

Calendar of Industrial Pioneers.

November 26, 1836. John Loudon McAdam died.—The great improver of road-making, McAdam began his experiments in Ayrshire, continued them at Falmouth, where he was a contractor for the Navy, and in 1815 was made surveyor general of the Bristol roads, where he introduced the method of forming a bed of stones broken into angular pieces. His process was gradually adopted with great advantage to commerce in all parts of the world.

November 27, 1811. Andrew Meikle died.—A millwright of Houston Mill, Dunbar, Meikle was the inventor of the modern type of threshing-machine. His machine is said to have saved this country 2,000,000*l.* per annum. In 1784 he conceived the idea of drums armed with beaters, and the first machine was made in 1786. He continued to improve it, but reaped little pecuniary benefit from his invention. In 1809 a subscription for him realised 1500*l.*

November 28, 1894. Sir Henry Hussey Vivian, first Baron Swansea, died.—The son of a merchant connected with the copper-smelting industry, Vivian, after leaving the University of Cambridge, directed works at Swansea, patented improvements in metallurgy, and introduced the manufacture of spelter and the production of nickel and cobalt. Through his efforts Swansea became "the metallurgical centre of the world." Vivian was remarkable for his energy and ability; he took part in local and national affairs, and after sitting in Parliament for many years was, in 1893, raised to the peerage.

November 29, 1766. John Wyatt died.—With Lewis Paul, Wyatt is credited with the important invention of spinning by machinery. Originally a carpenter in his native village near Lichfield, he afterwards entered the employ of Matthew Boulton. The compound weighing-machine now in general use and the roller bearing were invented by him.

November 30, 1866. John Mercer died.—Born in Lancashire in 1791, Mercer began work at nine as a bobbin-winder and became a hand-loom weaver. He studied mathematics and chemistry, became known for his experiments in dyeing, and, from 1825 to 1848, was partner with Fort Brothers. He contributed to the chemistry of dyeing, propounded a rational theory of catalytic action, and in 1850, after a long series of experiments, discovered the process of "mercerising."

November 30, 1906. Sir Edward James Reed died.—One of the foremost naval architects of his time, Reed was trained as a shipwright in the Royal Dockyards. In 1860 he became the first secretary of the Institution of Naval Architects, and in 1863, at the age of thirty-three, was made chief constructor of the Navy, a post he held till 1870. He introduced the belt and battery system and designed H.M.S. *Devastation*, the first mastless sea-going turret iron-clad. He afterwards designed many notable vessels for foreign navies, and as a public man was a strenuous advocate of scientific and technical education.

December 1, 1850. Aaron Manby died.—The builder of the first iron steam vessel to make a sea voyage, Manby founded the Horseley Iron Works at Tipton, Staffordshire, where, in 1821, he built the *Aaron Manby* of iron. This vessel was sent to London in pieces, put together in the Surrey Canal Dock, and in June 1822 crossed the Channel, taking a cargo of iron castings to Paris. Manby in 1819 established important engineering works at Charenton, supplied some of the earliest engines for the French Navy, and took a prominent part in the lighting of Paris by gas.

E. C. S.

Societies and Academies.

LONDON.

Royal Society, November 16.—Sir Charles Sherrington, president, in the chair.—A. S. Eddington: The propagation of gravitational waves. The potentials given in Einstein's theory represent not only the absolute gravitational disturbance of the field, but also the metric of the co-ordinate system which is to a great extent arbitrary; consequently the speed of propagation of the potentials is not necessarily the speed of the absolute disturbance. Einstein showed that, when the co-ordinate frame is chosen subject to a certain restriction, the potentials are propagated with the speed of light. Considering the propagation of plane waves on unrestricted co-ordinates, it is found that "transverse-transverse" waves continue to have the speed of light, whereas the other two types of waves have no fixed speed when Einstein's restriction is removed. The latter types do not correspond to any absolute disturbance of the field. Of the three conceivable types of transverse-transverse waves, one is inconsistent with the equations of entirely empty space, $G_{\mu\nu} = 0$; but this type nevertheless commonly occurs in Nature, namely, as a propagation of gravitational disturbance by light-waves. Divergent waves are also considered. Although the equations correspond to those of sound-propagation, no uniform spherical waves of gravitation can occur; they must always be complicated by doublet-sources for some of the components. The waves emanating from a spinning rod are worked out in detail, and it is found that (in agreement with Einstein) the rod must slowly lose energy by these waves; for a typical example the period of decay of the rotation is found to be of the order 10^{85} years.

