

methods of practical physics. We made each student verify Ohm's law, measure the specific capacity for heat of copper, or the wave-length of sodium light; and that method, devised for a special purpose for which I still think it the most useful, lent itself to the examiner and the teacher as a method by which the mass of pupils could be instructed and examined. It has been extended and developed by many able and enthusiastic men; too often it is elaborated so far as to be little more than press the button and note what happens. You have then proved that the pressure of a gas at constant volume is proportional to its temperature.

In the case of the ordinary boy and girl the results have little more influence on their lives than the lists of the kings of Israel or the emperors of Rome, or the exceptions to some abstruse rule of grammar. They have been forced to learn by heart in order to train their memory. Sir Napier Shaw has recently written thus:—"When we come to consider such provision as there is for science in general education as represented by the opportunities actually offered to boys and girls at school, it is for me impossible to avoid the conclusion that what the exponents of physical science have evolved as the elements of scientific education is quite unworthy of the subjects we wish to expound."

If this be so, how then are we to remedy it? The question is one too difficult to answer at the end of a long lecture. I think a remedy is possible. The teacher ought, I feel sure, to be able to arouse an interest in the principles of his subject without a wearisome attention to details; to give to a class the general idea of what is involved in the ordinary laws of Nature; of what we mean by energy or momentum, the conservation of energy or the mechanical equivalent of heat; of the connection between electricity and magnetism and the historical development of the various laws about which he has been speaking—in fine, to give the pupil some knowledge of the relation of the sciences to one another and a just conception of the means by which they advance.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A CONFERENCE on women in industry will be held under the auspices of the Industrial Reconstruction Council on Tuesday, October 22, at 6 p.m., in the hall of the Institute of Journalists, 2 and 4 Tudor Street, E.C.4. The subject will be introduced by Miss Lilian Dawson, after which the discussion will be open. No tickets are necessary.

A COURSE of three public lectures on "France's Share in the Progress of Science" will be delivered at University College on Tuesdays, October 22 and 29 and November 5, at 5 p.m., by M. Henri L. Joly, professeur de sciences physiques et naturelles au Lycee Français (Institut Français du Royaume Uni). The chair will be taken at the first lecture by Prof. J. Norman Collie. A leaflet containing a full syllabus of the lectures may be obtained by sending a stamped addressed envelope to the Publications Secretary, University College, London (Gower Street, W.C.1)

THE Armstrong College (Newcastle-upon-Tyne) calendar will not be published for the current session, but the prospectus of day classes, a copy of which has reached us, contains the essential particulars respecting the courses of work in pure and applied science which have been arranged for the academic year

1918-19. Students of pure or technical science in the college may proceed to the degrees in science of the University of Durham, of which the college is a part, and, according to the number of years of study, may present themselves for graduation as bachelor, master, or doctor of science, or as doctor of philosophy. For the degrees of master and doctor great importance is attached to success in research. We have received also the current calendar of the Royal (Dick) Veterinary College, Edinburgh, which was founded in 1823 by the late Prof. Dick, and endowed by him, his sister, and Mr. A. I. MacCullum. The college prepares its students for the diploma of membership of the Royal College of Veterinary Surgeons and degrees in veterinary science in the University of Edinburgh, and also offers facilities for post-graduate work.

SOCIETIES AND ACADEMIES.

MELBOURNE.

Royal Society of Victoria, July 11.—Mr. J. A. Kershaw, president, in the chair.—C. Fenner: The physiography of the Werribee River.—Prof. T. H. Laby and E. O. Hercus: The thermo-conductivity of air.

SYDNEY.

Linnean Society of New South Wales, March 27.—Prof. H. G. Chapman, president, in the chair.—Dr. A. B. Walkom: The geology of the Lower Mesozoic rocks of Queensland, with special reference to their distribution and fossil flora, and their correlation with the Lower Mesozoic rocks of other parts of Australia. The Lower Mesozoic rocks of Queensland comprise three divisions—the Ipswich, Bundamba, and Walloon series. The Ipswich and Bundamba series are of comparatively limited distribution, and are confined to the south-eastern portion of the State. The Walloon series has a much greater extent; in addition to occurring in south-eastern Queensland, in association with the Ipswich and Bundamba series, it outcrops in a belt along the western slope of the Main Divide from the New South Wales border to Cape York, dipping westerly beneath the marine Cretaceous. It probably underlies the Cretaceous strata over the greater part of western Queensland. In eastern Queensland there are a number of small isolated occurrences of the Walloon series. The thicknesses of the three series are, approximately: Ipswich series, 2000-2500 ft.; Bundamba series, 3000-5000 ft.; and Walloon series, up to 10,000 ft. A comparison of the Queensland Lower Mesozoic strata with other occurrences in Australia of similar age seems to show (1) that the Narrabeen and Hawkesbury Sandstone stages in New South Wales are older than the Ipswich series; (2) that the Wianamatta stage of the Hawkesbury series in New South Wales, and also possibly part of the Lower Mesozoic strata of Tasmania, are of the same age as the Ipswich series; and (3) that the following series in the other States are of the same age as the Walloon series: The Artesian series, Clarence series, and Talbragar beds in New South Wales; the Jurassic strata of the South Gippsland, Cape Otway, and Wannon areas of Victoria; the Leigh's Creek beds in South Australia; part of the Lower Mesozoic strata of Tasmania, and the marine Jurassic series in Western Australia.—Dr. R. J. Tillyard: (1) Studies in Australian Neuroptera. No. 5: The structure of the cubitus in the wings of Myrmeleontidæ. An examination of the pupal tracheation of the fore-wing of *Xantholeon helmsi*.

