Roberts, Lord and Lady Cowdray, and Mr. Walter Morrison for the endowment of the chairs of the Russian and Spanish languages and literatures.

Reference is made to the departure of the chancellor, the Duke of Devonshire, on his appointment to the position of Governor-General of Canada.

Rawdon College (Baptist) has been affiliated to the University, following the precedent of Mirfield College (Church of England) and Headingley College (Wesleyan Methodist). In spite of a diminished staff, members of which have been seconded by the Government for war work, the teaching has been maintained with its usual efficiency, and a substantial amount of pure research has been published; in addition to which several of the science and technical departments of the University have continued to give valuable aid to the Ministry of Munitions in connection with the textile industries, leather, and the testing of the raw material for explosives and of the finished product; and to the Royal Society War Committee in the preparation of necessary drugs. The many activities of the University in other departments, such as the training of welfare workers, of munition workers, and of women for farm work, are enumerated on pp. 45 and 46. The total number of day students was 698 (465 men and 233 women), and of evening students 103.

A loss of income through the reduction in the number of students is estimated at several thousand pounds, but the economies effected, together with a special grant from the National Exchequer, have saved the University from financial embarrassment. A list of nearly one thousand students, staff, and members of the University O.T.C. who have joined the Colours is given in an accompanying pamphlet.

LONDON.—Applications for grants from the Dixon Fund for assisting scientific investigations will be received not earlier than April 1, and not later than by the first post of May 15. Particulars of the grants may be obtained from the Academic Registrar, University of London, South Kensington.

An appointment to the Gilchrist studentship for women will shortly be made, and the Lindley triennial studentship of the value of rool. will be awarded. The studentship is open to students qualified to undertake research in physiology, and will be held in the physiological laboratory of the University. Particulars of the candidate's qualifications and of the mode in which he proposes to carry out his research must reach the Academic Registrar by April 30.

The Rosebery prize of 251. for the session 1915-16 of the London School of Economics and Political Science has been awarded to Messrs. W. G. Chapman and W. H. Jarvis for their joint paper on "Workmen's Trains." The Rosebery prize of 101. for the same session has not been awarded.

It is reported from Zurich that, in consequence of lack of coal and the impossibility of heating the buildings, all lectures in the University of Vienna have been suspended since January 29.

MR. C. J. STILL has resigned his position as lecturer and demonstrator in chemistry at the Municipal Technical Institute, Belfast, to become a research chemist with Messrs. Levinstein, Ltd., Manchester.

WE learn from *Engineering* that the Liebig Scholarship Society of Germany has recently been formed, with a capital of upwards of a million marks from German industries, for the purpose of assisting young German chemistry students to proceed with their studies, after their examinations, by working as assistants in the technical high schools.

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THE following gifts in America for educational work are announced in *Science*: 200,000*l*. by the Billings family of Chicago to the University of Chicago towards the endowment of the medical school; 10,000*l*. by Mr. J. H. Schiff to New York University for the division of public affairs in the school of commerce; and a bequest by Mr. J. D. Archbold to Syracuse University amounting to 100,000*l*.

According to *Science*, a school of fisheries in connection with the University of Washington is to be established within the next two years, provided that the Appropriation Bill for the University is passed as it stands. The passing of the appropriation would make possible the addition to the University staff of an expert authority on fishing and fisheries, increased laboratory space and equipment, and the enlargement of the scope of the University.

PROF. W. RIPPER, having been appointed vice-chancellor of the University of Sheffield in place of the Rt. Hon. H. A. L. Fisher, will be unable to deliver the course of Howard lectures on "Works Organisation and Efficiency" at the Royal Society of Arts in April and May; he will, however, deal with the subject in a paper at one of the ordinary meetings after Easter. Howard lectures on "The National Shortage of Cheap Iron-ore Supplies" will be delivered at the Royal Society of Arts on April 30 and May 7 by Prof. W. G. Fearnsides.

