

tute, for a thesis entitled "Stress and Strain Conditions in Rectangular Flat Plates Fixed at the Edges and Exposed to Uniform Pressure over Surface."

THE New York correspondent of the *Times* announces that a legacy of 3,000,000*l.* has been bequeathed to Yale University by the will of Mr. J. W. Sterling, who died suddenly on July 5. Mr. Sterling graduated from Yale in 1864.

MR. R. DOUGLAS LAURIE, who has been chief demonstrator and assistant lecturer in zoology and lecturer in embryology in the University of Liverpool for some years, has been appointed head of the department of zoology in the University College of Wales, Aberystwyth.

A FEW days ago a meeting was held at the Cardiff Exchange to consider the means of development of technological institutions, and the suggestion was then made that a sum of 50,000*l.* a year should be raised by the industrialists of the district. A beginning has been made in this direction by a contribution of 25,000*l.* from Lord Glanely towards the cost of a chemical laboratory, to be known as the Tatem Laboratory, in the University College of South Wales and Monmouthshire, Cardiff. In making this princely gift Lord Glanely remarks that the laboratory is the first step in a scheme essential both to the welfare of the college and the industrial community of South Wales. He adds:—"I understand that for the completion of the scheme in a manner worthy of a great industrial area a sum approaching 125,000*l.* is required, and I trust my contribution may be regarded as but the first step towards the accomplishment of this great undertaking. Slowly, but, I believe, surely, the industrial community is awakening to the importance of science and its application, and also to the necessity for its encouragement if we are to hold our own in the difficult times which are ahead of us. I am aware of the efforts made by Principal Griffiths to further the closer union of science and industry and to promote the cause of research, especially in those branches which most affect our local industries. It is, therefore, my earnest hope that his successor may be one who will realise the vital importance of this matter, and has the training and knowledge which will enable him to appreciate the problems which must be faced, and complete the work of which the foundations have now been laid."

THE University of London proposes to establish a degree in commerce. The scheme, to be really effective, must be worked out as a whole with an independent organisation, not as a mosaic of fragments built up from various faculties. The needs of the teaching depend on the aim of the degree course and the type of student for which it is intended. Finance and commerce in the broadest sense are the main interests of London, and likely to provide the mass of the students. The training should be correlated to the main interests of the individual, though in no sense a substitute for actual experience of business. Elementary economics, geography, and accounting, together with a thorough knowledge of a modern commercial language, with the addition of certain optional subjects, such as a science, or mathematics, or history, would provide a broad basis for more specialised work. The broad facts of commercial and financial organisation, recent historical development of the great commercial Powers, and the main principles of commercial law are of importance to all. Beyond these are two groups of subjects: on one hand, business organisation, the banking and financing of production and trade, and the movements of

