College in October 1923, a studentship of the annual value of 150*l.*, which shall be tenable for two years and renewable, but only in exceptional circumstances, for a third year. The studentship will be awarded at the beginning of October, and applications should be sent so as to reach the Master of Emmanuel, The Master's Lodge, Emmanuel College, not later than September 18.

LONDON.—The Senate has resolved to increase the annual grant to the Marine Biological Association, Plymouth, from 25*l.* to 50*l.* for the next five years.

The following doctorates have been conferred:—*D.Sc. in Embryology*: Mr. G. S. Sansom, an internal student, of University College, for a thesis entitled "Early Development and Placentation in *Arvicola* (*Microtus*) *amphibius*, with special reference to the Origin of Placental Giant Cells." *D.Sc. in Physiology*: Dr. G. V. Anrep, an internal student, of University College, for a thesis entitled "The Metabolism of the Submaxillary Gland."

Dr. Eustace E. Turner has been appointed demonstrator in the chemical department of the East London College.

ST. ANDREWS.—Principal J. C. Irvine, Dr. William Low, and Dr. Angus MacGillivray have been appointed representatives of the court of the University on a standing joint-committee constituted by the court and the directors of the Dundee Royal Infirmary for the purpose of recommending suitable candidates on the occurrence of vacancies in the chairs of clinical medicine in the University, and also of harmonising the activities of the University and the Infirmary in matters common to both. Prof. D'Arcy Thompson has been reappointed representative of the court on the council of the Scottish Marine Biological Association.

MAJOR-GEN. SIR GERALD ELLISON will unveil the war memorial of East London College on Wednesday, February 7, at 3 P.M.

A SWEDISH professor of education, contrasting Swedish and American schools, remarked that in his own country the word "teacher" is not a noun feminine as it is in America. That the criticism is not without some foundation is shown by the statistics published in Bulletin, 1922, No. 8, of the United States Bureau of Education. The number of men students enrolled in normal courses in all normal schools and teachers' colleges in 1919–20 was 19,110 out of a total of 135,418, or 14 per cent; in teachers' colleges the percentage was 18, in state normal schools 13, in city and county normal schools 6, and in private normal schools 9. Comparative tables of statistics of the five years 1899–1900, 1904–5, 1909–10, 1914–15, and 1919–20 give the numbers of women students in normal courses as 45,394, 49,346, 68,815, 80,347, 116,308, representing the following percentages of the total numbers of students in such courses: 65, 76, 78, 80, 86. The teachers' colleges referred to, 46 in number, are institutions having a four-year course above the secondary school and granting a degree. Of the total number of men students in normal courses (19,110), more than half (9763) were enrolled in these colleges. It is true that a very large proportion of the teachers in American schools have not passed through normal schools and that the percentage of men teachers is not necessarily the same as the percentage of men students in teacher-training institutions. Statistics of City School Systems 1919–20 (Bulletin, 1922, No. 17), however, tell a similar tale. They show that the percentage of men teachers in city schools (including schools in towns having a population of 2500 or more) is 11, while in city elementary schools the percentage is only 4. It is probably safe to assume that rural schools would show an even lower percentage.

Societies and Academies.

LONDON.

Royal Society, January 25.—Sir Charles Sherrington, president, in the chair.—A. V. **Hill**: The potential difference occurring in a Donnan equilibrium and the theory of colloidal behaviour. Loeb has shown experimentally that there is a potential difference between a colloidal solution of a protein and a crystalloid solution with which it is in equilibrium across a membrane, impermeable to the protein, but permeable to the other bodies involved. It varies in the same general manner as the osmotic pressure, the viscosity and the swelling. The variation can be deduced, in general, from the theory of the Donnan equilibrium. One of the chief arguments employed by Loeb, however, is incorrect. Loeb shows that the potential difference observed experimentally agrees very exactly with that "calculated" from the difference in hydrogen ion concentration, also observed experimentally. This is a necessary consequence of the manner in which the observations were made.—E. F. **Armstrong** and T. P. **Hilditch**: A study of catalytic actions at solid surfaces. X.: The interaction of carbon monoxide and hydrogen as conditioned by nickel at relatively low temperatures. A practical synthesis of methane. A mixture of equal volumes of carbon monoxide and hydrogen passed over nickel at temperatures 220-280° C. was largely transformed into methane and carbon dioxide:

