

Mr. Durell pleads, aim at developing in her sons the broadest scholarship and deepest general culture, and thus safeguard specialism from vagaries and develop it to the highest pitch.

WE have received a report on trade catalogues drawn up by the Technical and Commercial Libraries Committee of the Library Association. The report points out that much information of value to students of science is contained in these catalogues, and that therefore it is desirable that they should be collected and indexed in such a way that students may readily ascertain what new apparatus and inventions have been devised relating to the field of study in which they are working. The Library Association is of opinion that a National Lending Library of books suitable for giving assistance in scientific and industrial research would be of the greatest advantage to technologists. In such a library trade catalogues would hold an important place. It is pointed out that there are peculiar difficulties in indexing trade catalogues. They are seldom dated, and are therefore not easily identified, though the name of the firm by which they are issued can be given. Moreover, they are frequently without any precise description of their contents. The librarian would therefore find it necessary to call in the aid of scientific experts to help in the special indexing required. The report refers to the index to the collection of trade catalogues at the Department of Commercial Intelligence (foreign samples) published by the Board of Trade as an example of an alphabetical subject-index of such catalogues. In view of the special difficulties inherent in collecting and organising the literature of the trade catalogues, and with a view to the widest possible dissemination of the undoubtedly valuable information which these catalogues contain, the committee of the Library Association recommends that proposals be submitted to the leading professional societies and trade journals for the organisation of this class of literature on standardised lines, and possibly for the publication of periodical condensed catalogues of British manufacturing firms.

In proposing his amendment to the Representation of the People Bill, which, as we recorded in our issue for November 15 (vol. c., p. 216), was adopted, giving separate Parliamentary representation with one seat to the University of London, Sir Philip Magnus gave the House of Commons some interesting details of the size and activities of the University. London University consists of a collection of colleges and special schools, about eighty in number, scattered over the County of London. It was founded in the year 1837, and for the past fifty years it has been represented in Parliament. It includes under its ægis three large and important classes of teaching institutions. First, there are the Incorporated Colleges, with endowments and other funds, administered by the Senate of the University. These comprise University College and King's College, each of which is a complete university in itself. The second group of teaching institutions, known as the "Schools of the University," are thirty-three in number, and include the Imperial College of Science and Technology and the School of Oriental Studies, both of which have been established to meet not only national, but also Imperial needs. Somewhat similar in its Imperial character is the School of Economics. But among these thirty-three schools of the University are the eleven medical schools attached to our hospitals, the Royal Holloway College, Bedford College for Women, and other institutions. The third class of teaching institutions, twenty-seven in number, include all our polytechnic schools, the laboratories of which are now rendering valuable help to the Ministry of Munitions. There is also the vast scheme of Uni-

versity Extension Lectures. In the session immediately preceding the war 135 courses of lectures were delivered on philosophy, economics, history, and other subjects, and were attended by 12,902 students. Attached to the University itself are more than 100 professors; and, in addition, there are 1200 recognised teachers; 21,000 members of the University are or have been serving in his Majesty's forces, and of these nearly 700 have already made the supreme sacrifice. At the General Election in December, 1910, the number of graduates who voted at the University of Oxford was 6895, at the University of Cambridge 7145, and at the University of London 6072. The number of graduates, therefore, who voted at the London election was only 823 fewer than those who voted for Oxford, which has the privilege of sending two members to Parliament. The total number of male London graduates is about 11,500.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 22.—Sir J. J. Thomson, president, in the chair.—C. H. Browning and R. Subransen: Bactericidal properties conferred on the blood by intravenous injections of diaminoacridine sulphate. Whereas antiseptic compounds are in general greatly reduced in their bactericidal activity by the presence of serum, it has been found that salts of 3:6-diaminoacridine, both unsubstituted and also various derivatives with methyl groups substituted in the amino-side-chains, or in the benzol-rings, or in both situations, are enhanced in their lethal action on bacteria by the presence of serum; this is also the case with the salt of 3:6-diamino-10-methylacridinium. The sulphate of 3:6-diaminoacridine has been found specially suitable for intravenous injection on account of its low toxicity. By means of an intravenous injection of diaminoacridine sulphate in a dose which had no harmful effect on the treated animal (rabbit), it has been possible to confer antiseptic properties on the blood so that the serum from a specimen of blood withdrawn as late as from two to two and a half hours after the treatment failed to yield a culture when inoculated with *Staphylococcus aureus* or *B. coli*.—W. D. Lang: The Pelmatoporinæ: an essay on the evolution of a group of Cretaceous Polyzoa. The evolution of this sub-family is considered in detail. In order to present the facts intelligibly, they are marshalled according to the following theoretical considerations:—The species lie along diverging lineages; towards the bases or proximal ends of these are forms (radicals) with less calcareous skeletal matter and less elaboration of structure, and these forms appeared earlier in geological time; towards their higher or distal ends are forms with more skeletal matter and more elaborate structure, appearing later in geological time. The evolutionary tendency was to deposit the increasing superfluity of calcium carbonate where it least interfered with the organism's bionomics, if possible in such position and shape as might even be useful to the organism. Sooner or later the race perished through being unable to cope with its constitutional and increasing habit of excessive secretion of calcium carbonate.