—J. H. Jeans: The theory of the scattering of α - and β -rays. A theory of scattering is developed in which both the feeble encounters of the theory of multiple scattering and also the violent encounters of the theory of single scattering are taken into account. The presence of single scattering produces very nearly the same effect as can be produced by a suitable adjustment of the constants in the law of multiple scattering, and this renders the separate experimental study of single scattering very difficult.

—A. P. Chattock and L. F. Bates: On the Richardson gyro-magnetic effect. Richardson has shown that the angular momentum arising in a ferro-magnetic substance from unit change in its magnetic moment should have the value of 1.13×10^{-7} if gyrating electrons are responsible for its magnetism. Measurements of this quantity by the ballistic method for three specimens of iron and one of nickel are given. The results, divided by 1.13×10^{-7} , agree to within $1\frac{1}{2}$ per cent. with one another, and their mean is 0.6 per cent. greater than 0.500. Close proportionality also exists between the change of magnetic moment and the angular momentum resulting. The specimen used consisted of an upright wire suspended by a quartz fibre. By the introduction of a hinged joint between wire and fibre the adjustment of the magnetic axis of the wire to the vertical is much facilitated, and measurements were made on reversal of magnetism instead of on merely reducing it to zero. The more perfect symmetry resulting from this procedure may be the cause of the more consistent results obtained. The effect on the results of the eddy currents in the specimen was not more than a small fraction of 1 per cent. for the specimens used. At high dampings the ordinary damping correction gives values that are too large.—P. M. S. Blackett: On the analysis of α -ray photographs. A large

number of photographs were taken of the ends of the tracks of α -rays from polonium in both air and argon, using C. T. R. Wilson's expansion method. There are sudden bends made by the tracks due to collision with the atomic nuclei, and the actual form of these bends is obtained from measurements of the double images given by the special camera designed for the work by Shimizu. The frequency of occurrence of bends of given type are consistent with the existence of an inverse-square law of force between the α -particles and the nuclei, when their distance apart lies between 6×10^{-12} and 10^{-9} cm. for argon, and 3×10^{-12} and 5×10^{-10} cm. for air. The velocity of the α -particles along the latter part of their tracks was also calculated from the frequency of the bends and found to be much lower than had been expected. Velocities so low as 10 cm. per second were obtained, and the relation connecting the velocity v and the range r was found to be roughly of the form $v \propto 2\frac{2}{3}$, instead of the form $v \propto 2\frac{1}{2}$ found by Marsden and Taylor for the early part of tracks by other methods. No anomalous effects were discovered as regards frequency or type of collision.—**J. H. Jones**: The kinetic energy of electrons emitted from a hot tungsten filament. When allowance is made for experimental and secondary effects the distribution of energy agrees with that given by Maxwell's law. Of experimental errors the most serious are probably due to difficulties of measuring the small currents involved and the temperatures. These lead to uncertainties which in individual experiments may amount to so much as 10 per cent. The secondary effects probably arise from contamination of the heated surfaces. This tends to increase the apparent energy of electrons emitted and the increase may amount to so much as 20 per cent. The abnormal electron energies found by Ting, which were as much as 100 per cent. in excess of the Maxwell distribution value, do not appear under satisfactory experimental conditions.—**W. Wilson**: The quantum theory and electromagnetic phenomena. From the point of view of the quantum theory such systems as atoms possess stationary states which are subject to conditions expressed by the equations—

