

teriology tenable at the London Hospital Medical College.

The following doctorates have been conferred:—*D.Sc. in Applied Statistics*: Mr. E. H. Chapman, an internal student, of the Sir John Cass Technical Institute, for a thesis entitled "The Application of Statistical Methods to Meteorological Problems." *D.Sc. in Botany*: Mr. S. C. Harland, an internal student, of King's College, for a thesis entitled "Manurial Experiments with Sea Island Cotton in St. Vincent." *D.Sc. (Engineering)*: Mr. N. A. V. Piercy, an internal student, of East London College, for a thesis entitled "On the Flow in the Rear of Aerofoils."

Dr. Thomas Lewis, of the cardiographic department of University College, has been awarded the William Julius Mickle fellowship, of the value of 200*l.*, in recognition of the important work which he has carried out on the nervous mechanism of the heart.

OXFORD.—Dr. F. W. Keeble, who has been elected to the Sherardian professorship of botany in succession to Prof. S. H. Vines, was formerly professor of botany and dean of the faculty of science at University College, Reading. In 1914 he was appointed Director of the Royal Horticultural Society's gardens at Wisley, and in the following year became concurrently Director of Horticulture in the Food Production Department of the Board of Agriculture. Since last year he has been Assistant Secretary to the Board.

DR. FRITZ PANETH has recently been appointed to a professorship in chemistry at the University of Hamburg, which was founded in the spring of this year. After obtaining his doctorate at the University of Vienna Dr. Paneth proceeded to England, and worked for some time in the laboratories of Prof. Soddy at Glasgow, and of Sir Ernest Rutherford at Manchester. Later he was chemical assistant in the Radium Institute at Vienna, and after the appointment of Prof. Hönlgschmid to a chair of chemistry at the University of Munich in 1917, Dr. Paneth directed the work of the chemistry department of the German Technical High School in Prague.

THE University of Manchester, which before the war was preparing to issue an appeal for funds to enable it to make due provision to meet its expanding needs, has now made, in addition to that of the College of Technology, which requires 150,000*l.* for its much needed extension, an appeal for a sum of 500,000*l.*, towards which 76,000*l.* has been promised, in addition to 10,000*l.* for a chair of colloidal chemistry as announced at the public meeting held in the Town Hall on December 9, to meet the urgent demands which, among other claims, the great influx of students in all departments has made upon its resources. There was recently opened a large new building for the faculty of arts (languages, literature, history, and philosophy), which, as a consequence, enables the departments of chemistry, engineering, medicine, and commerce to be accommodated more adequately. But the pressure, especially in respect of students in medicine and chemistry, and the growing need for facilities in economics, sociology, and courses of training for social work, cannot be satisfactorily met in present circumstances. A new system of post-graduate training has been instituted and a new degree therein established, which is certain to retain and attract a large body of well-prepared students to the great advantage of the University and of all concerned. The provision of hostels is an urgent need, together with that of extra-mural teaching in tutorial classes, for which there is a strong demand on the part of working men

and women throughout the area covered by the University. A considerable increase in equipment, and especially in that of the teaching staff, in all departments is a pressing requirement, and altogether, having regard to the supremely and increasingly important place the University takes in the life of the city and district, makes this appeal for a large addition to its financial resources one that should commend itself to the liberal support of the great and wealthy community which it so effectively serves.