$$2CO + 2H_2 = CO_2 + CH_4.$$

This action affords the simplest and most economical means of producing methane in quantity, since a suitable gas mixture exists in ordinary commercial water-gas when the latter has been freed from catalyst poisons by removal of sulphur compounds. The experimental data obtained are compatible with a combination of the "water-gas reaction" with the normal hydrogenation process. Thus, of two volumes of water-gas ($2CO + 2H_2$), one molecule of carbon monoxide and a molecule of water interact and yield a molecule each of carbon dioxide and of hydrogen, the latter, with the balance of hydrogen present in the original gas, furnishing sufficient hydrogen for the normal hydrogenation of a second molecule of carbon monoxide.—J. **Holker**: The periodic opacity of certain colloids in progressively increasing concentrations of electrolytes. The method of testing the effect of common salt on the typical emulsoid colloid, serum, was described. Into each test-tube was pipetted 0·5 c.c. of undiluted serum and to each was then added 2 c.c. of solution of sodium chloride, which progressively increased in concentration in each successive tube. The tubes were shaken and placed in a thermostat at 40° C. for four hours. Then the opacity of the solution was determined. The phenomenon is periodic and is given by colloids of both the emulsoid and suspensoid type, and by animal, vegetable, and mineral colloids. It is also given by certain mixtures of simple aqueous solutions of inorganic salts. Emulsoid colloids tend to give many oscillations of low amplitude. Suspensoid colloids tend to give few oscillations of high amplitude. The phenomenon is not an optical interference of the light scattered by colloidal particles, but is a definite oscillatory change in the physical condition of those particles.—E. K. **Rideal** and R. G. W. **Norrish**: The photochemistry of potassium permanganate. Pt. I: The application of the potentiometer to the study of photochemical change. Pt. II.: On the energetics of the photodecomposition of potassium permanganate. The electrode potential of potassium permanganate when illuminated with ultra-violet light from the mercury vapour lamp undergoes a change (*ca* 0·25 volt) and

recovers slowly in the dark. This change is correlated with a photochemical decomposition of the permanganate, made apparent by the separation of a precipitate of the composition $K_2O \cdot 2MnO_2$, and the formation of a sol of MnO_2. Illumination establishes a photochemical stationary state, KOH being simultaneously produced by the decomposition, and removed by combination with the colloidal MnO_2. This involves an alteration of the P_H of the solution, which causes the electrode potential changes. The decomposition is monomolecular over the range of concentrations investigated. The decomposition of acidified permanganate under identical conditions is of zero order, due to non-formation of colloid. The photoactive radiation lies in the ultra-violet absorption spectrum of potassium permanganate, and the Hg line at 3128 ÅU is considered the chief agent. The quantitative absorption of radiant energy is in agreement with the Einstein Law of Photochemical Equivalent, a result of special interest as the first instance of its application to solutions.—E. A. **Fisher**: Some moisture relations of colloids. Pt. I.: A comparative study of the rates of evaporation of water from wool, sand and clay. Curves obtained by plotting rates of evaporation against water contents are discontinuous. Each portion of the rate curve can be expressed by a simple type of equation connecting rate of evaporation with water content. The rate curves obtained are similar in type in the cases of wool (wholly colloidal with a cellular structure), quartz sand (wholly non-colloidal with a granular structure), silty soil (notoriously feeble in colloid properties), and heavy clay sub-soil (typically colloidal in behaviour). The so-called shrinkage of wool on drying is really a deformation and not a volume shrinkage. The absorption of water by wool is attributed primarily to a filling up of fine pores of various shapes and sizes; the vapour pressures of wool-water systems are determined by the diameters of the pores that are full of water.—R. **Whytlaw-Gray**, J. B. **Speakman** and J. H. P. **Campbell**: Smokes. Pt. I.: A study of their behaviour and a method of determining the number of particles they contain. The smokes were produced (*a*) by the arc discharge in air, (*b*) by volatilisation and condensation, (*c*) by chemical action. In each case highly dispersed systems of very minute particles were obtained. Examined in an ultra-microscope of the slit type, the life-history of a smoke falls into two main periods:—(*a*) An unstable period in which the number of particles diminishes rapidly with time. (*b*) A stable period in which the decrease in number is slow. During the first period the increase in size is very marked; the changes are not due to evaporation but to a process of aggregation, which produces complexes of different structure depending on the nature of the dispersed substance.—R. **Whytlaw-Gray** and J. B. **Speakman**: Smokes. Pt. II.: A method of determining the size of the particles they contain. A filtration method is used which enables the concentration in weight of the suspended solid matter in rapidly changing smokes to be determined with an accuracy of about 3 per cent. A given volume of smoke (usually 1 litre) is filtered through small tubes containing asbestos, and the increase in weight is ascertained by a micro-balance sensitive to 0·0002 mgm. Filtration takes about five minutes. Curves have been obtained showing the variation in weight concentration of the smoke over periods of 0-6 hours. Knowing the weight and the number of the particles in a given volume, the average mass of a smoke particle at different periods can be calculated and the growth followed quantitatively. Assuming the density of the particle to be that of the substance in bulk the average radius can be evaluated. All the weight-concentration curves show an initial rise, and this fact, in conjunction with ultra-microscopic observations, renders it probable that all these clouds contain in the early stages a large number of invisible particles of a microscopic size.—R. C. **Ray**: The effect of long grinding on quartz (silver sand). When quartz (silver sand) is ground for a long time the density of the ground substance is lower than the one which has not been subjected to grinding. The fall of density shows that as much as 25·7 per cent. of the material is converted from the crystalline to the vitreous condition. This value agrees fairly with that derived from the molecular heats of solution.

