

when the living animal is at rest, nor why the larvæ should not penetrate the horn. I venture to assert as my own opinion, and that of many sportsmen from whom I have made inquiries, that the larvæ does not feed on the horns of living animals; had this been the case, it would not have escaped the observation of some of our "mighty African hunters." Thus Dr. Fitzgibbon's statement stands alone; the question must, however, remain *sub judice*.

The habitat of the moth was generally supposed to be Africa, but Sir George Hampson showed me some specimens which he had collected in various districts in India.

I am indebted to Lord Walsingham, who kindly gave me some very useful notes, he having himself written a few years ago on the subject; also to Mr. P. H. Miller for a very faithful sketch.

W. H. MCCORQUODALE.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—In connection with the Congress of Physiology and the Congress of Zoology to be held in Cambridge towards the end of August, the University proposes to confer the honorary degree of Doctor of Science on the following distinguished foreign representatives. For Physiology: Prof. Bowditch, Harvard; Prof. Golgi, Pavia; Prof. Kronecker, Berne; Prof. Kühne, Heilberg; and Prof. Marey, Paris. For Zoology: Dr. Anton Dohrn, Naples; Prof. Milne-Edwards, Paris; Prof. Haeckel, Jena; Prof. Hubrecht, Utrecht; and Prof. Kowalevsky, St. Petersburg.

The annual report of the Museums Syndicate testifies to the great activity of the science departments and the ever-growing importance and value of the collections acquired by the University. Numerous expeditions have left Cambridge to prosecute researches in far distant lands, and have returned with important and extensive trophies of their work. South America, through Mr. Graham Kerr and Mr. Budgett, has yielded some fine zoological series. The South Pacific fauna has been illustrated by the spoils of Mr. Stanley Gardiner of the Funafuti expedition. Dr. Willey has brought unique contributions from New Britain; and both he and Prof. Flinders Petrie have greatly enriched the magnificent collection of crania under the charge of Prof. Macalister. Other additions are due to Dr. Haddon (Torres Straits), Sir W. L. Buller (Macquarrie Island), Prof. Wiltshire and Mr. H. H. W. Pearson (Ceylon), and many other workers and benefactors.

Mr. Frank Morley, of King's College, the author of numerous works and memoirs in pure mathematics, has been approved for the degree of Sc.D.

The complete list of matriculations for the year has now been published. It appears that 931 students have joined the University in 1898, as compared with 887 in the preceding year.

Dr. Alex. Hill has been re-elected Vice-Chancellor for the ensuing academical year.

Mr. R. Pendlebury, and Mr. A. E. H. Love, F.R.S., Fellows and Lecturers of St. John's College, have been appointed University Lecturers in Mathematics.

A University Lectureship in Chemical Physiology is to be established in connection with Prof. Foster's department, but the University is unable to assign any stipend to the post at present. The lecturer will be remunerated from the students' fees.

Hitherto the same persons have acted as examiners in Anatomy and in Physiology respectively for the Natural Sciences Tripos, Parts i. and ii., and for the Medical examinations. The number of candidates has increased so largely (it is now 310 in physiology, and 252 in anatomy) that the work involved is too much for one pair of examiners. It is accordingly proposed to divide the duty by appointing separate examiners for the Tripos and for the M.B. examinations.

PROF. E. B. FROST, of Dartmouth College, has been elected professor of astrophysics at Yerkes Observatory; and Prof. E. F. Nichols has been appointed professor of physics in Dartmouth College.

MR. WILLIAM BUTLER DUNCAN, of New York City, has presented to Yale University the Hotel Majestic at New Haven, to be used as a dormitory, and to be called the Duncan Dormitory.

NO. 1493, VOL. 58]

IN replying to questions referring to the Government measures which it is intended to bring forward shortly, Mr. Balfour informed the House of Commons on Monday that the Lord President of the Council would introduce, "in another place," a Bill dealing with the organisation of secondary education, and he hoped the London University Bill would be passed.