By the will of Sir George Franklin, Pro-Chancellor of the University of Sheffield, who died on September 23, 1916, the following sums, among others, have been bequeathed, in the event of his adopted daughter leaving no issue:—25,000*l*. to the University of Sheffield to be applied for founding such chairs (to be called after him) as the council may decide, hoping that a portion may be applied in the foundation of a chair having for its object the advancement of some branch of medical science connected with the relief of human suffering; and 5000*l*. to the Corporation of Sheffield, the income to be applied by the local education committee, in providing scholarships tenable at Sheffield University for boys and girls educated at the Central Secondary School.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 25.—Sir J. J. Thomson, president, in the chair.—Hon. R. J. Strutt: Spectroscopic observations on the active modification of nitro-The faint red bands 6394:45, 6468.53, V. gen. 6544.81, and 6623.52, belonging to the first positive group, truly belong to the afterglow spectrum of nitrogen. The second positive group is entirely absent from the afterglow spectrum. The β and γ groups only appear when oxygen-containing gases are introduced into the afterglow, or are originally present in the nitrogen used. Using nitrogen that only gives the β and γ bands very faintly, it is found that oxygen or nitric oxide added to the afterglow brings in the β and γ bands with a certain relative intensity which may be called the standard. Carbon dioxide gives greater relative intensity to the β bands, and carbon monoxide to the γ bands. If nitric oxide or nitrogen peroxide is introduced in sufficient quantity into the overglow, the β and γ groups disappear and a visually greenish continuous spectrum is substituted. Nitric oxide in a blow-pipe flame gives this same greenish continuous band, together with the γ , but not the β , group. Chemical tests show that when oxygen is introduced into the afterglow there is no detectable oxidation of nitrogen, and certainly not nearly enough to account for the β and γ bands on the view that

these are due to nitric oxide generated.-Prof. J. W. Nicholson and Prof. E. Wilson : Magnetic induction and its reversal in spherical iron shells. A solution of problems which arise in the production of an effective magnetic shield for large spaces. These relate mainly to the effective demagnetisation of the shells of which the shield is constituted. Theoretical solutions of problems relating to the effects of indefinitely closely wound coils on various shells of such a shield are given, and compared with the experimental values for an actual coil. The experiments supply an estimate of the deviations of Maxwell's formula, for the field inside a spherically wound helical wire, from the true values, when the spacing in the helix is of importance. A study of the necessary interval between current reversals in the process of demagnetisation has been made, and it is shown that the delay in reversal of magnetic phenomena in considerable masses of iron, due to eddy currents, is negligible when the magnetic inductions are fewer than 300 C.G.S. units .- S. Brodetsky : The two-dimensional motion of a plane lamina in a resisting medium. Some of the types of motion of a plane lamina in a resisting medium, such as the air, are discussed. Experimental laws of resistance are used for varying circumstances of shape and motion. The motion is in two dimensions. Part i. deals with a lamina of large moment of inertia. For the case of no forces acting on the lamina other than the resistance of the medium, relations are obtained connecting the components of velocity, the rotation, and the time. In the case of a wide lamina an investigation is given of the oscillatory part of the motion. The graphical method is then extended to the case where forces in addition to the resistance act on the lamina, notably gravity. In part ii. the case of a lamina the moment of inertia of which is negligible is considered, and equations are found for correcting the paths found in Lanchester's phugoid theory. Part iii. treats of the oscillations about a steady fall. The vertical fall of a lamina is shown to be unstable unless the centre of mass is at a distance below the centre of figure lying between two limits given by a quadratic equation. The stability of a parachute with a hanging body attached to it is also considered.

February 1.—Sir J. J. Thomson, president, in the chair.—Sir Ronald Ross and Miss H. P. Hudson : An application of the theory of probabilities to the study of *a priori* pathometry. Part ii. A number of hypo-thetical epidemics on the basis of the equations of part i. are constructed. The influence of some of the principal parameters is considered. The equations are generalised to include a wider range of a priori suppositions as to the laws of the happening, and further suggestions are made as to the comparison of the results with mortality statistics. The following ten-tative conclusions are arrived at : The cases considered have led to exactly the series of curves required by the facts : 1. The steadily rising curve of a happening that gradually permeates the whole population (VII., iii.). 2. The symmetrical bell-shaped curve of an epidemic that dies away entirely (VII., v.). 3. The unsymmetrical bell of a new happening that begins with an epidemic and settles down to a steady endemic level (VII., v.). 4. The periodic curve with regular rise and fall due to a seasonal disturbance (XI., iv.). 5. The more irregular curve where there is recrudescence before the end of an epidemic, or where outbreaks differing in violence occur at unequal intervals (XI., v.). This suggests that the rise and fall of epidemics may be explained by the general laws of happenings as studied.-Dr. J. Brownlee : An investi-gation into the periodicity of measles epidemics in London from 1703 to the present day by the method of the periodogram. The statistics for the epoch