capital; on the other, the industrial and commercial conditions of the great markets of the world. Mr. A. J. Balfour, on July 18, spoke at a meeting at the Mansion House called to support the scheme of the University. He pointed out the two main criticisms that would be brought against degrees in commerce, one by those who argue that academic training is of little value in the actual practice of life, and the other by those who argue that vocational education is narrowing, and, indeed, may be so narrow as not to be education at all. He remarked that few subjects have so many aspects and so much human interest as the many-sided life of commerce.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 27.—Sir J. J. Thomson, president, in the chair.—Prof. T. H. Havelock: Periodic irrotational waves of finite height. It is shown that an extension of Michell's analysis for the highest wave gives a method which includes waves of any permissible height.—Dr. G. N. Watson: The diffraction of electric waves by the earth. Approximate formulæ have been obtained by Poincaré, Macdonald, Nicholson, and others, which express the disturbance due to a Hertzian oscillator at a distant point of the earth's surface. This paper contains a transformation of the series for the magnetic force into a series which converges very rapidly except in the immediate neighbourhood of the oscillator.—Dr. A. D. Waller: Concerning emotive phenomena. Part ii. Periodic variations of conductance of the palm of the human hand. This paper gives an account of further observations of changes of electrical resistance associated with emotive phenomena. Their physiological lost time is between two and three seconds, and occurs principally in the skin (palm of hand). With higher and lower conductivity the effects are greater and smaller. The electrical conductivity (palm of hand) exhibits a diurnal periodicity concurrent with the waxing and waning of physiological activity during the twenty-four hours.—Prof. J. A. MacWilliam: The mechanism and control of fibrillation in the mammalian heart. An essential condition in fibrillation is an altered (fascicular) mode of conduction. This may characterise even single beats as "fibrillar." The production of a rapid, continuous series of contractions in typical fibrillation depends on a disturbance in the normal relations of conduction time and refractory period, leading to the establishment of a mechanism of circulating excitations. Gradations are traced between fibrillar beats and rapid fibrillation. The chief protective and remedial agents described are urethane, adrenaline, strontium chloride, hirudine, and pilocarpine. The action of the last may reproduce the different actions of the vagus in auricles and ventricles respectively, promoting fibrillation in the former and restraining it in the latter.—Dr. J. F. Gemmill: The development of the sea anemones, *Actinoloba dianthus* and *Adamsia palliata*. An account is given of the development of these anemones from fertilisation to the eight-mesenteried stage. In both species the eggs are relatively small, those of *Actinoloba* containing so little food-yolk that the free-swimming planula feeds by the action of cilia on two precociously formed mesenteries (the future sulco-laterals), and afterwards crawls mouth-downwards with stomodæum everted, presumably obtaining food from the substratum. This is the only known instance of a feeding Actinian planula, and, indeed, the only previous detailed account of anemone development is that of Appellöf for *Urticina*, which has large yolky eggs.—

R. Beer and **Agnes Arber**: The occurrence of multinucleate cells in vegetative tissues. Binucleate or multinucleate cells have been observed by the authors in 174 plant species belonging to fifty-nine families. They have been found in each of the five classes of living Pteridophyta, in Gymnosperms, and in Angiosperms. They occur in a wide range of tissues belonging to stem, root, and leaf. The multinucleate condition has, in all cases, been found to arise by mitotic division of the nucleus, and in no instance have amitotic divisions been seen to play a part.—**Dr. J. H. Mummery**: The epithelial sheath of Hertwig in the teeth of man, with notes on the follicle and Nasmyth's membrane. The author shows that the "epithelial sheath of Hertwig" is present as a complete organ in human teeth, and, as shown by von Brunn in many mammalia, is the moulding or limiting organ of the dentine of the root, being constantly present where dentine is being deposited.—**H. H. Jeffcott**: The periods of lateral vibration of loaded shafts. The rational derivation of Dunkerley's empirical rule for determining whirling speeds. This paper deals with the periods of lateral vibration of loaded shafts, and gives the rational basis of Dunkerley's empirical method for determining the first whirling speed of a shaft carrying a number of loads. Results obtained by the Dunkerley formula are compared with the exact solutions in a few simple cases. The method employed is of general application, and leads to a theorem connecting the several speeds of vibration of a system of masses elastically connected with the speeds of vibration of the partial systems obtained by reducing to zero a given number of the masses in turn in all possible combinations.—**Prof. Norman Collie** and **Dr. H. E. Watson**: The spectrum of cadmium in the inactive gases.—**C. F. Brush**, **Sir Robert Hadfield**, and **S. A. Main**: Further experiments on spontaneous generation of heat in recently hardened steel.—**T. Matsushita**: The slow contraction of hardened carbon steels.

DUBLIN.

