Kant's fame as a metaphysician has completely overshadowed his reputation as a physicist; but all his earlier papers were on physical subjects, such as the theory of winds, the earth's rotation period, the rings of Saturn, and, best-known, the nebular hypothesis of the universe. His great object in life was to discourage visionary speculation and to reduce all subjects to the confines of reason. Where Newton had in some cases to postulate the direct intervention of the Creator, Kant based his explanation upon known physical laws. If he had known the laws of thermodynamics, his nebular hypothesis, which only fell short in that respect, would have completely anticipated Laplace.—The islands and coral reefs of the Fiji group, by A. Agassiz. This is an extract from a letter dated Suva, Fiji Islands, December 15, 1897, describing a cruise in the Australasian twin-screw steamer *Yaralla*. The writer says: The great variety of causes which have been active in shaping the present physiognomy of the reefs and atolls of Fiji shows the impossibility of assigning any one factor, like subsidence for instance, as is done by Dana and Darwin, as the single cause for the formation of the many different kinds of atolls and barrier reefs to be found in the Fiji group. The formation of the great barrier reef of the southern shores of Viti Levu is due to causes very similar to those which have given to the northern coast of Cuba between Nuevitas and Matanzas its present physiognomy.

Symons's Monthly Meteorological Magazine, February.—Meteorological observations at Camden Square, London, N.W. There are few records day and night for forty years without a break, and no station with suitable exposure in London which has been at work so long. We are glad to see that Mr. Symons intends to give a series of tables showing the results of his observations for each month, and the present number, being the first of a new volume, contains those for January 1858-97.—Warmth, dryness, and high barometer in January 1898. A number of notes are quoted upon the above subjects; the table above referred to shows that, for London, the features of 1898 are: barometer almost unprecedently high; mean dry bulb temperature, 0·05° above 1884, and therefore the highest on record; minimum in air and on grass, 0·6° and 0·5°, respectively, above the highest previous records, which were in 1875 and 1884; rain, only about a third of the average, but more than twice that of 1880.—In the Conway Valley geraniums were found in blossom out of doors.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 3.—"Comparison of Oxygen with the extra Lines in the Spectra of the Helium Stars, β Crucis, &c.; also Summary of the Spectra of Southern Stars to the $3\frac{1}{2}$ Magnitude and their Distribution." By Frank McClean, F.R.S.

In a previous paper read before the Society on April 8, 1897, it was suggested that the special lines present in spectra of the first division of helium stars (Type I., Division I*a*) might possibly be due to oxygen.

The indications in the spectra of the northern stars that these extra lines are due to oxygen are slight, as the lines at best are indistinct. Among the southern stars, however, there are several in the spectra of which these lines are better defined, and there is one, viz. β Crucis, in which they are very fairly defined.

Upon the plate which accompanies the paper a series of photographs of stellar spectra are reproduced. The lines are drawn out by themselves below the spectrum of β Crucis. They are then compared directly by juxtaposition with a drawing of the spectrum of oxygen. The close similarity of the whole grouping of the two spectra as they appear on the plate admits of little doubt that the extra lines actually constitute the spectrum of oxygen.

The spectrum of γ Argus is given on the plate in order to identify it as a helium star. It contains two crucial lines of helium. The Wolf-Rayet stars, of which it is the principal example, are thus classified as helium stars.

A summary of the spectra of 116 stars to the $3\frac{1}{2}$ magnitude in the Southern Hemisphere is given. They were photographed between May and October last with an object-glass prism, mounted in front of the Cape astrographic telescope. The photographic spectra are classified on the same system as in the previous paper. The table of distribution for the whole sphere by areas and classes is given.

There are in all 89 helium stars (Division I.), distributed 71 in the galactic zones and 18 in the galactic polar areas, the areas being equal.

The 81 stars in Division II., the Sirian stars, and Division III., the Procyon stars (which along with Division I. constitute Secchi's Type I.) are rather irregularly distributed throughout the sphere. To the extent of the observations there is no condensation of stars of Divisions II. and III. in the galactic zones as there is in the case of stars of Division I.

The 106 stars in Divisions IV. and V. (II. and III. of Secchi's types) are fairly evenly distributed throughout the sphere.