Geological Society, November 7.—Dr. Alfred Harker, president, in the chair.—Dr. F. Oswald: The Nimrud crater in Turkish Armenia. The Nimrud volcano, one of the largest craters in the world, is situated on the western shore of Lake Van, and was surveyed geologically for the first time by Dr. Oswald in 1898. The western half of the crater is occupied by a deep fresh-water lake, while the eastern half is composed of recent augite-rhyolites. The crater-wall is highest on

the north (9903 ft.). The southern wall only reaches the height of 9434 ft. The crater-wall has slipped down on the south-west to form a narrow shelf. The crater is nearly circular, and the lowest points lie on the long axis. The crater-wall has an external slope of 33° on the south and east. The history of the volcano may be summarised thus:—(1) Its forerunner was the Kerkur Dagh on its southern flank—a denuded mass of grey augite-trachyte. It was probably erupted in the Pliocene period, following the folding of the Armenian area, in which the latest folded rocks are of Miocene (Helvetian-Tortonian) age, consisting of limestones with corals and oysters. It came into existence at a period when the sedimentary rocks could no longer be folded, but were fractured along definite lines, and Nimrud is situated on the great fracture transverse to the Armenian folds at the apex of their bending round from the Antitauric to the Persian direction. (2) Numerous flows of augite-rhyolite built up the vast cone of the Nimrud Dagh, and the increasing pressure on the central vent became relieved by extrusions of augite-trachyte along radial fissures. (3) A presumably long period of inactivity was followed by violent explosions destroying the summit of the cone, and from this crater vast lava-flows of a fluid basalt flooded the country and filled up the valleys, which have since then been eroded a little below their former depth. (4) Further explosions widened the crater, in which a large lake was formed, while the eastern half of the crater became filled by a succession of outflows of augite-rhyolite. (5) The last eruption was recorded in 1441 by a contemporary chronicler, and resulted in the extrusion of a viscous augite-rhyolite along a north-to-south zone of weakness, both inside the Nimrud crater and also to the north. (6) A violent earthquake in 1881, which destroyed the village of Toghurt, was the last sign of activity; but earthquakes are still frequent in the Plain of Mush, and recent fault-scarps are visible along the borders of this faulted depression. Dr. Oswald has presented his model of the crater to the Museum of Practical Geology, and the rocks and slides to the British Museum, where his fossils from Armenia are preserved.