$$\oint p_s dq^{(s)} = n_s h.$$

The paper is chiefly concerned with an extended form of these quantum restrictions in which the momenta, p_s , are replaced by more general momenta, π_s , involving the components of the vector potential of the external field to which the system is subjected.—**S. Marsh and A. E. Evans**: On measurements of electrode potential drop with direct current and alternating current electrolysis. Electrodes of polished platinum, platinum-black, gold and nickel were used, normal sulphuric acid serving as the electrolyte. With direct current, anodic and cathodic effects were examined; with alternating current, the frequencies ranged from 25 to 80. Experiments were also made with various current densities. With all the metals examined, the cathodic drop increases with time, the curves (especially with polished platinum) resembling saturation curves in radio-activity. The anodic drop decreases at first and then rises similarly to the cathodic curve. With alternating current the electrode drop decreases during an interval depending on the frequency and thereafter increases slightly. The cathodic curves probably represent the effect of occlusion, while the anode curves represent the opposing effects of oxidation and occlusion.

Royal Microscopical Society, October 18.—Prof. F. J. Cheshire, president, in the chair.—**R. Chambers**: New apparatus and methods for the dissection and

injection of living cells. With the new apparatus there is a complete absence of lost motion, and continuous and accurate control of the needle in every direction under an immersion lens. The needle is maintained in one plane while it is being moved. Adjusting devices facilitate placing the needle or micro-pipette in position. The instrument consists essentially of rigid bars which are screwed apart against springs, the movements of the needle tip being in small arcs of a circle with a radius of about $2\frac{1}{2}$ in. There are three horizontal bars which are forced apart by two screws. When the screws are reversed, spring hinges at either end holding the bars together in pairs return them to their original position. A similar pair of vertical bars attached to the horizontal ones controls up and down movements of the needle. With this instrument the most delicate operations in micro-dissection, such as puncturing blood corpuscles or even cutting up chromosomes, can be performed. A new micro-injection apparatus is also described, as well as methods for making the needles and the moist-chamber.

Zoological Society, October 24.—Dr. A. Smith Woodward, vice-president, in the chair.—**J. P. Hill and R. H. Burne**: The foetal membranes and placentation of *Chiromys madagascariensis*.—**R. I. Pocock**: The external characters of the foetus of *Chiromys madagascariensis*.—**R. Kirkpatrick and J. Metzelaar**: On an instance of commensalism between a hermit-crab and a polyzoon.

Society of Public Analysts, November 1.—Mr. P. A. Ellis Richards, president, in the chair.—**C. Ainsworth Mitchell**: The colorimetric estimation of pyrogallol, gallotannin, and gallic acid. A ferrous tartrate reagent is used. The violet coloration produced is due to the pyrogallic group and, applied quantitatively, affords a measure of that group in different compounds. The reaction throws light on the constitution of gallotannin; the results for tannin from China galls are more in accordance with the formula recently suggested by Nierenstein than with that previously accepted. To estimate gallotannin in the presence of gallic acid the substances are estimated together colorimetrically in terms of gallic acid or pyrogallol. The tannin is then precipitated with quinine hydrochloride and the gallic acid estimated in the filtrate. The difference between the two results, multiplied by a factor, gives the gallotannin. The method has been applied to the estimation of tannin and gallic acid in various natural and commercial products.—**H. E. Annett and M. N. Bose**: The estimation of narcotine and papaverine in opium. Small quantities of opium (1-2 grams) only were available from plants used in selection experiments on the poppy. In estimating narcotine and papaverine an old observation of Plugge's, that on addition of sodium acetate to an aqueous opium extract, narcotine, papaverine, and narceine are precipitated, was used. Given the right conditions, the first two are precipitated completely; the narceine carried down can be washed away with water, and in the washed precipitate after further purification narcotine can be estimated polarimetrically.—**H. E. Annett and R. R. Sanghi**: The estimation of codeine. Codeine is extracted by toluene from an aqueous alkaline extract of opium, converted into the hydrochloride, purified by re-extraction with toluene, and finally converted into hydrochloride and weighed as such. The process is an improvement of that previously described by Annett and Son.—**J. R. Nicholls**: The estimation of morphine. If a 50 per cent. alcoholic solution containing morphine liberated by means of ammonia is shaken with half its volume of chloroform,

about 85 per cent. of the total morphine is in the lower layer; 2 such extractions remove more than 99 per cent. The alcohol retards or prevents the crystallisation of the base from the upper layer, and ensures a rapid separation.—R. L. Morris: Further notes on the estimation of potassium: by perchlorate and cobaltinitrite methods. A modification for the direct estimation of potash in the presence of phosphates of calcium, magnesium, iron, etc., is described. Sulphates should be removed by precipitation with barium chloride. Drushel's modification of the cobaltinitrite-permanganate process gives trustworthy results. Half-saturated sodium chloride solution should be used for the final washing of the precipitate.

