

in future will be possible in the event of a peace of renunciation. Anyone able to make a cool calculation must answer promptly in the negative. Certainly even in that case we should not collapse if we had to bear our war burdens alone; but as to this one should be under no illusion—we should then have to economise everywhere for these purposes, whether we liked it or not, in order at least to maintain our present rate of development."

EDUCATION (No. 2) Bill was introduced by Mr. Fisher in the House of Commons on January 14, and read a first time. In explaining the new measure, Mr. Fisher said:—"The Bill which I now introduce is substantially identical with the measure familiar to the House. It imposes upon the councils of counties and county boroughs the duty of providing for all forms of education. It abolishes exemptions from school attendance between five and fourteen years of age. It provides for further restrictions upon the industrial employment of children during the elementary-school age, and for the gradual introduction of a system of compulsory day continuation classes for adolescents. In the new Bill, as in the old one, local education authorities are empowered to give assistance to nursery schools, and in other ways to help the physical and social welfare of the children committed to their charge. Indeed, attention to physical welfare is a special and distinctive note of both Bills. On the other hand, I have either omitted or amended certain of the administrative clauses." Clause 5, which provided for provincial associations, is omitted, and provisions are embodied in Clause 6 which will facilitate the federation of local education authorities for certain purposes, which was the governing principle of Clause 5. Some alterations have been made in the clauses dealing with the attendance at continuation classes and at nursery schools, and also in the clause dealing with the abolition of fees. Mr. Fisher added:—"A White Paper will be circulated so that hon. members may be able to see clearly the changes of substance introduced. I hope it will be recognised that the adoption of this course will facilitate the expeditious discussion of the Bill in Committee. I hope that as the result of the consultations and discussions which I have held with the local education authorities during the last few months, a large portion of the measure which might otherwise give rise to acrid debate may be taken as substantially agreed upon."

SOCIETIES AND ACADEMIES.

LONDON.

Röntgen Society, January 1.—Capt. G. W. C. Kaye, president, in the chair.—Dr. W. D. Coolidge: A "radiator" type of X-ray tube. The anticathode consists of a block of copper faced with a small button of tungsten. This is fixed to a thick stem of copper which passes out through the glass neck of the tube and terminates in a fin radiator. The anticathode is thus kept cool and does not in consequence emit electrons, as in the case of the earlier type of Coolidge tube in which the whole of the anode speedily becomes red-hot. The new tube, therefore, so completely rectifies current that when an alternating potential is applied the current will only pass in one direction.—Dr. W. D. Coolidge and C. N. Moore: The field X-ray outfit of the United States Army. A petrol-electric unit supplies alternating current at 110 volts to a transformer arranged to give both high-tension and heating currents for the new radiator type of Coolidge tube. For simplicity of control the tube is worked at a constant potential of 5 in. equivalent spark-gap, and the current is adjusted to 5 milliamperes for continuous

running of the tube or to 10 milliamperes for short periods. An electrically actuated control on the throttle of the engine maintains constant output. The small size of the bulb, $3\frac{1}{2}$ in. in diameter, enables a close-fitting lead-glass shield to be employed. This is made in two parts, and completely surrounds the tube, a suitable aperture permitting egress of the useful rays.

Optical Society, January 10.—Prof. F. Cheshire, president, in the chair.—F. E. Lamplough and Miss J. M. Mathews: Relative dispersion and achromatism. The paper contained an account of an inquiry into the extent of the relation between the irrationality of dispersion in glasses and the mean dispersion and dispersive power. The work consisted chiefly in the reduction of observations made by Lt.-Col. J. W. Gifford on the refractive indices of thirteen spectral lines for thirty glasses. The results showed the absence of any accurate relations. It was found that in general the type of dispersion of a glass is determined by its dispersive power, but with a few special glasses mostly requiring protection an improvement could be effected on the achromatism secured by ordinary glasses of similar dispersive power. The problem of the triple objective was referred to.—J. Guild: A spherometer of precision. The chief feature of this instrument is the method employed for detecting the exact contact between the micrometer screw and the surface under test. The micrometer terminates in a small sphere of about 1.5 mm. diameter. A microscope with a suitable illuminating apparatus is mounted above, and the Newton's rings surrounding the point of contact are observed. By watching the behaviour of the rings when the screw is brought up, the exact point of contact is determined. The sensitivity is about one ten-thousandth of a millimetre.

PARIS.

