drops? These and other questions crowd upon our thoughts; but satisfactory replies can only be given after physicists have invented appropriate methods of investigation. Meteorological observers may contribute to the solution of the problems by collecting both general data and special observations of exceptional phenomena, but the discussion of the data and the definitive decision by means of experimentation as to the merits of conflicting hypothetical explanations must be left to the leading physicists of the world.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The election of a professor as member of the Council of the Senate, to fill the place of Prof. Robinson, now Canon of Westminster, will take place on Friday, March 17.

Prof. Woodhead is appointed an Examiner in State Medicine, in the place of the late Dr. Kanthack.

Syndicates are to be appointed to obtain plans and estimates for the new buildings of the Medical School and of the Botanical Department.

MR. FREDERICK TREVES, consulting surgeon to the London Hospital, has been appointed an Emeritus professor of surgery to the London Hospital, and will give a course of lectures in clinical surgery in the winter session. The special subjects and dates will be announced in due course.

PROF. A. H. SAYCE, of Oxford University, has been appointed Gifford Lecturer in Aberdeen University for 1900–1902. The honorary degree of LL.D. has been conferred upon Mr. Charles Stewart, F.R.S., Curator of the Museum of the Royal College of Surgeons, England; and Mr. George F. Stout, Lecturer on Comparative Psychology in Aberdeen University.

As will be seen from our advertisement columns a successor to the late Prof. Rutherford in the chair of Physiology of the University of Edinburgh will shortly be appointed. Applications for the post, accompanied by relative testimonials, should reach the Secretary to the Curators, at 66, Frederick-street, Edinburgh, on or before May 20.

IN connection with the inauguration of the new buildings of the Middlesex Hospital Medical School, Dr. F. Hetley, a former student, has contributed the sum of 1000*l.* to perpetuate the Hetley Clinical Prize of 25*l.* per annum, founded in 1884.

A CHAIR of Hygiene has been endowed in Harvard University by a donor whose name is withheld.

THE following appointments abroad are announced in *Science*:—Dr. James Monroe Taylor to be president of Brown University; Dr. T. J. J. See to be professor of mathematics at the Naval Academy, Annapolis; Prof. Fritz Regel, of Jena, to be professor of geography at Würzburg; Dr. Erich v. Drygalski, of Berlin, to be professor of geography at Tübingen.

THE resignation of Dr. Robert Otto, professor of chemistry in the Institute of Technology at Braunschweig, is announced.

SCIENTIFIC SERIALS.

American Journal of Science, February.—Contact metamorphism, by J. M. Clements. The various Huronian sediments which form a great portion of the iron-bearing districts of the Upper Peninsula of Michigan have in all of these districts been found to be penetrated by dikes of igneous rocks, which are predominantly basic in character. The author describes the products which have resulted from the intrusion of basic dikes in the Mansfield slate formation. Between the dolerites and the slates there are masses of hard, peculiar hornstone-like rocks, which have a well-banded character. Beginning with the clay-slate, the least metamorphosed rock in the district, the series passes through phyllites, spilosites, and desmosites to those which are known as adinoles, the latter being those which immediately adjoin the intrusive.—The origin of mammals, by H. F. Osborne. The author traces the ancestry of mammals to the Upper Permian, and in doing so he adopts Gill's two sub-classes of mammals, namely the *Eutheria*, comprising marsupials and placentals, and the *Prototheria* or monotremes. There are grounds for the view that the *Theriodontia* are the *Hypotheria* or *Promammalia*, because it appears that within the order may well have existed some small insectivorous types, far less specialised in both structures than either the carnivorous Cynodonts or herbivorous Gomphodonts, as one of those conservative species of adaptive radiation which form the focus of a new progressive type.—Chemical composition of tourmaline, by S. L. Penfield and H. W. Foote. The composition was deduced from the results of an analysis of a few specimens carried out with the utmost regard to accuracy. The specimens selected were the colourless tourmaline from De Kalb, St. Lawrence County, New York, and the pale green variety from the felspar quarries at Haddam Neck on the Connecticut River. The authors regard all varieties of tourmaline as salts of the acid $H_9Al_3(B.OH)_2Si_4O_{19}$, in which the complex aluminium-borosilicic acid radicle exerts a mass effect by virtue of which the remaining hydrogens may be replaced by metals of essentially different character without bringing about any pronounced change of crystalline form.—The thermodynamic relations for steam, by G. P. Starkweather. Discusses the application of Van der Waals's equation of condition to steam along the saturation line.—A volumetric method for the estimation of boric acid, by L. C. Jones. This is based upon the reaction $5KI + KIO_3 + 6HCl = 6KCl + 3H_2O + 3I_2$. The liberated iodine may be removed by sodium thiosulphate, and a solution obtained which is absolutely neutral, containing only neutral salts, potassium iodide, iodate, and tetrathionate. Boric acid in moderate amount in solution has not the slightest action on a mixture of iodide and iodate.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 16.—"The Thermal Deformation of the Crystallised Normal Sulphates of Potassium, Rubidium, and Cæsium." By A. E. Tutton, B.Sc. Communicated by Captain Abney, C.B., F.R.S.