EDINBURGH.

Royal Society, November 6.—Prof. F. O. Bower, president, in the chair.—J. H. Ashworth: On *Rhinosporidium seeberi*, with special reference to its sporulation and affinities. *Rhinosporidium seeberi* is parasitic in the connective tissue of the nasal septum of man, and causes proliferation resulting in the production of polypoid growths, a case of which has been under observation for four and a half years. The trophic stages of *Rhinosporidium* may be intracellular, but the great majority lie between the connective tissue cells. As growth proceeds, granules of protein and fat-globules appear in the cytoplasm and increase in number and in size. When the organism approaches 0.1 mm. in diameter the nucleus divides by mitosis. There are four chromosomes. Other nuclear divisions follow; the nuclei (with few exceptions) divide synchronously. About the time 128 nuclei are present the cell-wall, hitherto chitinous, becomes much thickened, except at one point, by deposition of cellulose on its inner surface. The nuclear divisions continue, and, after the twelfth, cleavage of the cytoplasm takes place and rounded cells are formed, which undergo two further divisions to form the spores (about 16,000). Usually a proportion of these are arrested in development, but the remainder enlarge, and in each, ten to sixteen refringent spherules of protein are formed in vacuoles in the cytoplasm. By this time the sporangium has reached a diameter of 0.25 to 0.3 mm.; its wall has become stretched, and at the point where cellulose was not deposited the wall eventually gives way, and the spores are launched into the tissues or escape through the ruptured surface of the polypus to the exterior. The spores which become lodged in favourable positions in the connective tissue grow, become sporangia, and produce a fresh crop of spores. Hitherto the nature of the spore has been misunderstood—the refringent spherules have been mistaken for spores. In view of the character of the nuclear divisions and the cellulose envelope of the sporangium, *Rhinosporidium* is regarded, not as a Sporozoon belonging to the Haplosporidia, but as belonging to the lower fungi (Phycomycetes) and in or near the Chytridinea.—J. Stephenson: On some Scottish Oligochaeta, with a note on encystment in a common freshwater oligochaete, *Lumbriculus variegatus* (Müll.). Descriptions of certain new and comparatively little known species of Microdrili are given; the limits of variability in certain organs and systems of the Enchytraeidae are discussed, particularly with reference to *Lumbricillus lineatus* (Müll.); and an account is given of the encystment of *Lumbriculus variegatus* (Müll.), a hitherto-unrecorded occurrence, on the margin of a Scottish loch in the dry summer of 1921.—Elsie I. MacGill: On the life-history of *Aphidius avenae* (Hal.), a braconid parasitic on the Nettle aphid (*Macrosiphum urticae*).

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PARIS.

