

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LONDON.—A large number of university courses of advanced lectures in science subjects are in progress or announced. In botany, a course of ten lectures on the history of British botany will begin on January 20 at University College. The first lecture of the course will be by Mr. Francis Darwin, on "Stephen Hales," and the work of other famous botanists will be described in later lectures, the lecturers being Profs. Vines, Bower, Farmer, Lang, Oliver, Scott, Dr. Arber, Mr. Praeger, and Mr. Henslow. Dr. W. N. Shaw, reader in meteorology, will begin a course of eight lectures on climatology, with special reference to British possessions, on the same day at the London School of Economics. Several courses of advanced lectures in physiology are announced. Prof. E. A. Minchin will begin a course of twenty-one lectures on the protozoa at the University on January 16 at 5 p.m. A course of three lectures on the comparative anatomy of the vertebrate ear, by Mr. R. H. Burne, will begin on January 19 at the Royal College of Surgeons. The times of the lectures in each case will be 5 p.m., and admission will be free, without tickets.

DURING the temporary absence of Prof. Starling, F.R.S., owing to ill-health, Dr. W. M. Bayliss, F.R.S., has been appointed acting professor of physiology in University College, London.

It is announced in *Science* that Harvard University is to receive 12,000*l.* from the will of the late Mrs. William O. Moseley, and that a gift of 100,000*l.* has been made to Dartmouth College by Mr. Edward Tuck.

The degree of D.Sc. as an external student has been granted to Arthur Slator, of University College, Nottingham, and Birmingham and Leipzig Universities, for a thesis on "Studies in Fermentation," and other papers.

We learn from *Science* that, as a memorial to her husband, Mrs. Edward H. Harriman, of New York City, has endowed with 20,000*l.* the chair in forest management in the Yale Forest School. Mr. Andrew Carnegie has agreed to give to the Maria Mitchell Memorial Association a sum of 2000*l.* toward the establishment of a research fellowship in astronomy, on condition that the sum of 1000*l.* required to complete the fund of 5000*l.* be subscribed. The progress made in ascertaining the approximate value of the Wyman bequest for the Graduate College of Princeton University confirms the original estimate of between 400,000*l.* and 600,000*l.*

A COURSE of six free public lectures is to be given at University College, Gower Street, W.C., by Lieut.-Colonel Ernest Roberts, introductory to the study of Indian sociology, on Tuesdays at 4.30 p.m., beginning on February 21 next. A course of eight lectures, free to all internal students of the University of London, is to be given by Dr. H. H. Dale in the Physiological Institute, University College, on Fridays at 4.30 p.m., commencing on January 20. The London County Council has arranged two courses of ten lectures for teachers, which are free to London teachers, to be given on Wednesdays at 6 p.m., beginning on January 18, at University College. One course is on scientific reasoning and its cultivation, the lectures being given by Dr. A. Wolf, and the other on models to illustrate the geometry of space, the lectures being given by Dr. L. N. G. Filon, F.R.S.

THE Philosophic Faculty of the University of Marburg has conferred the degree of Doctor Honoris Causa upon Mr. Ernst Leitz, of Wetzlar, the principal of the well-known firm of manufacturers of microscopes, microtomes, and other optical and scientific instruments.

### SOCIETIES AND ACADEMIES.

LONDON.

**Faraday Society**, December 13, 1910.—Mr. F. W. Harbord in the chair.—J. **Swinburne**: Separation of oxygen by cold. The problem of separating oxygen from the air is not the same as making liquid air. To separate oxygen from nitrogen involves doing mechanical work, which is

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converted into heat. A rectifying plant may be considered as an apparatus, which takes in heat substantially at the boiling point of the liquid with highest boiling point, and gives it out at a lower temperature near the boiling point of the most volatile liquid. An air separator thus takes in heat at 90° A, gives out heat at about 82° A, and at the temperature of the works, say, 273° A. The Linde process may be regarded as a rectifying plant of this sort, and a thermodynamic engine, in which a gas is compressed so as to liquefy at 90° A under pressure, and to evaporate at 82°, thus supplying the heat at the boiling point of oxygen and absorbing it at the boiling point of the air. Such a process is generally considered irreversible, but is, in fact, nearly reversible, and therefore economical. Assuming an efficiency of 40 per cent., the cost of oxygen comes out approximately 1*s.* a ton on a large scale. This ought to lead to its use in blast furnaces and other cases where an extra high temperature may be important.—Dr. H. J. S. **Sand** and W. M. **Smailey**: A new apparatus for the rapid electro-analytical determination of metals. A glass-frame anode for use with silver and nickel kathodes. In order to reduce the amount of platinum employed, a pair of electrodes has been designed which, while retaining as much as possible the essential features of those previously described, contains as little platinum as possible. The anode has been made largely of glass, so that the total weight of platinum has been reduced to about 5 grams. Special care has been taken in the design to render it as little fragile as possible. For copper determinations a kathode of silver is employed, which has been designed so that it can be made without much difficulty with the facilities usually available in a chemical laboratory. For zinc determinations a kathode of nickel was employed. The results of copper and zinc depositions are substantially as good as those obtained with platinum electrodes. The time required for determining 0.3 gram of copper is about seven minutes. A stand for holding the auxiliary apparatus required in electro-analysis is also described.