A DEPUTATION of members of the governing body of the Imperial College of Science and Technology, introduced by Lord Crewe, and received on December 15 by Mr. Balfour and Mr. Fisher, put forward the request that the college should be empowered to award degrees, either by being constituted a university or by granting its own degrees as a college. At present each of the constituent colleges of the Imperial College grants its own diplomas in the form of associate-ships of the Royal College of Science, the Royal School of Mines, and the City and Guilds' Institute respectively, while the Imperial College itself awards a diploma for a course of advanced work. There is, however, a great difference in the market values of a diploma and a degree, and it is on this account that the movement to make the college a degree-conferring institution has the support of most past and present students. The question of constituting another university in London has already been considered by two Royal Commissions and adversely reported upon, and the demand for the foundation of the new university will need to be strongly supported before it can have the promise of success in the face of these two reports and of the certain opposition of London University. The simplest course, and the one that would arouse least opposition, would be to grant the college the power of conferring degrees. Whichever plan is adopted, it is to be hoped that the position of past students of the constituent colleges will be effectively safeguarded. We assume that, whether the Imperial College grants a degree or a diploma, adequate provision will continue to be made for the study of pure science. It is becoming increasingly difficult to obtain the necessary funds for carrying on scientific research not directly concerned with industry, and the neglect of this part of the work of the college would eventually have a disastrous effect on technical education and industrial progress. A strong case can, no doubt, be made out for several distinct universities in London, and the appeal made on behalf of the Imperial College has been followed by a letter from Profs. W. H. Bragg and E. H. Starling in the *Times* of December 22, in which like claims are made for the freedom of King's College and University College "as regards teaching, research, and the granting of degrees."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 11.—Sir J. J. Thomson, president, in the chair.—C. F. U. Meek: A further study of chromosome dimensions. The degree of somatic complexity of an animal cannot be correlated with (a) the lengths of the chromosomes composing its complex; (b) the diameters of the chromosomes composing its complex; (c) the total volume of the chromosomes composing its complex; and (d) the number of the chromosomes composing its complex. There are many different chromosome diameters. The chromosomes composing the spermatogonial complex of an animal are not necessarily identical in

diameter with those composing its secondary spermatocyte complex. All chromosomes composing an individual complex are not necessarily of the same diameter.—J. M. H. **Campbell**, C. G. **Douglas**, and F. G. **Hobson**: The respiratory exchange of man during and after muscular exercise. Support is given to the view that muscular work may involve the metabolism of a higher proportion of carbohydrate to fat than is the case during rest. In the case of the severer degrees of work, serious shortage of oxygen, as indicated by the production of lactic acid, may lead in the earlier stages of the exercise to temporary great exaggeration of the hyperpnoea, accompanied by washing out of preformed CO₂ from the body and an abnormally high respiratory quotient, phenomena which are absent in the case of lighter work.—A. D. **Waller**: The energy output of dock labourers during heavy work. Part i. The paper contains the results of observations on dock labourers by a simplified method, which consists in measurements of the CO₂ discharge at convenient intervals throughout the working day or night with the least possible interruption of work.—J. **Gray**: The relation of spermatozoa to certain electrolytes (ii.). The paper embodies an attempt to apply the facts of recent chemistry to the behaviour of the living cell.

Royal Anthropological Institute, December 9.—Sir Everard im Thurn, president, in the chair.—J. H. **Hutton**: Leopard-men in the Naga Hills. The Naga tribes generally regard the tiger as having the same origin as man, in that the first tiger and the first man were brothers, sons of one mother. No clear distinction is drawn between leopards and tigers, the same word being ordinarily used for both animals. The practice of lycanthropy among the Naga tribes differs from that followed in India, Burma, and Malaysia, in that no actual metamorphosis is believed to take place, in which respect it seems to differ from the form which lycanthropy takes in most parts of the world. The Naga method is to project the soul from the human body into the body of a leopard, usually, but not necessarily, during sleep. By this process the two bodies become intimately associated, and violent emotions affecting the one body are perceptible to the other. On the death of one, the other dies. The acquisition of the powers of a lycanthropist is not desired, but feared and disliked. The practice is assumed involuntarily at the dictation of spirits whose will the subject of it is more or less powerless to resist. The closest parallel to the Naga practice seems to be found in Nigeria, where there are beliefs ("Golden Bough," vol. ix.) which resemble those of the Naga tribes closely. In the Naga Hills and Assam this particular form of lycanthropy seems to be connected with migration from the north as distinct from other immigrations from the east and south.

Linnean Society, December 11.—Dr. A. Smith Woodward, president, in the chair.—Prof. W. A. **Herdman**: Notes on the abundance of marine animals and a quantitative survey of their occurrence. On a former occasion the author considered the plankton food-supply of edible fishes for the purpose of showing the fundamental importance of a very few organisms, about half a dozen kinds of diatoms and the same number of Copepoda. In the present paper he extended the same conclusions to the shallow-water and littoral common animals which are the food of our bottom-feeding fishes.—J. B. **Gatenby**: The germ-cells and early development of *Grantia compressa*. The spermatids of *Grantia* are described for the first time. They lie inside chambers formed of mesogleal cells. The mitochondria (chromidia) and Golgi apparatus of oocytes and other cells are described.