In this memoir are communicated the results of sixty-four determinations of the thermal expansion of the orthorhombic crystals of the normal sulphates of potassium, rubidium, and cæsium, carried out for the three axial directions of the crystals with the aid of the compensated interference dilatometer previously described by the author.

The coefficients of cubical expansion exhibit a progression, corresponding to the progression of the atomic weights of the three respective metals. This is true of both the constants a and b in the general expression for the coefficient of cubical expansion, $\alpha = a + 2bt$, for any temperature t.

The order of progression of the two constants is inverted; a, the coefficient for 0°, diminishes with increasing atomic weight of the metal, while b, half the increment of the coefficient *per* degree of temperature, increases. Consequently, the coefficients of cubical expansion of the three salts converge, with rise of temperature, and attain equality in pairs. Beyond the temperature of identity divergence occurs, and an increase of atomic weight is now accompanied by an increase of expansion.

The differences between the coefficients of linear expansion along the three axial directions of any one salt, although only amounting to one-eighth of the total coefficient, are large compared with the differences between the values for the same direction of the three salts. This, together with the fact that the replacement of one metal by another is accompanied by considerable modifications of the relations of two of the three values for the original salt, those corresponding to the axes a and c, prevent the coefficients of linear expansion for any one direction of the three salts from exhibiting any progression corresponding to that of the atomic weights of the three metals.

The increment of the linear coefficient of expansion along the axis c of each salt is about twice as large as the increments for

the other two directions, *a* and *b*, for which latter the increments are nearly equal. This is analogous to the optical behaviour.

The amount of expansion along the direction of the axis *b* is approximately identical for all three sulphates, indicating that interchange of the metals is without influence on the thermal behaviour along this axis.

The chief of the directional perturbations previously referred to consists of a reversal, for temperatures below 50°, of the directions of the maximum and intermediate axes of the thermal ellipsoid for rubidium sulphate, compared with their directions in the potassium and cæsium salts. The maximum thermal axis is *c* for the two latter salts, but *a* for rubidium sulphate. A similar reversal of the direction of the maximum axis of the optical ellipsoid (the indicatrix), the first median line, from *c* to *a*, occurs for the same temperatures, in the case of rubidium sulphate. The maximum thermal axis is identical with the first median line in all three salts.

At higher temperatures the same relations continue to hold for the potassium and cæsium salts, both thermally and optically. But owing to the increment of expansion along *c* being so much greater than for the other directions, the intermediate expansion along *c* for rubidium sulphate attains equality at 50° with the expansion along *a*, and beyond this temperature *c* becomes the maximum thermal axis for this salt, as it is for the other two sulphates. Consequently, at 50° the crystals of rubidium sulphate are apparently thermally uniaxial. At temperatures varying 10° each side of 50° for different wave-lengths of light, they have previously been shown to simulate uniaxial optical properties. The thermal and optical ellipsoids of revolution are not, however, identically orientated, the axis of the former being *b* and of the latter *a*.

