

inculcation of good reading habits and the systematic dissemination of superior literature, not merely to make this literature better known, but to create an atmosphere in which—except in the case of thoroughly inferior minds—inferior literature will not be able to exist.

IN 1901 a central committee was formed in Berlin for the purpose of organising gratuitous post-graduate courses in medical science throughout Prussia. This committee, of which Prof. von Bergmann is the chairman, has now instituted such courses in twenty-three towns, and has acquired a collection of medical books and instruments to be lent to the local committees in small places where such means of instruction are not sufficiently available. A building, to be called the Empress Frederick House for Post-graduate Training, will be erected in Berlin to serve as the headquarters of the organisation in Prussia. The Emperor has expressed complete approval of the plans of the committee.

THE eleventh annual report for the year 1902 of the Technical Instruction Committee of the City of Liverpool shows an increase of 1040 in the number of registered students of the evening science, art and technological classes. The total number of entries to the classes held at the Central Technical School was 3625. This increase is to be attributed in some measure to an exhibition of students' practical work held just before the commencement of the session, and it is in contemplation to continue the exhibition and extend it to other centres. The establishment of a day technical school in the central school building, and of improved local buildings in the south end and on the east side of the city are still under consideration. The report also shows that the City Council has devoted to educational purposes the whole of the amount received under the Local Taxation (Customs and Excise) Act, 1890, with the exception of a sum of 7000*l.* paid to the credit of the City fund in 1892. The total amount thus allocated to educational purposes during the twelve years, 1890-1902, is 225,450*l.* 19*s.* 4*d.*

THE platitudes often expressed by speakers on educational subjects, and the verbose character of the larger part of educational literature, are responsible for the suspicion and want of respect with which many practical teachers regard any attempts to construct an educational science. What is wanted at the present time is a centre where the aims and practice of education can be studied without the limitations of traditional doctrines, and with modern requirements well in mind. The University of Birmingham seems to offer an opportunity for work of this kind in connection with the new chair of education, for which applications are invited. In the particulars issued to candidates for the post we read:—"The University believes that the improvement of education in England is a vital matter, and that the present post offers attractive opportunities to a man of influence and ability who is willing to cope with the difficulties of the task. Such a man would meet with cordial cooperation and assistance, and might be able to accomplish a worthy piece of work." The professor will be required to take control of the training of secondary teachers and to organise the inspection and examination of secondary schools. It should thus be possible for the successful candidate to establish a system of training of teachers in the science and art of education which would have a decided influence upon the work of secondary schools.

A CONFERENCE of representatives of county and county borough councils was held on Tuesday, under the auspices of the National Association for the Promotion of Technical and Secondary Education, to consider the question of higher education. Lord Avebury presided, and the following resolutions were adopted:—(1) That this conference of representatives of local authorities and educational bodies recognise the great importance of suitable, adequate and systematic provision being everywhere made for the supply of facilities for higher education by means of continuation schools, secondary schools, technical institutes, and classes, and by access to the universities, such facilities to include a sufficient number of scholarships and exhibitions, and, where suitable funds exist, to provide for a post-graduate course and the endowment of original research; (2) that every effort should be made to secure proper cooperation between local authorities and educational bodies in promoting higher, including university, education; (3) that it

is urgently necessary for the improvement of education that more suitable means should be provided for the training of all grades and classes of teachers. Mr. J. Bryce, M.P., was one of the speakers, and in the course of his remarks train for the universities; and in towns of 100,000 people what they might call a grammar school, providing the elements of technical instruction; in towns of 40,000 or 50,000 population there ought to be a school competent to train for the universities; and in towns of 100,000 people there should be a completely equipped technical institute to fit boys for a science profession and for the pursuit of science. He added that in towns of 300,000 there should be a university college.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xxv. No. 1, January.—D. N. Lehmer, parametric representation of the tetrahedroid surface by elliptic functions. Various properties of the singular points, lines and planes.—E. B. Skinner, on ternary monomial substitution-groups of finite order with determinant ± 1 . All the groups can be got from three generators or less, one of order two, and conversely.—V. Snyder, forms of sextic scrolls (two papers). There are sixty-eight types of such scrolls which are unicursal, and thirty-two of genus 1.—E. D. Roe, note on symmetric functions.—A portrait of Cremona accompanies this part.

