

THE Board of Agriculture has again made an increased grant of 1300*l.* to Wye College, and has promised a grant of 262*l.* (for six months) for the cost of investigations on hops, on the life-history of the parasitic stomach worms (*Strongyli*) of sheep, and on the disease of "struck" of sheep, whilst the institution of a fresh grant of 1000*l.* towards the expense of an advisory staff in entomology and mycology—more particularly for fruit-growers—has also been officially intimated to the college authorities.

THE treasurer of Columbia University has reported to the trustees, says *Science*, that he has received about 310,000*l.* from the executors of the estate of the late Mr. George Crocker. Accordingly, the work of cancer research, for which Mr. Crocker gave this sum as an endowment, will begin at once. The research fund will be entrusted for administration to a board of managers, to consist of representatives of the trustees and of the medical faculty, together with a director of cancer research to be appointed.

THE Cambridge University Press has published a report by Mr. E. R. Burdon on a visit, undertaken in accordance with a resolution of the Forestry Committee of the University of Cambridge, for the purpose of studying the research work and educational methods of the forestry departments and forestry schools in those countries in connection with the study of timber and other forest products. An excellent description is provided of the departments of the Products Branch of the United States Forest Service, including particularly the Forest Products Laboratory at Madison, Wis., and the Office of Wood Utilisation, Chicago. The forestry schools of Yale, Harvard, Michigan, and Toronto Universities were visited by Mr. Burdon, and the particulars here brought together should prove of great service in this country.

IN an article in the Bulletin of the Society for the Promotion of Engineering Education for the present month, Profs. W. S. Franklin and Barry MacNutt deal with the teaching of elementary physics. They confine their attention in this case wholly to lectures and text-book work, though they recognise fully the paramount value of laboratory practice. Commenting upon the answers of 164 freshman engineering students—who had taken elementary mechanics for half a year—to a series of simple questions, the writers come to the conclusion that the great majority of young men cannot realise the meaning of simple English when it is impersonal and non-anthropomorphic, and a large proportion of the failures to answer the questions were due to the inability of the men to read the questions intelligibly. The object of elementary physics, the authors urge, should be to develop "rational insights." It is not the duty of a teacher of elementary physics to give his students a survey of the science.

THE report of the Board of Education for the year 1910-11 is now available (Cd. 6116). From it we find that though there were 768,358 students in attendance at evening and similar schools in 1909-10, as compared with 752,356 in 1908-9, nearly 18 per cent. of the students enrolled failed to complete the small minimum of attendances required in order to enable grants to be paid towards their instruction. In the administrative counties (excluding London) each student received, on an average, 45 hours of instruction. There was reason to expect the average would be lower in rural than in urban areas; only in eight cases, however, was the average below 30 hours, and in three cases it was 60 or more. The total amount of advanced instruction of the kind provided in technical institutions is still disappointingly small. There were 49 technical institutions at which courses were

