

Chattaway, F.R.S. The class is open to students who are not members of the University.

THE new college buildings of Bedford College for Women at Regent's Park, London, N.W., are to be opened by the Queen on July 4, at 3 p.m.

VACATION courses for instrument-makers and glass-blowers will be held at the University of Leyden from August 21 to September 4. Particulars of the courses can be obtained from the director, Prof. H. Kamerlingh Onnes, or the general secretary, Dr. C. A. Crommelin.

THE Commemoration Day proceedings at Livingstone College on June 7 will be the celebration by the college of the Livingstone centenary. The reception of the special delegates and visitors by the principal will be from 3 to 3.30 p.m., and afterwards a number of addresses will be given and an exhibition held.

At the end of the present academic year Cornell University, N.Y., will lose the services of Prof. H. H. Norris, who has occupied its chair of electrical engineering since 1905, and has been head of the department since 1909. He is resigning in order to undertake editorial work in connection with *The Electrical Railway Journal* and *The Electrical World*.

THE following appointments have been made to the faculty of the new school of technology in connection with Johns Hopkins University, Baltimore:—Prof. C. C. Thomas, of the University of Wisconsin, to the chair of mechanical engineering; Prof. C. J. Tilden, of the University of Michigan, to the chair of civil engineering; and Prof. J. B. Whitehead, hitherto professor of applied electricity in Johns Hopkins University, to the chair of electrical engineering.

AN influentially signed memorial has been sent to Lord Haldane, in his capacity of Chancellor of the University of Bristol, directing attention to the circumstances in which Mr. R. P. Cowl, formerly professor of English literature, was removed from the University of Bristol in 1910. The signatories point out that it appears that a grave injustice may have been committed, and ask for a full investigation of the case. In the first list of signatories there are many distinguished names, including the following men of science:—Prof. W. Ridgeway, Sir Bertram Windle, Profs. R. H. Yapp, J. A. Green, W. M. Travers, P. F. Frankland, Leonard Hill, William Bullock, J. Adams, Gisbert Kapp, F. W. Burstall, W. M. Bayliss, E. W. Hobson, and F. R. Japp.

It is announced in *Science* that Mrs. G. W. Hooper, of San Francisco, has transferred to the University of California 200,000*l.* for the establishment of an institute of medical research. We learn from the same source that the late Prof. Louis A. Duhring, formerly professor in the University of Pennsylvania, in his will disposes of an estate valued at about 100,000*l.* The will creates a trust fund of 5000*l.*, the income of which is to be used for the benefit of the department of cutaneous medicine, and it gives the University of Pennsylvania Hospital 10,000*l.* for the establishment of free beds in which cutaneous, cancerous, and allied diseases shall be treated and studied. After a number of private bequests have been made, the residue of the estate is to be given to the trustees of the University of Pennsylvania, and applied to the treatment of cutaneous diseases and their study.

THE Apprenticeship and Skilled Employment Association has issued its seventh annual report. The work of the association is, among other matters, to watch over the interests of juveniles so far as they are affected by fresh legislation. During the year

under review the association has inquired into the hours of employment of van and errand boys, and the conditions of employment of boy clerks in the Civil Service; and representatives of the association have given evidence before the Royal Commission on the Civil Service. It is satisfactory to know that the London County Council has adopted a suggestion made a short time ago by the association that attendance at continuation classes should be made a condition of employment of their laboratory monitors. These lads on leaving the council's service have, as in the past, been referred to the association, and have in almost every case been successfully placed. The report gives further interesting evidence that there is a growing disposition among public bodies to make use of the services of the association in the matter of boys and girls under their supervision.

THE issue of *The Fortnightly Review* for June includes an article on vocational education by Mr. Cloudesley Brereton. The whole spirit of vocational education is, he maintains, that the manual work and crafts with which it deals should not be taught mechanically, or as a mere rule of thumb, but should be used as veritable instruments of culture. In London, vocational education has led, apart from the polytechnic movement and the great extension of trade schools, to the conversion of the higher elementary schools into central schools, to which has been given a definite bias for the preparation of the pupils for an industrial or commercial life; while the work in the infant schools and lower grades of the elementary schools is every day becoming more concrete and constructive. It is to be hoped, Mr. Brereton thinks, that any scheme of national education will immensely enlarge the facilities for vocational education, and be the means of bringing the university into closer touch with the business world and the locality of which it should be the spiritual and intellectual inspiration. One thing is, he says, at least certain: we shall never gain the full confidence of the business world and the working classes until we can show that education is practical, *i.e.* that it has an economic value; while if we are to retain the confidence of those who believe in the spiritual side of education, we must likewise hold fast to its humanistic ideals. Vocational education in the widest sense means the working out of the combination of these ideals.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society**, May 29.—Sir Archibald Geikie, K.C.B., president, in the chair.—Prof. A. B. Macallum: *Acineta tuberosa*: a study on the action of surface tension in determining the distribution of salts in living matter. In previous investigations it was found that the salts demonstrated microchemically to occur in the living cell were not uniformly diffused but were condensed or "localised" at points in its cytoplasm, or at parts of its surface. Amongst such salts were the compounds of potassium, which are very soluble and are not known to form precipitates in nature. It was concluded that some other force than simple osmotic pressure was concerned in this distribution of the salts, especially in the cases where the condensations were in those portions of the cell surface where, from the deformation observed, it was inferred that a lowering of surface tension was involved. The explanation advanced was that surface tension was the factor primarily concerned in these condensations. Two years ago an investigation of the distribution of potassium salts in *Acineta tuberosa*, a marine Suctorian Protozoan, gave results which appear to place