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MANCHESTER.

Literary and Philosophical Society, December 2.—Prof. F. E. Weiss, deputy chairman, in the chair.—C. E. **Stromeyer**: A method by which roots of numbers can be easily and rapidly found by division sums.—L. V. **Meadowcroft**: A discussion of the theorems of Lambert and Adams on motion in elliptic and hyperbolic orbits. Lambert's theorem (1761) on the motion of a body in an elliptic orbit, under the influence of a central gravitational force, can be stated in the following purely geometrical form. The area of any focal sector of an ellipse can be expressed in terms of the focal distances of its extremities, of the chord which joins them, and of the axes of the ellipse. To J. C. Adams is due the most elegant form of the proof. The present author shows that this can be translated from analytical into geometrical terms. An independent proof based on geometrical considerations is thus suggested. Such a proof is given, and also an analogous proof for the corresponding theorem on the area of a focal sector of a hyperbola.—W. E. **Alkins**: Morphogenesis of *Reticularia lineata*. After a résumé of earlier work (including Day's) on variation in Brachiopoda, by using Day's specimens the author had constructed skeleton solid figures showing the distribution of length and width, and of length and depth, among 945 individuals of *Reticularia lineata*, Martin, from a restricted locality in the Carboniferous Limestone of North Derbyshire. Day's conclusions were confirmed. The ratio of width to length and of depth to length throughout the series showed that in the development of the individual shell the width and length were connected by a linear function, whereas the depth and length, though related by a linear expression up to a certain size, were connected by a logarithmic function over the greater portion of the range covered by the specimens. The transition from the linear function to the logarithmic relationship was perfectly gradual and continuous.

DUBLIN.

Royal Dublin Society, November 25.—Mr. R. Li. Praeger in the chair.—T. G. **Mason**: Electrolytes in the leaf-sap of *Syringa vulgaris*. Determination of the dissolved electrolytes of the cell by means of conductivity measurements is largely vitiated by the influence of the viscosity of the solvent. Correction by means of direct measurement of the relative viscosity of the sap is shown to be unsatisfactory. By introducing a known concentration of an electrolyte into the sap and by comparing its conductivity in the sap with that in water, it is possible to obtain a closer estimate of the amount of electrolytes in the sap corresponding with the observed conductivity of the sap. Fluctuations in the electrolyte content of the sap appear to be in the inverse sense of those of the soluble carbohydrates. It is suggested that the concentration of the dissolved electrolytes may be directly or indirectly controlled by the osmotic pressure of the sap.—L. B. **Smyth**: The Carboniferous coast section at Malahide. Between Malahide and Portmarnock, Co. Dublin, an outcrop of Carboniferous Limestone rocks occurs, extending for about a mile along the sea-shore, and having a general dip to the north. This exposure was mapped by the Geological Survey. One fault was shown, separating a smaller southern portion from the rest. This southern part was considered to be older than the remainder, and to have been brought up by the fault. It was assigned, chiefly on lithological grounds, to the Lower Limestone Shales. The author maintains, on both structural and faunal grounds, that it is really the youngest part of the section, and belongs to Vaughan's "C" zone, the part north of the fault being assigned to the "Z" zone

and the base of "C." The throw of the fault was estimated to be at least 780 ft. Two other faults are pointed out. One, in the middle of the exposure, causes a repetition of "Z" beds, and has a down-throw of 330 ft. to the south. The other, to the north of this, throws in the opposite direction, and is probably slight. Three new species of corals are described of the genera *Michelinia*, *Zaphrentis*, and *Endophyllum*.—J. J. Dowling: An apparatus for the production of high electrostatic potentials. The apparatus is an influence machine which transforms a battery voltage of, say, four hundred to, say, five hundred volts. The ratio of transformation can be adjusted, and the high potentials are remarkably steady. An earthed disc is carried to and fro, being fixed to the end of a rod which is given a reciprocating motion by an eccentric device. A contact-maker is mounted on the eccentric shaft, and this alternately connects a fixed insulated disc, mounted opposite the earthed disc, alternately to the battery and to the apparatus which is to be maintained at the high potential. One pole of the battery is, of course, earthed.