ABOUT a year ago the Lords of the Committee of Council on Education decided to make inquiries as to the number of pupils in public and private secondary and other schools (not being public elementary or technical schools) in England, and the teaching staff in such schools. These schools are very various in character, in constitution, and in size; but, broadly speaking, they furnish to the country what is known as secondary or intermediate education in its different grades, and fill the gap between the public elementary schools and the universities or university colleges. They include schools in which educational efficiency is at a minimum, and schools (unfortunately but a small proportion) where rational methods of instruction are followed. The results of the inquiries made through the Education Department have just been published in a Blue Book. The Return represents the first attempt which has been made in this country to give a statistical survey of the schools in the great province of national education which is intermediate between the public elementary schools and institutions of academic rank or for technical training. It shows the various forms of control and ownership under which these schools are carried on, but, as they do not come under any comprehensive system of inspection, no pronouncement can be made as to their educational efficiency or inefficiency. The number of pupils in the 6209 schools comprised in the Return are 291,544; of these 158,502 are boys, and 133,042 are girls. Only 9 per cent. of the boys are more than sixteen years of age, and 11 per cent. of the girls. As to the staff, 32 per cent. of the boys' schools are without graduates on the attached staff, 73.8 per cent. of the girls' schools, and 81.3 per cent. of the mixed schools. From this it will be seen that 61.6 per cent. of all the schools on the Return have only non-graduates on the exclusively attached staff. Of course, this division into schools with graduates and without graduates on the staff only affords a rough criterion as to the character of the instruction, for graduates are not necessarily good teachers, nor are good teachers necessarily graduates. It is, however, time that steps were taken to insist upon all private schools giving public guarantees of their educational efficiency.

### SOCIETIES AND ACADEMIES.

LONDON.

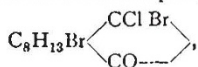
**Linnean Society, May 5.**—Dr. A. Günther, F.R.S., President, in the chair.—Dr. Bernard Renault and Prof. Max Carl Wilhelm von Weber were elected Foreign Members of the Society.—A paper was read by Sir John Lubbock, Bart, M.P., F.R.S., on some Spitsbergen Collembola. Owing to the well-known tolerance of cold by insects belonging to this order, it was, he thought, not surprising that several species should occur in Spitsbergen. Eleven species of *Collembola* had been found in Greenland, as recorded by Meinert (Vidensk. Meddel., 1896, pp. 167-173), and five species were already known from Spitsbergen. He was now able to add two more, one of which was new. This he proposed to call *Isotoma spitsbergenensis*. The second species, *Isotoma quadrioculata*, had been previously met with in Greenland. Both of these were obtained by Mr. Trevor Battye during Sir Martin Conway's expedition to Spitsbergen in 1896.—Miss Ethel Barton, by permission of the President and Council, read a paper on the structure and development of *Soranthera*, a genus of brown Algae (*Phaeophyceae*) containing a single species, *S. alvodea*.—Mr. J. T. Cunningham read a paper dealing with the evolution of animal structure, and entitled "The Species, the Sex, and the Individual." The general conclusion arrived at by the author was that adaptation was not produced indirectly by selection from indefinite variations, but directly by the influence of stimulation in modifying the growth of the parts or organs of the body.

**Geological Society, May 18.**—W. Whitaker, F.R.S., President, in the chair.—The garnet-actinolite schists on the southern side of the St. Gothard Pass, by Prof. T. G. Bonney, F.R.S. The author described the field relations and the microscopic structures of a group of schists or gneisses characterised by the frequent presence of conspicuous garnets and actinolites,



which are exposed on the southern slopes of the St. Gothard Pass and for some distance west and east, on the northern side of the Val Bedretto. These rocks in the field might be regarded as highly-altered sedimentary strata (as the author once thought) or as a group of igneous rocks (originating possibly in magmatic differentiation) affected by fluxion-movements anterior to consolidation. To the latter view he now inclined, but considered the schistosity and the peculiar minor structures to be the results of crushing (generally without marked shearing) followed by very considerable mineral reconstruction.—On the metamorphism of a series of grits and shales in Northern Anglesey, by Dr. C. Callaway. While mechanical force has been concerned in producing the more intense metamorphism of the lower part of the series, the author was not disposed to advance this as the sole cause of the changes produced.—On a volcanic series in the Malvern Hills, near the Herefordshire Beacon, by H. D. Acland. It is suggested that the rocks may be the volcanic equivalents of the plutonic rocks of the Malvern axis, faulted down and protected by the bend in the axis which occurs in the neighbourhood of the Herefordshire Beacon.