Physical Society, November 9.—Prof. C. V. Boys, president, in the chair.—C. R. Darling and A. W. Grace: The thermo-electric properties of fused metals. In a previous paper ("Proceedings," vol. xxix., part i.) the authors described experiments with bismuth, the apparatus then used only being capable of furnishing readings up to 560° C. Methods have now been devised in which the metals examined may be heated in the tube of an electric furnace, and observations made up to the temperature limit of the furnace. The metals experimented with were lead, tin, and antimony up to 1000° C., and zinc and cadmium up to temperatures approaching the boiling point. No change in thermo-electric properties was noticed at fusion, except in the case of antimony, which, like bismuth, shows an abrupt bend in the E.M.F.-temperature curve at the melting point, 632° C. This exceptional behaviour of antimony and bismuth is in keeping with the anomalous properties of these metals, both of which expand on solidification; and it is suggested that an allotropic change occurs at fusion in these metals. In the case of lead, which is used as the reference metal in thermo-electric diagrams, it is shown that extrapolation of lines in the diagram beyond 300° led to serious errors, and that although at low temperatures the E.M.F.-temperature curves are approximate parabolas, the departure from this shape above 300° is so marked as to render thermo-electric diagrams of little value.—T. Smith and Miss A. B. Dale: Triple cemented telescope objectives. The paper de-

scribes the four series of triple cemented thin telescope objectives which can be made from two kinds of glass, and determines their construction when first-order spherical aberration and coma are eliminated. The second-order spherical aberration and coma are then calculated, and the former found to be of the same sign for all optical glasses when the surfaces are spherical. The best standard attainable varies very little over a considerable range of glasses. Diagrams show the variations in the curvatures as the glasses are varied for refractive index and dispersion. Contrary to the general belief, it is found that the objectives with least second-order aberrations (absolute values) are not those with the least curvatures for their refracting surfaces.

Linnean Society, November 15.—Sir David Prain, president, in the chair.—Dr. D. H. Scott: Notes on *Calamopitys*, Unger. *Calamopitys* is a genus of fossil plants, with structure preserved, of Lower Carboniferous age; some species may perhaps go back to the Upper Devonian. The first part of the paper deals with the origin and division of the leaf-trace in *C. americana*. The relations of the five known species among themselves, and of the genus as a whole, are then considered.

Aristotelian Society, November 19.—Dr. H. Wildon Carr, president, in the chair.—Mrs. K. Stephen: Thought and intuition. An attempt to bring out the meaning of Bergson's theory of knowledge. Bergson confines his attention to knowledge of existence, and maintains that the best way of knowing existence is to be directly acquainted with it. Thought, which can only give knowledge *about*, is, according to him, a *pis aller*, and he only deals with it so far as it affects the actual experience which we get by acquaintance. Thought and acquaintance defeat one another. Nevertheless, in practice we try to carry on both operations together, and the result is our everyday experience of things having qualities and relations. This experience is a hybrid product. It still has some of the content of the original act of intuition, but whatever could not be used as material for thought has been left out of it, and it has borrowed the form which belongs to the symbols used by thought. It has been "intellectualised." As a new philosophical method, Bergson proposes that instead of limiting our attention to just so much of experience as provides material for thought, and instead of intellectualising our experience, we reverse our mental habits, make an effort to enlarge rather than to limit the whole field of experience with which intuition acquaints us, and attend to it directly without any intermediary.

Royal Meteorological Society, November 21.—Major H. G. Lyons, president, in the chair.—Dr. G. C. Simpson: The twelve-hourly barometer oscillation. (1) The existence of the twelve-hourly atmospheric vibrations, one parallel to the circles of latitude and the other parallel to the meridians, first suggested by A. Schmidt in 1890, and investigated by E. Alt in 1909, has been proved. (2) A mathematical expression for the amplitude and phase of each vibration containing the geographical position as the only variable has been obtained. (3) The interference of these two waves has been shown to account very completely for the observed variations in amplitude and phase of the twelve-hourly barometer oscillations, especially in high northern latitudes.—W. W. Bryant: Abnormal temperature, with special reference to the daily maximum air temperature at Greenwich. The author proposes that for certain meteorological elements a value shall be defined as "abnormal" if the departure from a well-established normal is at least twice the mean residual, both normal and residual being determined

by smoothing values from a long series of observations. He applies this method to the maximum air temperatures at Greenwich for the period 1841 to 1916, using the first sixty-five years as a standard. The limit thus calculated varies at different times of year from 8° to 12.5° F., so that a fixed limit of 10° would not be applicable. In the analysis it appears that one day in ten is abnormal, the proportion being higher in the months from May to October; and much lower in December and January. Additional tables deal with spells or alternations of heat and cold, and generally with the distribution of abnormal days. The principle is also extended to monthly and annual values, and the effect of a higher limit, three or four times the mean residual, is considered. The relatively hottest month in the period was June, 1846, and the coldest December, 1890, the hottest year 1868 and the coldest 1879.