Geological Society, January 10.—Prof. E. J. Garwood, vice-president, and afterwards, Prof. A. C. Seward, president, in the chair.—W. J. **Sollas**: Man and the ice-age. Four ancient coast-lines of remarkably constant height have been traced around the Mediterranean Sea and along the western shores of the North Atlantic Ocean. These, with their associated sedimentary deposits, form the successive stages of the Quaternary system; namely, the Sicilian (coast-line about 100 metres); the Milazzian (coast-line about 60 m.); the Tyrrhenian (coast-line about 30 m.); and the Monastirian (coast-line about 20 m.) The Sicilian deposits contain a characteristic cold fauna. The fauna of the Milazzian is warm-temperate and of the Tyrrhenian and Monastirian still warmer. The three lower coast-lines correspond with the three lower river-terraces of the Isser (Algeria), the Rhône, and the Somme. Hence it may be inferred that the position of the river-terraces has been determined by the height of the sea-level. The climate of the Quaternary age was, on the whole, warm-temperate or genial, but interrupted by comparatively short glacial intervals. It is now possible to assign the palæolithic stages of human industry to their place in the Quaternary system: thus the "Strepyan" or pre-Chellean is Milazzian in age, the typical Chellean, Tyrrhenian, the evolved Chellean, Acheulean, and Lower Mousterian, early Monastirian, and the Upper Mousterian, Aurignacian, Solutrian, and Magdalenian, later Monastirian. The coast-lines of the Northern Hemisphere appear to have their counterparts in the Southern Hemisphere. The Quaternary movements are probably due to a general deformation of the globe involving eustatic changes in the level of the sea.

Optical Society, January 11.—C. **Davidson**: On the amount of the displacement in gelatine films shown by precise measurements of stellar photographs. A stellar photograph consists of a number of minute discs scattered over an otherwise transparent plate. The purpose of the photograph is to determine with precision the relative positions of these discs. In the trigonometrical method of determining stellar parallaxes photographs of a selected region are taken at two epochs about six months apart when the earth is at opposite sides of its orbit. A new star will show a displacement relatively to the distant stellar background. A series of such photographs give equations from which the parallax and proper motion are determined. After the computed quantities have been taken out, each plate will show a small residual error made up of errors of measurement, observing, etc., and film displacement. From a discussion of many plates from Greenwich it appears that the average probable error of the measured position of a star on a single plate is $\pm 0{\cdot}0008$ mm. Film displacement being only a part of the total it follows that this must be the upper limit of the probable error of film displacement. In the Kapteyn system of observation, the photographs at the two epochs are taken on

the same plate, which is stored away during the interval and developed after the second exposure. It was arranged that the images fell near each other (within 1 mm.—they were, however, too small for the Ross effect to come into action) and only the small differences separating the images were measured, any film displacement which would affect both images equally, consequently disappearing. This method has now been given up in favour of single plates, but a number of the Kapteyn pairs have since been measured treating each photograph as a separate plate. From a discussion of the residuals of some 300 plates the film error is ±0·0003 mm.