The final conclusion of the investigation, therefore, is that:

The thermal deformation constants of the crystals of the normal sulphates of potassium, rubidium, and cæsium exhibit variations which, in common with the morphological, optical, and other physical properties previously investigated, follow the order of progression of the atomic weights of the alkali metals which the salts contain.

"Observations on the Cerebro-Spinal Fluid in the Human Subject." By St. Clair Thomson, M.D., Leonard Hill, M.B., and W. D. Halliburton, M.D., F.R.S.

One of the authors, Dr. Thomson, has had under his care for some years a very remarkable patient, in whom, without any history of injury, cerebro-spinal fluid dripped continuously from one nostril. Research into the literature of the subject has shown that there are other cases on record which must have been similar, although the true nature of the fluid was not recognised. Some of these patients ultimately died from inflammation of the membranes of the brain, which had probably spread from the nose through the opening in the bony lamina that normally completely separates the cranial and nasal cavities.

The fluid itself is characterised by its clear watery character, its low specific gravity, the small amount of proteid in it, and the absence of albumin, and by the presence in it of a substance which reduces Fehling's solution, but is not dextrose; the substance is possibly related to pyrocatechin. The contrast between such a fluid, and the mucin-containing fluid of ordinary nasal hydrorrhœa is very marked.

Analysis of the fluid which escaped in the evenings showed it to be more watery than that collected first thing in the mornings; the difference is due principally to an alteration in the amount of organic solids. This confirms an observation of Cavazzani on dogs, and is what one would expect, as the decreased capillary pressure during rest would lessen the rate of exudation of water.

The case afforded a unique opportunity to Dr. Leonard Hill to confirm the theories he has advanced concerning the cerebral circulation. He has put forward the view that the rate of secretion of the cerebro-spinal fluid, when the cranio-vertebral cavity is opened, depends directly on the difference between the pressure in the cerebral capillaries and that of the atmosphere. At the same time it was shown that cerebral capillary pressure varies directly and absolutely with vena cava pressure.

On the other hand, cerebral capillary pressure varies directly, but only proportionately, with aortic pressure, for between the aorta and the capillaries there lies the peripheral resistance.

It follows from the above that the easiest methods of raising the cerebral capillary pressure in man are:—

(*a*) By compression of the abdomen.

(*b*) By the assumption of the horizontal posture. In this position, however, the rise of venous pressure may be compensated by the fall of arterial pressure, which normally occurs when the body is at rest. This is, no doubt, the case during sleep.

(*c*) By straining or forced expiratory effort, with the glottis closed.

By all these methods the vena cava pressure is considerably raised; and by the last method the venous inlets into the thorax may be completely blocked, and the pressure in the cerebral capillaries raised to something like aortic pressure.

It is true that by such a forced expiratory effort the aortic pressure is lowered. Nevertheless, the total effect on capillary pressure is a very great rise, for a fall of aortic pressure of 25 mm. of mercury produces a fall in cerebral capillary pressure of less than 5 mm. of mercury, while a rise of vena cava pressure of 25 mm. of mercury produces a rise of cerebral capillary pressure of 25 mm. Hg.

The figures, which are given in detail in the paper, show that in the present case the flow of the cerebro-spinal fluid is accelerated by all the circumstances enumerated, which raise the cerebral capillary pressure. The increase of flow is, moreover, accompanied by a decrease in the percentage of solid matter.