Academy of Sciences, December 24, 1917.—M. Paul Appell in the chair.—A. Lacroix: The forms of the leucitic magma of the Lazial volcano. Fourteen complete chemical analyses of the various minerals are given, and the results are compared with those obtained from the rocks of the Somma.—Y. Delage: The mesorheometer, an instrument for measuring the velocity of water currents intermediate between the surface and the sea-floor. The special point of the apparatus described is a contrivance for damping the effects due to the oscillation of the boat.—G. A. Boulenger: The marine origin of the genus *Salmo*. A reply to some objections of Louis Roule.—M. G. Friedel was elected a correspondant for the section of mineralogy in the place of the late M. Vasseur.—G. H. Hardy and J. E. Littlewood: The convergence of Fourier's series and Taylor's series.—M. Guillet: Measurement of the intensity of the field of gravity. Galileo's pendulum and Newton's tube. Some advantages are claimed for Newton's tube over the pendulum, and details are given of the best construction of the former apparatus.—Mme. E. Chandon: A determination with the prism astrolabe of the latitude of Paris Observatory. The mean of the determinations is $48^{\circ} 50' 11.21''$. This compares with $48^{\circ} 50' 11.07''$, the mean furnished by several instruments between 1851 and 1892, and $48^{\circ} 50' 11.3''$, a more recent determination (1899 to 1901) with the meridian circle.—A. Veronnet: The law of densities inside a gaseous mass. A study of the density curve of a star considered as wholly gaseous.—V. Schaffers: The sound of cannon at a great distance.—H. Hubert: The use of the stereoscope for the examination of superposed projections.—E. Chéneveau: A relation between the refractive properties and chemical constitution of fatty substances.—G. Fouqué: The separation of the secondary amines arising from the catalytic hydro-

genation of aniline. The crude mixture to be separated contains *cyclohexylamine*, *dicyclohexylamine*, *cyclohexylaniline*, *diphenylamine*, and some secondary products, benzene, *cyclohexane*, and tar. A scheme is given for the separation and isolation of the above amines.—G. F. **Dollfus**: Geological observations made in the neighbourhood of Honfleur (Calvados).—L. **Dunayer** and G. **Reboul**: The diurnal variations of the wind in altitude.—C. **Gessard**: An erythrogenic variety of the pyocyanic bacillus.—M. **Belin**: A new method of general chemicotherapy: oxidotherapy. A description of results obtained by the injection of solutions of potassium permanganate in tetanus, typhoid fever, acute rheumatism, and other diseases.

PETROGRAD.

Academy of Sciences, September 13, 1917.—E. E. **Kostyleva**: The forms of corrosion of topaz crystals from Šajtanka (Oural).—N. N. **Adelung**: Contributions to our knowledge of the Palæartic Blattoidea. II.: Supplementary notes on *Ectobiella duskei*, Adel.—A. P. **Semenov-Tian-Šanskij**: Preliminary synopsis of the Mydoidæ of the Russian fauna (Diptera).—V. K. **Soldatov**: New genus of Zoarcidæ—*Gymnelopsis*, n.gen., and *G. ocellatus*, *G. brashnikovi*, *Lycenchelis armatus*, nn.spp., from the Okhotsk Sea.—N. M. **Krylov** and Ja. D. **Tamarkin**: The method of W. Ritz for the approximate solution of problems of mathematical physics.—P. P. **Lazarev**: The laws of transitory illumination of the retina in peripheral vision.—A. **Bačinskij**: Molecular fields and their extent.—M. **Kasterin**: The inconsistency of Einstein's principle of relativity.—N. V. **Nasonov**: The fauna of the Turbellaria of Finland.—I. N. **Filipiëv**: Instructions for collecting free-living nematodes.—V. N. **Ipatiev** and V. **Verchovskij**: The solution of zinc in hydrochloric acid under high pressure.

BOOKS RECEIVED.

A Critical Revision of the Genus *Eucalyptus*. By J. H. Maiden. Vol. iv., part 2. (Sydney: W. A. Gullick.) 2s. 6d.

Australasian Antarctic Expedition, 1911-14. Scientific Reports, Series C. Zoology and Botany. Vol. iv., part 2. Cephalopoda. By S. S. Berry. Vol. v., part 1. Arachnida from Macquarie Island. By W. J. Rainbow. (Adelaide: R. E. E. Rogers.) 1s. and 3s. 6d. respectively.

A Short Course in Elementary Mathematics and their Application to Wireless Telegraphy. By S. J. Willis. Pp. 182. (London: Wireless Press, Ltd.) 3s. 6d. net.

Britain's Heritage of Science. By A. Schuster and A. E. Shipley. Pp. xv+334+illustrations. (London: Constable and Co., Ltd.) 8s. 6d. net.