**Chemical Society, May 19.**—Prof. Dewar, President, in the chair.—The following papers were read:—The liquefaction of hydrogen and helium, by J. Dewar. Hydrogen was liquefied by allowing the gas cooled to  $-205^{\circ}$ , and under 180 atmos. pressure, to expand; about 1 per cent. of the gas liquefied. Helium was liquefied by cooling in liquid hydrogen.—The action of formaldehyde on amines of the naphthalene series, Part 1, by G. T. Morgan. Formaldehyde acts on  $\beta$ -naphthylamine in alcoholic solution containing hydrochloric acid yielding naphthacridine, and bases of the composition  $C_{21}H_{13}N$ ,  $C_{22}H_{16}N_2$ , and  $C_{23}H_{18}N_3$ .—On the constitution of oleic acid and its derivatives, Part 1, by F. G. Edmed. Pelargonic and azelaic acids, as well as two hydroxystearic acids, are formed on oxidising oleic and elaidic acids; the author therefore assigns the constitution  $CH_3(CH_2)_7CH:CH(CH_2)_7CO_2H$  to the two latter acids.—Stereoisomeric derivatives of camphor, by T. M. Lowry. On recrystallising dibromochlorocamphor,



its rotatory power changes, indicating the existence of stereoisomerism.

CAMBRIDGE.

**Philosophical Society, May 16.**—Mr. F. Darwin, President, in the chair.—On the figures produced on photographic plates by electric discharges, by Mr. J. A. McClelland. When an electric discharge has passed to the surface of a photographic plate a distinct figure is produced when the plate is developed, and the form of the figure is dependent on the sign of the discharge. The object of the paper is to determine whether these figures are produced by some direct electrical action on the film, or by the light which accompanies the discharge. Figures were taken with the plates in air at various pressures, and as the pressure was diminished the branching lines in the figures became broader and less distinct, as they would if produced by the light of the discharge in the air close to the film. The transparency of various substances was tested, and while no effect was produced through thin slips of ebonite, the effect through glass and mica was quite distinct. The experiments seemed to show that the light of the discharge was chiefly instrumental in producing the figures. The difference in the positive and negative figures is due to the difference in the discharge in air in the two cases.—On a method of facilitating the measurement of temperature by platinum thermometry, by Mr. E. B. H. Wade. Attention is drawn to the inconvenience arising from the fact that equal increments of the resistance of platinum wire do not represent equal increments of the temperature. A form of Wheatstone's Bridge is then described in which the inconvenience disappears. The resistance of the platinum is balanced by that of two resistance boxes in parallel, plugs being transferred from one box to the corresponding places in the other till the balance is obtained. It is shown that when this is done, equal increments of the resistance in one box may be made to represent equal increments in the temperature of the platinum wire. Accuracy is not sacrificed in obtaining the simplification resulting from this method.—The development of *Peripatus novae-britanniae*, by Dr. A. Willey. The ova are without yolk, and the nutrition of the embryo is effected by the development of a large trophic vesicle, which occupies the entire dorsum of the