Annals of Mathematics (2), vol. iv. No. 2, January.—J. W. Bradshaw, the logarithm as a direct function (with introduction by W. F. Osgood).—P. Saurel, positive quadratic forms.—E. A. Hook, multiple points on Lissajous's curves in two and three dimensions.—C. C. Engberg, a special quadri-quadric transformation of real points in a plane ($x = x'$, $y = \pm \sqrt{x'^2 + y'^2}$).

Bulletin of the American Mathematical Society (2), vol. ix. No. 5, February.—W. F. Osgood, transformation of the boundary in conformal mapping.—V. Snyder, quintic scroll with three double conics.—L. P. Eisenhart, surfaces referred to their lines of length zero.—E. R. Hedrick, note on calculus of variations.—E. B. Wilson, synthetic treatment of conics at the present time. The author (very properly) emphasises the value of v. Staudt's methods.—Reviews: Brown's "Lunar Theory" (F. R. Moulton), Geissler's "Die Grundsätze u. das Wesen des Unendlichen" (E. R. Hedrick), recent German text-books in geometry (P. F. Smith).

Bulletin of the American Mathematical Society (2), vol. ix. No. 6 (March).—L. E. Dickson, the abstract group isomorphic with the alternating group on six letters.—H. F. Blichfeldt, property of conics.—R. W. H. T. Hudson, analytic theory of displacements.

Transactions of the American Mathematical Society, vol. iv. No. 1 (January).—F. Morley, orthocentric properties of the plane n -line.—L. E. Dickson (two papers), definitions of a field by independent postulates; definitions of a linear associative algebra.—E. V. Huntington (two papers), definitions of a commutative group and of a field.—C. N. Haskins, invariants of differential forms of degree higher than two.—A. Loewy, reducibility of groups of linear homogeneous substitutions.—A. B. Coble, the quartic curve as related to conics.—E. Kasner, cogredient and digredient theories of multiple binary forms.—R. E. Allardice, envelope of axes of conics through three fixed points.—W. F. Osgood, a Jordan curve of positive area.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 19.—"The Evaporation of Water in a Current of Air." By Dr. E. P. **Perman**. Communicated by Prof. E. H. Griffiths, F.R.S.

The object of this investigation was to discover with what accuracy the vapour-pressure of water could be calculated from the amount of water vapour carried off by an air current passed through the water, the temperature being maintained constant. The method adopted was to aspirate air, at a rate of not more than 0.1*l.* per minute, through

a succession of wash-bottles containing water and placed in a thermostat. The water carried off by the air was absorbed by means of concentrated sulphuric acid and weighed. The results obtained show in every case a close agreement between the calculated vapour-pressure and that commonly accepted. Experiments were made at temperatures varying from 20° to 90° C. It may be concluded from this that in air saturated with moisture (under the conditions used in the experiments) the pressure of the aqueous vapour is the same as the vapour-pressure of water when no other gas is present, also that the density of the aqueous vapour in the mixture is normal. It follows also that the density of saturated aqueous vapour, *without admixture of any other gas*, is approximately normal. This conclusion is confirmed by calculations of the density from the thermodynamical equation $L = T/J(s' - s)dp/dT$, using Griffiths's values of L and J and the latest determinations of vapour-pressure at the Reichsanstalt for the values of dp/dT .

Mathematical Society, March 12.—Dr. E. W. Hobson, vice-president, in the chair.—Mr. G. H. Hardy, On the convergence of certain multiple series. The paper contains an investigation of the analogue for multiple series of a theorem (due to Abel) concerning the partial summation of simple series. Most of the ordinary tests of convergence for simple series are founded on this theorem. Proofs of convergence of certain classes of multiple series are obtained, in particular of the class in which the general term is of the type

$$(b_1 r_1 + b_2 r_2 + \dots + b_n r_n)^{-x} \exp i(a_1 r_1 + a_2 r_2 + \dots + a_n r_n).$$