Royal Dublin Society, June 25.—**Dr. G. H. Pethybridge** in the chair.—**Dr. F. E. Hackett**: The twist and magnetisation of a steel tube in a spiral magnetic field. This paper deals with the verification of a formula given by Knott in 1888 relating the Wiedemann effect to the Joule effect, viz. twist=length (radius)⁻¹ sin 2α (e₁+e₂), where e₁ and e₂ are the longitudinal elongation and transverse contraction in a given magnetic field. The theory was tested by keeping the spiral field constant and varying the pitch-angle α. Examination of the longitudinal magnetisation under the same conditions shows that the slight deviations observed from the expected linear relation of the twist to sin 2α are due mainly to the demagnetising effects at the ends.—**R. G. Allen**: The absorption of water by vulcanised fibre and erinoid on exposure to moist air, and the consequent change of electrical resistance. Results were given for thoroughly dried samples of vulcanised fibre and erinoid which were immersed in nearly saturated air for measured intervals of time. The quantity of water absorbed was found to be approximately related to the time of immersion by a simple equation, and fibre was demonstrated to be much more hygroscopic than erinoid. Other results were given for these materials, showing the change of electrical resistance with quantity of water absorbed from moist air and the rapidity of decrease in resistance, especially in the case of fibre, with increase of this quantity. It was also shown that, whatever the quantity of absorbed water in fibre and erinoid, the same simple relation between temperature and resist-

ance, common to many materials, including water, was followed in every case. The latter result was pointed out as giving strong support to the theory that electricity is conducted through the material of an insulator by the vehicle of water-films.

BOOKS RECEIVED.

Colour in Relation to Chemical Constitution. By **Dr. E. R. Watson**. (Monographs on Industrial Chemistry.) Pp. xii+197. (London: Longmans, Green, and Co.) 12s. 6d. net.

Wireless Telegraphy and Telephony: A Handbook of Formulæ, Data, and Information. By **Prof. W. H. Eccles**. Second edition, revised and enlarged. Pp. xxiv+514. (London: Benn Bros., Ltd.)

War Nursing: What Every Woman Should Know. Red Cross lectures by **Prof. C. Richet**. Translated by **H. de Vere Beauclerk**. Pp. xi+119. (London: W. Heinemann.) 3s. 6d. net.

Natural Science and the Classical System in Education. Essays New and Old. Edited for the Committee on the Neglect of Science by **Sir Ray Lankester**. Pp. ix+268. (London: W. Heinemann.) 2s. 6d. net.

The Practice of Soft Cheesemaking: A Guide to the Manufacture of Soft Cheese and the Preparation of Cream for Market. Fourth revision by **C. W. Walker-Tisdale** and **T. R. Robinson**. Pp. 106. (London: J. North.) 3s. net.

The War and the Coming Peace: The Moral Issue. By **Prof. M. Jastrow**, jun. Pp. 144. (Philadelphia and London: J. P. Lippincott Co.) 5s. net.

A Short Handbook of Oil Analysis. By **Dr. A. H. Gill**. Revised, eighth edition. Pp. 209. (Philadelphia and London: J. P. Lippincott Co.) 10s. 6d. net.

CONTENTS.

| | PAGE |
|--|------|
| School and College Mathematics. By S. B. | 401 |
| Lecithin and Allied Substances | 402 |
| A Faunistic Survey | 402 |
| Our Bookshelf | 403 |
| Letters to the Editor:— | |
| Discovery of Neanderthal Man in Malta. (Illustrated).— Prof. Arthur Keith, F.R.S. | 404 |
| A Successful Method of Obtaining Amoebæ for Class Purposes.— Dr. T. Goodey | 405 |
| Scientific Plant Breeding | 405 |
| The Value of Insectivorous Birds. By Dr. Walter E. Collinge | 407 |
| Indian Industrial Progress | 409 |
| Notes | 410 |
| Our Astronomical Column:— | |
| Periodic Comets | 414 |
| The Period of Sirius | 414 |
| Two Spectroscopic Binaries of Long Period | 414 |
| Stonyhurst College Observatory | 414 |
| The Future of the Electrical Trades | 414 |
| Italian Meteorology. By R. C. M. | 415 |
| Geology of the Barberton Gold-mining District | 415 |
| The Spinning-top in Harness. By Sir George Greenhill, F.R.S. | 416 |
| University and Educational Intelligence | 418 |
| Societies and Academies | 419 |
| Books Received | 420 |

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