The Faraday Society, January 15.—Sir Robert Robertson, president, in the chair.—E. W. J. **Mardles**: Study of the reversible sol to get transition in non-liqueous systems. Pt. 1: The change of viscosity with time during gelation. The viscosity value of a sol during its gelation is dependent on the method and conditions of its determination, and since the system is heterogeneous, it loses its real significance. The change of apparent viscosity with time during the gelation of a sol of cellulose acetate in benzyl alcohol can be expressed by an empirical formula. The temperature, when the rate of gelation becomes nil, is regarded as the maximum gelation temperature, since above it the sol is relatively stable with time and below it a part or whole of the dispersed particles aggregate to form a gel structure. The relation between the maximum gelation temperature and concentration resembles that between temperature and the saturation concentration for crystalloids. Pt. 2: Viscosity changes associated with the gel to sol transition. These have been measured at various temperatures and with different concentration systems of cellulose acetate in benzyl alcohol. The viscosity at first rapidly diminishes; the rate of change becoming smaller until a constant value is obtained. The minimum temperature at which there is a complete return to the original viscosity of the sol without mechanical treatment is termed the minimum solation temperature. Mechanical treatment hastens solation in the same way that it retards gelation. The time taken for a system to attain constant viscosity or mobility depends on the previous treatment of the gel. The hysteresis effect observed during the sol⇌gel transition can be measured by the difference in the temperature of minimum solation from that of maximum gelation, and the cause of it has been ascribed to the different conditions of the particles in the gel and sol state.—E. W. J. **Mardles**: Changes of volume and refractive index associated with (*a*) the formation of organosols and gels; (*b*) the reversible sol to gel transition. In general, the volume changes are largest (*a*) at the lower concentrations, (*b*) with the best solvents and optimum solvent mixtures, and (*c*) at higher temperatures. They are much smaller than those observed by other workers for hydrosols and gels. The reversible sol to gel transition is associated with a small volume change which varies with time as in the case of the Tyndall number changes. There are also indications of a change of refractive index corresponding to the volume and Tyndall number changes during the reversible sol to gel transition.—E. W. J. **Mardles**: The scattering of light by organo-sols and gels of cellulose acetate. Measurements of the change with temperature of the Tyndall number of sols and gels of cellulose acetate in benzyl alcohol during the reversible sol to gel transition show that with fall in temperature of the sol the rate of change is small until a certain critical temperature, after which it increases with acceleration. Eventually there may be a point of inflexion on the curve, the position of which depends on the rate of cooling, and is determined by the formation of a firm jelly structure which inhibits the development of opalescence. The Tyndall number of a gel is a function of the mechanical treatment as well as rate of gelation and it varies with time, the rate of change rapidly diminishing in absence of mechanical treatment. A gel tends to increase its Tyndall number, and mechanical treatment may induce opalescence. The Tyndall number-concentration curve contains a maximum which tends to disappear at higher temperatures, thus the size of the particles in a gel structure is a function of the concentration and the temperature at which it was formed. The curve resembles Tammann's curve relating the number of crystallisation nuclei, or rate of crystallisation, with the degree of supersaturation.—J. R. **Partington** and W. J. **Shilling**: The variation of the specific heat of air with temperature. The velocity of sound in the gas contained in a large silica tube arranged as an electrically heated furnace was measured at intervals of approximately 100° C., from room temperature up to 1000° C. The values obtained up to 700° C. lie practically on the line given by $C_v = 4{\cdot}849 + 0{\cdot}000358T$ grm. cal. Above 700° C_v appears to increase more rapidly with temperature, but at present the values above 800° are uncertain.

Royal Anthropological Institute, January 16.—Dr. F. C. Shrubsall, treasurer, in the chair.—Mr. M. **Addison**: Human heads carved in steatite from Sierra Leone. The Mende tribes, in whose territory the heads were obtained, know nothing of their origin, but although the heads exhibit certain characteristics, such as nose- and ear-rings and long drooping moustaches, which do not occur among the inhabitants of the district at the present day, it is not probable that they are of a very high antiquity, their age possibly being two or three hundred years. Among the Mende the heads are used for magical purposes, and, placed on mounds in the fields, are thought to increase the fertility of the crops.—F. W. H. **Migeod**: The Bedde group of tribes of Northern Nigeria. Though extending from Lake Chad as far as the City-State of Hadeija the Bedde are not a well-known people. They have the legend that they originated in Yemen in Arabia and that they were the first people driven out of Arabia in consequence of their refusal to accept Mohammedanism. The Western-most branch of the Bedde, the Awuyoka, have a list of kings going back to the 12th century. The language shows no traces of an Arabian origin. The Bedde live in round huts grouped in compounds, and formerly all the towns were surrounded by a rectangular mud embankment, but most of the defensive works are now in ruins. Swords, spears, and bows and arrows are the offensive weapons. Children are named by the father, but there are fixed names for twins, male and female. Marriage may take place into any family. Corpses are buried on the right side with head to the south and so facing east, the hands being drawn down and placed together. The Bedde seem to be very superstitious and to believe in omens. They are divided up into animal tribes such as Leopard, Hippopotamus, etc., which form a bond outside family life. No worship is offered to the tutelary animal, but it must not be killed or eaten by those who bear its name. The people now nearly all wear gowns of cotton like the Hausas or Bornuese. They slash or cut their faces with a main design and subsidiary marks. The men shave their heads but the women indulge in fancy head-dressing. They are not a short race. They usually have broad faces, some being very broad across the cheek-bones, and usually have heads low above the ears and receding foreheads; but there is great variety.