One of the authors (W. D. H.), in conjunction with Dr. Mott, F.R.S., has examined the results of injecting into animals cerebro-spinal fluid removed from cases of brain atrophy, especially from cases of general paralysis of the insane. This fluid contains a toxic substance, choline, doubtless derived from the disintegration of lecithin in the brain. Injection of such fluid into the jugular vein of animals, anæsthetised with ether, causes a marked lowering of arterial blood pressure, which is partly cardiac in origin, but principally due to the local action of the poison on the neuromuscular apparatus of the peripheral vessels, especially in the splanchnic area.

The fluid obtained from the present case was also injected in a similar way. Quantities varying from 7 to 10 c.c. were injected into the circulation in dogs, but with entirely negative results. Such a quantity in the case of fluid from a general paralytic would be quite sufficient to cause a marked fall of arterial pressure.

Mineralogical Society, January 31.—Prof. A. H. Church, F.R.S., President, in the chair.—On a new mode of occurrence of ruby, in North Carolina, by Prof. John W. Judd, F.R.S., and Mr. W. E. Hidden; with crystallographic notes by Dr. J. H. Pratt. About fifteen years ago, very finely-coloured rubies were found at Cowie Creek, North Carolina, and some of these, according to competent experts, have the colour and brilliancy of the finest stones from Burma. These rubies are found in gravels and alluvia underlaid by a "saprolitic" material, the product of the decomposition *in situ* of the rocks of the district. The gems are derived, not like those of Burma from a limestone rock, but from certain basic rocks, such as eclogite, amphibolite, and hornblende schist. Associated with the rubies are found specimens of "rhodolite," a very clear and fine-coloured variety of garnet having a composition intermediate between pyrope and almandine. This garnet is often found enclosed in corundum, so that it must belong to an earlier period of consolidation. In habit, the corundum crystals of Cowie Creek are very similar to those found at Yogo Gulch and other localities where the mineral occurs in rocks of undoubted igneous origin. It is suggested that the rubies of both Burma and Cowie Creek may have originally existed in rocks of basic character of very similar composition.—Experiments on zeolites, by Prof. A. H. Church, F.R.S. The author describes an experiment tending to show that the action of silver nitrate on phillipsite is analogous to that investigated by Eichhorn and by Lemberg in the case of other salts on other zeolites. Prof. Church also exhibited numerous specimens of pure blue apatites from Ceylon, which, owing to their beautiful colour, had been mistaken for sapphires. One of these specimens contained as much as 3·21 per cent. of chlorine, but others only 0·63 per cent. and 0·34 per cent.—On the constitution of mineral arsenates and phosphates. II. Pharmacosiderite, by Mr. E. G. J. Hartley. In continuation of his chemical investigation of mineral arsenates and phosphates, the author gives the results of analyses of pharmacosiderite. From 2·4 to 4 per cent. of potash was found in the specimens analysed, and all the Cornish specimens examined contained this alkali. Water determinations made with special care showed that the mineral contains eighteen molecules instead of fifteen, as previously supposed.—The specific identity of binnite with tennantite, by Mr. G. T.

Prior and Mr. L. J. Spencer. Owing to variations in previous analyses, the true character of this rare mineral from the Binnenthal has been hitherto in doubt. The result of the chemical analysis of very carefully selected material, and of the crystallographic examination made by the authors, shows that binnite is identical with tennantite, since neither in its chemical nor in its physical characters can it be distinguished from that mineral.

Linnean Society, February 16.—Dr. A. Günther, F.R.S., President, in the chair.—Mr. Clement Reid exhibited some fruits of *Najas minor*, Allione, and of *Najas graminea*, Delile, found during a further examination of the interglacial deposits at West Wittering in Sussex.—Dr. A. B. Rendle exhibited specimens of a freshwater Alga (*Pithophora*) new to Britain, and described its structure.—Mr. Gilbert C. Bourne read a paper on the genus *Lemnalia*, Gray, with an account of the branching systems of the order *Alcyonacea*. In the course of his remarks some new terms were proposed specially applicable to the morphology of the Alcyonaceans.—Messrs. I. H. Burkill and C. H. Wright read a paper "On some African *Labiatae* with alternate leaves," a peculiarity which had been recently used by M. Hua to characterise a new genus, *Icomum*. To this genus three new species were now added.—Messrs. J. Cosmo Melvill and Robert Standen communicated a "Report on the Marine Mollusca obtained during the first expedition of Prof. A. C. Haddon to the Torres Straits." Over 400 forms of Gastropoda and Pelecypoda were collected, together with a few Polyplacophora. Twenty-four novelties were described, one of the most noteworthy being a Neriteid Mollusc allied on the one hand to *Vanicoro*, and on the other to *Nerita*, for which the generic name *Magadis* was proposed. *Pholadomya Haddoni* was described as a new species.