CAMBRIDGE.

Philosophical Society, October 29.—Prof. Marr, president, in the chair.—G. H. Hardy: The convergence of certain multiple series.—G. N. Watson: Bessel functions of large order.—H. Todd: A particular case of a theorem of Dirichlet.—L. J. Mordell: Mr. Ramanujan's empirical expansions of modular functions.—Dr. A. Kienast: Extensions of Abel's theorem and its converses.

MANCHESTER.

Literary and Philosophical Society, November 13.—Mr. W. Thomson, president, in the chair.—Miss Constance Lightbown: The Siphonozooids of the sea-pens. The author made an investigation of the Siphonozooids of a large number of sea-pens to determine the presence or absence of the mesenteric filaments. It was found that these filaments are usually present in the fleshy forms, but absent in the slender ones. In species of Pennatula and Pterœides which possess Mesozooids the mesenteric filaments are usually absent.—Dr. J. H. Salter: Regional distribution of the native flora of Teneriffe. Particular attention is directed to the evergreen character of the vegetation and the large proportion of shrubby or arborescent forms. The large number of endemic forms is due to the long isolation of the island from the African continent, and to the climatic conditions, which differ considerably from those of the adjacent continent. Among the Compositæ nearly 50 per cent. are endemic to the island, while in such genera as Senecio, Euphorbia, Sempervivum, and others the proportion is still higher. In the coastal region there is a definite foreshore vegetation of cosmopolitan character, including many Chenopodiaceæ (goosefoot family), with only two endemic forms belonging to the genus Beta. On the barren slopes above the foreshore is a desert-like vegetation, in some places ten kilometres in breadth, largely given up to Opuntia (prickly pear), formerly cultivated in connection with the cochineal industry, and now a serious pest in the island. The upper portion of the coastal region comprises all the more fertile portions of the island, and is mainly under cultivation with the aid of a system of water channels. Of the native plants, Sempervivum, Euphorbia, and Dracæna (dragon tree) are the most characteristic of this region, while certain xerophytic ferns, such as Notochlæna, Ceterach, and Cheilanthes, are also in evidence. The "cloud region," commencing at about 2500 ft., runs up to 5000 ft., the lower portion forming the characteristic "Monte Verde," while the last 1000 ft. constitute the "Pinar" (pine woods). The former consists of a transition from scrub to woodland, comprising several species of Cistus (rock-rose), Erica arborea (tree heath), Ilex canariensis (the native holly), Myrica Faya (the candleberry myrtle), and several forms of laurel. The higher-lying pine forests consist mainly of Pinus canariensis. Above the cloud belt vegetation

is very scanty and mainly characterised by scattered bushes of the broom-like "retama" (*Spartocytisus nubigenus*). There is no true alpine vegetation, but, protected by the retama, several grasses and other plants of small stature are found to occur.

EDINBURGH.

Royal Society, November 5.—Dr. John Horne, president, in the chair.—Dr. J. Horne: Opening address: Science applied to industry. The president reviewed the work of the Committee of the Privy Council for Scientific and Industrial Research and of the Advisory Council during the past year. Reference was made to the appointment of a Fuel Research Board; and other administrative changes, such as have been proposed in reference to the Geological Survey, the fisheries, oceanography, geodesy, etc., were also noted among the signs of the times. A special appeal was made on behalf of Dr. Bruce's Oceanographical Laboratory, established for a number of years in Edinburgh, and now suffering lamentably from want of funds.—R. K. S. Lim: Period of survival of the shore-crab (*Carcinus maenas*) in distilled water. Shore-crabs survive a short time in fresh water, and the duration of survival is closely connected with the moult cycle. The harder the shell, the longer the period of survival. Examination of the immersed fluid showed the presence of salts which must have been derived from the animal before its death. Thus the survival depends upon the rate of loss of salts and the rate of intake of water, and these factors vary with the condition of the membranes, and therefore with the moult age.