Royal Microscopical Society, January 17.—Prof. F. J. **Cheshire**: The early history of the polariscope and the polarising microscope (presidential address). The early history of double refraction, from 1669, when Bartholinus first received specimens of spar from the Bay of Roërford in Iceland, up to 1808, when Malus, by a happy chance, made the wonderful discovery of polarisation by reflection, and the identity of the light thus produced with the refracted beams given by Iceland Spar, was discussed. The difficulty was considered of explaining double-refraction on Huygens' undulatory theory, disposed of by Fresnel in 1821, who abandoned the theory of longitudinal vibrations, and substituted transverse ones for them, after having proved, with Arago in 1816, that oppositely polarised beams do not interfere in the same way that Young had shown beams of ordinary light do. The work of Brewster and Biot was referred to, and some account given of the extraordinary amount of work done between Malus's discovery in 1808, and the invention of the Nicol prism in 1828, from which date the modern microscope dates. In the early days the polarising microscope was employed primarily for the examination of general objects, whereas the application of the petrological microscope to the systematic study of rock-sections dates no further back than 1870. Various forms of polariscopes, including a remarkable one invented by Airy in 1831, were described, and possibilities of further improvements discussed. It was urged that the work of Herapath and others in the production of artificial tourmalines should be again taken up. Finally, to meet the present difficulties of supplying students' microscopes it was urged that teachers and manufacturers should come to an agreement as to the simplest possible designs with which the students' work could be done.

PARIS.

Academy of Sciences, January 8.—M. Albin Haller in the chair.—A. **Haller** and R. **Lucas**: Study of the absorption in the ultra-violet of a series of derivatives of camphor. Certain derivatives of camphor of the type $C_8H_4\begin{cases}C=CH\,.\,R\\ |\\ CO\end{cases}$ show anomalies in their optical properties (dispersion, molecular refraction, rotatory power) compared with the corresponding reduction products. Seven substances of the first type and two of the second have been studied from the point of view of their ultra-violet absorption spectra, and the results given in the form of the curves suggested by Lord Rayleigh.—P. A. **Dangeard** and Pierre **Dangeard**: The vitality of Aucuba leaves preserved in a vacuum. An adult leaf of Aucuba placed in a vacuum and exposed to light during six months preserved all its cells alive, and no important difference could be detected between the structure of these cells and that of the leaves remaining on the tree.—Th. **Anghelutza**: The representation of functions of one real variable.—Gaston **Julia**: Rational substitutions with two variables.—J. F. **Ritt**: Rational permutable functions.—G. V. **Pfeiffer**: A special method of integration of partial differential equations of the first order.—Torsten **Carleman**: The effective calculation of a quasi-analytical function, the differentials at a point being given.—Emile **Borel**: Remarks on the preceding note of M. Torsten Carleman.—Paul **Dienes**: Transfinite series of real numbers.—Tadé **Wazewski**: Measurable *ensembles*.—G. **Bratu**: Curves defined by recurrent series.—J. **Chuard**: Some properties of cubical networks traced on a sphere.—David **Wolkowitsch**: The infinitely small movements at a point of an elastic body admitting a plane of symmetry. Charles **Frémont**: The influence of the velocity of impact in the calibration of dynamometer springs. The experiments were arranged with falling weights so chosen that the product of the weight by the height fallen remained constant. The deflections of the spiral spring increased as the velocity of impact diminished: the anomalous result is due to the inertia of the spring.—J. **Guillaume**: Observations of the sun made at the Observatory of Lyons during the third quarter of 1922.—R. **Lucas**: Natural and magnetic rotatory power. If a substance possessing natural optical activity is suitably placed in a magnetic field, the substance acquires a complex rotatory power. The question as to whether there is simple additivity of the two rotatory powers, or whether the two phenomena exert a mutual influence on each other is investigated mathematically, and the conclusion is arrived at that the change in the natural rotatory power produced by the action of the magnetic field would be too small to put in evidence experimentally.—A. **Catalán**: The structure of the arc spectra of the elements of columns VI and VII of the periodic table.—G. **Reboul** and P. **Blet**: The different aspects of the electrical discharge in crystals.—A. **Grumbach**: Batteries with fluorescent liquid. If two platinum electrodes dip into a fluorescent solution and one of them is illuminated, an electromotive force is produced which varies with time. Some experimental results with solutions of uranine in water are given proving that Goldmann's explanation of the phenomenon is inadequate.—A. **Bigot**: The action of heat on kaolins, clays, etc. Ceramic plastic materials, under the action of heat, harden without dehydration and without change of volume. The colloidal plasticity is reduced by this heating.—Roger G. **Boussu**: A method for studying the velocity of formation of precipitates.—F. **Bourion**: The normal acids of Berthelot and the theory of ions.—Henri **Bénard** and Albert **Laborde**: The estimation of albumen by nephelemetric methods.—Mlle. S. **Veil**: The evolution of the molecule of ferric-hydroxide in water: the dehydration of ferric-hydroxide by ignition or by heating with water in sealed tubes to temperatures between 120° C. and 210° C. has been co-ordinated with the changes produced in the magnetisation coefficient.—B. **Bogitch**: The removal of sulphur from metals by lime. A study of the decomposition by lime, in the presence of carbon, of some metallic sulphides dissolved in the fused metal. Copper, nickel, iron, and manganese were studied, the action of lime and basic slag being examined separately. A mixture of lime and fluorspar gave the best results.—Mlle. de la **Paulle**: The estimation of potash as alum.—R. **Douris** and G. **Beytout**: The mercuric compounds of hexamethylenetetramine.—Carl **Störmer**: Results of the photogrammetric measurements of the aurora borealis of March 22-23, 1920. The greatest altitude measured was 750 kilometres; in no case was the height less than 100 kilometres.—Octave **Mengel**: New seismotectonic views, resulting from the earthquakes felt between August and December 1922, in the eastern part of the Pyrenees.—M. **Stefanescu**: The growth in two opposite directions, and the marks of friction and pressure, of the molars of mastodons and elephants.—L. **Joleaud**: Sub-fossil hippopotami of Madagascar and the recent geographical connexions of this island with the African continent.—Albert **Baldit**: The undulatory movements of the atmosphere and their utilisation in aviation without a motor.—Jean **Mascart**: The quantity of heat received by the earth in the course of the seasons.—F. **Diénert**: Considerations on the formation of springs.—J. **Cluzet** and A. **Chevallier**: The use of thorium emanation in inhalation. By utilising radiothorium from the sludge