registration give of the main periodicity of measles in London for the last seventy-two years as almost exactly ninety-seven weeks. The amplitude almost exactly ninety-seven weeks. The amplitude of this period is 0.4 of the mean number of cases. Periods with amplitudes of about one-half of this are found for one year and for six months. These periods probably reflect the influence of the weather upon the deaths from measles, though the evidence is not complete. There are two sets of periods grouped on either side of the main period in such a way as could be explained by interference with long waves of prevalence or severity of the disease. These periodicities are probably the expression of something in the lifehistory of the organism causing the disease .- Capt. I. Hammond: The causes responsible for the developmental progress of the mammary glands in the rabbit during the latter part of pregnancy. Experimental results show that the development of the mammary gland of the rabbit during the second half of pregnancy is under the same influence as that which controls the development during the first half, namely, the corpus luteum. This gland is active during the second half of pregnancy. The further development of the corpus luteum is due to the influence of the fœtus. The view that milk secretion in pseudo-pregnancy takes place in correlation with the involution of the corpus luteum is confirmed. Apparently the secretion of milk results whenever the influence causing the glandular growth is removed or lessened in amount, provided that the initial development has gone far enough.—F. H. A. Marshall and E. T. Halnan: The post-œstrous changes occurring in the generative organs and mammary glands of the non-pregnant dog. The uterus and mammary glands of the non-pregnant bitch undergo pronounced postcestrous development under the influence of the corpora lutea during a definite pseudo-pregnant period. Retrogressive changes do not set in with any of these organs until about thirty days after ovulation. The developmental changes are similar to those taking place during pregnancy. The relatively long persistence of the corpora lutea in the bitch is probably correlated with the monœstrous habit. This persistence elucidates the phenomenon of bitches which had not been impregnated secreting milk at or near the end of the pseudo-pregnant period. The changes which occur in the generative organs and mammary glands after œstrous are now brought into relation with the rest of the œstrous cycle.

Physical Society, January 26.—Prof. C. V. Boys, president, in the chair.—C. O. Bartrum: A clock of precision. The principal feature is the employment of a "slave" clock to do most of the work, leaving the master pendulum no function beyond that of controlling the rate of the other. The master pendulum swings freely except for a short period every minute, during which it receives an impulse from a falling pallet electromagnetically released by the slave clock. At the end of its fall the pallet closes a second circuit and is restored to its initial position. The electric circuits also energise parts of the mechanism in the slave clock by which the latter is kept in time with the master pendulum. The lagging of correction behind error, with the resulting periodic fluctuation in the "negative backlash" in the control mechanism. A mathematical discussion of the best working condimathematical discussion of the best working condi-tions and of the possible magnitude of errors is given.—Dr. F. Schwers: The effect of water vapour in the atmosphere on the propagation of electromagnetic waves. The probable influence of moisture in the atmosphere on the refraction of electromagnetic waves round the earth's surface is discussed. The conclusion of Kiebitz that the presence of mois-

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ture does not affect the dielectric constant by more than 10 per cent. is shown to be erroneous. In the absence of more accurate data for ordinary temperatures, the author prefers to assume a value for the dielectric constant of water vapour obtained by extrapolating the results secured by Baedeker for higher temperatures. It is shown that the lowest layers of the atmosphere refract electromagnetic waves towards the earth, so that the greater part of the space waves will reach the receiver, contrary to the conclusion of Kiebitz.

Challenger Society, January 31.—Dr. S. F. Harmer in the chair.—G. H. **Fowler**: (i) The currents of the United States Atlantic coast, illustrated by the drift of the Nantucket Shoals buoy, 1915–16. The buoy was at large for twenty months; it drifted down the Labrador current to off Cape Hatteras, was drawn into the Gulf Stream, went east, and was thrown out southward; this occurred three times, the buoy being returned to the Gulf Stream twice by the Bahama branch of the N. Atlantic Drift and once by towage. (ii) A graphic method of finding the density of sea-water from the salinity and temperature based on Knudsen's tables.

BOOKS RECEIVED.

Mathematical Papers for Admission into the Royal Military Academy and the Royal Military College, September-November, 1916. By R. M. Milne. Pp. 32. (London: Macmillan and Co., Ltd.) 18. net.

A Bibliography of British Ornithology. By W. H. Mullens and H. Kirke Swann. Part v. (London:

Macmillan and Co., Ltd.) 6s. net. High-speed Internal Combustion Engines. By A. W. Judge. Pp. ix+350. (London: Whittaker and Co.) 155. net.

A Practical Manual of Autogenous Welding (Oxy-Acetylene). By R. Granjon and P. Rosemberg. Translated by D. Richardson, Fourth edition. Pp. xxv+244. (London: C. Griffin and Co., Ltd.) 5s. net.

The Study of Animal Life. By Prof. J. A. Thom-son. Revised edition. Pp. xi+477. (London: J. Murray.) 6s. net. Plants, Seeds, and Currents in the West Indies and

Azores. By H. B. Guppy. Pp. xi+531+3 maps.

(London : Williams and Norgate.) 258. net. A Text-book of Thermochemistry and Thermo-dynamics. By Prof. O. Sackur. Translated and revised by Dr. G. E. Gibson. Pp. xvi+439. (London: Macmillan and Co., Ltd.) 125. net.