Tillyard, reveals the presence of the original archaic Cu_2 close to the base of the wing, where it fuses with 1A. The veins hitherto called Cu_1 and Cu_2 , respectively are shown to be, in reality, Cu_{1a} and Cu_{1b} . As a result, the position of the tribe Creagrini within the subfamily Dendroleontinæ has to be revised, the genera included in it being shown to be much more highly specialised than has hitherto been thought possible. The phylogenetic stages by which the condition of Cu in the fore-wing of Myrmeleontidæ has been reached are shown to be still existent in some ancient types of Hemerobiidæ. (2) The affinities of two interesting fossil insects from the Upper Carboniferous of Commeny, France. The paper discusses the affinities of *Megagnatha odonatiiformis*, Bolton, and *Sycopteron symmetrica*, Bolton, described from the types in the "Mark Stirrup" collection, Manchester Museum. The former is assigned by Bolton to the Perlaria, with possible relationship to the Sialidæ. These affinities are disproved, and the suggestion is made that the insect is, in reality, an ancient representative of the Embioptera. A detailed comparison is made with the recent genus *Oligotoma*. The *Sycopteron* is assigned by Bolton to the Mecoptera. This is shown to be extremely doubtful, and a much closer resemblance is proved between the fossil and the Psocopterous genus *Amphientomum* (Oligocene and recent).

April 24.—Prof. H. G. Chapman, president, in the chair.—Dr. H. L. Kesteven: The origin of yolk in the ova of an endoparasitic Copepod.—Dr. R. Greig Smith: Contributions to a knowledge of soil fertility. No. 16: The search for toxin producers. It has been shown that certain soil bacteria, moulds, and amœbæ, all reasonably supposed to be capable of furnishing substances of a toxic nature, were grown in various media and under varying conditions, and in all cases the signs of toxicity which became manifest could be attributed to an alteration in the reaction of the media. The test organism, *Bacterium prodigiosus*, grows best in a neutral medium, and an indicator is required which will indicate strict neutrality. The methyl-orange numbers are too high, and the phenolphthaleïn too low. Small divergences from the neutral point strongly affect the growth. The humus of leaf-mould contains two types of humic acid; one absorbs alkali from alkaline carbonates, and the other from alkaline carbonates and hydrates. These were present to the extent of one part of the former to three of the latter. Heating the humus increases the amount of acid, and the increase is largely soluble in water. The effect of reaction is quite of a different order from the evidence of toxic action obtained in former researches.—J. J. Fletcher and C. T. Musson: Certain shoot-bearing tumours of Eucalypts and Angophoras, and their modifying influence on the growth-habit of the plants.

BOOKS RECEIVED.

A Memoir on British Resources of Refractory Sands for Furnace and Foundry Purposes. Part i. By Prof. P. G. H. Boswell, with Chemical Analyses by Dr. H. F. Harwood and A. A. Eldridge. Pp. xii+246+ plates xl. (London: Taylor and Francis.) 8s. 6d. net.

The Modern Geometry of the Triangle. By W. Gallatv. Second edition. Pp. vii+126. (London: F. Hodgson) 2s. 6d. net.

A Critical Revision of the Genus *Eucalyptus*. By J. H. Maiden. Vol. iv., part 5. (Sydney: The Government of the State of New South Wales.) 2s. 6d.

Studies in Clocks and Time-keeping No. 2. Tables

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of the Circular Equation. By Prof. R. A. Sampson. (Edinburgh: R. Grant and Son.) 2s. 10d.

A Monograph of the British Lichens: A Descriptive Catalogue of the Species in the Department of Botany, British Museum. By A. Lorrain Smith. Second edition. Pp. xxiv+520+71 plates. (London: British Museum (Natural History).) 30s.

DIARY OF SOCIETIES.

THURSDAY, OCTOBER 17.

INSTITUTION OF GAS ENGINEERS, at 10.—Lt.-Col. Arthur Smithells and Prof. John W. Cobb: Preliminary Report of the Gas Investigation Committee.—B. R. Parkinson: Life of Gas Meters Research Committee Communications on "Unaccounted-for Gas."—J. G. Taplay: Corrosion of Dry Gas Meters.—Dr. J. W. Mellor: Report of Refractory Materials Committee.—Walter Emery and Dr. A. Scott: The Corrosive Action of Flue-dust on Fire Bricks.

FRIDAY, OCTOBER 18.

INSTITUTION OF GAS ENGINEERS, at 10.—Papers from list given above. INSTITUTION OF MECHANICAL ENGINEERS, at 6.

TUESDAY, OCTOBER 22.

ZOOLOGICAL SOCIETY, at 5.30.—Prof. H. M. Lefroy: Wheat Weevil in Australia.—Sir E. G. Loder, Bart.: Notes on the Beavers at Leonardlee, 1916-18.—G. A. Boulenger: The Madagascar Frogs of the Genus *Mantidactylus*, Blgr.

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