The general distribution of the types of spectra throughout the sphere to the extent of the observations bears out generally the conclusion that stars with spectra of the more advanced types, in order of development, are evenly distributed in space. Also that stars with spectra more recent in order of development are mostly congregated in the galactic zones. The helium stars of Division I. are predominant in the Southern Hemisphere, being congregated in the lower or southerly halves of the galactic zones. They include 48 stars out of a total of 94 stars in those areas. They are also more closely congregated in the vicinity of the galaxy than is the case in the northerly halves of the galactic zones. In the contiguous constellations of Musca, Crux, Centaurus, Lupus, and Scorpio there are 27 helium stars out of a total of 36 stars included in the tables.

February 17.—"Upon the Structure and Development of the Enamel of Elasmobranch Fishes." By Charles S. Tomes, M.A., F.R.S.

The nature of the hard polished outer layer of the teeth of this group of fishes has been from time to time a subject of discussion, some authors holding that it is enamel, whilst others deny its claim to be so styled.

The general conclusion arrived at by the author is that, just as the whole teeth of the Elasmobranchs present the simplest known form of tooth development, so do they also present the first introduction of enamel as a separate tissue.

In its first introduction it was a joint product, made under circumstances which almost precluded any slow and gradual formation of an outer layer upon the teeth; but in the further specialisation of teeth in reptiles and mammals the tooth germs sink more deeply into the submucous tissue, and are protected for a much longer time.

The enamel organs become more specialised, and finally take upon themselves the entire work of enamel building, manufacturing both the organic matrix and furnishing it with lime salts, as unquestionably happens in mammals.

And if these conclusions be correct, it would be quite justifiable to call it enamel, even though the dentine papilla has had a share in its production.

Geological Society, February 2.—Dr. Henry Hicks, F.R.S., President, in the chair.—The President announced that Dr. Charles Barrois, Secretary of the Organising Committee of the VIIIth International Geological Congress, which will be held in Paris in 1900, would shortly come to London to invite the Geological Society to the Congress, and to consult the Fellows with regard to the proposed excursions and the subjects of discussion.—"Contributions to the Glacial Geology of Spitsbergen," by E. J. Garwood and Dr. J. W. Gregory. The extent of glaciation of Spitsbergen has been exaggerated, for there is no immense ice-plateau, but normal glaciers with some inland sheets and Piedmont glaciers. These differ from Alpine glaciers, as they are not always formed from snow-fields at the head, and though some of the glaciers (as the Baldhead Glacier) have tapering snouts in front, most have vertical cliffs. Chamberlin's explanation that the latter are due to the low angle of the sun is insufficient, and they seem to be caused by the advance of the ice by a rapid forward movement of its upper layers. The ice of these upper layers falls off and forms talus in front, over which the glacier advances, carrying detritus uphill with it, and producing a series of thrusts. The Booming Glacier illustrates cases of erratics carried in different directions by the same mass of ice. The deposits of the Spitsbergen glaciers are of four types: (1) moraines of Swiss type; (2) those formed mainly of intraglacial material; (3) those formed of re-deposited beach-material; (4) deposits of glacial rivers, and re-assorted drifts. The materials of the second are subangular and rounded; scratched and polished pebbles and