the matter beyond doubt. It would seem, from further investigations, that surface tension not only determines the condensations in the films and elsewhere in the organisms, but also maintains these condensations against the forces of diffusion.—Sir David Bruce, Majors D. Harvey and A. E. Hamerton, and Lady Bruce: Morphology of various strains of the trypanosome causing disease in man in Nyasaland. IV., The Mzimba strain.—Helen L. M. Pixell: Notes on *Toxoplasma gondii*.—J. C. F. Fryer: An investigation on pedigree breeding into the polymorphism of *Papilio polytes*, Linn.—Dr. S. Russ and Dr. Helen Chambers: The action of radium rays upon the cells of Jensen's rat sarcoma.

**Physical Society**, May 16.—Prof. C. H. Lees, vice-president, in the chair.—Dr. W. Makower and Dr. S. Russ: Some experiments to detect  $\beta$  rays from radium A. When an atom of radium A disintegrates an  $\alpha$  particle is expelled which carries with it two positive atomic charges. At the same time the radium B atom formed recoils with a single positive charge. To explain this it is necessary to suppose that three negative electrons are expelled during the process. If these are emitted with a high velocity they should appear as  $\beta$  rays capable of detection; or they might consist of a slowly moving  $\delta$  radiation which would escape such detection. The experiments, made by both methods in the hope of detecting  $\beta$  rays from radium A, failed to reveal any such radiation.—Dr. J. Robinson: Dust figures. The ripple formation in Kundt's tube was explained by W. König in 1891. His theory was based on the hydrodynamical forces between two particles in a stream. Certain measurements on dust figures produced by an electric spark have shown that these figures also can be explained in a similar way to the Kundt's tube figures. Cook suggested that viscosity must be introduced in order to account for the formation of ripples. The author shows that it is possible to account for ripple formation without introducing viscous forces at all. In the case of the Kundt's tube figures there is a variation of velocity of the air from a node to an antinode, which produces a variation in the forces, and this causes the powder to lose its uniformity of distribution and to form ripples. The necessary constraints for the ripples are forthcoming without the introduction of viscosity.—Dr. Haworth: Vibration galvanometer design. (1) The maximum amount of power available for vibrating the moving system of a vibration galvanometer of the moving-coil type is  $V^2/4R$ . As the frequency of the instrument is raised the losses increase rapidly, so it is an advantage to be able to increase the useful power input per unit voltage; the resistance of the instrument must be decreased. This can be done in a galvanometer of the Duddell type by leading the current in and out at the bottom bridge and short-circuiting the wires at the top bridge, and it results in an increase of sensibility. (2) Owing to the losses in the moving system increasing at a greater rate than the first power of the frequency, and because the frequency of the system increases at a slower rate than the reciprocal length of the string on account of the mass of the mirror, the flux density must be increased as the frequency increases. As the losses are low at low frequency and the mass of the mirror is not large, then, compared with the mass of the wire, the flux density required is moderate; but at high frequencies the flux density required is large. To obtain this result economically it is convenient to make the depth of the poles small compared with the maximum length of the wires. (3) A combination of (1) and (2) makes a satisfactory instrument with a much flatter voltmeter-sensibility-frequency curve than obtained usually.

NO. 2275, VOL. 91]

DUBLIN.