Zoological Society, February 21.—Prof. G. B. Howes, F.R.S., Vice-President, in the chair.—Mr. A. Smith Woodward read a paper by Dr. F. P. Moreno and himself, on a piece of skin supposed to belong to the *Neomylodon listai* of Ameghino, from a cavern near Consuelo Cove, Lost Hope Inlet, Patagonia. Dr. Moreno's contribution was an amplification of his remarks on the subject made at a previous meeting. He maintained that the specimen in question was of great antiquity, and belonged to the extinct ground-sloth, *Mylodon*. In reply to objections founded on its state of preservation, he supported his contention by mentioning that he had found a well-preserved mummified human body in another cavern in the same district, which certainly belonged to an extinct race of great antiquity, unknown even to the present Tehuelche Indians. Mr. Woodward gave a detailed description of the specimen, pointing out that the skin was unique, even for an Edentate, in having the armour of ossicles confined to the lower half of the dermis, while the covering of hair was implanted in every part of the upper half. He thought he could recognise in it the base of the left ear, and concluded that the piece of skin had probably belonged to the neck. It certainly represented an animal quite as large as *Mylodon;* but he noted discrepancies in the microscopical structure of the dermal ossicles, which inclined him to believe in its generic distinctness. The problem could not be solved, because the dermal armour of *Mylodon* had only been definitely described in the lumbar region, and it was quite possible that the ossicles in the flexible neck of the animal might not agree with those in the comparatively rigid back above the pelvis. If Dr. Moreno had not been able to give so circumstantial an account of the discovery, Mr. Woodward would have unhesitatingly pronounced the skin to belong to a recent animal killed quite lately.—A communication was read from P. W. Bassett-Smith, R.N., containing observations on the formation of the coral-reefs on the N.W. coast of Australia. Special attention was called to the part played by massive *Polyzoa* in forming coral-reefs.—A communication was read from Mr. G. A. Boulenger, F.R.S., containing an account of a collection of reptiles and batrachians made by Mr. J. D. La Touche in N.W. Fokien, China. Eight species were described as new to science in the present paper, amongst which was a snake belonging to a new genus, most nearly allied to *Opisthotropis* of Günther, proposed to be called *Tapinophis latouchii*, after its discoverer.—A communication was read from Sir G. F. Hampson, Bart., containing the second portion of his "Revision of the Moths of the subfamily *Pyraustinae* of the family *Pyralidae*."

Anthropological Institute, February 14.—Mr. C. H. Read, President, in the chair.—A paper was read by Colonel Sir T. H. Holdich, K.C.I.E., C.B., on "The Arab Tribes of our India Frontier." After describing the physical features of the country, the author proceeded to discuss certain ethnological questions. Many of the existing tribes can be identified with those named by Herodotus and Strabo. The author gave a sketch of Arab influence in Baluchistan, which was, he suggested, greater than is commonly supposed. The explanation why our control of the southern borderland is more effective than it is in the north, is that in the former we are not merely facing the Baluch tribes, but we are at the back of them. Besides this, the Baluchis have a well-defined tribal organisation, and the dealings of the Indian Government with them are thereby much facilitated. The author's view as to the predominance of Arab influence in Baluchistan was disputed by Messrs. J. Kennedy and W. Crooke.