derived from the Echaillon springs, thorium emanation has been used directly by inhalation, and the therapeutic results obtained proved to be comparable with those given by other methods of treatment.—Jean **Bathellier**: The fungus gardens of *Entermes Matangensis*. These ants cultivate fungi (identified as a Xylaria) in special chambers.—G. **Marinesco**: Oxidising ferments and thermogenesis.—F. **Vlés**, J. **Dragoin**, and M. **Rose**: Researches on the hydrogen-ion concentration arrest of egg division in the sea urchin.—L. J. **Simon** and L. **Zivy**: The mixture of tartrates and phosphates regarded as buffer substances. The antagonistic action of calcium chloride.—Emile **Misk**: Tin in the human organism. Reference is made to the frequent presence of traces of tin in preserved foods. Tin appears to be present in the human body, the largest proportion being found in the liver. From the physiological point of view it is interesting to note that the body appears to contain normally at least as much tin as zinc.—Boris **Ephrussi**: The spermatogenesis of *Balanus perforatus*.—A. **Trillat**: The different properties of dry or liquid bacterial dusts.—C. **Levaditi** and S. **Nicolau**: Inoculation of the herpetic virus in the genital organs of the rabbit. Transmission of the herpeto-encephalitic infection by sexual contact.

Official Publications Received.

Memoirs of the Asiatic Society of Bengal. Vol. 8, No. 1: Ismailitica. By W. Ivanow. Pp. 76. (Calcutta: Asiatic Society of Bengal.) 2 rupees; 3s.

City and County of Bristol: The Bristol Museum and Art Gallery. Report of the Museum and Art Gallery Committee for the Year ending 30th September 1922. Pp. 23. (Bristol.)

Diary of Societies.

MONDAY, FEBRUARY 5.

ROYAL INSTITUTION OF GREAT BRITAIN, at 5.—General Meeting.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Prof. H. E. Griffiths: The Relation of Diseases of the Gall Bladder to the Secretory Function of the Stomach and Pancreas.

SOCIETY OF ENGINEERS, INC. (at Geological Society), at 5.30.—A. Collis-Brown: Practical Notes on Inspection.

INSTITUTE OF TRANSPORT (at Institution of Electrical Engineers), at 5.30.—H. N. Gresley: Wagon Stock on British Railways.

INSTITUTION OF ELECTRICAL ENGINEERS (Informal Meeting), at 7.—J. Coxon and others: Discussion, The Supply of Steady D.C. for Telephonic and other Purposes.

