

evenings are occupied in discussions on points connected with the work of some department to which a visit has been previously paid by the whole body of teachers under the guidance of the engineers of the company. The arrangement appears to have benefited both teachers and company, and seems worthy of a trial in this country.

PROF. ARNOLD WALL, of Canterbury College, has published "A Plea for a System of Internal Examination in the New Zealand University" (Christchurch: Whitcombe and Tombs, Ltd.; price 1s.). The University at present possesses the unique disability that its examination papers are set and the answers marked in exactly the opposite part of the globe—in London—a plan originally introduced in order to enable the University to maintain a standard identical with that prevailing in Great Britain. The system has the disadvantage as at present worked that the professors and teachers have no voice in the setting of the papers, nor are their opinions from personal knowledge of the candidates available for the guidance of those who mark the scripts. We hope Prof. Wall will succeed in introducing some reform which will bring teachers and examiners into closer touch with each other. At the same time the system which he proposes has proved to be a failure in at least one university in this country, and it cannot be said that it is altogether satisfactory to have examinations conducted by a board in which both the external and internal examiners are in a minority, and the majority are teachers interested in other colleges or in other subjects than the one under examination.

A COPY of the calendar of the University of Sheffield for the session 1916-17 has been received. The arrangement of the contents follows the plan of previous years, and detailed particulars are given of the courses of work arranged for students who desire to graduate in the various faculties of the University. It will be remembered that, as in the case of other of our more modern universities, there is at Sheffield a very comprehensive faculty of applied science, and the degrees of bachelor, master, and doctor may be gained both in the various branches of engineering and in metallurgy. There is a department of glass technology which provides facilities for systematic study and research in the manufacture and general technology of glass, and students who attend and qualify in a full-time course may obtain a diploma in the subject. The mining department of the University, under arrangement with the West Riding County Council, provides courses of extension lectures in mining science, and inspects and examines local mining classes in the southern portion of the West Riding. Similar instances could be multiplied of the successful efforts being made by the University authorities of Sheffield to keep in touch with the industries of the area served by the University, and to give local manufacturers the benefit of the assistance of expert advice on scientific matters.

READERS who have copies, which they may be willing to spare, of advanced text-books, models, specimens, and apparatus for the study of geology are invited to communicate with the British Prisoners of War Book Scheme (Educational) at the Board of Education, Whitehall, S.W. A request has just reached the committee of that war charity from Ruhleben for about fifty books, etc., to enable the camp school there to establish a general course in dynamic geology and crystallography. The class will be conducted by two of the prisoners, who are (to quote the letter) "professionally engaged in geology"; and more than a dozen students, mostly engineers, have already given in their names. The following books

are specially asked for, and they may serve as an indication of the scope of the classes at this camp and of the type of book desired:—Haug, "Traité de Géologie"; Launay, "Traité de Métallogénie"; Hobbs, "Earthquakes"; Murray and Hjort, "The Depths of the Ocean"; Dana, "System of Mineralogy"; Groth, "Physikalische Krystallographie" (or any other good English book of the kind); Braune, "Chemische Mineralogie"; Rosenbusch, "Microscopische Physiographie der Mineralien und Gesteine"; Harker, "Petrology for Students." Among the requirements for the equipment of the classes are a microscope, slides for crystal, mineral, and rock specimens, crystal models, mineral powders and apparatus for blow-pipe analysis, and goniometers. A detailed list of the requirements may be obtained from the chairman of the Book Scheme, Mr. A. T. Davies, at the Board of Education, Whitehall, S.W., to whom all offers (accompanied by a detailed list) should be addressed. Books in almost every subject are urgently needed to meet the steadily increasing demands which are daily being received from British prisoners interned in enemy or neutral countries.

THE report on the work of the Department of Technology of the City and Guilds of London Institute for the session 1915-16 has been published by Mr. John Murray. The work of the department has been carried on with some difficulty during the year. Half of the office staff has joined the Army, and the secretary of the department himself is serving in the Army in France. Whereas the number of classes registered in technological subjects in the session 1913-14 was 5049, in 1915-16 the number had fallen to 3961. The students in attendance in these two years numbered 55,996 and 35,203 respectively. The report points out that recognition is due to the authorities and teachers of technical schools for the successful efforts which they have made to carry on the work of their classes uninterrupted, notwithstanding the absence of members of their staffs on active service, and many other difficulties due to the war. Valuable help has been given to the Ministry of Munitions by the technical schools in general, either by directly manufacturing articles and gauges for munitions of war, or by undertaking special work and training men in it. In connection with the examiners' reports on the results of the examinations, it is again put on record that candidates frequently enter upon their technical instruction very poorly equipped in the matter of general elementary education, ability to do simple calculations, or even to write simple English correctly. The institute goes so far as to endorse the opinion of one examiner that "the standard of general education of the candidates is not improving." The report concludes by insisting that, speaking generally, employers must change their attitude towards technical training, so that those who foster the education of their younger employees should become the great majority instead of the minority, and so that attendance at continuation schools and day schools, or, if this be too much to expect, at least at evening technical classes, should become the rule. Nothing short of a strong national movement in this direction can prove adequate to meet the requirements of the case.