MANCHESTER.

Literary and Philosophical Society, February 7.—Mr. J. Cosmo Melvill, President, in the chair.—Notes on the slipperiness of ice, by Prof. Osborne Reynolds, F.R.S. The author referred to some experiments by Mr. Beauchamp Tower on the lubrication of two metallic surfaces, and showed the extraordinary degree of coherence between two "Whitworth planes" after they had been pressed together so as to squeeze out the film of air between. All lubrication is due to the presence of a fluid, either liquid or gaseous, between the opposing surfaces, and in the case of ice the pressure induces a partial liquefaction, which is the sole cause of slipperiness. When ice is cooled below a certain point, it becomes no more slippery than a polished surface of stone.—On science in the "Historical English Dictionary," by C. L. Barnes. It was pointed out that "astronomy" and "astrology" have interchanged meanings since they were first introduced, as is clearly shown by Evelyn in his "Memoirs" (1676), where he says: "Dined with me Mr. Flamsteed, the learned astrologer and mathematician, whom his Majesty had established in the new observatory in Greenwich Park." The science of chemistry appears to have been unhappy in its first introduction into literature, for Gaule (1652) speaks of it as "a kind of praestigious, cheating, covetous magick," and Bentham, in 1812, makes use of this language: "Idioscopic, or cryptodynamic anthropurgics has for its single-worded synonym the unexpressive appellation chemistry." The curious derivation of "alcohol," from the Arabian "kohl," referred to in 2 Kings, ix. 30, and in Ezek. xxiii. 40, as a material for personal adornment, was next referred to. From meaning a fine powder, produced either by trituration or sublimation, the latter sense gradually slid off towards distillation, though in Spanish the words alcohol, alcoholado, alcoholador, and alcoholar still retain their ancient significance in part. The derivation of the word "antimony" itself, and Littre's conjecture that the same Arabic root has furnished both "antimonium" and "stibium"—the latter through the Greek "stimmi"—was also noticed. Under the heading "Atom," the Dictionary quotes, besides the ordinary meanings, a table of Papias, Bishop of Hierapolis in Phrygia in the second century, in which the word signifies a small interval of time, the 22,560th part of an hour. A similar usage is found in the Greek text of 1 Cor. xv. 52, where the expressions "en atomo, en rhipe ophthalmou" are translated "in a moment, in the twinkling of an eye." But most important of all is the discovery, announced alone in this dictionary, that the word "gas" was suggested to Van Helmont by the Greek "chaos," or, as he himself puts it: "Halitum illum 'gas' vocavi, non longe a chao veterum secretum." The spirant sound of the Dutch "g" was probably taken as a nearer equivalent of the Greek "ch" than "k" would have been. Lastly, allusion was made to the originally divergent meanings of "algebra," as a branch of mathematics and the art of bone-setting, which are still both in use in Spain.

PARIS.

Academy of Sciences, February 27.—M. van Tieghem in the chair.—The Perpetual Secretary announced the death of M. Sophus Lie, Correspondant of the Section of Geometry.—Notice on M. Sophus Lie, by M. Darboux.—An electrolytic interruptor, by M. d'Arsonval. A description of Wehnelt's electrolytic interruptor.—On a new uranium mineral, carnotite,