embryo, and projects far in front of the embryo as a head-fold and behind as a tail-fold. The trophic vesicle is thus a hollow closed cylinder lined internally by endoderm and externally by ectoderm, the cells of the latter being adapted for absorption of nutriment. The trophic folds were compared with the amniotic folds of insects. The trophic cavity becomes the gastral cavity of the adult, and in the transformation from one to the other the endoderm undergoes certain changes. It secretes a basal membrane and a cuticular membrane simultaneously with a great increase in thickness; and between the two membranes the endoderm contains numerous small and large yolk-like globules, which are probably to be regarded as reserve nutrient matter to tide the embryo over the first few days of its independent life. This late deposition of reserve nutrient matter derived ultimately from the maternal organism, as opposed to foreign ingested matter, is probably of some significance with regard to the question of the lecithality of the ovum. The embryo lies outside on the ventral surface of the trophic vesicle just as an insect embryo lies upon the yolk.—On Röntgen rays and ordinary light, by Mr. C. Godfrey. Prof. J. J. Thomson has shown that the sudden stoppage of an electron gives rise to a thin electric pulse which is propagated through the medium; these pulses he identifies with Röntgen rays. The application of Fourier analysis shows that the assemblage of these pulses is equivalent to a mixture of simple harmonic waves of all wave-lengths; a peculiar feature is that these waves are absent whose lengths are sub-multiples of the thickness of the pulse. Most of the energy is resident in the short waves; but about 1/1000 of the whole energy will be visible light. The pulses suggested by Sir George Stokes as affording an explanation of Röntgen rays differ from Prof. Thomson's in one respect; the integrated displacement through the thickness of the pulse is zero. On this property Sir G. Stokes bases his proof that there will be no diffraction; and it may be seen that these pulses (taken to be of the same thickness as Prof. Thomson's) will have only  $10^{-9}$  of this energy in the visible spectrum.—On the possibility of deducing magneto-optic phenomena from a direct modification of an electro-dynamic energy function, by Mr. J. G. Leatham. The method initiated by Maxwell for the explanation of the Faraday effect depended on the direct insertion of a magneto-optic term in the energy. This method was extended by Fitzgerald and others to the explanation of Kerr's effect, namely the modification introduced in the circumstances of optical reflexion by magnetisation of the reflector. A difficulty occurred, however, in satisfying all the interfacial conditions, which virtually showed that such a scheme was not formally self-consistent. The origin of the discrepancy has been traced by Mr. Larmor ("Report on the Action of Magnetism on Light," Brit. Assoc., 1893) to omission to secure what may for shortness be called the electromotive incompressibility of the medium: in the ordinary problem of optical reflexion there is no tendency for this to be disturbed, but when Maxwell's magneto-optic energy terms are included, the reaction against compression introduces what may be termed an electric pressure, which must appear in the equations. It was necessary to compare the modified-scheme thus obtained with experimental knowledge: and the calculations given in this paper show that in fact it does not represent the phenomena. The paper is only a summary of the actual calculations, because since they were completed the author has shown ("On the Magneto-optic Phenomena of Iron, Nickel and Cobalt," *Phil. Trans.* 1897), that the other rigorous theory formulated as an alternative by Mr. Larmor (*loc. cit.*), which leads to an analytical scheme practically the same as those advanced on various hypotheses by Fitzgerald, Goldhammer, Basset, Drude, and others, is in much more satisfactory agreement with experiment. This brief history of the subject shows the desirability of the examination of the consequences involved in the former method of explanation; the result is, however, what was to be expected by those who adhere to the more recent formulation (Larmor: "A Dynamical Theory of the Electric and Luminiferous Medium," Part 3, *Phil. Trans.*, 1898) of optical theory, which treats a material medium as free aether pervaded by discrete molecules involving in their constitution electrons considered as nuclei of intrinsic aethereal strain. On such a view a continuous energy function is not the starting-point, and the influence of these discrete nuclei could hardly be conceived to modify the propagation in the intervening aether in so fundamental a manner as an electromotive pressure would demand.—On the solutions of the equation  $(\nabla^2 + \kappa^2)\psi = 0$  in elliptic coordinates and their physical applications, by Mr. R. C.



Maclaurin.—On the interpretation of divergent solutions of the hypergeometric equation, by Mr. W. McF. Orr. The author obtains divergent series satisfying a general hypergeometric equation, and estimates the error involved in choosing a finite number of terms of such a series as a solution of the equation.

## EDINBURGH.

Royal Society, May 16.—Lord Maclaren in the chair.—Prof. Crum Brown read a paper on the origin of certain of the Phœnician alphabet characters. The idea was to ascertain whether any of them can plausibly be regarded as modifications of others. It was suggested, for example, that *Aleph* was deduced from *Argin* by the addition of a central vertical stroke, *Heth* from *He* and *Tsade* from *Zain* by the addition of a vertical stroke at the left side, *Caph* from *Gimel* and *Samesh* from *Zain* by the addition of a horizontal stroke, *Pe* from *Beth* by opening the loop (or *peice versâ*), *Daleth* from *Tau* by the addition of a diagonal stroke, &c. Attention was called to the risks of being misled by accidental resemblances and to the bearing of such guesses on de Rougé's hypothesis.—Mr. T. C. Baillie read a paper on the thermal conductivity of nickel. The value he obtained by use of Forbes' method was 117. What was believed to be a better value, namely 103, was obtained by a new method, which had the great merit of giving an experimental value of the thermal conductivity directly without requiring the specific heat to be known. A short bar had its one end kept at a steady high temperature as in the Forbes' experiment. To the other end a small cap was attached, through which a steady stream of water was passed. The temperature of the water was taken just as it entered the cap, and just as it left it. The quantity of water passed in a given time being known, the amount of heat lost from the end of the bar to the water was calculated in terms of the specific heat of water. By means of thermometers set at intervals along the bar, the gradient of temperature was indicated, and a good approximation to the value of the gradient at the position occupied by the cap could be calculated. These measured quantities, the gradient and the heat lost, give at once the conductivity. The paper also contained an account of a simple method for determining the thermometer corrections.—Prof. D'Arcy Thompson, in a paper on the crab in mythology, drew attention to the fact that in old coins the crab is always found associated with those deities which are astrologically connected with the zodiac sign *Cancer*, and with animals that give names to constellations which are astronomically related to the constellation *Cancer*.