BOOKS RECEIVED.

A Short History of Education. By Prof. J. W. Adamson. Pp. xi+371. (Cambridge: At the University Press.) 12s. 6d. net.

Malleable Cast-Iron. By S. J. Parsons. Second edition. Pp. xi+175. (London: Constable and Co., Ltd.) 14s. net.

Les Grottes de Grimaldi (Baoussé-Roussé). By Prof. M. Boule. Tome i., Fasc. iv.: Géologie et Paléontologie (Fin). Pp. 237-362+plates. (Monaco.)

An Introduction to Social Psychology. By Dr. W. McDougall. New edition. Pp. xxiv+459. (London: Methuen and Co., Ltd.) 7s. 6d. net.

Nationality and Race: From an Anthropologist's Point of View. By Prof. A. Keith. Pp. 39. (London: Oxford University Press.) 2s. net.

Mesures Pratiques en Radioactivité. By Drs. W. Makower and H. Geiger. Traduit de l'Anglais par E. Philippi. Pp. vii+181. (Paris: Gauthier-Villars et Cie.) 8 francs.

Aircraft in Peace and the Law. By Dr. J. M. Spaight. Pp. viii+233. (London: Macmillan and Co., Ltd.) 8s. 6d. net.

An Introduction to Anthropology. By Rev. E. O. James. Pp. ix+259. (London: Macmillan and Co., Ltd.) 7s. 6d. net.

Psychology of the Normal and Subnormal. By Dr. H. H. Goddard. Pp. xxiv+349. (London: Kegan Paul and Co., Ltd.) 25s. net.

Lectures on Industrial Psychology. By B. Muscio. New edition. Pp. iv+300. (London: G. Routledge and Sons, Ltd.) 6s. 6d. net.

Fuel, Water, and Gas Analysis for Steam Users. By J. B. C. Kershaw. New edition. Pp. xii+201. (London: Constable and Co., Ltd.) 12s. 6d. net.

The Aviation Pocket-Book for 1919-20. By R. B. Matthews. Pp. xxiv+536. (London: Crosby Lockwood and Son.) 12s. 6d. net.

Outlines of the History of Botany. By Prof. R. J. Harvey-Gibson. Pp. x+274. (London: A. and C. Black, Ltd.) 10s. net.

The Preparation of Organic Compounds. By E. De Barry Barnett. New edition. Pp. xv+273. (London: J. and A. Churchill.) 10s. 6d. net.

A Treatise on Qualitative Analysis. By Prof. F.

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Clowes and J. B. Coleman. New edition. Pp. xvi+400. (London: J. and A. Churchill.) 12s. 6d.

Elementary Practical Chemistry. By Prof. F. Clowes and J. B. Coleman. New edition. Part i.: General Chemistry. Pp. xvi+241. (London: J. and A. Churchill.) 6s.

Modern Spiritism: Its Science and Religion. By Dr. A. T. Schofield. Pp. ix+259. (London: J. and A. Churchill.) 3s. 6d. net.

Die Stämme der Wirbeltiere. By Prof. O. Abel. Pp. xviii+914. (Berlin and Leipzig: W. de Gruyter and Co.) 56 marks.

DIARY OF SOCIETIES.

MONDAY, DECEMBER 29.

ROYAL GEOGRAPHICAL SOCIETY (at Æolian Hall), at 3.30.—Mrs. Dickinson Berry: Serbia and Yugo-Slavia, Before the War and After (Christmas Lecture to Young People).

TUESDAY, DECEMBER 30.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. W. H. Bragg: The World of Sound, I., What is Sound? (Christmas Lectures).

THURSDAY, JANUARY 1.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. W. H. Bragg: The World of Sound, II., Sound and Music (Christmas Lectures).

FRIDAY, JANUARY 2.

ROYAL GEOGRAPHICAL SOCIETY (at Æolian Hall), at 3.30.—Miss Hilda Bowser: A Visit to the Diamond Mountain in Korea (Christmas Lecture to Young People).

ROYAL SOCIETY OF ARTS (Indian Section), at 4.30.—A. P. Morris: Burmese Village Industries: Their Present State and Possible Development.

SATURDAY, JANUARY 3.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. W. H. Bragg: The World of Sound, III., sounds of the Country (Christmas Lectures).

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