SYDNEY.

Linnean Society of New South Wales, June.—Dr. H. G. Chapman, president, in the chair.—Dr. W. N. Benson: The geology and petrology of the Great Serpentine Belt of New South Wales. Part vi., General account of the geology and physiography of the western slopes of New England (concluded).—R. J. Tillyard: Studies in Australian Mecoptera. No. 1, The new family, Nannochoristidæ, with descriptions of a new genus and four new species; and an appendix descriptive of a new genus and species from New Zealand. With the exception of a single specimen from Ebor, N.S.W. (5000 ft.), all the representatives of this family were discovered in Tasmania, where they are to be obtained by sweeping the vegetation bordering lakes and small mountain-streams. The insects are of small size, and quite unlike other scorpion-flies in appearance; indeed, they might almost be described as "four-winged Diptera." The venation is much reduced for Mecoptera, and resembles that of the Diptera Brachycera in having R_{2+3} , a straight, unbranched vein. The head is globular, without a prominent beak; the mouth-parts are in a very interesting stage of evolution, the mandibles being absent or vestigial, the labium beginning to form a proboscis, with labellum, but no pseudotracheæ. Wishing to put the "Antarctic theory," as advocated by Hedley, to the test, co-types of the Tasmanian type-species were sent to correspondents in New Zealand, with a suggestion that similar insects should occur there. In reply, Mr. A. Philpott, of Invercargill, sent the pair of specimens herein described, which had been taken in 1913, and put by as "anomalous lacewings."

July.—Dr. H. G. Chapman, president, in the chair.—Dr. A. J. Turner: Revision of Australian Lepidoptera. Part vi. (first instalment), Nineteen genera of Australian Lepidoptera. Nineteen genera and forty-six species of the subfamily Boarmianæ, family Geometridæ, are reviewed.—T. G. Sloane: Description of a new tiger-beetle from the Northern Territory.—T. G. Sloane: The endo-skeleton of the head, the anterior coxæ, and the an-

terior coxal cavities in the families Carabidæ and Cicindelidæ (Coleoptera).

August 29.—Dr. H. G. Chapman, president, in the chair.—E. F. Hallmann: The genera *Echinaxia* and *Rhabdosigma* (Porifera). The genera were proposed in a recent paper, without definitions, for two species wrongly referred to *Axinella* and *Sigmaxinella* respectively. The definitions are now given, with remarks on the probable relationships of the two genera, and re-descriptions of the type-species.—T. G. Sloane: Carabidæ from tropical Australia. Twenty-one species belonging to the tribes Scaritini, Harpalini, Odacanthini, Lebiini, and Helluonini are described as new. The Australian genera of the tribe Odacanthini, including four proposed as new, are tabulated.—Dr. A. J. Turner: Revision of Australian Lepidoptera. Part vi. (second instalment), Eighteen genera, and eighty-two species of the sub-family Boarmianæ, are discussed.

Royal Society of New South Wales, September 5.—J. H. Maiden: Notes on the genus *Acacia*, No. III (extra-tropical Western Australia). Several species are proposed as new to science (one on behalf of Mr. W. V. Fitzgerald), and also a new variety of *A. pyrifolia*. Several imperfectly known species are more fully described, and *A. chisholmi*, hitherto known only from Queensland, is shown to belong to Western Australia. The synonymy of certain species is elucidated, and additional information is given as to distribution and other points.

CAPE TOWN.