boulders are abundant, and the fine-grained matrix, which is frequently argillaceous, is often well-laminated and false-bedded. Some of these drifts are stratified, others unstratified, and contorted drifts occur. This type of moraine is remarkably like some British boulder clay. The third class is sometimes formed by land-ice, at other times beneath the sea; the latter shows stratification. The superglacial and intraglacial streams, so far as seen, were usually clear of drift. Under the fourth head an esker in a tributary of the Sassendal is described. The direct geological action of the marine ice is of four kinds: transport of material, contortion of shore-deposits, formation of small ridges of boulder-terraces above sea-level, and striation, rounding, and furrowing of rocks along the sea-shore. Traces of former glaciation are described in the case of the Hecla Hook beds, and of certain beds of late Mesozoic or early Cainozoic age in Bunting Bluff. Under the head of general conclusions the authors state that they have discovered no certain test to distinguish between the action of land-ice and marine ice; that there is no evidence to prove that land-ice can advance far across the sea; and that there is evidence, which they regard as conclusive, of the uplift of materials by land-ice. They note that the mechanical processes connected with the advance of the glaciers are of three kinds. All the material seen transported by the glaciers was superglacial or intraglacial, and not subglacial. Some striation of intraglacial material is caused by differential movement of different layers of ice. The advance and retreat of the Spitsbergen glaciers is very irregular, and apparently due to local changes. The observations of the authors support the views of those who ascribe a limited erosive power to glaciers. Lastly, the theory that glacial periods occurred as a consequence of epeirogenic uplifts receives no support from Spitsbergen.—An interesting discussion followed, in which Sir Martin Conway, Prof. Bonney, the Rev. Edwin Hill, and Mr. Marr took part. Mr. P. F. Kendall said that the paper would mark a distinct epoch in British glacial geology. Hitherto, one body of geologists had attributed the drift-deposits of Britain to the agency of land-ice, while another had invoked the agency of the sea. The latter had argued that glaciers cannot move uphill, that they cannot transport materials from lower to higher levels, that glaciers cannot gather up materials over which they are moving, and that, even if they could pick up shells they would grind them to powder—"On a Quartz-rock in the Carboniferous Limestone of Derbyshire," by H. H. Arnold-Bemrose. The paper describes the occurrence in the field and the microscopic structure of a rock consisting essentially of quartz, which is found in the mountain limestone in several localities. It occurs in irregularly-shaped bosses and veins, and shows no signs of stratification. The author considers that the quartz-rock is not a gritty limestone, altered by the growth of crystalline quartz around the detrital grains, but that it is a limestone replaced by quartz.

Mathematical Society, February 10.—Prof. Elliott, F.R.S., President, in the chair.—Lieut.-Colonel Allan Cunningham, R.E., read a paper entitled "On Aurifeuillians." These are defined as the *algebraic prime factors* of two functions, viz.: of $(X^{2n} + Y^{2n})$ when $2n$XY $= \square$, and of $(X^n + i^{n+1}. Y^n)$ when nXY $= \square$, where n is *odd*, and $i = \sqrt{-1}$. Their salient property (discovered by Mr. Aurifeuille, of Toulouse) is that they are *algebraically* resolvible into two factors (say L, M). Also L, M are expressible in the same 2^{ic} forms as their product-function. The quotient of one Aurifeuillian by another of the same order has the same properties. The properties of the two Aurifeuillians of orders 2 and 3, viz.:

$$(x^4 + 2^2y^4) \text{ and } (x^6 + 3^3y^6) \div (x^2 + {}^3y^2),$$

were stated at some length. The application to Fermat's numbers $(2^{4\nu+2} + 1)$ and $(3^{6\nu+3} + 1)$ was given, and a table of the factorisation thereof into *prime* factors was given, extending (with gaps) to $(2^{210} + 1)$, $3^{105} + 1)$. In opening the discussion on the paper, Mr. Bickmore pointed out that Aurifeuille's formulæ, which were enunciated without complete proof by Lucas, might be completely proved by the theory of complex integers. Thus the formulæ express the algebraical prime-factor of $a^n - (-1)^{\frac{n-1}{2}} b$, of n as the difference of two squares, when n is an uneven integer, and $\frac{ab}{n}$ is a perfect square. But the algebraical prime-factor is the norm of the binomial n^{ic} integer

$$a - (-1)^{\frac{n-1}{2}} b\rho^2,$$

which, when

$$a = x^2 \text{ and } b = ny^2,$$

is equal to

$$\left\{x - (-1)^{\frac{n-1}{4}} y\rho\sqrt{n}\right\} \times \left\{x + (-1)^{\frac{n-1}{4}} y\rho\sqrt{n}\right\}.$$

Gauss's results give

$$(-1)^{\frac{n-1}{4}}\sqrt{n} = f(\rho),$$

a rational integral function of ρ; hence, finally,

$$N_n\left\{x^2 - (-1)^{\frac{n-1}{2}} ny^2\rho^2\right\} = N_n\{x - y\rho f(\rho)\} \times N_n\{x + y\rho f(\rho)\}.$$