recognised as eligible for grant in 1909-10. In the case of 37 institutions for which alone the statistics are complete, there were 3032 students enrolled, of whom 2664 qualified for grant, and 1806 of these took full courses of instruction. There is still a tendency, the report states, to admit students to technical institutions before they have had an adequate course of general education.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 21.—Sir Archibald Geikie, K.C.B., president, in the chair.—Lord Rayleigh: The self-induction of electric currents in a thin anchoring.—Hon. R. J. Strutt: The after-luminosity of electric discharge in hydrogen observed by Hertz. Hertz observed that if Leyden-jar discharges were passed through hydrogen at a pressure of, say 100 mm., the gas remains luminous for a small fraction of a second afterwards. It is concluded that Hertz's effect is due to the presence of sulphuretted hydrogen in the hydrogen employed. It is conjectured that sulphuretted hydrogen is decomposed by the discharge, that sulphur vapour emerges in a specially active state, and that it then unites with hydrogen, the blue glow accompanying this process. Prof. J. H. Poynting: The changes in the dimensions of a steel wire when twisted, and on the pressure of distortional waves in steel. In a former paper (*Proc. Roy. Soc., A*, vol. lxxxii., 1909) the author described experiments showing that when a loaded wire is twisted it lengthens by an amount proportional to the square of the angle of twist. In this paper it is shown that if the wire is previously straightened by heating it under tension, the lengthening is, within errors of measurement, the same for all loads which could be applied, so that, as was supposed, the only function of the load in the earlier experiments is to straighten the wire. In all wires examined so far, the lowering is symmetrical about a point a fraction of a turn always in the counter-clockwise direction from the condition of no twist.—H. S. Patterson, R. S. Cripps, and R. Whytlaw-Gray: The orthobaric densities and critical constants of xenon. Using a carefully purified sample of xenon prepared from 150 c.c. of the gas lent by Sir William Ramsay, measurements were made of the orthobaric densities between the temperature limits of 16 and -66.8° C. The variation of the mean density of liquid and saturated vapour with temperature was found to follow closely Cailletet and Mathias's law, and the results are expressed by the equation $D_l = 1.205 - 0.003055t$, where D_l = mean density at t° C. The slope of the diameter is abnormally large, and is practically identical with the value for the argon diameter recently found by Onnes. The constants $T_c = 16.6^{\circ}$ C. and $P_c = 58.2$ atms. were found, and the following were calculated from the results:—critical density, 1.115 grms. per c.c.; density of liquid close to boiling point, 3.063 grms. per c.c.; atomic volume close to boiling point, 42.7 grms. per c.c.—W. A. Harwood and Dr. J. E. Petavel: Experimental work on a new standard of light. The source of light consists of a strip of platinum heated by an electric current. The thermopiles measure the radiation passing through (a) a plate of black fluorspar, (b) a water-trough. The thermopiles are connected in opposition. As the current through the strip is increased, the intensity of the luminous radiation increases more rapidly than the intensity of the radiation of longer wave-length. Therefore, for a given thickness of the absorbing media and distance of the thermopiles, there will be one definite temperature at which the reading of a

galvanometer in the thermopile circuit will be zero. A long series of experiments showed that the light could be kept constant within ± 0.5 per cent. when a constant temperature was maintained by the above criterion.—**J. A. Crowther**: The distribution of the scattered Röntgen radiation. Experiments have been made to determine accurately the distribution of the scattered Röntgen radiation round a radiator. It has been found that the radiation can be divided into two parts: a true scattered radiation, distributed in accordance with the usually accepted theory of the scattering, and an additional or excess radiation. The curves representing the distribution of the latter have been found to resemble those previously obtained for a parallel pencil of β rays after passing through thin sheets of matter.—**E. A. Owen**: The passage of homogeneous Röntgen rays through gases. (1) The absorption coefficient of the different homogeneous radiation in a light gas such as CO_2 or SO_2 is proportional to the absorption of radiations in air. (2) The absorption of homogeneous radiation in a gas is proportional to the pressure of that gas. (3) For the homogeneous rays emitted by metals of atomic weight ranging from that of iron to that of molybdenum, the coefficient of absorption in the gases investigated is approximately inversely proportional to the fifth power of the atomic weight of the radiator which emits that characteristic radiation, *i.e.* $\lambda \alpha \omega^{-5}$. (4) The amount of ionisation produced in a thin layer of a gas is directly proportional to the pressure of the gas. (5) The ionisation relative to air is approximately constant in the same gas for the different homogeneous rays. (6) The total number of ions produced by homogeneous beams of equal intensity is approximately the same in each gas for any particular type of rays.—**J. C. Chapman**: Fluorescent Röntgen radiation from elements of high atomic weight.—**J. A. Gray**: The nature of γ rays excited by β rays. A determination has been made of the relative amount of emergent and incident γ radiation excited in "radiators" of different thicknesses and different materials. Results of the experiments are:—(1) The emergent γ radiation is generally greater in amount than the incident radiation, and is more penetrating. (2) The ratio of emergent to incident γ radiation is greater, for radiators of the same material, the thinner the radiator; for radiators of different materials thick enough to stop the β rays, the lower the atomic weight of the radiator. (3) The results obtained point to the conclusion that the excited γ ray is an entity, the direction of which is nearly that of the β ray exciting it. (4) The chance of a β ray making a γ ray is roughly proportional to the atomic weight of the radiator, provided the β ray spends its range in the radiator.