—Mr. S. M. Jacob, On certain sequences for determining the n th root of a rational number. The paper contains a systematic development of a method used by Dedekind (in the case of the square root) to obtain sequences of the kind in question. If D is any rational number, and x is a rational approximation by excess or defect to the n th root of D, it is shown how to construct a rational number y which lies between x and the n th root of D.—Prof. H. Lamb, Note on the approximate calculation of the frequencies of a vibrating circular plate. The method of Rayleigh ("Theory of Sound," § 88) is applied to calculate the frequencies of the gravest modes of vibration of a plate by means of the assumption of very simple hypothetical types. The agreement of the results with those calculated by Kirchhoff from the exact equation for the frequencies is remarkably close.—Prof. A. R. Forsyth, On surfaces which have assigned families of curves as their lines of curvature. The paper contains a new method of investigating the conditions that a given family of curves may be the lines of curvature of a surface, and of determining the character of the surface from that of the lines. The method is illustrated by the example of Dupin's cyclide.—Mr. E. T. Dixon, Note on a point in Hilbert's "Grundlagen der Geometrie."—Mr. J. H. Grace, Extension of two theorems on covariants.—Prof. T. J. I'A. Bromwich, Note on double limits and on the inversion of a repeated infinite integral. The object of the note is to determine the conditions which are necessary and sufficient for the change of order of integration in an integral with infinite limits, and for the existence of a double integral with such limits. The continuity of a definite integral with infinite limits, considered as a function of a parameter contained in the subject of integration, is discussed.—Prof. W. Burnside, On the representation of a group of finite order as an irreducible group of linear substitutions, and the direct establishment of the relations between the group characteristics. The paper deals with the representation in question from a self-contained point of view, without introducing considerations which are foreign to the conceptions of an abstract group of finite order and of a group of linear substitutions. The arrangement of the subject from this point of view is materially different from that in previous discussions of it. The complete reducibility of a group of linear substitutions of finite order is taken first, the number of distinct irreducible representations and the composition of them follow, and the group-characteristics and their properties occupy the last place.

Geological Society, February 20.—Prof. Charles Lapworth, F.R.S., president, in the chair.—Annual General Meeting.—In his anniversary address the president dealt with the rela-

tion of geology to its fellow-sciences. In the course of the address the president remarked that the study of geology shows that the corporate geological organism has three necessary functions—research, practice and education. So long as all three functions are naturally and healthfully performed, so long will geology live and flourish. The work and influence of Werner and De la Beche show that the progress of the science is at its swiftest and surest when none of the three functions suffer from disuse.

February 25.—Prof. Charles Lapworth, F.R.S., president, in the chair.—On the occurrence of Dictyozamites in England, with remarks on European and eastern floras, by Mr. A. C. Seward, F.R.S. The specimens described as a new species of Dictyozamites were obtained from a bed of ironstone on the northern face of the Upleatham outlier, near Marske-by-the-Sea. The genus is also found in the Rajmahal Series of India, in Central Japan and at Bornholm. Its probable taxonomic position is best expressed by placing it as a member of the Cycadophyta. A comparison of the Bornholm, Indian, Japanese and English floras is made, and a special list of these floras has been prepared, in which, while the names at present in use are indicated, it is pointed out where obscured identities or resemblances exist. The author concludes that there was a greater similarity between the vegetation of eastern and western regions, during part at least of the Mesozoic era than is usually admitted. The most noteworthy exceptions are afforded by the Mesozoic representatives of the two isolated recent ferns *Matonia* and *Dipteris*; these two families—each with a surviving genus—played a conspicuous part in the vegetation of the Rhætic and succeeding Jurassic epochs in Europe, and to a less extent in North America, but there are no satisfactory records of their existence in India or Japan.—The amounts of nitrogen and organic carbon in some clays and marls, by Dr. N. H. J. Miller. Analyses of soils are given to show that decaying vegetable matter in soil tends to become more nitrogenous, on account of the greater ease with which gaseous compounds are formed with carbon than with nitrogen. Hilgard's experiments throw light on the effects of extreme conditions of climate, the amount of soluble humus being much greater in soils in humid than in arid climates. The large areas of peat-land known as "Hochmoor" contain larger proportions of carbon and nitrogen at depths of seven and fourteen feet than at the surface. The organic matter of soils is of two kinds—the humous portion and the bituminous, the latter being regarded as belonging to the original deposit from which the soil is derived. Analyses of soils and subsoils are given to illustrate this point. Further light on this subject is derived from the analysis of specimens obtained through the kindness of Sir A. Geikie from borings in the possession of the Geological Survey. Apart from the interest due to the great depths from which the samples were obtained, and the evidence which they afford of the enormous accumulations of combined nitrogen, they possess the further and greater value of representing the materials out of which large areas of soils have been derived. It would be important to determine, in the case of these older deposits, whether any of the organic matter at all is in the form of humus.