**Royal Dublin Society**, May 20.—Prof. James Wilson in the chair.—W. J. Hartley: A violet colouring matter and its production by a certain bacterium. The bacterium was isolated from the water supply of a creamery. The cultural characters resemble those of both *Bacterium violaceum* and *B. ianthinum*, as described by Macé. The colour was best produced on potato. Colour was not produced at 37° C., in the absence of air, or in the absence of more moisture than was sufficient for the growth of the organism. In artificial media colour was produced in the absence of peptone. The colouring matter extracted with alcohol is an amorphous blue-black, solid, without surface reflection. A weighed quantity was dissolved in alcohol, and the absorption spectra were examined optically and photographically at various dilutions. The spectra extended from  $\lambda 670$  in the red to  $\lambda 227$  in the ultra-violet. At the greatest dilution only one absorption band was observed, starting at  $\lambda 6439$ , and extending towards, but not further than,  $\lambda 5000$ ; the ultra-violet absorption is general, with no indication of bands. This spectrum differs from that of the dyes, such as Hoffmann's violet, and from the spectra of violet colouring matters extracted from natural sources by Schneider, Moseley, Molisch, Krukenburg, and Lecoq de Boisbaudran. The chemical reactions of the solution resemble those of some natural violet colouring matters. It is an oxygenated substance which, in the presence of light, oxidises substances such as alcohol.—Rev. Henry V. Gill: The effect of a low potential electric current on photographic plates. The object of this communication was to describe some results which had been obtained from experiments on photographic plates. There is a great deal of uncertainty concerning the nature of the changes which take place in the sensitive surface of such plates when they are exposed to the action of light and other influences. Many physicists have studied the effect of passing electric sparks over the surface of dry photographic plates. On development a record of the path traversed by the discharge is obtained. The blackening of the plate is in great part due to the luminosity accompanying the discharge, and it is consequently difficult to determine the part played by the current as distinct from the luminosity of the spark. The discharge was non-luminous, and of comparatively low voltage, from 200 to 400 volts. The results obtained show that the effect of such a current on sensitive plates is complicated, and depends to a great extent on the nature of the terminals placed at the surface of the plate, between which the discharge takes place. The ions coming from the positive terminal seem to play the chief part in the reaction. When, for example, copper is employed as positive terminal, a considerable region of the plate surrounding the point of contact is found on development to be blackened; on the other hand, when platinum is used no blackening of the plate is produced. Silver and other metals produce characteristic effects. The effect at the negative terminal is very much less and does not depend on the nature of the terminal.

PARIS.

**Academy of Sciences**, May 26.—M. F. Guyon in the chair.—Emile Picard: Concerning the recent meeting of the International Association of Academies. A short account of the subjects discussed at the meeting at St. Petersburg.—Paul Appell: The Hermite polynomials  $U_{m,n}$  and their analogues connected with spherical functions in hyperspace.—P. Chofardet: Observations of the Schumasse comet, 1913a, made at the Observatory of Besancon with the bent equatorial. Positions are given for May 21 and 24. On

May 4 this comet appeared as a circular nebulosity 1.5 diameter, magnitude between 8 and 9. There was a diffuse nucleus but no tail.—Nicolas **Kryloff**: Some properties of integral equations with non-symmetrical nucleus.—J. **Tamarkine**: The problem of the development of an arbitrary function in a Sturm-Liouville series.—W. F. **Osgood**: An extension of a theorem of Weierstrass and on a restriction of another theorem by the same author.—M. **d'Ocagne**: The general application of the method of aligned points to problems which reduce themselves to solutions of spherical triangles.—Th. **Got**: The equivalence of certain indefinite ternary quadratic forms of the same genus.—L. **Décombe**: The viscosity of the atom. In the absorption of light and in certain abnormal dielectric phenomena an explanation is found in a certain viscosity term, proportional to the velocity, and regarded hitherto as an empirical term. An attempt is made to connect this with the fundamental principles of mechanics.—A. **Tian**: The relation between light energy and photochemical action. An examination of the conditions under which the law of proportionality between photochemical effect and light absorption is verified.—L. **Chaumont**: The theory of apparatus serving for the study of elliptically polarised light.—R. **Fortrat**: The normal magnetic triplet and Preston's rule.—Jacques **Carvalho**: The electrical conductivity of pure ether. An arrangement is described securing the perfect isolation of the electrodes. Under a constant difference of potential of 1144 volts the conductivity diminished slowly for eight days, after which it remained constant. The extremely small residual conductivity observed is attributed to traces of impurities.—Kevin **Burns**: Interference measurements of wave-lengths in the iron spectrum. Employing the methods of Buisson and Fabry, interference measurements of the iron lines have been extended from wave-length 6500 to 8824.—Félix **Bidét**: The displacement limit of monoethylamine by ammonia gas. A study of the influence of temperature and pressure on the equilibrium limit and on the velocity of the reaction.—Georges **Charpy** and André **Cornu**: The separation of graphite in alloys of iron and silicon.—A. **Recoura**: The instability of ferric fluosilicate and its spontaneous transformation into another double fluoride of silicon and iron.—J. B. **Senderens** and J. **Abouïenc**: The ester salts derived from octanol by the method of the authors; observations on the principle of this method. The application of the use of small quantities of sulphuric acid (2 per cent. to 3 per cent.) in the catalytic formation of esters.—Georges **Dupont**: The catalytic hydrogenation of the acetylene  $\gamma$ -glycols in presence of palladium black. Acetylene glycols of the fatty series treated with hydrogen and palladium black are more highly reduced than when platinum black is used. A mixture of a saturated glycol, alcohol, and hydrocarbon is produced. The difference between the two catalytic agents is still more marked with the aromatic acetylenic glycols, platinum giving the saturated glycols only, palladium the hydrocarbons.—A. **Guyot** and J. **Martinet**: The condensation of the primary and secondary aromatic amines with the mesoxalic esters. Synthesis in the indole series.—Jean **Nivière**: The action of  $\alpha$ -monochlorohydrin and epichlorohydrin upon the monosodium derivative of glycerol.—Marcel **Lantenais**: Some new properties of carbon tetraiodide and its estimation in presence of iodoform. Carbon tetraiodide reacts with an aqueous solution of silver nitrate giving carbon dioxide, nitric acid, and silver nitrate; iodoform, with the same reagent, gives carbon monoxide, silver iodide, and iodate and nitric acid. When aqueous solution of silver nitrate is allowed to act upon a mixture of iodoform and carbon tetraiodide the proportion of carbon monoxide and dioxide evolved serves accurately to