The formulæ also express as the difference of two squares the algebraical prime-factor of $a^{2n} + b^{2n}$, when n is an uneven integer, and $\frac{ab}{2n}$ is a perfect square; in this case the final result is

$$N_n(x^4 + 4n^2y^4\rho^4) = N_n\left\{x^2 - 2ny\rho f(\rho) + 2(-1)^{\frac{n-1}{2}} ny^2\rho^2\right\} \times N_n\left\{x^2 + 2ny\rho f(\rho) + 2(-1)^{\frac{n-1}{2}} ny^2\rho^2\right\}.$$

Kummer's tests show that if n be > 3, the absolute term in each of the complex integers is correctly fixed; hence, y being a factor of every term except the absolute term, if either Aurifeuillian factor be a prime, it has any prime factor of y as a residue of order n, when $n > 3$. The process also expresses complex n^{ic} integers with *more* terms than two, which are expressible in the form

$$x^2 - (-1)^{\frac{n-1}{2}} ny^2,$$

(x and y being themselves complex integers of order n) as the product of two complex n^{ic} integers.—The President (Lieut.-Colonel Cunningham, *pro tem.* in the chair) communicated a paper by Mr. J. E. Campbell on the transformations which leave the lengths of arcs on any surface unaltered. The object of the paper was to obtain the infinitesimal transformations which have the property of leaving unaltered the lengths of arcs on any given surface in space of $n + 1$ dimensions—that is, the transformations which leave $dx_1^2 + \ldots + dx_n^2 + dz^2$ invariant where $z = f(x_1 \ldots x_n)$. It is remarkable that this problem can be solved completely when $n > 2$, though not when $n = 2$. At the conclusion of the paper it is proved that if H is the Hessian of $f(x_1 \ldots x_n)$, then

$$H \div \left\{1 + \left(\frac{dy}{dx_1}\right)^2 + \ldots + \left(\frac{dy}{dx_n}\right)\right\}^{\frac{n+2}{2}}$$

is an invariant for such substitutions; this is a generalisation of the well-known theorem that the measure of curvature (on a surface in ordinary space) is unaltered by transformations which leave the lengths of arcs invariant.—Mr. Hargreaves made a short impromptu communication.

Zoological Society, February 15.—Dr. Albert Günther, F.R.S., Vice-President, in the chair.—A letter was read from Mr. Dudley Le Souëf, of Melbourne, containing a summary of some observations on the transfer by the mother of an embryo kangaroo (*Macropus giganteus*) by her mouth into her pouch.—A report was read, drawn up by Mr. A. Thomson, the Society's head-keeper, on the insects exhibited in the insect-house during the year 1897, and a series of the specimens was exhibited.—The Secretary exhibited a series of specimens of butterflies, which had formed part of a collection lately on view at the Dunthorne Gallery, in illustration of the mode of mounting employed in "Denton's Patent Butterfly Tablets."—Mr. W. P. Pycraft read the first of a series of contributions to the osteology of birds. The present part (of which the following is an abstract) related to the Steganopodes. The fact that in the tropic-birds, cormorants, gannets, and frigate-birds, all the toes are united by a common web, has led to the belief that these forms are closely related; they form the sub-order *Steganopodes* or *Totipalmatæ* of authors. A comparison of the osteology of the group confirms this opinion.—Dr. W. G. Ridewood read a paper on the skeleton of regenerated limbs of the midwife-toad (*Alytes obstetricans*). He demonstrated the possibility of the development, in the regenerated hind limb of the larva, of tarsal, metatarsal, and phalangeal cartilages identical in every respect with those of the normal limb.—Mr. G. A. Boulenger,

F.R.S., described a new species of sea-snake from Borneo, which he proposed to name *Hydrophis floweri*, after Mr. Stanley Flower, its discoverer. Mr. Boulenger also gave an account of the reptiles and batrachians lately collected by Mr. W. F. H. Rosenberg in Western Ecuador. Seventy-seven species were enumerated, of which twenty-three, viz. eleven reptiles and twelve batrachians, were described as new.

CAMBRIDGE.