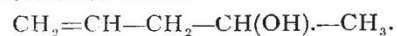
Geological Society, March 13.—**Dr. Aubrey Strahan**, F.R.S., president, in the chair.—**Dr. R. L. Sherlock** and **A. H. Noble**: The glacial origin of the Clay-with-Flints of Buckinghamshire, and on a former course of the Thames. The superficial deposits are divided into Clay-with-Flints with the associated Gravelly Drift, and the Fluvio-glacial Gravels. Certain high-level gravels, older than any of these, and also the river-gravels and alluvium of the present streams, are not dealt with in the paper. The evidence shows that the Clay-with-Flints and Gravelly Drift were formed by an ice-sheet which came from the north or north-west over the Chiltern Hills. Only the clean upper layers of ice surmounted the escarpment, and this produced the Clay-with-Flints and Gravelly Drift. At that time the Thames flowed from Bourne End through Beaconsfield and Rickmansworth to Watford. The ice-sheet blocked the river-channel between Bourne End and Rickmans-

worth, and diverted the Thames southwards at Bourne End. The river beyond Watford was further blocked by the Eastern Drift. On the melting of the ice, Fluvio-glacial Gravels were left over a great area. These gravels are composed chiefly of Eocene and Cretaceous materials derived from the Gravelly Drift. The floods from the melting ice, added to the waters of the Thames and Colne, produced the great flat through which the Thames now flows. After the retreat of the ice, the Wye and Misbourne extended their channels over the Fluvio-glacial Gravel flat, and some other small streams were formed.—**Jane Longstaff**: Some new Lower Carboniferous gasteropoda. Eight species of gasteropoda are described, six being regarded as belonging to five new genera or subgenera, the others representing Pithodea, De Koninck, which has not previously been recorded from the British or Irish Carboniferous Limestone.

Linnean Society, March 21.—**Dr. D. H. Scott**, F.R.S., president, in the chair.—**Dr. I. Bolivar** and **C. Ferrière**: Orthoptera-Phasmidæ of the Seychelles.—**J. A. Liddell**: *Nitocrameira bdelluræ*, a new genus of parasitic Canthocamptidæ.—**W. West** and **Prof. G. S. West**: The periodicity of the phytoplankton of some British lakes.

PARIS.

Academy of Sciences, March 11.—**M. Lippmann** in the chair.—**C. Guichard**: Osculating circles and osculating spheres to the lines of curvature of a surface.—**M. Lucas-Championnière** was elected a member of the section of medicine and surgery in the place of the late **O. M. Lannelongue**.—**MM. Fayet** and **Schaumasse**: The elliptical character of the Schaumasse comet (1911h).—**E. Vessiot**: Permutable functions and continuous groups of linear functional transformations.—**V. Jamet**: Certain complexes of lines.—**Rodolphe Soreau**: Generalisation of Massau's construction and abacus for solving equations of the form $z^{\alpha+\beta} + nz^{2\beta} + pz^{\beta} + q = 0$.—**MM. Papin** and **Rouilly**: The gyropter. Two diagrams completing the note published on March 4.—**Samuel Lifchitz**: The displacement of the particles in the Brownian movement. The explosive shock of the spark as the cause of the phenomenon.—**Ch. Féry**: A new thermoelectric combustion calorimeter. A calorimetric bomb is fixed by two discs of constantan in an external metallic envelope, the latter and the constantan discs forming a thermocouple. The rise of temperature observed, which is high owing to the absence of water, is read directly on a millivoltmeter.—**Jean Escard**: Some practical arrangements for the determination of the densities of solid bodies of small volume. A description of a volumometer modified to measure accurately the density of solids having volumes from 1 c.c. to 3 c.c.—**P. Th. Muller** and **E. Carrière**: The refraction and dispersion of the mercury nitrates.—**J. Meunier**: Some mechanical phenomena of gaseous combustion. The spiral flame.—**H. Baudigny**: Researches on the formation of dithionic acid in the reaction between alkaline sulphites and copper salts.—**V. Hasenfratz**: Apharmine-carboxylic acid, apharmine, and some derivatives of this base.—**Marcel Sommelet**: γ -Ethoxyacetoacetic ester. This ester is obtained by the interaction of ethoxyacetic acid, bromoacetic acid, and zinc.—**Mme. Ramart-Lucas**: The action of phenylmagnesium bromide upon pinacolone and on methylpinacolone.—**H. Pariselle**: Study of the unsaturated alcohol