SOCIETIES AND ACADEMIES.

LONDON.

Aristotelian Society, December 18, 1916.—Dr. H. Wildon Carr, president, in the chair.—A. N. Whitehead: The organisation of thought. Science is a thought organisation of experience. The most obvious aspect of the field of actual experience is its disorderly character. It is for each person a *continuum*, fragmentary,

and with elements not clearly differentiated. The fields of experience from which science starts are of a radically untidy and ill-adjusted character, whereas the neat, trim, tidy, exact world which is the goal of scientific thought is a world of ideas. The first great steps in the organisation of thought were due exclusively to the practical source of scientific activity, without any admixture of theoretical impulse. The whole apparatus of common-sense thought arose in this way: concepts of definite material objects, of the determinate lapse of time, of simultaneity, of recurrence, of definite relative position, etc. Science is rooted in the apparatus of common-sense thought. Science is essentially logical; the nexus between its concepts is a logical nexus, and the grounds for its detailed assertions are logical grounds. Four departments of logical theory may be discriminated, which by analogy may be called the arithmetic section, the algebraic section, the section of general-function theory, and the analytic section. The last, which is concerned with the investigation of the properties of special logical constructions—that is, of classes and correlations of special sorts—includes the whole of mathematics.

PARIS.

Academy of Sciences, December 11, 1916.—M. Camille Jordan in the chair.—M. P. Painlevé was elected vice-president for the year 1917.—A. Lacroix: The phenomena of exomorph and endomorph contact phenomena of the ægyrine and riebeckite granites of North-West Madagascar.—G. Bigourdan: The position and co-ordinates of the observatories of Bouilliau, of Cassendi, and of P. Petit.—E. Ariès: The determination of free energy by the equation of Clausius.—C. E. Guillaume: Wire-drawing and the expansion of invar.—G. Charpy and M. Godchot: The oxidation of coal. Fourteen samples of coals from St. Eloy, Ferrières, and Noyant were heated at 100° for periods of from two to three months. After this heating there was a gain in weight due to oxidation of from 3 to 5 per cent. Comparisons were made of the ash, volatile matter, and calorific value before and after heating. The loss of calorific power varied from 3 to 13 per cent. The ash and volatile matter were practically unaltered, and hence it follows that the deduction of the calorific value of a coal from its ash and volatile matter must be liable to grave error, since a similar oxidation process is often found to have occurred in stored coal, and sometimes even in the coal in the mine.—M. Mesnager: Formulæ of the thin plate fixed on a plane rectangular contour.—C. Benedicks: A new effect relative to thermo-electricity and to the thermal conductivity of metals. From theoretical considerations the author has arrived at the conclusion that the well-known deduction from the Wiedemann-Franz law made by Drude is inadmissible, and experimental evidence in support of this is given in the present communication.—R. Ledoux-Lebard and A. Dauvillier: The K series of tungsten and the production of the X-rays from the point of view of the quanta theory. The relation between the frequency and the voltage according to the quanta theory should be linear; for voltages between 24 and 140 kilovolts the experimental data give a curve, the deviation from the theoretical straight line increasing with the voltage. The K series appears at about 80 kilovolts instead of the 95 indicated by Whiddington's formula.—G. A. Hemsalech: The grouping of the lines of the iron spectrum under the selective influence of thermal and chemical actions. The lines in the iron flame spectrum can be arranged in three groups: lines emitted by the external flame of a Bunsen burner and reinforced in flames of higher temperature, lines produced under the influence of chemical actions, very marked in the cone but feeble in the