**Geological Society**, December 21, 1910.—Prof. W. W. Watts, F.R.S., president, in the chair.—T. O. **Bosworth**: The Keuper marls around Charnwood Forest. The area under consideration includes the towns of Leicester, Loughborough, Coalville, and Hinckley. The Charnian rocks project through a mantle of Triassic deposits, which once completely covered them. The quarries have been opened in the summits of the buried hills. A quarry is so worked that its outline follows the contour of the buried hill; consequently, the section presents but a dwarfed impression of the irregularity of the rock-surface. On the buried slopes and in the gullies are scree and breccias, and bands of stones and grit are present in the adjacent beds of marl. All these stones are derived only from the rock immediately at hand. Where exposed, the Charnian igneous rocks are deeply weathered and disintegrated, but the same rocks beneath the Keuper are fresh right up to the top. The Keuper marls lie in a catenary manner across the gullies. There has been almost no post-Triassic movement in Charnwood. All the points of contact of any one bed with the Charnian rocks lie on one horizontal plane. The inclination of the strata must, therefore, be due to subsequent sagging. The Upper Keuper deposits accumulated in a desert basin, of which parts were dry and parts were occupied by ever-shifting salt-lakes and pools. In these waters the red marls were laid down. The abundant heavy minerals are garnet, zircon, tourmaline, staurolite, rutile, magnetite. The grains are intensely worn. The quartz-grains are sometimes wind-worn. The false bedding is mainly from the south-west. The ripples indicate prevalent south-westerly winds.—R. L. **Sherlock**: The relationship of the Permian to the Trias in Nottinghamshire. The conformability or unconformability of the Bunter to the Permian has been much discussed, but it is generally considered that there is a small unconformity between them. In this paper, a section on the Great Central Railway near Annesley is described. It shows a gradual passage from the Middle Marl into the Lower Mottled Sandstone. Detailed mapping has confirmed this conclusion. From Nottingham to Mansfield the Middle Marl retains a

uniform character and thickness, but at Mansfield it is apparently absent. At the same place the limestone becomes sandy, forming the Mansfield Sandstone. These two phenomena can be best explained by supposing that a river deposited a sandbar at Mansfield during Permian times. North of Mansfield the Middle Marl becomes normal again. Near Cuckney, the Upper Magnesian Limestone first appears as a very thin bed, and the limestone arises as thin lenticular bands in the passage-bed. It is believed that the Upper Magnesian Limestone and Upper Marl of the northern part of the outcrop are the time equivalents of the Bunter of South Nottinghamshire.