Royal Society of South Africa, September 26.—Dr. L. Péringuey, president, in the chair.—W. von Bonde: Note on the abnormal development of the genital organs of *Jasus lalandii*.—G. H. Malan: The colour-octahedron as a complexity: being suggestions towards a mathematics of colour. Developing certain ideas of Meinong, who contends that the possibility of representing certain well-known facts in connection with colour-psychology by a diagram in the form of an octahedron rests on the presence of certain *a priori* relations incidental to the very nature of colour itself, the writer is led to examine Meinong's contention critically in the light of modern mathematical logic (as expounded by B. Russell). The result of this examination is (1) to show that Meinong's theory, though true in its intention, is at fault in its practical conception of an *a priori* science of colour, and (2) to necessitate a more exact discrimination between the viewpoints of empirical psychology and mathematical science.—Miss A. M. Bottomley: A list of South African fungi. This paper is a systematic compilation, with indexes of all the South African fungi in the Government Mycological Herbarium. It records some 276 genera and 800 named species, some of the more important or more interesting of which are illustrated by photographs of actual specimens. Considerable space is occupied by the rusts, the perisporiales, and the pore fungi, three groups which are receiving particular attention in the mycological department.

BOOKS RECEIVED.

British Rainfall, 1916. By Dr. H. R. Mill and C. Salter. Pp. 256. (London: E. Stanford, Ltd.) 10s.
How to Collect and Dry Flowering Plants and Ferns. By H. S. Thompson. Pp. 56. (London: G. Routledge and Sons, Ltd.) 7d. net.
Lord Lister. By Sir R. Godlee, Bart. Pp. xix+676. (London: Macmillan and Co., Ltd.) 18s. net.
Vegetable Forcing. By R. L. Watts. Pp. xx+431. (New York: Orange Judd Co.) 2 dollars net.

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DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 29.
LINNEAN SOCIETY, at 5.—(1) Intensity and Direction of Light as Factors in Phototropism; (2) Spore-coloration in Agaricacæ: Dr. Harold Wager.

FRIDAY, NOVEMBER 30.
INSTITUTION OF MECHANICAL ENGINEERS, at 6.—"Thomas Hawksley"
Lecture; Heat Engines: Captain H. Riall Sankey.

SATURDAY, DECEMBER 1.
GEOLOGISTS' ASSOCIATION, at 3.—The Gold Coast: A. E. Kitson.

MONDAY, DECEMBER 3.
ROYAL SOCIETY OF ARTS, at 4.30.—Progress in the Metallurgy of Copper: Prof. H. C. H. Carpenter.
ARISTOTELIAN SOCIETY, at 8.—The Development of Criticism: F. C. Bartlett.

VICTORIA INSTITUTE, at 4.30.—Prehistoric Man: his Antiquity and Characteristics: W. Dale.

TUESDAY, DECEMBER 4.
SOCIETY OF CHEMICAL INDUSTRY, at 8.—Presidential Address: The Economics of Coal Production: Prof. H. Louis.
INSTITUTION OF CIVIL ENGINEERS, at 5.30.—Recent Developments in By-product Coking: G. B. Walker.

WEDNESDAY, DECEMBER 5.
GEOLOGICAL SOCIETY, at 5.30.
ENTOMOLOGICAL SOCIETY, at 8.
ROYAL SOCIETY OF ARTS, at 4.30.—Inaugural Trueman Wood Lecture: Discovery and Invention: Sir Dugald Clerk, K.B.E.
SOCIETY OF PUBLIC ANALYSTS, at 5.—The Valenta Number as a Discriminative Test for Oils and Fats: P. J. Fryer and F. E. Weston.—The Composition of Sharps and Bran: H. E. Cox.—Notes on Porcelain: W. T. Burgess.—Note on the Colorimetric Estimation of Iron: E. R. Dovey.

THURSDAY, DECEMBER 6.
ROYAL SOCIETY, at 4.30.—*Probable Papers*: The Series of Legendre: Prof. W. H. Young.—The Discharge of Gases under High Pressures: L. Hartshorn.—The Electrostatic Problem of a Conducting Sphere as a Spherical Cavity: Dr. Alexander Russell.—The Zeros of Bessel Functions: Prof. G. N. Watson.
INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—Electrical Cooking as applied to Large Kitchens: W. A. Gillott.
CHEMICAL SOCIETY, at 8.—The Relation between Chemical Constitution and Physiological Action: Dr. F. L. Pyman.

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