Academy of Sciences, October 30.—M. Albin Haller in the chair.—M. d'Ocagne: The plane representation of space.—M. de Séguier: The divisors of certain linear Galoisian groups.—C. Camichel: The turbulent regime. An account of some experiments on the turbulent flow of water in tubes.—M. Maggini: The rôle of anomalous dispersion in the spectra of stars. Displacements of lines in the spectrum of a star may be due to pressure, radial velocity (the Döppler effect), anomalous dispersion, or a difference in the potential of gravitation. Displacements have usually been attributed to the Döppler effect, but it is shown that certain cases are more probably due to anomalous dispersion.—R. Goudey: An annual periodic variation of the rate of a pendulum.—M. Giacobini: Observations of the Baade comet, made at the Paris Observatory. Positions of the comet and comparison stars given for October 23, 24, and 25. The comet is small, about 10" in extent, and with a nucleus of about magnitude 12.—P. Chofardet: Observations of the Baade comet (1922c) made with the *coudé* equatorial of the Observatory of Besançon. Two positions are given for October 24.—A. Schaumasse: Observations of the Baade comet, made with the *coudé* equatorial of Nice Observatory. Positions of the comet are given for October 23, 26, 27. It was of 10.5 magnitude, with a nebulosity 1'.5 in diameter, and presenting an elongation in the direction opposed to the sun.—M. Poivilliers: A new "stereo-autograph." A description of a modified stereoscope which permits of the preparation by mechanical means of a plan showing contour lines or vertical sections from two photographs. The scale may be varied at will and the apparatus is suitable for railway surveys.—Louis de Broglie and A. Dauvillier: Analogies of structure between the optical series and Röntgen series of lines. From the point of view of Bohr's theory, the analogy of structure between the optical series and Röntgen series is explained by the fact that the internal levels, K, L, M, etc., respectively are characterised by the same total number of quanta as the first virtual exterior levels at the last electronic layer. These last levels are responsible for the optical series.—A. Sellerio: The axial effects of the magnetic field, analogous with those of Righi-Leduc and Ettingshausen.—Carl Benedicks: A study of the deformability of the photographic layer. It has been proved by astronomers that no sensible deformation of the photographic film takes place in ordinary star photography, but it is possible that the more intense light of the solar corona might produce a deformation and this would seriously affect such delicate measurements as the deviation of light passing through the field of gravity of the sun. The experiments described, designed to measure such a deformation, gave negative results, but the desirability of repeating the work with apparatus capable of giving higher precision is pointed out.—J. A. Muller: The degree of molecular polymerisation of substances at the critical state.—René Dubrisay: The action of boric acid on mannite in alkaline solution. To solutions containing equivalent proportions of boric acid and soda, increasing proportions of mannite were added and measurement made of the temperature of miscibility with phenol, the rotatory power, and the surface tension. No definite conclusions can be drawn from the experimental results. There always remains some soda uncombined, and there would appear to be at least two distinct compounds with mannite in the solutions.—M. Bonnier: The estimation of alkaline carbonates in presence of phenolphthalein. A statement of the

conditions under which solutions of carbon dioxide in caustic soda solutions can be titrated with accuracy.—L. J. Simon: The rôle of chromic oxide in oxidation with chromic and sulphuric acids.—Paul Bertrand: The coal flora of the Sarre coal measures.—R. Legendre: Diurnal variations of the hydrogen ion concentration of sea water near the coast. The hydrogen ion concentration of sea water taken near the coast varies during the day and passes through a maximum at about 3 P.M.—S. Metalnikow: Ten years' culture of infusoria without conjugation.—C. Delezenne and Mlle. Suzanne Ledebt: The transmission in series of the proteolytic power initially conferred on inactive pancreatic juice by enterokinase.—René Wurmser and Raymond Jacquot: The relation between the colloidal state and the physiological functions of protoplasm.—A. Pézard and F. Caridroit: Subrenal-testicular interpenetration in incompletely castrated cocks.—Edouard Chatton and André Lwoff: The evolution of the infusoria of lamellibranchs. The relations between the Hypocoma and Ancistrum. The genus Hypocomidés.—Et. Burnet: The relations between *B. Abortus* and *Micrococcus melitensis*.—J. Dumas, D. Combiesco, and J. Baltiano: The action of the tetanic and diptheric toxins administered by the mouth. Experimental tetanus can be produced in the guinea-pig by adding the tetanus toxin to the food, but the rabbit is resistant. On the other hand, the rabbit is more sensitive than the guinea-pig to the action of the diptheric toxin administered in the same way. These results are not in agreement with the results of other workers, and this is explained by the author by the fact that his preparations contained more of the toxins.

Official Publications Received.

Zeitschrift für angewandte Geophysik. Unter ständiger Mitarbeit zahlreicher Fachgenossen. Herausgegeben von Dr. R. Ambronn. Band 1, Heft 1. Pp. 32. (Berlin: Gebrüder Borntraeger.)