**Royal Microscopical Society, December 21, 1910.**—Mr. E. J. Spitta, vice-president, in the chair.—W. R. **Traviss**: A small microscope lamp, particularly suited for opaque objects and dark-ground illumination with high powers. The light used was a small inverted incandescent burner carried at the extremity of a short arm, that could be easily moved up and down on a standard. The light could be brought very close to the table or raised to illuminate opaque objects on the stage.—M. J. **Allan**: An easy method of treating printing-out paper (P.O.P.) for all kinds of photography. The author recommends that the prints be washed in a strong solution of salt, then placed in a saturated solution of hypo, after which they are to be washed in running water.—C. H. **Higgins**: A new system of filing slides.—A. A. C. E. **Merlin**: The measurement of Grayson's new ten-band plate. The plate, comprising ten bands running from  $1/10000$ th to  $1/10,000$ th of an inch, had been ruled by an improved machine, and was found to be much better even than Grayson's earlier productions. The author in measuring the bands used a selected objective of 1.32 N.A., having an initial magnification of 143 on a 10-inch tube. A Nelson-Powell screw setting micrometer, which is alone suitable for the purpose, was used. The result obtained was that the variation from the mean in the spacing of the lines did not exceed  $1/230,000$  inch. The mean diameter of the lines was 0.00002488 inch. The author also made a series of measurements with  $1$ -inch,  $\frac{1}{2}$ -inch, and  $\frac{1}{4}$ -inch objectives, and came to the important conclusion that low powers were unsuited for micrometry.—Jas. **Murray**: Some African rotifers—Bdelloida of tropical Africa. Thirty-three species of bdelloids were obtained from dried moss sent by Mr. A. Allan and Sir Philip Brocklehurst from British East Africa. Nine of the species are new to science. Several of them have very distinct characters not previously noted for any bdelloids. *Harbrotrocha caudata* has a tail-like process, the function of which is unknown. The animal secretes a protective shell, and the "tail" is enclosed in a slender tube open at the end, so that the shell has two openings. *H. acornis* has no trace of spurs, otherwise universal in the order. Several other species approach it in this respect, having the spurs reduced to minute papillæ. *H. auriculata*, when feeding, has at each side of the head a peculiar ring-like auricle, giving it the appearance of a two-handled vase. The nature and function of the auricles remain unknown. Their form, even, is difficult to interpret, as they present apparently contradictory appearances from different points of view. The bdelloids take a very important place in moss-faunas. In every country they are abundant, and in most regions there is a fair proportion of peculiar species. When more fully known the bdelloids seem likely to prove a group of hitherto unsuspected importance, both in point of numbers and diversity of forms. All these moss-dwellers can revive after desiccation. The adult animals become dormant when deprived of moisture, and revive when remoistened. It is not, as Zacharias concluded from his experiments in 1886, that the survival of the species is effected by means of eggs.

#### MANCHESTER.

**Literary and Philosophical Society, December 13, 1910.**—Mr. Francis Jones, president, in the chair.—Miss Margaret C. **March**: Preliminary note on *Unio pictorum*, *U. tumidus*, and *D. cygnea*. The form of the British unionids can be shown to be dependent on current and soil, and is therefore useless for systematic purposes when taken alone. The umbonal markings of these animals

merge into one another, and are therefore useless specifically. Phylogenetically, they show that *U. pictorum* is most archaic, *anodon* least, *tumidus* being intermediate. The edentulousness of American anodons illustrates heterogeneric homæomophy. The ornament and dentition of unionids show relationship to trigonids, and a descent from a pre-trigonid ancestor.—D. M. S. **Watson**: Notes on some British Mesozoic crocodiles. The author discussed some systematic and nomenclatorial difficulties, recording the occurrence of a new variety of *Metricorynchus hastifer* in the Corallian of Headington, of *M. hastifer* itself in the Kimmeridge Clay of Britain, and discussed *Petrosuchus laevidens* and *Steneosaurus stephani*.—Prof. F. E. **Weiss**: Sigillaria and Stigmariopsis. The author exhibited some specimens of axes of Sigillaria associated with stigmarian bark. From the repeated occurrence of these specimens it was suggested that they represented the base of the aërial or the subterranean axes of Sigillaria, probably of the Eusigillaria type. The secondary wood was more copiously developed than is general in the aërial axes. The primary wood was of sigillarian type, so that these stigmarian axes have centripetal primary wood, and their pithcasts would be striated like those described for Stigmariopsis. It was noticed that in some instances small axes were found in contiguity, and apparently in continuity, with the main axes. These smaller axes resemble the ordinary stigmarian axes very nearly, and do not show the centripetal primary wood of the main axis, but only a few fine tracheids in the pith region.