ARISTOTELIAN SOCIETY (at University of London Club), at 8.—Miss May Sinclair: Primary and Secondary Consciousness.

ROYAL SOCIETY OF ARTS, at 8.—Dr. H. P. Stevens: The Vulcanisation of Rubber (Cantor Lectures) (1).

SOCIETY OF CHEMICAL INDUSTRY (London Section) (at Engineers' Club, Coventry Street), at 8.—G. T. Bray and F. Major: The Estimation of Fat in Casein.—Dr. E. Fyleman: Explosions in Liquid Air Rectification Plant.

ROYAL INSTITUTE OF BRITISH ARCHITECTS, at 8.30.—Presidential Address to Students and Presentation of Prizes.

TUESDAY, FEBRUARY 6.

AIR CONFERENCE (at the Guildhall, E.C.), at 10.30.—Maj.-Gen. Sir W. J. Brancker: The Position of Air Transport To-day.—Comdr. C. D. Burney: A Self-supporting Airship Service. At 2.45.—Air Vice-Marshal Sir W. G. H. Salmond: The Progress of Research and Experiment.—Col. A. Ogilvie: Gliders and their Value to Aeronautical Progress.—C. R. Fairey: Seaplanes.

INSTITUTION OF HEATING AND VENTILATING ENGINEERS (Annual General Meeting) (at the Holborn Restaurant), at 2.30.—Prof. W. E. Garner: Theory of Combustion of Gaseous and Liquid Fuels.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—R. D. Oldham: The Character and Cause of Earthquakes (2).

ROYAL SOCIETY OF ARTS (Dominions and Colonies and Indian Sections), at 4.30.—Sir Richard A. S. Redmayne: The Base Metal Resources of the British Empire.

ZOOLOGICAL SOCIETY OF LONDON, at 5.30.—The Secretary: Report on the Additions made to the Society's Menagerie during the months of November and December 1922.—E. G. Boulenger: Account of Experiments on Amphibians and Insects at Vienna.—C. A. A. Dighton: Coat-colour in Greyhounds.—E. L. Gill: The Permian Fishes of the Genus Acentrophorus.—Dr. C. F. Sonntag: The Vagus and Sympathetic Nerves of the Terrestrial Carnivora.—E. P. Allis, Jr.: The Postorbital Articulation of the Palato-quadrate with the Neurocranium in the Cœlacanthidæ.—Dr. G. S. Giglioli: The Linguatulid Arachnid, *Raillietiella furcocerca* (Diesing, 1835), Sambon, 1922.—Rita Markbreiter: Some *Microfilaria* found in the Blood of Birds dying in the Zoological Gardens, 1920-1922.

INSTITUTION OF CIVIL ENGINEERS, at 6.—D. H. Remfry: Wind-Pressures, and Stresses caused by the Wind on Bridges.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—Major O. Rutter: The Natives of North Borneo.

RÖNTGEN SOCIETY (at Institution of Electrical Engineers), at 8.15.

WEDNESDAY, FEBRUARY 7.

AIR CONFERENCE (at the Guildhall, E.C.), at 10.30.—General Discussion on the Papers read in the morning of February 6. At 2.45, General Discussion on the Papers read in the afternoon of February 6.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Prof. G. Keynes: Chronic Mastitis.

GEOLOGICAL SOCIETY OF LONDON, at 5.30.—G. V. Douglas: The Geological Results of the Shackleton-Rowett (*Quest*) Expedition.

NEWCOMEN SOCIETY (at Alpine Club), at 5.30.—G. P. Baker: East Indian Cotton Prints and Paintings of the 17th and 18th Centuries.

INSTITUTION OF ELECTRICAL ENGINEERS (Wireless Section), at 6.—J. Hollingworth: The Measurement of the Electric Intensity of Received Radio Signals.

SOCIETY OF PUBLIC ANALYSTS AND OTHER ANALYTICAL CHEMISTS (Annual General Meeting) (at Chemical Society), at 8.—Presidential Address.—O. Jones: Notes on the Examination of Preserved Meats, etc.—E. Griffiths-Jones: Titanium in Nile Silt.

ROYAL SOCIETY OF ARTS, at 8.—C. R. Darling: Electrical Resistance Furnaces and their Uses.

FELLOWSHIP OF MEDICINE (at Royal Society of Medicine), at 8.30.—J. P. Lockhart-Mummery: Diverticulitis.

THURSDAY, FEBRUARY 8.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. I. M. Heilbron: The Photosynthesis of Plant Products (2).