Zoological Society, March 3.—Mr. G. A. Bou'enger, F.R.S., vice-president, in the chair.—A communication was read from Mr. E. R. Sykes on the operculate Land-Mollusca collected during the "Skeat Expedition" to the Malay Peninsula in 1899-1900. Fourteen genera were represented in the collection by examples of twenty-three species, eight of which were described as new.—Mr. R. Lydekker communicated a paper on the callosities of the limbs of the Equidæ, in which it was urged that the view of the callosities being vestigial foot-pads was untenable. The author maintained that they were probably decadent glands, and that possibly the one on the hind limb might correspond to the tarsal gland of deer.—Mr. Rudolf Martin read a paper on some remains of the ostrich, *Struthio kartheodoris*, found in the Upper Miocene deposits of Samos. The author stated that the existence of an ostrich in Samos was of interest, because a comparison of the fauna of Samos and that of the Siwalik Hills showed that the latter was younger, and consequently *S. kartheodoris* was of a greater geological age than *S. asiaticus*. The hypothesis, therefore,

that the family of ostriches had been developed in Southern Eurasia and emigrated at a later period to Africa and Southern Europe could not be sustained. The discovery of *S. karatheodoris* in Samos showed rather that the specialisation took place in Africa, and that the existence of such forms in India and Southern Europe was due to a secondary immigration from Africa. Most probably, however, there was the same relationship between the whole fauna of Samos and that of the Siwalik Hills—i.e. the latter was a transformed and later generation of the former.—Mr. F. E. **Beddard**, F.R.S., read a paper upon some species of Oligochæta from Africa.

Linnean Society, March 5.—Prof. S. H. Vines, F.R.S., president, in the chair.—Rev. T. R. R. Stebbing, F.R.S., exhibited a collection of spiders and wasps from Singapore, made by Mr. C. J. **Saunders**. (1) Spiders found in eleven clay cells built between the boards of a thin book standing upright on a book-shelf; the space $\frac{1}{4}$ inch broad by $\frac{1}{2}$ inch high, and $4\frac{1}{2}$ to 5 inches long. Mr. Saunders reckoned that each cell contained ten or eleven spiders and a single grub. He found a small fly in one cell, and others later in a different set of cells. He remarks that the Chinese must have noticed the spider-trapping habit, since they say of certain bees that they "adopt" spiders and bring them up as young bees. (2) Contents of another set of cells, built in a corner of the verandah, in two vertical rows, about thirteen cells in all. The spiders were all of one kind, fifty-six in number, with three half-eaten and two skins. (3) Contents of a set of cells, the topmost of which was closed while Mr. Saunders was examining other sets. The day before had been wet, but even the topmost cell, which was not yet dry, contained a grub. The exhibitor also remarked that in the family Crabronidæ or Sphegidæ, *Ammophila hirsuta*, a British species of sand-wasp, is said to provision its nest with spiders. The same habit has long been known in *Pelopoëus spirifex* (Linn.), belonging to the same family. Also in the family Pompilidæ, species of *Pompilus* are known to attack large spiders and make them a provision for their young ones. Latreille, in 1802, quotes a letter from Cossigny to Réaumur, describing the behaviour of *Pelopoëus spirifex* to spiders in the Isle de France. Latreille named the genus *Pelopoëus*, the mud-worker, or potter.—On some points in the visceral anatomy of the Characinidæ, with an inquiry into the relations of the Ductus pneumaticus in the Physostomi generally, by Mr. W. S. **Rowntree**. The author summarised Sagemehl's observations on the skull of the Characinidæ, and then described his own investigations into the visceral anatomy of these fishes, derived from the examination of fifty-three species belonging to thirty-three genera, the chief interest of the paper centring in the author's observations on the position of the Ductus pneumaticus in relation to the alimentary canal, which observations had extended to other families of the Physostomi.—On the anatomy of the pig-footed bandicoot, *Chaeropus castonotis*, by Mr. F. G. **Parsons**.—Further notes on the lemurs, with especial reference to the brain, by Dr. G. Elliot **Smith**. This paper records observations supplementary to those recently published in the *Transactions* of the Linnean Society, and deals with two internal casts of imperfect crania of *Nesopithecus* recently acquired by the British Museum, two brains of young specimens of *Pro-pithecus diadema*, and an adult brain of *Lemur macao*. The brain of *Nesopithecus* (*Globilemur*) is shown to present a curious mixture of pithecoïd and prosimian features, and the author regards this genus as a specialised one, forming a connecting link between the lemurs and apes.