by MM. C. Friedel and E. Cumenge. The mineral occurs mixed with silica in a finely divided state at Montrose, Colorado. It dissolves readily in nitric acid, and contains uranium, vanadic acid, and potassium, together with traces of iron, alumina, copper, lead and barium. The composition was found to be $2U_2O_3.V_2O_3.K_2O.3H_2O$.—On some new and important applications of photography made in Canada in the production of plans, by M. A. Laussedat.—An attempt at a new form of the characteristic equation of fluids, by M. E. H. Amagat. A somewhat complex formula containing ten constants is given as a closer approximation to the behaviour of carbon dioxide than the usual $pv=RT$ equation.—Prof. Ray Lankester was elected a Correspondant for the Section of Anatomy and Zoology, in the place of the late M. Lovén.—M. Lortet was also elected a Correspondant for the same section, in the place of the late M. Steenstrup.—On linear partial differential equations, by M. E. Vessiot.—Transformation of the X-rays by different bodies, by M. G. Sagnac.—Influence of very low temperatures on phosphorescence, by MM. Auguste and Louis Lumière.—The amplification of sounds in phonographs, by M. Dussaud. The intensity of the sound emitted by the phonograph increases with the diameter of the registering cylinder.—On the relation which exists between the molecular weights and densities of fluids, by M. Daniel Berthelot.—On the phosphorescence of strontium sulphide, by M. J. R. Mourelo.—On ethene-pyrocatechol, by M. Ch. Moureu.—Method of analysis of acetone oils, and their composition, by MM. A. and P. Buisine. The acetone oils obtained from wool contain about 75 per cent. of ethyl-methylketone, and less than 5 per cent. of acetone.—On the combinations of phenyl hydrazine with alcoholic iodides, by MM. P. Genvresse and P. Bourcet.—On the direct transformation of ammonia into nitric acid in liquid media, by M. E. Demoussy.—On the fermentation of galactose, by M. Dienert.—On the source of the fossilised shells of ostracods which fell at Oullins, near Lyons, on September 24, 1898, by M. R. Fourtau. The author concludes that the shells could not have come from Egypt.

DIARY OF SOCIETIES.

THURSDAY, MARCH 9.

ROYAL SOCIETY, at 4.30.—A Preliminary Note upon certain Organisms isolated from Cancer, and their Pathogenic Effects upon Animals: H. G. Plimmer.—On the Gastric Gland of Mollusca and Decapod Crustacea; its Structure and Functions: Dr. MacMunn.—On the Structure and Affinities of *Matonia pectinata*, R.Br., with Notes on the Geological History of the Matonineæ: A. C. Seward, F.R.S.—A Sugar Bacterium: Prof. H. Marshall Ward, F.R.S., and Prof. J. R. Green, F.R.S.—Note on a New Form of Light Plane Mirrors: A. Mallock.

SOCIETY OF ARTS (Indian Section), at 4.30.—Leprosy in India: H. A. Acworth.

MATHEMATICAL SOCIETY, at 8.—Note on a Property of Groups of Prime Degree: Prof. Burnside, F.R.S.—Note on the Expansion of $\tan(\sin\theta) - \sin(\tan\theta)$ in Powers of θ: R. H. Pinkerton.—Remarks on the Phenomenon of Zeeman and its Bearing on the Problem of the Origin of Spectra: Dr. J. Larmor, F.R.S.—Note on Involution: G. B. Mathews, F.R.S.—The General Conic and its Normic Equations: Prof. A. Sawin.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Subject announced at Meeting of March 2.

FRIDAY, MARCH 10.

ROYAL INSTITUTION, at 9.—Measuring Extreme Temperatures: Prof. H. L. Callendar, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 8.—(1) Occultations observed during the Lunar Eclipse of 1898 December 27; (2) Nebulæ observed during the Year 1898: Cape Observatory.—On the Use of the Electric Light for the Artificial Star of a Zöllner Photometer: W. de Sitter.—The Radiant Point of the April Meteors (Lyrids): W. F. Denning.—Observations of Hind's Variable Nebula in Taurus: E. E. Barnard.—Determination of the Diameter and Compression of the Planet Mars: Prof. W. Schur.—Periodic Variation in the Colours of the Equatorial Belts of Jupiter: A. Stanley Williams.—Double-Star Observations, 1895–98: W. H. Maw.—*Papers promised*: (1) Note on the Diurnal Variations of the Nadir and Level of the Greenwich Transit Circle; (2) The Greenwich Meridian Observations of Polaris, 1836–93, with Reference to Personality, the Constant of Aberration, and the Star's Parallax: Royal Observatory, Greenwich.