ROYAL SOCIETY, at 4.30.—Prof. L. Bairstow, Miss M. B. Cave, and Miss E. D. Lang: The Resistance of a Cylinder moving in a Viscous Fluid.—G. I. Taylor: The Motion of Ellipsoidal Particles in a Viscous Fluid.—L. F. Richardson: Theory of the Measurement of Wind by Shooting Spheres Upward.—Prof. W. E. Dalby: Further Researches on the Strength of Materials.—L. C. Jackson and Prof. H. Kamerlingh Onnes: Investigations on the Paramagnetic Sulphates at Low Temperatures.—L. C. Jackson and Prof. H. Kamerlingh Onnes: Investigations on the Paramagnetism of Crystals at Low Temperatures.—Prof. E. Wilson: The Susceptibility of Feebly Magnetic Bodies as affected by Tension.—W. D. Womersley: The Specific Heats of Air, Steam, and Carbon Dioxide.

WOMEN'S ENGINEERING SOCIETY (26 George Street, W.1.), at 6.15.—E. W. C. Kearney: The Kearney High-speed Railway.

OPTICAL SOCIETY (Annual General Meeting) (at Imperial College of Science and Technology), at 7.30.—Sir Frank Dyson: Large Telescopes (Presidential Address).—Discussion on paper by F. W. Preston: The Properties of Pitch used in Working Optical Glass. A new *prismatic astrolabe* designed at the Admiralty Research Laboratory exhibited and described by Commdr. T. Y. Baker.

CAMERA CLUB, at 8.15.—C. H. L. Emanuel: Notes of a Collector of Prints and Drawings.

INSTITUTE OF METALS (London Local Section) (at Institute of Marine Engineers, Inc.), at 8.30.—Miss M. L. V. Gayler: The Investigation of the Constitution of Alloys.

FRIDAY, FEBRUARY 9.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Anniversary.

PHYSICAL SOCIETY OF LONDON (Annual General Meeting) (at Imperial College of Science and Technology), at 5.—Sir William Bragg: The Crystalling Structure of Anthracene.—Capt. H. Shaw and E. Lancaster-Jones: The Eötvös Torsion Balance.—H. W. Heath: Demonstration of the Flame Phone.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Prof. L. R. Rawling: Remote Effects of Gun hot Wounds of the Head.

MALACOLOGICAL SOCIETY OF LONDON (at Linnean Society), at 6.

INSTITUTION OF MECHANICAL ENGINEERS, at 6.—Adjourned Discussion on Symposium of Papers on Indicators:—L. Pendred: The Problems of the Engine Indicator.—Prof. F. W. Burstall: A New Form of Optical Indicator.—W. G. Collins: Micro-Indicator for High-Speed Engines.—H. Wood: R.A.E. Electrical Indicator for High-Speed Internal-Combustion Engines, and Gauge for Maximum Pressures.

JUNIOR INSTITUTION OF ENGINEERS, at 7.30.—Prof. F. C. Lea: The Effect of Temperature on the Properties of Engineering Materials.

PHILOLOGICAL SOCIETY (at University College), at 8.—J. Hodgkin: Macaronic Poetry.

ROYAL INSTITUTION OF GREAT BRITAIN, at 9.—Sir John Russell: "Rothamsted" and Agricultural Science.

PUBLIC LECTURES.

SATURDAY, FEBRUARY 3.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—F. Balfour-Browne: Insect Pests and their Control.

MONDAY, FEBRUARY 5.

KING'S COLLEGE, at 5.—N. B. Jopson: The Original Home of the Slavs.

UNIVERSITY COLLEGE, at 5.—Sir John Russell, and staff of the Rothamsted Experimental Station: The Micro-Organic Population of the Soil (succeeding Lectures on February 7, 12, 14, 19, 21, 27, March 1, 5, and 7).

TUESDAY, FEBRUARY 6.

GRESHAM COLLEGE, at 6.—W. H. Wagstaff: Geometry (succeeding Lectures on February 7, 8, and 9).

WEDNESDAY, FEBRUARY 7.

KING'S COLLEGE, at 5.30.—Dr. J. S. Haldane: The Fundamental Conceptions of Biology.

THURSDAY, FEBRUARY 8.

UNIVERSITY COLLEGE, at 5.30.—G. A. Sutherland: The Acoustics of the Auditorium. (Succeeding Lectures on February 15 and 22.)

CENTRAL LIBRARY (Fulham), at 8.—MRS. G. Skelton: Women and Industry.

FRIDAY, FEBRUARY 9.

UNIVERSITY COLLEGE, at 8.—Miss E. Jeffries Davis: The Evolution of London (succeeding Lectures on February 16 and 23).

SATURDAY, FEBRUARY 10.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—E. Lovett: Household Appliances of a Hundred Years Ago.