indicate the composition of the mixture.—Henri **Pottevin**: Cholera toxin and antitoxin.—A. **Besredka**: Study of the tubercle bacillus. A description of a good liquid medium for the culture of the tubercle bacillus. The growth after twenty-four hours in this liquid is as abundant as that of an ordinary microbe such as streptococcus. Bovine and human bacilli give distinctive growths in this medium.—Mme. A. **Hufnagel**: A pericesophagian organ observed in two Lepidoptera.—Em. **Bourquelot** and Em. **Verdon**: The use of increasing proportions of glucose in the biochemical synthesis of  $\beta$ -methylglucoside. The influence of the glucoside formed on the arrest of the reaction.

## CALCUTTA.

**Asiatic Society of Bengal**, May 7.—D. **Prain** and I. H. **Burkill**: A synopsis of the Dioscoreas of the Old World, Africa excluded, with descriptions of new species and of varieties. Diagnoses of new species and varieties are given, as well as a key to the genus.—H. M. **Chibber**: Variations in the flowers of *Limnanthemum indicum*, Thwaites. Four hundred and fifty-seven flowers were examined and the variations observed are given in tabular form.—Maude L. **Cleghorn**: Notes on pollination of *Colocasia antiquorum*. The paper records some observations on the pollination of the Indian Kachu, and compares it with the process known in the European cuckoo-pint (*Arum maculatum*).—Jitendra Nath **Rakshit**: Double compounds of mercuric oxide with compounds containing ketonic radical. A compound is described of the formula  $C_3H_6O, 3HgO$ .

## BOOKS RECEIVED.

British Museum (Natural History). Catalogue of the Plants collected by Mr. and Mrs. P. A. Talbot in the Oban District, South Nigeria. By Dr. A. B. Rendle, E. G. Baker, H. F. Wernham, S. Moore, and others. Pp. x+157+17 plates. (London: The Trustees of the British Museum; Longmans and Co. and others.) 9s.

British Museum (Natural History). Catalogue of the British Species of *Pisidium* (Recent and Fossil) in the Collections of the British Museum (Natural History), with Notes on those of Western Europe. By B. B. Woodward. Pp. ix+144+xxx plates. (London: The Trustees of the British Museum; Longmans and Co. and others.) 10s. 6d.

Die biologischen Grundlagen der sekundären Geschlechtscharaktere. By Drs. J. Tandler and S. Grosz. Pp. 169. (Berlin: J. Springer.) 8 marks.

Qualitative Analyse vom Standpunkte der Ionentheorie. By Dr. W. Böttger. Dritte Auflage. Pp. xvii+565+plate. (Leipzig: W. Engelmann.) 11.20 marks.

A Text-Book on Trade Waste Waters: their Nature and Disposal. By Drs. H. M. Wilson and H. T. Calvert. Pp. xii+340. (London: C. Griffin and Co., Ltd.) 18s. net.

Preliminary Chemistry. By H. W. Bausor. Pp. 106. (London: W. B. Clive.) 1s. 6d.

Man and his Forerunners. By Prof. H. v. Buttel-Reepen. Translated by A. G. Thacker. Pp. x+96. (London: Longmans and Co.) 2s. 6d. net.

Researches on Irritability of Plants. By Prof. J. C. Bose. Pp. xxiv+376. (London: Longmans and Co.) 7s. 6d. net.

Egyptian Government. Ministry of Finance. Survey Department. Report on the Work of the Laboratories and of the Assay Office during 1912. By A. Lucas. Pp. 28. (Cairo: Government Press.) 5 P.T.

Electric Wiring. By Prof. W. C. Clinton. New edition. Pp. viii+197. (London: J. Murray.) 2s.