flame, and the third group, the lines of the "supplementary" spectrum. Examination of the normal spectra has shown the existence of curious groups of lines in each of the three classes, distributed according to a law as yet unknown.—A. de Gramont: Remarks on the preceding communication, emphasising the importance of the results obtained by G. A. Hemsalech and pointing out the desirability of the study of a more extended portion of the iron spectrum by the same method.—J. Deprat: The discovery of numerous fossil-bearing horizons in the Middle and Upper Cambrian of South Yunnan, and on the succession of the fauna in these strata.—Ph. Glangeaud: The first volcanic eruptions (Oligocene) in the lacustral geosynclinal of Limagne (Côtes de Clermont, Chanturgue).—J. Amar: An instrument for measuring and re-educating the movements of pronation and supination, the gyrograph.—A. Lardennois, P. Pech, and J. Baume: Study of the gangrenous infections of wounds by means of radiography. The information which can be obtained by the radiographic examination of gas gangrene is useful not only for the study of the process of destruction and its localisation in the muscle, but also it is useful for the diagnosis of the focus of a gangrene, and especially for determining its extent.—J. Beauverie: New experiments on the influence of osmotic pressure on bacteria. Studies of the effects of increasing proportions of common salt on the growth of bacteria.—A. Paillot: New parasitic micro-organisms of the cockchafer.

NEW SOUTH WALES.

Linnean Society, October 25, 1916.—Mr. A. G. Hamilton, president, in the chair.—E. F. Hallmann: Revision of the genera with microseleres, included, or provisionally included, in the family Axinellidæ (Porifera). Part iii. The genera *Thrinacophora*, *Dragnetyle*, *Holoxea*, and *Higginsia* are revised; five genera and one species are described as new.—A. H. S. Lucas: An efflorescence on some New Zealand kelps.—C. Hedley: Studies on Australian Mollusca. Part xiii. Six species referable to the genera *Arca*, *Loripes*, *Solecardia*, *Tellina*, and *Tugalia* are described as new, and figured; additional particulars and illustrations of a number of imperfectly known species are supplied.—F. H. Taylor: Australian Tabanidæ. Part ii. One genus and twelve species are proposed as new; a change in the names of two is made, and notes on, and additional localities for, known forms are recorded.—A. M. Lea: Descriptions of new species of Australian Coleoptera. Part xii: Twelve species of the family Curculionidæ and eight of the Cerambycidæ are described as new.—G. F. Hill: Notes on the bionomics of *Lyperosia exigua*, de Meijere. The buffalo-fly, a formidable pest to cattle and horses in the Northern Territory, is believed to have been introduced with early shipments of buffaloes, cattle, or ponies from the East Indies, so far back as 1824. The local distribution, habits, oviposition and life-history, natural enemies, and methods of control are discussed.

VICTORIA.

Royal Society, November 9, 1916.—Mr. W. A. Osborne, president, in the chair.—F. Chapman: The probable environment of the Palæozoic genus *Hercynella* in Victoria. The complete fauna of the Yeringian beds containing this supposed pulmonate mollusc in Victoria was recorded, and, from the presence of corals and many gasteropods, it was shown that these sediments must have been laid down under fairly deep water marine conditions, as in Bohemia. The thin-shelled fauna of the Yeringian sea was probably due to the marked terrigenous element in the deposits produced by fluvial action. This evidence was compared with that given by Miss O'Connell, of Buffalo.

U.S.A., who has described the *Hercynellas* of the Waterlime group as being associated with a brackish or estuarine fauna containing eurypterids and pod-shrimps, and therefore differing considerably from the Victorian occurrence.—R. Etheridge, jun.: Reptilian notes. (1) The identity of *Megalania* (vel *Varanus*) *prisca*, Owen, with *Notiosaurus dentatus*, Owen. Some vertebrae, limb-bones, dentary, and tooth from King Creek, Condamine River, in the Australian Museum, confirm Lydekker's conjecture of the identity of these two forms. (2) *Megalania prisca*. A cave fossil from the Wellington Caves Reserve. Remains of this lizard have now been recorded from fluviatile, spring, and cave deposits. (3) An opalised reptilian dentary from Lightning Ridge, Walgett, of Cretaceous age, described as *Crocodylus* (? *Botto-saurus*) *selaslophensis*.

PETROGRAD.