## PARIS.

Academy of Sciences, May 31.—M. Wolf in the chair.—Photographic studies on some parts of the surface of the moon, by MM. Lœwy and Puiseux.—Remarks on the third part of the photographic atlas of the moon, published by the Paris Observatory.—On the preparation and properties of the di-alkylamido-anthraquinones, by MM. A. Haller and A. Guyot. Dimethyl-amido-benzoylbenzoic acid heated at 180° with strong sulphuric acid gives about one-third of the theoretical yield of dimethyl-amido-anthraquinone. The yield is more than doubled by starting with the reduction product, dimethyl-amido-benzoylbenzoic acid, condensing this with sulphuric acid, and oxidising the product with ferric chloride. The corresponding ethyl derivatives were prepared in a similar manner.—On the creation of new articulations between bones normally independent, in the case where the old articulations cannot be reconstituted owing to their having been completely destroyed, by M. Ollier.—Formation in blood serum, under the action of chemical substances, of a material capable of coagulating the bacilli of true tuberculosis, by M. S. Arloing. It has been shown in a previous paper that the blood serum of tuberculised goats contains a substance which is capable of coagulating the tubercle bacilli from a homogeneous culture. It is now shown under that prolonged treatment, by injection of such substances as eucalyptol, guaiacol, creosote, and solution of corrosive sublimate, the blood serum acquires the same property, the last-named substance giving the most active serum. The author points out that all these chemical substances have been proposed for the treatment of tuberculosis in man.—On a flying apparatus, by M. Ader. The apparatus described does not belong to the class of aeroplanes, but attempts to reproduce the curves of the wings of birds in flying.—On surfaces of total constant curvature, by M. C. Guichard.—On the form which by the suppression of certain terms becomes a development in complete series, by M. Riquier.—On a method of determining the

order of a fringe of high order, by MM. Ch. Fabry and A. Perot. The fringes produced by the interference of the reflections from two parallel silvered plates some three or four centimetres apart are of a very high order. By throwing simultaneously rays of two different known wave-lengths (say red and green), and noting the positions of exact coincidence of a red and green ring, the order can be determined.—On the cathode rays, by M. P. Villard. If the antikathodic wall of a Crookes' tube is covered with cupric oxide glass, cuprous oxide is formed by the action of the rays. This reduction is attributed to hydrogen, furnished by the traces of water given up by the glass. In a tube with mercury electrodes, in which the vacuum was formed by boiling out with mercury, no cathode rays could be formed.—Action of some carbonates upon chromous acetate, by M. G. Bauge.—On the states of equilibrium of a ternary system, lead-tin-bismuth, by M. Georges Charpy. The results are expressed in the form of a curve, Thurston's triangular diagram.—On dimethylpiperazine and some phenolic combinations of this base, by MM. P. Cazeneuve and Moreau.—Heats of neutralisation of phenyl-phosphoric acid, by M. G. Belugou.—On some halogen derivatives of ethyl-phenyl-ketone, by M. A. Collet. The ketones described were prepared from propionyl and bromo-propionyl chlorides, and the halogen benzene derivative by Friedel and Crafts' reaction, and include ethyl-*p*-chlorophenyl-ketone, ethyl-*p*-bromophenyl-ketone, bromoethyl-*p*-chlorophenyl-ketone and bromoethyl-*p*-bromophenyl-ketone, together with their oximes, and phenylhydrazones.—On the solipidisation of the Equidæ during recent times, by M. G. Joly. A comparison of the osteology of the horse of the quaternary period with that of the present day shows that the alterations of structure corresponding to increased speed can be readily traced, and are probably still going on.—On *Acinetospora pusilla* and the sexuality of the Tilopteridæ, by M. C. Sauvageau.—On the growth of a green plant, in absolute darkness, by M. R. Bouilliac. The algæ nostoch can be grown in complete absence of light, and has a green colour, although less intense than when grown in sunlight. It is essential that glucose be present in the culture fluid.—On polymorphism, by M. Fred. Wallerant.—Examination of a combustible material by means of the X-rays, by M. H. Couriot. The method affords a ready means of determining the amount of mineral impurity present in a coal.—The artesian basin of the "Oued Rir," and the best means of utilising its irrigation waters, by M. Georges Rolland.—On the distribution of gluten and its immediate principles in the farinaceous nucleus of the wheat grain, by M. E. Fleurent.—Influence of asphyxia upon the amount of carbonic oxide in the blood.—Production of carbon monoxide in the organism, by M. Maurice Nicloux. The carbonic oxide found in the blood would appear not to be derived from the air, but to be a substance formed normally by the organism.—Researches on the ostioles of the cerebro-spinal system, by M. J. J. Andeer.