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 15. ROYAL SOCIETY, at 4 30.—Structure and Development of the Tubular Enamel of the Sparidæ and Labridæ: Dr. J. H. Mummery.—And other

Enamel of the Sparidæ and Labridæ: Dr. J. H. Bunnery, Andersen papers. ROYAL INSTITUTION, at 3.—The Mechanism of Chemical Change: Prof. F. G. Donnan. Sociery of GLASS TECHNOLOGY, at the University, Western Bank, Sheffield, at 4.30.—The Annealing of Glass: F. Twyman. ROYAL SOCIETY OF ARTS. at 4.30.—The Indian Silk Industry: Prof. H. Maxwell-Lefroy. INSTITUTION OF MINING AND METALLURGY, at 5.30.—The Wet Assay of Tin Concentrate: H. W. Hutchin.—Hydraulic Tin M ning in Swazi-land: J. Jervis Garrard. LINNEAN SOCIETY, at 5.—The Home-life of the Sparrow-hawk: J. H. Owen.

Owen. FRIDAY, FEBRUARY 16. ROYAL INSTITUTION, at 5.30.—Authors' Dedications in the Seventeenth Century: The Dean of Durham. INSTITUTION OF MECHANICAL ENGINEERS, at 6.—Annual General Meeting.—Alternating Stress Experiments : Dr. W. Mason. GEOLOGICAL SOCIETY, at 3.—Annual General Meeting.

SATURDAY, FEBRUARY 17. ROYAL INSTITUTION, at 3.-The Mystery of Counterpoint: Dr. H. Walford Davies.

MONDAY, FEBRUARY 19. ROYAL SOCIETY OF ARTS, at 4.30.—The History and Practice of Town Planning and Civic Architecture. Lecture iv. : Prof. A. Beresford Pite.

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ROYAL GEOGRAPHICAL SOCIETY, at 5.30.—The Baghdad Railway and its Tributaries : H. Charles Woods. ARISTOTELIAN SOCIETY, at 8.—The Nature of Knowledge as conceived by Malebranche : Morris Ginsberg. VICTORIA INSTITUTE, at 4.30.—From World Dominion to Subjection ; the Story of the Fall of Babylon : Dr. T. G. Pinches.

TUESDAY, FEBRUARY 20. ROYAL INSTITUTION, at 3.—Pain and its Nervous Basis: Prof. C. S.

Sherington.
ZOUGICAL SOCIETY, at 5::00.—(1) Notes from the Caird Insect House, with Exhibition of Specimens and Lanternslides: (2) The Coleoptera of the Family Cissidæ found in Britain, with Descriptions of Two New Species. Family Cisside found in Britain, with Descriptions of Two New Species.
 A New Species of the Coleopteran Genus Cryptorthynchus, Illiger:
 C. J. C. Pool.—Heude's Collection of Pigs, Sika, Serows, and Gorals in the Sikawei Museum, Shanghai: A. de C. Sowerby.—The Lizards of the Genus Philochortus, Matschie: G. A. Boulenger.
 ROYAL STATISTICAL SOCIETY, at 5.15.
 ILLUMINATING ENGINEERING SOCIETY, at 5.—The Effect on the Eye of Varying Degrees of Brightness and Contrast: Dr. James Kerr.
 INSTITUTION OF PETROLEUM TECHNOLOGISTS, at 8.—Liquid Fuel and its Combustion : Prof. J. S. Brame.

WEDNESDAY, FEBRUARY 21. WEDNESDAY, FEBRUARY 21. ROYAL MICROSCOPICAL SOCIETY, at 8.—Parasitology of Pyorrhœa: Dr. A. H. Drew and Dr. Una Griffin. ROYAL SOCIETY OF ARTS, at 4.30.—Ine Training of Educated Women for Secretarial and Commercial Work, and their Permanent Employment: Mrs. C. Hoster. ROYAL METEOROLOGICAL SOCIETY, at 5.—The Heat Balance of the Atmosphere: W. H. Dines.—Continentality and Temperature: C. E. P. Brooks. THURSDAY

Brooks. THURSDAY, FEBRUARY 22. ROYAL SOCIETY, at 4.30.—Probable Papers: The Fossil Human Skull found at Talgai, Queensland: S. A. Smith.—The Magnetic Storm of August 22, 1976: Dr. C. Chree.—The Ordinary Convergence of Restricted Fourier Series: Prof. W. H. Young. ROYAL INSTITUTION, at 3.—Memorial Art in History: Prof. E. S. Prior ROYAL GEOGRAPHICAL SOCIETY, at 5.—The Origin and Growth of the Dry Lakes in Western Australia: J. T. Jutson.

FRIDAY, FEBRUARY 23. ROYAL INSTITUTION, at 5.30.—Some Guarantees of Liberty : H. Wickham Steed. SATURDAY, FEBRUARY 24.

ROYAL INSTITUTION, at 3.—The Pronunciation of Languages in General: Daniel Jones.

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