Entomological Society, March 4.—Prof. E. B. Poulton, F.R.S., president, in the chair.—Colonel C. T. **Bingham** sent for exhibition specimens of Diptera and two Aculeates from Sikhim, showing in the banding of the wings and other characteristics a singularly beautiful case of mimicry. The Rev. F. D. Morice drew attention to the way in which the fly imitated with its tibia the tarsus of the bee.—Mr. A. J. **Chitty** exhibited specimens of the rare *Atomaria rhenana*, taken by him out of some food rubbish found near Lancing, probably the same locality where the beetle was discovered formerly by Dr. Sharp. He also exhibited a *Ptinus*, found in a granary in Holborn in 1893, apparently new to Britain and probably introduced.—Mr. W. J. **Kaye** exhibited species

of Lepidoptera from British Guiana, forming a Müllerian association in which all but one were day-flying moths, the exception being an Erycinid butterfly, *Esthemopsis secina*. The particular interest of the exhibit consisted in the association being one of moths, a butterfly being the exception, and not one of butterflies with perhaps a single moth, which latter is so frequently the case in South America. The butterfly most closely resembled *Agyrta micilia*, one of the most abundant of the Syntomid group.—Mr. C. O. **Waterhouse** read notes on the nests of bees of the genus *Trigona*; Mr. G. A. Rothney communicated a paper on the Aculeate Hymenoptera of Barrackpore, Bengal, and descriptions of eighteen new species of Larridæ and Apidæ, from Barrackpore, by Peter **Cameron**; Colonel Charles **Swinhoe** communicated a paper on the Aganiidæ in the British Museum, with descriptions of some new species.

MANCHESTER.

Literary and Philosophical Society, February 17.—Mr. Charles Bailey, president, in the chair.—Mr. T. **Thorp** showed a copy of a Japanese magic mirror he had cast. He had had it ground and polished with a partial vacuum behind it, with the result that the reflection showed the design on the back of the mirror very distinctly. Mr. Thorp believed this to be the first mirror to be made in that way, and he afterwards presented the mirror to the Society. Mr. Thorp also exhibited a small apparatus for attaching to a gun to facilitate sighting.—Mr. W. E. **Hoyle** showed on the lantern screen a number of microscopic sections illustrating the structure of the luminous organs of a cuttlefish which he had described to the Society during the previous session. Mr. Hoyle also read a paper entitled "Notes on the Type Specimen of *Loligo eblanae*, Ball," in which was demonstrated the identity of a squid from Dublin Bay, described by the late Dr. Robert Ball, with one recorded by M. Girard from the coast of Portugal and also found in the Mediterranean.

PARIS.