## AMSTERDAM.

Royal Academy of Sciences, April 23.—Prof. van de Sande Bakhuyzen in the chair.—Mr. Hamburger on the result of experiments showing that venous propulsive pressure promotes in a high degree the destruction of bacilli anthracis and their spores, which have been introduced under the skin.—Prof. Pekelharing presented a paper by Dr. G. C. J. Vosmaer and himself, entitled "Observations on Sponges," which will be published in the *Transactions* of the Academy.—Prof. Franchimont presented on behalf of Dr. P. van Romburgh a paper for publication in the report of the meeting, entitled "On the occurrence of cinnamic methyl ether in *Alpinia Malaccensis*, Rosc." On distillation with water the rootstocks of this plant yielded about 0.2 per cent. of ethereal oil, specific gravity 1.039 at 27°, exerting a right-handed rotation of 1° 5' in a tube 200 mm. in length. On the temperature being lowered, cinnamic methyl ether crystallised out—the liquid residue seemed to contain terpenes—which substance was not only detected by vapour density and analysis, its melting-point, 36°, and its boiling-point, 159°, but it also saponified, after which the two components, into which it was split up, were detected, cinnamic acid by its melting-point, 133°, and its other properties; methyl alcohol e.g. by the formation of the addition product with nitro-trimethylphenylenediamine, which crystallised in orange-coloured needles. Cinnamic methyl ether in chloroform, on being treated with bromine, yielded a dibromic addition product, melting at



116°, consequently phenyl  $\alpha\beta$ -dibromic propionic methyl ether. The leaves of this plant, too, are rich in methyl cinnamate. This is the first instance of cinnamic methyl ether being found in the vegetable kingdom.—Prof. van Bemmelen made on behalf of Dr. E. A. Klobbie a communication entitled “Qualitative-analytic determination of osmic tetroxide,” which will be inserted in the report of the meeting.—Prof. H. A. Lorentz on optical phenomena, depending on the mass and the charge of the ions (II.). The author discussed the question whether the density of the absorbing gas itself and of other gases, with which it is mixed, has any influence on the position of the absorption lines in the spectrum. The formulæ show no appreciable influence, if the absorption is small in a layer of the thickness of one wave-length.

DIARY OF SOCIETIES.

THURSDAY, JUNE 9.

ROYAL SOCIETY, at 4.30.—On a New Constituent of Atmospheric Air: Prof. W. Ramsay, F.R.S., and Morris H. Travers.—Experiments on Aneroid Barometers at Kew Observatory and their Discussion: Dr. C. Chree, F.R.S.—The Nature of the Antagonism between Toxins and Anti-Toxins: Dr. C. J. Martin and Dr. T. Cherry.—Some Differences in the Behaviour of Real Fluids from that of the Mathematical Perfect Fluid: A. Mallock.—On the Heat Dissipated by a Platinum Surface at High Temperatures: J. E. Petavel.

ROYAL INSTITUTION, at 3.—Modern Methods and their Achievements in Bacteriology: Dr. E. E. Klein.

MATHEMATICAL SOCIETY, at 8.—On the General Theory of Anharmonics: Prof. E. O. Lovett.—Point-Groups in a Plane, and their Effect in determining Algebraic Curves: F. S. Macaulay.—On a Regular Rectangular Configuration of Ten Lines: Prof. F. Morley.—On the Calculus of Equivalent Statements (eighth paper): H. MacColl.—On the Conformal Representation of a Pentagon on a Half Plane: Miss M. E. Barwell.—On a Continuous Group defined by any Given Group of Finite Order (second paper): Prof. Burnside, F.R.S.

FRIDAY, JUNE 10.