#### PARIS.

**Academy of Sciences, January 3.**—M. Armand Gautier in the chair.—The Fanny Emden prize (3000 francs). This prize will be awarded for the current year for the best work dealing with hypnotism, suggestion, and generally physiological actions capable of being exerted at a distance from the animal organism. In the special circumstances, memoirs on this subject will be received up to June 1.—M. **Bertin**: The general laws of accelerated or retarded motion of a ship following on a change in the power of the engine. The formulæ developed from theoretical considerations are compared with experimental results obtained by the vessel *Patrie*; the agreement is satisfactory.—Pierre **Termier**: Remarks on the geological map of the Alps.—M. **de Forcrand**: The thermochemical study of some binary compounds of the metals of the alkalies and alkaline earths. A table is given, summarising recent determinations by various authors, giving the heats of solution and formation of the chloride, bromides, iodides, and fluorides of lithium, calcium, strontium, barium, sodium, potassium, rubidium, and caesium, and some general conclusions are drawn based on these data.—Ernest **Esclangon**: A rotating governor for fixed or variable velocity. The method of regulation, described and illustrated, has been designed for the control of meridian and equatorial telescopes. It permits of easy regulation when in actual motion.—G. **Tzitzeica**: The W congruences.—Michel **de Domeccky**: The theory of symmetrical functions.—C. **Popovici**: Stable permanent movements.—Leinekugel **le Cocq**: The general theory of two indeformable suspended solids, from which are derived formulæ applicable to all systems of rigid suspension bridges.—O. **Boudouard**: The testing of metals by the study of the damping of vibratory movements. Details of experiments on specimens of iron and steel containing up to 1.0 per cent. of carbon, and the thermal treatment of which is exactly determined.—C. E. **Guillaume**: The definition of the practical electrical units.—A. **Lebedeff**: The extraction of zymase by simple maceration. A simple method is described of obtaining zymase not requiring the use of costly materials.—L. **Bruntz** and L. **Spillmann**: The physiological significance of the vital coloration of leucocytes. The so-called vital coloration of leucocytes appears to represent, as in phagocytosis, a defensive physiological action, and this general phenomenon is carried out both in vertebrates and invertebrates by identical processes.—Henry **Péneau**: The cytology of *Bacillus megatherium*.—D. **Roudsky**: The possibility of rendering *Trypanosoma lewisi* virulent for other rodents besides the rat.

## NEW SOUTH WALES.

**Linnean Society**, November 30, 1910.—Mr. C. Hedley, president, in the chair.—Dr. R. Greig-Smith: The permanency of the characters of the bacteria of the *Bacillus coli* group. Twelve races of bacteria of this group, upon their isolation from rachitic stools, showed diverse cultural characters. They were cultivated for seven months, and again examined. The activities towards dextrose and mannit were found to be the most permanent. The permanency of the other characters was lactose, neutral-red, motility, milk, growth on gelatin, saccharose, the power of fermenting, which is easily acquired and presumably easily lost.—Dr. R. Greig-Smith: Contributions to our knowledge of soil fertility. Part i.: The action of wax solvents and the presence of thermolabile bacteriotoxins in soil. Water extracts from soil a substance which is filterable through porcelain and toxic to bacteria. The toxin is destroyed by heat, by sunlight, and by storage. It disappears from air-dried soil, and decays in aqueous solution. It is not destroyed by salts such as sodium chloride or potassium sulphate. Soils vary in the amount of toxin they contain, good soils containing less, poor soils more. The particles of soil are covered or "waterproofed" with soil-wax or "agricere," which consists of a mixture of saponifiable and unsaponifiable bodies. With the removal of the "waterproofing," the soil nutrients are more easily dissolved by soil water and attacked by bacteria.—W. W. Froggatt: Notes on fruit-flies (Trypetidae), with descriptions of new species. Fifteen species, referable to the genera *Ceratitis*, *Dacus*, and *Rioxa* (Trypeta), are treated, including seven new.—T. G. Sloane: Carabidae from Dorrigo, N.S.W. With an appendix: Tenebrionidae from Dorrigo, by J. H. Carter.—W. M. Carne: Note on the occurrence of a limestone fauna at Grose Valley, Hawkesbury district.—R. J. Tillyard: Some remarkable Australian Libellulinae. Part iii.: Further notes on *Camacinia othello*, Tillyard. The female, not before known, is described, and a figure of its wings given. The range of the species is extended from Cooktown to Torres Straits and Port Darwin. An intermediate form, from the Aru Islands, connects this species with the Malayan and East Indian *C. gigantea*, Brauer.—T. T. Flynn: Contributions to a knowledge of the anatomy and development of the Marsupialia. No. 1. The material investigated was furnished by an adult female *Thylacinus* with three advanced young in the pouch. The external features of the young are described, together with the genital organs of both the adult and the young.

## DIARY OF SOCIETIES.

## THURSDAY, JANUARY 12.

ROYAL SOCIETY, at 4.30.—The Absolute Expansion of Mercury: Prof. H. L. Callendar, F.R.S., and H. Moss.—The Density of Niton (Radium Emanations) and the Disintegration Theory: Dr. R. W. Gray and Sir W. Ramsay, K.C.B., F.R.S.—The Charges on Ions in Gases, and some Effects that Influence the Motion of Negative Ions: Prof. J. S. Townsend, F.R.S.—The Distribution of Electric Force in the Crookes Dark Space: F. W. Aston.—The Measurement of End Standards of Length: Dr. E. P. Shaw.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—*Adjourned discussion*: Submarine Cables for Long Distance Telephone Circuits: Major W. A. J. O'Meara, C.M.G.