The Linacre Lecture on the Law of the Heart. By Prof. E. H. Starling. Pp. 27. (London: Longmans and Co.) 1s. 6d. net.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 17.

LINNEAN SOCIETY, at 5.—(1) Restoration of the Head of *Osteolepis*; (2) Femur of *Pterodactyl* from the Stonesfield Slate: E. S. Goodrich.—Some Early Cape Botanists: J. Britten.—A Hybrid *Stachys*: C. E. Salmon. INSTITUTION OF MINING AND METALLURGY, at 5.30.—The Incidence of Taxation upon Metalliferous Mining in the British Isles: H. Louis.—Molybdenum in Norway: E. R. Woakes. MATHEMATICAL SOCIETY, at 5.—A Method of Studying any Convergent Series: Major P. A. MacMahon.—Additional Note on Dirichlet's Divisor Problem: G. H. Hardy.—Note on a Diophantine Inequality: J. H. Grace.—Supernormal Curves: C. H. Forsyth.—A Note on a Theorem of Mr. Hardy's: K. Amanda Ran.—Plane Quartic Curves with a Tacnode: Prof. H. Hilton and Miss D. S. Tuck. CHEMICAL SOCIETY, at 8.—The Synthesis of Ammonia at High Temperatures: E. B. Maxted.—Interactions of Formaldehyde with Urea: A. E. Dixon.—The Colouring Matters of Camwood, Barwood, and Sanderswood: P. O'Neill and A. G. Perkin.—Studies on the Walden Inversion. VII. The Influence of the Solvent on the Sign of the Product in the Con-

version of β -Phenyl- α -bromopropionic Acid to β -Phenyl- α -aminopropionic Acid (Phenylalanine): G. Senter, H. D. K. Drew, and G. H. Martin.—Pure Piperidine Nitrate: A. K. Macbeth.—The Chemistry of Slightly Soluble Compounds of Thorium, as Investigated by Radio-active Methods: W. T. Spizine.

ROYAL SOCIETY OF ARTS, at 4.30.—The Tata Iron and Steel Works: H. M. Surtees Luckwell.

FRIDAY, JANUARY 18.

ROYAL INSTITUTION, at 5.30.—Studies on Liquid Films: Sir James Dewar. INSTITUTION OF MECHANICAL ENGINEERS, at 6.—Traction on Bad Roads of Land: L. A. Legros.—Utility of Motor Tractors for Tillage Purposes: A. Amos.

SATURDAY, JANUARY 19.

ROYAL INSTITUTION, at 3.—The Chemical Action of Light: Prof. W. J. Pope.

MONDAY, JANUARY 21

ARISTOTELIAN SOCIETY, at 8.—The Category of Action in Indian Philosophy and its Value for Modern Thinking: Dr. F. W. Thomas.

ROYAL GEOGRAPHICAL SOCIETY, at 5.—Discussion: Study of a Dune Belt: W. J. Harding King.

ROYAL SOCIETY OF ARTS, at 4.30.—High-temperature Processes and Products: C. R. Darling.

TUESDAY, JANUARY 22.

ROYAL INSTITUTION, at 3.—Palestine and Mesopotamia: Prof. Flinders Petrie.

INSTITUTION OF CIVIL ENGINEERS, at 5.30.—Further Discussion: Rail, creep: F. Reeves.—Creep of Rails: H. P. Miles.

WEDNESDAY, JANUARY 23.

GEOLOGICAL SOCIETY, at 5.30.

ROYAL SOCIETY OF ARTS, at 4.30.—Water Power in Great Britain (with Special Reference to Scotland); Its Amount and Economic Value: Alexander Newlands.

THURSDAY, JANUARY 24.

ROYAL SOCIETY, at 4.30.—Probable Papers: Graphical Solution for High-angle Fire: Prof. A. N. Whitehead.—Flocculation: Spencer Pickering.

—Revolving Fluid in the Atmosphere: Dr. J. Aitken.—Ultra-violet Transparency of the Lower Atmosphere and its Relative Poverty in Ozone: Hon. R. J. Strutt.—The Pressure in the Solar Spectrum of the Water-vapour Band λ 3064: Prof. A. Fowler.—The Ultra-violet Band of Ammonia and its Occurrence in the Solar Spectrum: Prof. A. Fowler and C. L. Gregory.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—Telephone Exchange Transfers and their Organisation: F. G. C. Baldwin.

FRIDAY, JANUARY 25.

ROYAL INSTITUTION, at 5.30.—The Motion of Electrons in Gases: Prof. J. S. Townsend.

SATURDAY, JANUARY 26.

ROYAL INSTITUTION, at 3.—The Chemical Action of Light: Prof. W. J. Pope.

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