Academy of Sciences, March 9.—M. Albert Gaudry in the chair.—The general theory of translucency, by M. J. **Boussinesq**. A generalisation of the theory of gradual extinction of plane waves with pendular motions, given in a preceding note.—The preparation and properties of the hydrides of rubidium and cæsium, by M. Henri **Moissan**. The hydrides of these metals were obtained by heating the metal in hydrogen at about 300° C., the general method adopted being that described in a previous note on the preparation of the hydrides of potassium and sodium. In both cases crystalline compounds possessing the composition RbH and CsH were obtained. These are energetic reducing agents decomposing water, hydrogen sulphide and hydrochloric acid at the ordinary temperature. With sulphur dioxide at low temperatures, and under reduced pressure, hydrosulphites are obtained; carbon dioxide is added on directly with the formation of formates, and amides are produced by the reaction with ammonia.—On the non-conductivity of the metallic hydrides, by M. Henri **Moissan**. An attempt to measure the electric conductivity of the hydrides of sodium, potassium, cæsium and rubidium showed that all these substances act as insulators. These experiments lead to the conclusion that hydrogen is not comparable to the metals, since the metallic hydrides have neither the properties nor the appearance of metallic alloys.—On the motion of vitreous media, affected by viscosity and very slightly deformed, by M. P. **Duhem**.—M. Th. Schløsing, jun., was elected a member of the section of rural economy in the place of the late M. Dehérain.—The comet 1902 *b*, by M. A. **Senonque**. The results of photographic observations at the Observatory of Meudon. The comparison of the photographs taken on October 6 and 7 shows large variations in the size of the tail of the comet.—On a transformation of a particular class of triple orthogonal systems, by M. C. **Guichard**.—On the deformation of surfaces, by M. W. de **Tannenberg**.—On the hypothermitian, by M. Léon **Autonne**.—The rigidity of liquids, by M. G. de **Metz**. From the equation given by Maxwell connecting the viscosity coefficient, the modulus of rigidity, and the time of relaxation of the elastic force, and from some measurements of the rate of relaxation of accidental double refraction in

copal varnish, the author has been able to determine the modulus of rigidity in this liquid, 0.12 absolute unit at 22° C. It is interesting to note that this figure is of the same order of magnitude as the value found by M. Schwedoff for the modulus of rigidity of a half per cent. solution of gelatine, by an entirely different method.—New magnetic systems for the study of very feeble fields, by MM. V. **Cremieu** and H. **Pender**. The disadvantages attending the use of astatic systems for the exploration of very weak magnetic fields are fully discussed, and a new arrangement is proposed consisting of a horizontal arm suspended at its centre by a long wire, and carrying at one end a vertical magnet and at the other a non-magnetic counterpoise. It is claimed for this arrangement that it is extremely sensitive, easily regulated, and capable of being rendered perfectly astatic.—On electric convection, by M. **Vasilescu-Karpen**. Experiments are described by the author which appear to prove beyond question the reality of the existence of the Rowland effect.—A method of stereoscopic radiology, by M. Th. **Guilloz**. It is shown that the use of two sources of the X-rays is unnecessary for stereoscopic radiology, and that the same effects can be practically realised by the displacement of a single tube.—On a thermostat with electrical heating and regulation, by MM. C. **Marie** and R. **Marquis**. The expansion of acetone or other suitable liquid actuates a relay, by which the heating current is governed. The bath can be kept at any desired temperature within two or three hundredths of a degree.—On cuprous sulphate, by M. A. **Joannis**. The author has succeeded in isolating and analysing the compound of cuprous sulphate and carbon monoxide the existence of which was indicated in a previous note. Its composition is $Cu_2SO_4 \cdot 2CO \cdot H_2O$; the carbon monoxide is given off in a vacuum, the residual cuprous sulphate decomposing into copper and cupric sulphate, although there are indications that the cuprous sulphate can exist undecomposed in the presence of ammonia.—On some derivatives of oxynaphthoic acid, by M. F. **Bodroux**.—On the nervous system of the Nautilus, by M. Ch. **Gravier**.—On a new mode of constitution of the chain in a new Salpa from the Persian Gulf, by MM. Jules **Bonnier** and Charles **Pérez**. A new subgenus is proposed, *Stephanosalpa*, and the new species collected at Kumzar is described under the name of *Stephanosalpa polyzona*.—On the influence of the subject on the graft, by M. Leclerc **du Sablon**. The results of a series of experiments on the grafting of different varieties of pears.—On the development of *Cicer arietinum* after section of the embryo, by M. P. **Ledoux**.—On the new genus *Protascus*, by M. P. A. **Dangeard**.—The formation of antherozoids in *Marchantia polymorpha*, by M. S. **Ikeno**.—On the existence of several successive orogenic movements in the Northern Urals, by MM. L. **Duparc**, L. **Mrazec** and F. **Pearce**.—On the oxydases of cuttle fishes, by M. C. **Gessard**. A study of the ink-producing gland of the cuttle fish shows that, as is the case in plants, the tyrosinase is always accompanied by a laccase.—On the presence of an erepsin in some Basidiomycetes, by MM. C. **Delezenne** and H. **Mouton**.—On the dust deposits of February 22, 1903, by M. F. A. **Forel**.