ROYAL INSTITUTION, at 9.—Some Experiments with the Telephone: Lord Rayleigh.

ROYAL ASTRONOMICAL SOCIETY, at 8.—Observations of Phenomena of Jupiter's Satellites in the Year 1897: John Tebbutt.—Occultations of Ceres and Venus: Cambridge Observatory.—Reply to Dr. Rambaut's Note on the Effect of Chromatic Dispersion: David Gill.—Right Ascensions and Declinations of Eight Stars in Aquarius, and their Probable Proper Motions: C. J. Merfield.—Further Researches on the Orbit of  $\gamma$  Lupi: T. J. J. See.—On the Actinic Qualities of Light as affected by different Conditions of Atmosphere: Rev. J. M. Bacon.

PHYSICAL SOCIETY, at 5.—Exhibition of a Model illustrating Dr. Max. Meyer's New Theory of Audition: Prof. S. P. Thompson, F.R.S.—Attenuation of Electric Waves along a Line of Negligible Leakage: Dr. E. H. Barton.—Diffusion Convection: A. Griffiths.

MALACOLOGICAL SOCIETY, at 8.—On the Land Shells of Curaçoa and the Neighbouring Islands: Edgar A. Smith.—On the Anatomy and Synonymy of the Genus *Mariaella* (Gray): W.-M. Webb.—A Note on a New Form of Arionidae from the Alps in Austria: J. F. Babor.—Descriptions of New Land Shells from Ceylon: E. R. Sykes.—List of the Land and Freshwater Mollusca of South Africa: J. C. Melvill and J. H. Ponsoby.

SATURDAY, JUNE 11.

ROYAL INSTITUTION, at 3.—The Temples and Ritual of Asclepius at Epidaurus and Athens: Dr. R. Caton.

GEOLOGISTS' ASSOCIATION (Waterloo Station, S.W.R.), at 1.50.—Excursion to Godalming. Director: T. Leighton.

TUESDAY, JUNE 14.

ROYAL HORTICULTURAL SOCIETY.—Lecture on Hybrid Orchids.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—Evidence of Lake Dwellings on the Banks of the Costa, near Pickering, North-east Yorkshire, with Illustrative Specimens: Captain the Hon. Cecil Duncombe.—Exhibition of a Large Collection of Stone Implements from Illinois and Ontario, with Descriptive Remarks: Rev. James Oliver Bevan.—On Marriage Laws and Customs of the Cymri: R. B. Holt.

WEDNESDAY, JUNE 15.

ROYAL METEOROLOGICAL SOCIETY, at 4.30.—Frequency of Non-Instrumental Meteorological Phenomena in London with Different Winds from 1763 to 1897: R. C. Mossman.—Progress of the Exploration of the Air by means of Kites at Blue Hill Observatory, Mass., U.S.A.: A. Lawrence Rotch.

ROYAL MICROSCOPICAL SOCIETY, at 7.30.—Exhibition of Sponges: B. W. Priest.—At 8.—Report on the Foraminifera of the Malay Archipelago (continuation): F. W. Millett.

THURSDAY, JUNE 16.

ROYAL SOCIETY, at 4.30.

LINNEAN SOCIETY, at 8.—Observations on the Seasonal Variations of Elevation in a Branch of Horse-Chestnut Tree: Miller & Christy.—On Pantopoda collected by Mr. W. S. Bruce in the Neighbourhood of Franz-Josef Land: G. H. Carpenter.—Morphological Relationships of the Actiniaria and Madreporaria: J. E. Duerden.—On some Fossil Leporines: Dr. C. I. Forsyth Major.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—Preparation of a Standard Acid Solution by Direct Absorption of Hydrogen Chloride: Dr. G. T. Moody.—Researches on the Terpenes. III. Halogen Derivatives of Fenchene and their Reactions. IV. On the Oxidation of Fenchene: J. A. Gardner and G. B. Cockburn.

SATURDAY, JUNE 18.

GEOLOGISTS' ASSOCIATION (London Bridge, L.B.S.C.), at 12.25.—Excursion to Crowborough. Directors: G. Abbott and R. S. Herries.

BOOKS, PAMPHLET, SERIALS &c., RECEIVED.