Imperial Academy of Sciences, September 28, 1916.—E. S. Fedorov: The determination of the density of the atoms in the surfaces of crystals.—V. P. Amalickij: Geological and palæontological explorations on the northern Dvina and the Suchona. Palæontological results. Reptilia. Part i., Anomodonts, Owen; Dicynodontidae, Broom; Dvinosauridae, n.f. Part ii., Seymouridae.—G. N. Frederiks: The genera *Reteporina*, d'Orbigny; *Phyllopora*, King; and the allied forms of the *Fenestellidae*.—R. Abels: Magnetic observations in W. Siberia, 1914–15.—S. V. Orlov: Simplified formulæ applied to investigating the curve in the tail of comet 1908c (Morehouse).—S. Kostinskij: The new variable 1916 Cassiopeiae.—A. A. Belopol'skij: A new method of determining the radial velocities of stars with the spectro-comparator.—B. Gorodkov: A journey to the southern limit of the conifer forests of the Tobolsk Government.—D. Smirnov: Observations on the life of *Ellobius talpinus*, Pall., in the Merv oasis (Mammalia, Rodentia).—A. R. Prendel: The Hirudinea of the ancient beds of the Dniester.—A. V. Martynov: A new species of the tribe of the Apataniini and other forms from the Minussinsk district.—V. and E. Martino: Materials for the classification and geographical distribution of the Mammifera of the Kirgise Steppe. Part ii.—A. Birulia: *Miscellanea scoriologica*, xi. The scoriop-fauna of Lower Mesopotamia, Kurdistan, and N. Persia.—A. A. Borisliak: Tertiary mammals of Russia. No. 1, *Indricotherium*, n.g.—V. I. Palladin and V. V. Levčenko: Glycuronic acid in plants.

SECTION FOR HISTORICAL SCIENCE AND PHILOLOGY, October 12.—A. N. Samojlovich: The adages of the Crimean Tatars.—Vl. Kotvič: Mongolian inscriptions of Erdenidzu.—E. D. Polivanov: A note on Japanese riddles.—V. M. Aleksëev: The immortal doubles and the tao-ssé with the golden toad in the suite of the god of riches.—N. J. Marr: The migration of the Japhetic peoples from the southern to the northern Caucasus.—V. V. Bartold: The folk-tale of Dido's ruse.

BOOKS RECEIVED.

The Towns of Roman Britain. By the Rev. J. O. Bevan. Pp. viii+65. (London: Chapman and Hall, Ltd.) 2s. 6d. net.

Stars at a Glance. Pp. 48. (London: G. Philip and Son, Ltd.) 1s. net.

Genetics and Eugenics. By Prof. W. E. Castle. Pp. vi+353. (Cambridge, Mass.: Harvard University Press; London: Oxford University Press.)

Joseph Pennell's Pictures of War Work in England. Pp. xii+plates li. (London: W. Heinemann.) 6s. net.

Cosmical Evolution: Critical and Constructive. By

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E. McLennan. Second edition. Pp. xxi+490. (Corvallis, Oregon: The Author.)

God's Progressive Revelations of Himself to Men. By the Rev. Canon J. M. Wilson. Pp. 62. (London: S.P.C.K.) 1s. net.

DIARY OF SOCIETIES.

SATURDAY, JANUARY 6.

GEOLOGISTS' ASSOCIATION, at 3.—The Age of the Chief Intrusions of the Lake District: J. F. N. Green.—The Ibex-zone at Charnmouth: W. D. Lang.

MONDAY, JANUARY 8.

ARISTOTELIAN SOCIETY, at 8.—Hume's Theory of the Credibility of Miracles: C. D. Broad.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The Geography of South American Railways: W. S. Barclay.

TUESDAY, JANUARY 9.

INSTITUTION OF CIVIL ENGINEERS, at 5.30.—Recent Progress in Dredging Machinery: W. Brown.

WEDNESDAY, JANUARY 10.

GEOLOGICAL SOCIETY, at 5.30.—Notes on the J. A. Douglas Collection of Graptolites from Peru: Dr. C. Lapworth.—The Palæozoic Platform beneath the London Basin and Adjoining Areas, and the Disposition of the Mesozoic Strata upon it: H. A. Baker. With an Appendix by Dr. A. M. Davies.

THURSDAY, JANUARY 11.

ROYAL GEOGRAPHICAL SOCIETY, at 5.30.—The Amazon River and Unexplored South America: J. Campbell Besley.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Principles Involved in Computing the Depreciation of Plant: F. Gill and W. W. Cook.

FRIDAY, JANUARY 12:

ROYAL ASTRONOMICAL SOCIETY, at 5.
MALACOLOGICAL SOCIETY, at 8.—*Patella vulgata*, L., and its so-called Variety, *P. depressa*, Penn.: Rev. Dr. A. H. Cooke.—The Occurrence of Manganese in Mollusca: Dr. A. E. Boycott.—Note on the Holotype of *Crioceratites bowenbanki*: J. de C. Sowerby and G. C. Crick.

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