MATHEMATICAL SOCIETY, at 5.30.—A Property of the Number 7: T. C. Lewis.—A Mode of Representation of an Electromagnetic Field as due to Singularities Distributed over a Surface: Prof. H. M. Macdonald.—On the Fundamental Theorem in the Theory of Functions of a Complex Variable: Dr. W. H. Young.—On the Fundamental Theorem relating to the Fourier Constants for given Functions: Prof. E. W. Hobson.

## FRIDAY, JANUARY 13.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Verification of the Centre Yard and Three Centre Feet on the R.A.S. Tubular Scale: H. B. Darling.—(1) Proper Motion of Small Star near 17 Lyrae; (2) Measures of a Faint Proper Motion Star: S. W. Burnham.—Periodic Discordance between the R.A.S.'s of the Fundamental Catalogues and those of the Greenwich Standard Clock Stars: W. G. Thackeray.—Micrometrical Measures of Double Stars: Rev. T. E. R. Phillips.—Observations of Halley's Comet: J. Tebbutt.—An Adjustable Compensation for an "Invar" Pendulum: R. Inwards.—A suggested method of Determining the Stellar Brightness of a Faint Comet: H. Knox Shaw.—(1) The Magnitude Equation of the Mean Greenwich Observer, from Comparison of Greenwich Standard R.A.s. of Clock Stars for 1900 with Boss's Preliminary General Catalogue; (2) Standard Mean R.A.s. of Clock Stars for 1860, based on 12-hour Groups from Greenwich Transit Circle Observations in 1853-67: W. G. Thackeray.—*Probable Papers*: The Bearing of the Principle of Relativity on Gravitational Astronomy: W. de Sitter.—Nova Lacertae (Espin): F. A. Bellamy.

## MONDAY, JANUARY 16.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The *Michael Sars* North Atlantic Deep Sea Expedition: Sir John Murray, K.C.B., and Dr. Hjort.

## TUESDAY, JANUARY 17.

ROYAL INSTITUTION, at 3.—Heridity: Prof. F. W. Mott, F.R.S.

ROYAL STATISTICAL SOCIETY, at 5.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Discussion*: (1) The Strengthening of the Roof of New Street Station, Birmingham; (2) The Reconstruction and Widening of Arpley Bridge, Warrington: W. Dawson.

## WEDNESDAY, JANUARY 18.

ROYAL SOCIETY OF ARTS, at 8.—The Dutch Labour Colonies: J. C. Medd.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Ordinary Meeting.—At 7.45 Annual General Meeting.—Presidential Address: The Present Position of British Climatology: H. Melish.

ROYAL MICROSCOPICAL SOCIETY, at 8.—Presidential Address: Prof. J. Arthur Thomson.

ENTOMOLOGICAL SOCIETY, at 8.

## THURSDAY, JANUARY 19.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: The Action of *B. lactis aerogenes* on Glucose and Mannitol. Part II.: G. S. Walpole.—The Pharmacological Action of South African Boxwood (*Gonioma Kamassi*): Dr. W. E. Dixon.—Autoagglutination of Red Blood Cells in Trypanosomiasis: Dr. W. Yorke.—The Transformation of Proteids into Fats during the Ripening of Cheese (Preliminary Communication): M. Nierenstein.—The Action of X-rays on the Developing Chick: J. F. Gaskell.

ROYAL INSTITUTION, at 3.—Recent Progress in Astronomy: F. W. Dyson, F.R.S., Astronomer Royal.

LINNEAN SOCIETY, at 8.

ROYAL GEOGRAPHICAL SOCIETY, at 5.—Research Meeting. Neolithic Villages in Thessaly: Mes-rs. Wace and Thompson.

## FRIDAY, JANUARY 20.

ROYAL INSTITUTION, at 9.—Chemical and Physical Change at Low Temperatures: Sir James Dewar, F.R.S.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Modern Electrical Dock-equipment, with Special Reference to Electrically-operated Coalhoists: W. Dixon and G. H. Baxter.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Design and Construction of Reinforced-concrete Arches: G. F. Walton.

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