DIARY OF SOCIETIES.

THURSDAY, MARCH 19.

ROYAL SOCIETY, at 4.30.—On the Formation of Barrier Reefs and of the Different Types of Atolls: Prof. A. Agassiz, For. Mem. R.S.—On Central American Earthquakes particularly the Earthquake of 1838: Admiral Sir John Dalrymple Hay, Bart, F.R.S.—The Emanations of Radium: Sir William Crookes, F.R.S.

LINNEAN SOCIETY, at 8.—On *Poa laxa* and *Poa stricta*, of our British Floras: G. Claridge Druce.—The Botany of the Ceylon Patanas. Part II. Anatomy of the Leaves: John Parkin and H. H. W. Pearson.

FRIDAY, MARCH 20.

ROYAL INSTITUTION, at 9.—The Paths of Volition: Prof. E. A. Schäfer, F.R.S.

EPIDEMIOLOGICAL SOCIETY, at 8.30.—The Prevention of Diphtheria Outbreaks in Hospitals for Children: Dr. Louis Parkes.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—A Premium System applied to Engineering Workshops: James Rowan.

SATURDAY, MARCH 21.

ROYAL INSTITUTION, at 3.—Light: Its Origin and Nature: Lord Rayleigh.

MONDAY, MARCH 23.

SOCIETY OF ARTS, at 8.—Hertzian Wave Telegraphy in Theory and Practice: Prof. J. A. Fleming, F.R.S.

TUESDAY, MARCH 24.

ROYAL INSTITUTION, at 5.—Great Problems in Astronomy: Sir Robert Ball, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Protection Works of the Kaiser-i-Hind Bridge over the River Sutlej, near Ferozepur: A. Morse.

MINERALOGICAL SOCIETY, at 8.—On the Diathermancy of Antimonite: Dr. A. Hutchinson.—A Peculiar Form of Magnetite in Bunter Sandstone: J. B. Scrivener.—(1) A Large Crystal of a Sulpharsenite of Lead from the Binnenthal; (2) A Twin of Copper Pyrites: Prof. Lewis.—A New Sulpharsenite of Lead from the Binnenthal: R. H. Solly.

WEDNESDAY, MARCH 25.

SOCIETY OF ARTS, at 8.—Oil Light by Incandescence: Arthur Kitson.

GEOLOGICAL SOCIETY, at 8.—(1) On a New Species of *Solenopsis* from the Pendle-side Series of Hodder Place, Stonyhurst; (2) Note on Some Dictyonema-like Organisms from the Pendle-side Series of Pendle Hill and Poolvash: Dr. Wheelton Hind.—The Geology of the Tintagel and Davidstow District (Northern Cornwall): John Parkinson.

THURSDAY, MARCH 26.

ROYAL SOCIETY, at 4.30.—*Probable Papers*.—Some Physical Properties of Nickel Carbonyl.—Prof. J. Dewar, F.R.S., and H. O. Jones.—The Electrical Conductivity imparted to a Vacuum by Hot Conductors: Q. W. Richardson.—An Attempt to Estimate the Relative Amounts of Krypton and of Xenon in Atmospheric Air: Sir William Ramsay, K.C.B., F.R.S.—On a New Series of Lines in the Spectrum of Magnesium: A. Fowler.—An Inquiry into the Variation of Angles Observed in Crystals, especially of Potassium-Alum and Ammonium-Alum: Prof. H. A. Miers, F.R.S.—On the Dependence of the Refractive Index of Gases on Temperature: G. W. Walker.—On the Evolution of the Proboscidea: Dr. C. W. Andrews.

FRIDAY, MARCH 27.

ROYAL INSTITUTION, at 9.—The Pearl Fisheries of Ceylon: Prof. W. A. Herdman, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Advantages of Motor Driven Printing Machines: J. G. Y. D. Morgan.

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