Memoirs of the Indian Meteorological Department. Vol. 23, Part 3: Mean Monthly Characters of Upper-Air Winds deduced from the Flights of Pilot Balloons at Thirteen Stations in India during the Period 1910 to 1919. By J. H. Field. Pp. 41-136. (Calcutta: Government Printing Office.) 2 rupees; 3s.

Report of the Department of Industries, Madras, for the Year ended 31st March 1921. Pp. v+60+ii. (Madras: Government Press.)

Annals of the Transvaal Museum. Vol. 8, Part 4, containing Review of the Nomenclature of South African Birds, by A. Roberts; An Imperfect Skeleton of *Youngina Capensis*, Broom, in the Collection of the Transvaal Museum, by Dr. R. Broom. Pp. 187-276. Vol. 9, Part 1, containing Contributions to our Knowledge of the Dermaptera and Orthoptera of the Transvaal and Natal, by J. A. G. Rehn. Part 1: Dermaptera and Blattidae. Pp. 99-4 plates. Vol. 9, Part 2, containing the Sphingidae of South Africa, by Dr. G. Arnold: New Forms of Lasiocampidae from the Transvaal Museum, by G. Aurivillius. Pp. 101-141. (Cambridge: Printed at the University Press.)

Transactions of the Rochdale Literary and Scientific Society. Vol. 14, 1919-1922. Pp. 128+xi+xi+xi. (Rochdale.)

Imperial Department of Agriculture for the West Indies. Report on the Agricultural Department, St. Lucia, 1921. Pp. iv+31. (Barbados.) 6s.

Nigeria. Annual Report on the Forest Administration of Nigeria for the Year 1921. Pp. 18. (Ibadan.)

The Botanical Society and Exchange Club of the British Isles. Vol. 6, Part 3, Report for 1921. By G. C. Druce. Pp. 261-546. (Arbroath: T. Buncle and Co.) 10s.

Shall the State throw away the Keys? An Exposition of what Fine Chemicals mean to the Nation. Pp. 32. (London: Association of British Chemical Manufacturers, 199 Piccadilly.)

Diary of Societies.

SATURDAY, NOVEMBER 25.

ASSOCIATION OF SCIENCE TEACHERS AND THE ASSOCIATION OF UNIVERSITY WOMEN TEACHERS (at University College), at 11 and 2.30.—Joint Conference on the Teaching of Science in Schools and Colleges.

MONDAY, NOVEMBER 27.

ARISTOTELIAN SOCIETY (at University of London Club), at 8.—Prof. R. F. A. Hoernlé: Notes on the Treatment of "Existence" in recent Philosophical Literature.

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ROYAL SOCIETY OF ARTS, at 8.—Prof. W. A. Bone: Brown Coal and Lignites (Cantor Lecture).
ROYAL SOCIETY OF MEDICINE (Odontology Section), at 8.—Dr. P. Watson-Williams: Infections of the Teeth and Gums in relation to the Nose, Throat, and Ear.
ROYAL GEOGRAPHICAL SOCIETY (at Æolian Hall), at 8.30.—C. Gillman: An Ascent of Kilimanjaro.

TUESDAY, NOVEMBER 28.

ROYAL HORTICULTURAL SOCIETY, at 3.—M. B. Crane: Self-Sterility and the Pollination of Fruit Trees.
ROYAL SOCIETY OF MEDICINE (Medicine and Ophthalmology Sections)—Dr. B. Shaw, F. Moore, and others: Discussion on the Differentiation and Prognosis of Arterio-Sclerotic and Renal Retinitis.
INSTITUTION OF CIVIL ENGINEERS, at 6.—E. O. Forster-Brown: Underground Waters in the Kent Coalfield, and their incidence in Mining Development. (Continued discussion.)
INSTITUTE OF MARINE ENGINEERS, INC., at 6.30.—Film illustrative of the Conquest of Oil. Anglo-American Oil Co.
ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN, at 7.—J. E. Saunders: Off the Beaten Track at the Ipo.
SOCIOLOGICAL SOCIETY (at Royal Society), at 8.15.—H. Belloc: Factors of Historical Changes in Society.