Philosophical Society, January 24.—Mr. F. Darwin, President, in the chair.—A new method in combinatory analysis with applications to Latin squares and associated questions, Major P. A. Macmahon, R.A., F.R.S. The author applies the theory of symmetric functions to obtain solutions, hitherto unachieved, of problems in combinatory analysis associated with the question of Latin squares.—On Abelian functions in connection with two-dimensional fluid motion, H. F. Baker.—On the production of a cloud by the action of ultra-violet light on moist air, C. T. R. Wilson. If the light from an arc lamp be brought to a focus, by means of a quartz lens, within a vessel containing moist dust-free air, a bluish fog becomes visible in the course of a few minutes along the path of the light. The cloud particles remain in suspension for hours after the light has been cut off. The phenomenon is shown even in unsaturated air, but the faint blue haze which then develops takes much longer to form. When the radiation is not sufficiently intense to show these effects, a dense fog can still be obtained by bringing about slight supersaturation by expansion. These clouds, unlike those obtained by Tyndall (*Phil. Trans.*, 160, p. 333, 1870) and by Aitken (*Edin. Trans.*, 39, I. p. 15, 1897) by the action of light on various vapours, are due to the ultra-violet rays alone; for if a thin sheet of glass or mica (substances which are opaque to these rays) be interposed, not a trace of fog or rain is formed even when a high degree of supersaturation is brought about by expansion. It is possible that the small particles to which the blue of the sky is due are the result of this action of the ultra-violet rays, of which sunlight, when it first enters our atmosphere, doubtless contains a plentiful supply.—On the use of logarithmic co-ordinates in physics, J. H. Vincent. The paper divides all curves into "translatants" and "non-translatants." As examples of the former, Mr. Boys' chart of wave and ripple velocities is referred to, and an impedance chart is constructed. Non-translatants are not in general suited to this method of plotting. By suitable devices the logarithmic homologue of the equation for the propagation of waves on a frozen sea is drawn, although this is a non-translatant. The paper concludes with suggested uses of tri-dimensional logarithmic coordinates and semi-logarithmic coordinates.—On the diffuse reflection of Röntgen rays, Prof. J. J. Thomson. The paper contains the theory of the electromagnetic effects produced by suddenly setting an electrified body in motion. It is shown that a thin pulse of intense electromagnetic disturbance is generated which travels outwards with the velocity of light. The magnitude of the magnetic force at a point P due to the pulse is when the velocity w of the particle is small compared with the velocity of light equal to $we \sin\theta/2ar$, where $2a$ is the diameter of the particle O, e the change on the particle, r the distance PO, and θ the angle between OP and the direction of motion of the particle. Using the theory of the Röntgen rays given by the author in the *Phil. Mag.*, February 1898, the result just quoted is applied to find the intensity of the radiation scattered when Röntgen rays are incident on a collection of positively and negatively electrified bodies. The intensity of the scattered rays in a direction making an angle θ with the incident ray varies as $(1 + \cos^2\theta)$. So that the intensity of the scattered light when $\theta = 0$ would be twice that when $\theta = \pi/2$. Photographs taken by the scattered rays in these two positions showed that there was little, if any, difference of intensity in these directions. This result indicates that the scattered Röntgen radiation is probably more nearly allied to fluorescence than to the scattering of light by small particles. Experiments were made on the absorption of the light diffusely "returned" (to use Sir George Stokes' phrase) from lead and platinum by thin sheets of platinum and red lead; these showed that there was no strong selective absorption by thin platinum of rays scattered from platinum, or by lead of rays scattered from lead. A mathematical investigation is given to show that in the case of rapidly damped radiations selective absorption would not be exhibited.

PARIS.