This alcohol was prepared by the interaction of allyl bromide, acetaldehyde, and magnesium. Its properties are described, and also those of its acetate and chloride.—**Marcel Guerbet**: The action of caustic

potash on the tertiary alcohols: a new method for the diagnosis of these alcohols.—A. Mailhe and M. Murat: The nitro derivatives of phenyl oxide.—J. Virieux: *Achromatium oxaliferum*.—Victor Dupont and Jean Gautrelet: General anæsthesia by the rectum, using titrated mixtures of air and chloroform or the vapours of ethyl chloride. Details of experiments on the rabbit.—Jacques Pellegrin: The dentition of *Mobula olfersi*.—D. Keilin: The anatomy and development of *Belgica antarctica*. Work done on material collected by M. Gain in the course of the expedition of the *Pourquoi-Pas?*—E. Daday de Déès: The polymorphism of the males in certain phyllopod. —A. Cligny: The marine migration of the common eel. In November, 1911, and January, 1912, about a dozen eels were caught in the English Channel about 20 miles from the coast of Cornwall. A detailed account of the condition of one of these, a female, is given.—M. Flajolet: Contribution to the application of wireless telegraphy to the prediction of storms. A description of some arrangements for increasing the sensibility of the recording apparatus. With these modifications, the apparatus gives indications of electrical disturbances when the storm is from ten to twenty-four hours distant.—A. Baldit: The electrical charges of rain at the Puy-en-Velay in 1911.

March 18.—M. Lippmann in the chair.—J. Boussinesq: The explanation of the instantaneous action of gravity and molecular forces, without successive propagation, at all distances at which the forces are produced round the material points from which they emanate.—A. Haller: Phenyl-, *p*-tolyl-, and diphenyloxyhomocampholic acids and their transformation into benzylidene-*p*-tolylidene- and diphenylmethylenecamphors.—Ch. Ed. Guillaume: The expansion of commercial nickel. Although the coefficient of expansion of nickel is greater than that of invar (nickel-steel), it has the advantage of withstanding corrosion after prolonged immersion in water. The coefficient of expansion of bars of commercial nickel has been studied over a period of twenty years, and a gradual diminution in the coefficient has been noted.—M. Constantin was elected a member of the section of botany in the place of the late M. Bornet.—Emile Belot: The formation of rings in the Laplace nebula.—H. W. E. Jung: The invariant of Zeuthen and Segre.—Jean Chazy: A differential equation of which a coefficient is a divergent series.—Louis Roy: Waves of shock in the motion of flexible membranes.—Charles Reignier: The starting period in aeroplane motors. Unless the motor takes a certain minimum time to attain full power, there is a risk of breaking the propeller or transmission gear. The relation between this time and the strength of the moving parts is investigated in this paper.—Georges Meslin: The interference fringes obtained with the Fresnel tripism.—G. A. Hemsalech: The influence of capacity, of self-induction, and of the explosive distance on the velocity of luminous vapours in the electric spark. The velocity of the metallic vapour is not sensibly changed by varying the capacity; it varies inversely as the self-induction of the discharge circuit, and directly as the explosive distance.—P. Mesernitsky: Contribution to the study of the decomposition of uric acid by the action of the radium emanation.—Camille Matignon: The equilibrium of the system cadmium sulphate, hydrogen chloride.—P. Melikoff and M. Becaia: The estimation of phosphoric acid in presence of colloidal silicic acid.—G. Chavanne: The ethylene isomerism of acetylene bichloride.—J. B. Senderens: The catalytic dehydration of the fatty alcohols in the wet way by means of sulphuric acid. Experimental evidence in favour of the view that the formation of ethylenes