PHYSICAL SOCIETY, at 5.—(1) A Study of an Apparatus for the Determination of the Rate of Diffusion of Solids dissolved in Liquids; (2) Note on the Source of Energy in Diffusive Convection: Albert Griffiths.—An Exhibition of Dr. A. Wehnelt's Electrolytic Current Interruptor for Ruhmkorff Coils: A. A. Campbell Swinton.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Construction of the Elan Aqueduct, Birmingham Waterworks: H. Lapworth.

MALACOLOGICAL SOCIETY, at 8.—On an Apparently Undescribed *Ariophanata* from Mysore, with a Note on *Mariaella dussumieri*: W. T. Blanford.—Description of a New Species of *Hemiplecta* from Perak: Edgar A. Smith.—On a New Species of *Dinoplax* and *Chiton* from South Africa: E. R. Sykes.—Description of Five New Species of New Zealand Land Mollusca: H. Suter.

SATURDAY, MARCH 11.

ROYAL INSTITUTION, at 3.—Mechanical Properties of Bodies: Lord Rayleigh, F.R.S.

MONDAY, MARCH 13.

SOCIETY OF ARTS, at 8.—Cycle Construction and Design: Archibald Sharp.

ROYAL GEOGRAPHICAL SOCIETY (at the University of London, Burlington Gardens, W.), at 8.30.—The Uses of Practical Geography, as Illustrated in Recent Frontier Operations: Colonel Sir T. H. Holdich, K.C.I.E., C.B., R.E.

TUESDAY, MARCH 14.

ROYAL INSTITUTION, at 3.—Morphology of the Mollusca: Prof. E. Ray Lankester, F.R.S.

ANTHROPOLOGICAL INSTITUTE, at 8.—Secret Tribal Societies of West Africa: H. P. FitzGerald Marriott.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Papers to be discussed: Water-Tube Boilers for Marine Engines: J. T. Milton.—Recent Trials of the Machinery of War-Ships: Sir. A. J. Durston, K.C.B., R.N., and H. J. Oram, R.N.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Theoretical Considerations in choosing Colours for Three-Colour Printing: Captain W. de W. Abney, C.B., F.R.S.

WEDNESDAY, MARCH 15.

SOCIETY OF ARTS, at 8.—Liquid Fuel: Sir Marcus Samuel.

ROYAL MICROSCOPICAL SOCIETY, at 8.—The Projection Microscope: Lewis Wright.

THURSDAY, MARCH 16.

ROYAL SOCIETY, at 4.30.—The Croonian Lecture: On the Relation of Motion in Animals and Plants to the Electrical Phenomena which are associated with it: Prof. J. Burdon Sanderson, F.R.S.

LINNEAN SOCIETY, at 8.—So-called Quintocubitalism in the Wing of Birds: P. Chalmers-Mitchell.—Some Facts concerning the so-called Aquintocubitalism of the Bird's Wing: W. P. Pycraft.—A Further Contribution to the Freshwater Algæ of the West Indies: W. West and G. S. West.

CHEMICAL SOCIETY, at 8.—Influence of Substitution on Specific Rotation in the Bornylamine Series: Dr. M. O. Forster.—Rotatory Power of Optically Active Methoxy- and Ethoxy-propionic Acids prepared from Active Lactic Acid: Prof. Thomas Purdie, F.R.S., and James C. Irvine.

FRIDAY, MARCH 17.

ROYAL INSTITUTION, at 9.—The Electric Fish of the Nile: Prof. F. Gotch, F.R.S.

EPIDEMIOLOGICAL SOCIETY, at 8.30.—Backwater or Hæmoglobinuric Fever: Dr. W. H. Crosse.

SATURDAY, MARCH 18.

ROYAL INSTITUTION, at 3.—Mechanical Properties of Bodies: Lord Rayleigh, F.R.S.

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