WEDNESDAY, NOVEMBER 29.

NEWCOMEN SOCIETY (Annual General Meeting) (at Iron and Steel Institute), at 5.—At 5.30.—R. Jenkins: Notes on the Early History of Steel-making in England.
ROYAL SOCIETY OF ARTS, at 8.—Major W. S. Tucker: The Hot Wire Microphone and its Applications.

THURSDAY, NOVEMBER 30.

ROYAL SOCIETY, at 4.—Anniversary Meeting.
LINNEAN SOCIETY, at 5.—Dr. R. J. Tillyard: The Wing-venation of the Order Plectoptera, or May-flies.—D. M. S. Watson and E. L. Gill: The Structure of certain Palæozoic Dipnoi.
ROYAL SOCIETY OF MEDICINE, at 5.—Sir Almoth Wright: New Principle in Therapeutic Immunisation (Occasional Lecture).
CHILD-STUDY SOCIETY (at Royal Sanitary Institute), at 6.—Dr. A. F. Tredgold: Some Problems relating to Mental Deficiency.
INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—W. A. Gillott: Domestic Load Building: a Few Suggestions upon Propaganda Work.
OPTICAL SOCIETY (at Imperial College of Science and Technology), at 6.—A. Whitwell: The Design of Spectacle Lenses.—Dr. M. von Rohr: On the Available Means for Correcting Considerable Cases of Anisometropia.—A. Whitwell: The Best Form of Spectacle Lenses for the Correction of Small Amounts of Anisometropia.—Dr. M. B. Dobson: Notes on the Non-operative Treatment of Squint.—O. Raphael: Standards of Accuracy for Ophthalmic Prescriptions.—W. A. Dixey: Some Recent Developments in Spectacle Lenses.—J. H. Gardiner: Sir William Crookes' Anti-glare Glasses.—H. S. Ryland: Methods used in the Manufacture of Gold-filled Spectacles and Clips.
CAMERA CLUB, at 8.15.—C. Robbins: A Peep at Prehistoric Man.
ROYAL SOCIETY OF MEDICINE (Urology Section), at 8.30.—Dr. Langdon Brown and others: Discussion on the Factors in Uræmia.

FRIDAY, December 1, 1922

INSTITUTION OF MECHANICAL ENGINEERS, at 6.—Dr. T. E. Stanton: Some Recent Researches on Lubrication (Thomas Hawksley Lecture).
JUNIOR INSTITUTION OF ENGINEERS, at 7.30.—H. G. Brown: Machines used in Magnetic Separation.

PUBLIC LECTURES.

SATURDAY, NOVEMBER 25.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—F. Balfour-Browne: British Water-beetles.

MONDAY, NOVEMBER 27.

UNIVERSITY COLLEGE, at 5.30.—Miss E. Jeffries Davis: The Evolution of London. Succeeding Lectures on December 4 and 11.
CITY OF LONDON Y.M.C.A. (186 Aldersgate Street), at 6.—Col. Sir William H. Willcox: Rheumatism and how to avoid it.

TUESDAY, NOVEMBER 28.

SCHOOL OF ORIENTAL STUDIES, at 5.—Sheikh M. H. Abd el Razek: The Study of Moslem Civilisation in Europe.

THURSDAY, NOVEMBER 30.

KING'S COLLEGE, at 5.30.—N. P. Jopson: The Distribution and Inter-relations of the Slavonic Peoples and Languages.
UNIVERSITY COLLEGE, at 5.30.—Dr. C. Pellizzi: Platone e l'Umanesimo (in Italian).

FRIDAY, DECEMBER 1.

ROYAL INSTITUTE OF PUBLIC HEALTH, at 5.—Prof. T. Madsen: Specific and Unspecific Antitoxin Production (Harben Lecture).
BEDFORD COLLEGE FOR WOMEN, at 5.30.—Miss E. Jeffries Davis: Roman London.

SATURDAY, DECEMBER 2.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—Dr. E. Marion Delf: Vitamins and Health.