from alcohols by the action of sulphuric acid is a catalytic effect, and is not due, as is commonly supposed, to a direct withdrawal of water from the alcohols by the acid.—H. Duval: Researches on the endozoic compounds.—Mme. Paul Lemoine: The general characters of the Arctic and Antarctic genera of the calciferous algæ.—L. Cuénot and L. Mercier: Study of cancer in mice.—A. Trillat and M. Fouassier: The influence of the nature of the gases dissolved in water on the vitality of micro-organisms. The nature of the dissolved gases in water is an important factor in the multiplication and preservation of pathogenic organisms. The results with the Eberth bacillus are especially emphasised.—F. de Montessus de Ballore: Luminous phenomena accompanying great earthquakes.

BOOKS RECEIVED.

- Alle Fonti della Vita. Prolegomeni di Scienza e d'arte per una Filosofia della Natura. By Dr. W. Mackenzie. Pp. 387. (Genoa: A. F. Formiggini.)
- Cambridge County Geographies:—West London. By G. F. Bosworth. Pp. xii+267. Breconshire. By C. J. Evans. Pp. xi+172. Oxfordshire. By P. H. Ditchfield. Pp. xi+218. (Cambridge: University Press.) Each 1s. 6d.
- Einführung in die Biologie. By Prof. O. Maas and Dr. O. Renner. Pp. ix+394. (München & Berlin: R. Oldenbourg.) 8 marks.
- The Student's Handbook of Stratigraphical Geology. By A. J. Jukes-Browne. Second edition. Pp. xiv+668. (London: E. Stanford.) 12s. net.
- Ctenophores of the Atlantic Coast of North America. By A. G. Mayer. Pp. 58. (Washington: Carnegie Institution.)
- The British Tunicata. By the late J. Alder and the late A. Hancock. Edited by J. Hopkinson. Vol. iii. Pp. xii+113. (London: The Ray Society.) 12s. 6d. net.
- A Monograph of the British Desmidiaceæ. By W. West and Prof. G. S. West. Vol. iv. Pp. xiv+191+plates. (London: The Ray Society.) 25s. net.
- Achondroplasia: its Nature and its Cause. By Dr. M. Jansen. Pp. 98. (Leyden: E. J. Brill, Ltd.)
- An Elementary Treatise on Statics. By Prof. S. L. Loney. Pp. viii+393. (Cambridge: University Press.) 12s.
- Year-Book of the Royal Society of London, 1912. Pp. 256. (London: Harrison and Sons.) 5s.
- Is the Mind a Coherer? By L. G. Sarjant. Pp. 304. (London: George Allen and Co., Ltd.) 6s. net.
- Principles and Practice of Poultry Culture. By J. H. Robinson. Pp. xvi+611. (London, Boston, &c.: Ginn and Co.) 10s. 6d.
- Stanford's Geological Map of Central Europe. (London: E. Stanford.) 5s.
- Prüfung der chemischen Reagenzien auf Reinheit. By E. Merck. Zweite Auflage. Pp. v+332. (Darmstadt: E. Merck.)
- Die Süßwasserfauna Deutschlands. Eine Exkursionsfauna. Edited by Prof. Brauer. Heft 14. Pp. iv+273. (Jena: G. Fischer.) 7 marks.
- Text-book of Embryology. By Dr. F. R. Bailey and A. M. Miller. Second edition. Pp. xvii+672. (London: J. and A. Churchill.) 21s. net.
- Outlines of Applied Optics. By P. G. Nutting. Pp. ix+234. (Philadelphia: P. Blakiston's Son and Co.) 2 dollars net.
- Prehistoric Thessaly: being some Account of Recent Excavations and Explorations in North-eastern Greece from Lake Kopais to the Borders of Macedonia. By A. J. B. Wace and M. S. Thompson. Pp. xvi+272+6 plates. (Cambridge: University Press.) 18s. net.