Academy of Sciences, February 14.—M. Wolf in the chair.—On certain singular examples of successive approximations, by M. Émile Picard.—On the masses of the planets, by M. E. Roger.—Remarks on a note by M. Anceaux. Of the three laws given in this note, the first only is rigorously exact, the second is an approximation, and the third a consequence of the two others.—*Résumé* of the solar observations made at the Royal Observatory of the Roman College during the second half of 1897, by M. P. Tacchini. Observations are given for the distribution of sunspots, protuberances, and faculæ.—On the extension of the decimal system to the division of the day and the circle; advantages and practical methods, by M. J. de Rey Pailhade.—On the singular Abelian functions, by M. G. Humbert.—On some general algorithms, and on iteration, by M. Lémeray.—On the surfaces which admit an infinite, discontinuous group of birational transformations, by M. P. Painlévé.—Deformation of metals, by M. Mesnager.—Direct measurement of the period of the Hertzian oscillations, by M. L. Décombe. Photographs of the explosive spark from a revolving mirror showed that it is possible to fix on a gelatino-bromide plate oscillations of which the period is less than a five-millionth of a second. The necessary conditions were a very high velocity of rotation of the mirror, the employment of a collimating lens, in the focal plane of which the spark is placed, of very small focal length. The results obtained confirmed the theory of Poincaré and Bjerknes, according to which the radiations emitted are of one wave length only.—Emission of secondary rays in air under the influence of the X-rays, by M. G. Sagnac. It is shown experimentally that air through which the X-rays are passing gives off secondary radiations capable of affecting an electroscope. This phenomenon is comparable to the emission of light by a liquid containing a small quantity of a fluorescent substance in solution during the passage of a luminous bundle.—On a new contact-breaker for induction coils, by M. V. Crémieu. The ordinary form of contact-breaker used in induction coils is attended with the inconvenience that the oppositely induced electromotive forces are not symmetrical. This difficulty is overcome by the apparatus described, but at the expense of a larger amount of energy, since to obtain a spark of a given length the electromotive force of the primary circuit must be double that required by the ordinary form.—On a crystallised hydride of dicamphene, by MM. A. tard and G. Meker The dry hydrochloride of terebenthene is fused and sodium added; a hydrocarbon $C_{20}H_{34}$ can be obtained from the product of the reaction. It is noteworthy as being one of the few terpenes obtainable in the crystallised state.—Action of cyanamide upon bromanil in presence of potash, by M. H. Imbert. The substance obtained appears to be the potassium salt of dicyanimino-dibromo-dioxyquinone.—Researches on organic phosphorus, by M. J. Jolly. The experiments given tend to show that phosphorus does not exist in the organic molecule in an unoxidised state.—The production of carbon monoxide in the blood after inhalations of chloroform, by M. L. de Saint-Martin. In attempting to confirm the statement of MM. Degrez and Nicloux that prolonged inhalation of chloroform produces carbon monoxide in the blood, the author finds that normal blood, treated in a vacuum at 40°, with an organic acid, also gives off small quantities of carbon monoxide.—On the oxydase of *Botrytis cinerea*, by M. J. Laborde. A study of the effect of this oxydase upon the fermentation of grapes, with especial reference to the decolorisation of the wine.—Tuberculosis and pseudo-tuberculosis, by MM. Bataillon and Terre. The authors have previously described a form of the tubercle bacillus capable of existing in cold-blooded animals, such as the frog. A third form of this bacillus, originally human, has now been obtained after a passage of three days in the frog On solid media this form grows rapidly at temperatures between 12° and 48°, and is distinguished from the form previously described by three points: appearance of cultures, power of easily developing at high temperatures, and rendering beef-broth turbid. The colonies on the potato are brownish, and the bacilli are not stained by the methods of Gram or Ehrlich. Experiments on animals led to the conclusion that many cases of pseudo-tuberculosis are in reality true tuberculosis, having as a cause one of the numerous forms of Koch's bacillus.—The parasites of cancer and sarcoma, by M. F. J. Bosc. As a result of the examination of numerous tumours it was found that the abnormal formations foreign to the tissues could be grouped under five morphological types: microbial forms, granulations, cellular forms of very variable origin, encysted

forms and sarcodic forms. All these forms exist in epithelioma, carcinoma and sarcoma, but the last-named contains especially the microbial forms and the granulations.—Remarks on the Bloch-appendices in the siluroids of genus *Aspredo*, by M. Léon Vaillant.—On the place of the sponges in classification, by M. Yves Delage.—Influence of the X-rays on germination, by MM. Maldiney and Thouvenin. From experiments upon *Convolvulus arvensis*, *Lepidium sativum*, and *Panicum miliaceum*, it would appear that the X-rays hasten germination.—The melanosis of the mandarin orange, by M. Trabut.—Detection and rapid estimation of manganese in plants and vegetable earths by a colorimetric method, by M. P. Pichard. The method is based upon the ignition of the ash with an alkaline carbonate, and subsequent formation of permanganate by the use of lead peroxide and nitric acid.—On the conglomerate of the Amône in the Swiss Ferret valley, by MM. L. Duparc and F. Pearce.—On the formation of anhydrite by the calcination of gypsum at high temperatures, by M. A. Lacroix.—On the origin of the overlapping layers in the region of Ubaye, by MM. W. Kilian and E. Haug.—On some phenomena of fluvial erosion and corrosion, by M. Jean Brunhes.