BOOKS.—Dante's Ten Heavens: E. G. Gardner (Constable).—Die Zelle und die Gewebe: Prof. Dr. O. Hertwig, II. (Jena, Fischer).—Lehrbuch der Botanik für Hochschulen: Prof. Strasburger and others, Dritte verbesserte Auflage (Jena, Fischer).—Th. Thoroddsen, Geschichte der Isländischen Geographie, Autorisierte Übersetzung von A. Gebhardt, Zweiter Band (Leipzig, Teubner).—Angling Days: J. Dale (E. Stock).—Essai sur la Classification des Sciences: Prof. E. Goblot (Paris, Alcan).—Automobiles sur Rails: J. Dumont (Paris, Gauthier-Villars).—Ostwald's Klassiker der Exakten Wissenschaften, Nos. 93 to 96 (Leipzig, Engelmann).—Practical Plant Physiology: Prof. W. Detmer, translated by S. A. Moor (Sonnenschein).—Year-Book of the Scientific and Learned Societies of Great Britain and Ireland, 15th Annual Issue (Griffin).—The Heat Efficiency of Steam Boilers: B. Donkin (Griffin).—Introduction to Algebra: Prof. G. Chrystal (Black).

PAMPHLET.—Summary Survey of the Geological Survey Department for the Year 1897 (Ottawa).

SERIALS.—Berichte der Naturforschenden Gesellschaft zu Freiburg i.B., Zehnter Band, 1, 2, 3 Heft (Freiburg i.B.).—Bulletin of the American Mathematical Society, May (N.Y., Macmillan).—Astrophysical Journal, May (Chicago).—Zeitschrift für Physikalische Chemie, xxvi. Band, 1 Heft (Leipzig).—Bulletins de la Société d'Anthropologie de Paris, Tome viii. No. 6 (Paris, Masson).—National Review, June (Arnold).—Scribner's Magazine, June (S. Low).—Strand Magazine, June (Newnes).—Fortnightly Review, June (Chapman).—Engineering Magazine, June (222 Strand).—Transactions of the Royal Society of Edinburgh, Vol. xxxviii. Parts 3 and 4; Vol. xxxix. Part 1 (Edinburgh, Grant).—Proceedings of ditto, Vol. xxii. No. 1 (Edinburgh, Grant).—Meteorological Record, Vol. xvii. No. 67 (Stanford).—Quarterly Journal of the Royal Meteorological Society, April (Stanford).—Geographical Journal, June (Stanford).—Journal of Botany, June (West).—Observatory, June (Taylor).—Atlantic Monthly, June (Gay).

Geological Model of London and Suburbs: J. B. Jordan (Stanford).

CONTENTS.

PAGE

Lord Rayleigh's "Sound." By L. R. W. . . . . 121

Hawks and Hawking. By R. L. . . . . 122

The Rudiments of Physics and Chemistry . . . . . 123

Our Book Shelf:—

Buchanan White: "The Flora of Perthshire."—

I. H. B. . . . . 124

Ricks: "Manual Training: Woodwork. A Handbook for Teachers" . . . . . 124

Barringer: "A Description of Minerals of Commercial Value" . . . . . 124

"Ludwig Otto Hesse's Gesammelte Werke, herausgegeben von der Mathematisch-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenschaften."—G. . . . . 124

Ives: "Krömsköp Colour Photography" . . . . . 124

Letters to the Editor:—

Liquid Hydrogen.—Prof. J. Dewar, F.R.S. . . . 125

Printed Matter and Photographic Plates.—A. A. C. Swinton . . . . . 125

The Transport of Live Fish.—D. O'Connor . . . 125

Ceremonial Dances of the American Indians . . . 125

On a New Constituent of Atmospheric Air. By Prof. William Ramsay, F.R.S., and Morris W. Travers . . . . . 127

Lyon Playfair. By H. E. R. . . . . 128

Osbert Salvin, F.R.S. By N. . . . . 129

Notes . . . . . 129

Our Astronomical Column:—

The Companion to Procyon . . . . . 134

The Liverpool Observatory . . . . . 134

Sunspot Periods and Natural Phenomena . . . . 134

Double and Multiple Southern Stars . . . . . 134

The Royal Observatory, Greenwich . . . . . 134

Gutta Percha. (Illustrated.) By Dr. E. F. A. Obach 136

Horn-feeding Larvæ. (Illustrated.) By W. H. McCorquodale . . . . . 140

University and Educational Intelligence . . . . 141

Societies and Academies . . . . . 141

Diary of Societies . . . . . 144

Books, Pamphlet, Serials, &c., Received . . . . . 144