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 24.

ROYAL SOCIETY, at 4.30.—Meeting for Discussion.—Subject: The Scientific Advantages of an Antarctic Expedition. The Discussion will be opened by Dr. John Murray, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—On the Manufacture of Lamps and other Apparatus for 200 volts Circuits: G. Binswanger, Byng.

FRIDAY, FEBRUARY 25.

ROYAL INSTITUTION, at 9.—The Theory of Colour Vision applied to Modern Colour Photography: Captain W. de W. Abney, C.B., F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Problem of Train Resistance: C. E. Wolff.

SATURDAY, FEBRUARY 26.

ROYAL INSTITUTION, at 3.—The Structure of Instrumental Music: W. H. Hadow.

PHYSICAL SOCIETY (Eton College), at 4.—The Rev. T. C. Porter will describe (1) a New Theory of Geysers; (2) a New Method of Viewing Newton's Rings; (3) Experiments bearing on the Sensation of Light; (4) a Method of Viewing Lantern Projections in Stereoscopic Relief; (5) Winter Observations on the Shadow of El Teide, with a New Method for Measuring approximately the Diameter of the Earth; (6) Temperature of the Water of Niagara.

MONDAY, FEBRUARY 28.

SOCIETY OF ARTS, at 8.—The Principles of Design in Form: Hugh Stannus.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The Annual Range of Temperature in the Surface Waters of the Ocean, and its Bearing on Oceanographical Problems: Dr. John Murray, F.R.S.

INSTITUTE OF ACTUARIES, at 5.30.—The Relation of the Actuarial Profession to the State: J. Nicoll.

TUESDAY, MARCH 1.

ROYAL INSTITUTION, at 3.—The Simplest Living Things: Prof. E. Ray Lankester, F.R.S.

ZOOLOGICAL SOCIETY, at 8.30.—On the Perforate Corals collected by the Author in the South Pacific: J. Stanley Gardiner.—The Myology of the Terrestrial Carnivora, Part 2: Prof. B. C. A. Windle and F. G. Parsons. On the Brain and some other Points in the Anatomy of *Bassaris*: F. E. Beddard, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Papers to be further discussed: The Theory Design, and Practical Working of Alternate-Current Motors: Llewelyn B. Atkinson.—Dublin Electric Tramway: H. F. Parshall.

RÖNTGEN SOCIETY, at 8.—Photographic Activity and Penetration of Röntgen Rays at Different Vacua: J. H. Gardiner.—Other Papers by Wilson Noble and Hall Edwards.—Mr. Isenthal will show some New Apparatus.

WEDNESDAY, MARCH 2.

SOCIETY OF ARTS, at 8.—Kites: their Theory and Practice: Captain B. F. S. Baden-Powell.

THURSDAY, MARCH 3.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: The Relationship of Variations of the Ground Water Level to the Incidence of Malarial Fevers in Chotta Nagpur, Bengal: Dr. L. Rogers.—On the Depletion of the Endosperm of *Hordeum vulgare* during Germination: H. T. Brown F.R.S., and F. Escombe.—Experimental Observations on the Early Degenerative Changes in the Sensory End Organs of Muscles: Dr. F. E. Batten.

ROYAL INSTITUTION, at 3.—Recent Researches in Magnetism and Diamagnetism: Prof. J. A. Fleming, F.R.S.

LINNEAN SOCIETY, at 8.—On the Sense Organs of the Lateral Line in certain Fishes: F. J. Cole.—On the Occurrence of *Carex helvola* in Britain: G. C. Druce.—On Arctic Spiders from Franz Josef Land: Rev. O. Pickard-Cambridge.

CHEMICAL SOCIETY, at 8.

FRIDAY, MARCH 4.

[illegible]AL INSTITUTION, at 9.—Some Recent Results of Physico-Chemical [illegible]iry: Prof. T. E. Thorpe, F.R.S.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

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