

electrons with a metal. The relation between the atoms, free electrons, and ions within a metal are essentially those of dissociation equilibrium. The free electrons may be 2-3 per cent. of the number of atoms and increase with temperature. This gives an ionising potential of the solid metal of $\frac{1}{8}$ volt for cobalt to $\frac{1}{4}$ volt for iron at 0° C.—F. G. Keyes and F. W. Sears: Recent measurements of the Joule effect for CO_2 . A glass bomb containing the gas is broken in a vacuum and the temperature change measured by a platinum resistance wire.—H. B. Lemon: The comet tail spectrum and Deslandres' first negative group. Helium pumped through activated carbon gives a brilliant comet tail spectrum. The spectrum is also given by a hydrogen tube containing carbon cooled to liquid air temperature and with a hot cathode, but is feeble.—W. F. Meggers: The periodic structural regularities in spectra as related to the periodic law of the chemical elements. The spark spectrum (from ionised atoms) resembles in structure the arc spectrum (from neutral atoms) of the preceding element (Displacement Law). Even and odd structures, *i.e.* doublets and triplets, etc., characterise the arc spectra of alternate elements in columns I.-VIII. of the periodic classification, and even and odd structures their spark spectra (extension of Rydberg's Alternation Law). Experimental verification.—E. L. Nichols: Notes on neodymium oxide. The oxide in bulk or in a bead gives a band spectrum of two identical sets, though the bands are generally in different places. There are two absorption spectra: the reversal of the band spectrum and the spectrum of an aqueous solution. The same two sets of bands appear together with a third.—A. H. Pfund: Halogen isotopes and infra-red reflection spectra. Potassium salts of the halogens have as many bands of selective reflection in the infra-red as there are isotopes. Plotting wave-numbers ($1/\lambda$) against atomic weights gives two parallel straight lines, the lighter isotopes, together with iodine, falling on one line.—P. A. Ross and D. L. Webster: (1) The Compton effect with no box around the tube. The apparatus was so arranged that radiation from any light element other than the secondary radiator had to travel a distance by which, according to the inverse square law, its intensity would be made negligible. Compton's predicted shift is confirmed, but no trace is found of the tertiary radiation suggested by Duane. (2) Compton effect: evidence on its relation to Duane's box effect. The intensity of scattered radiation from a box enclosing the X-ray tube and secondary radiator as calculated using Barkla's mass-scattering coefficient is inadequate to explain the peak observed by Duane in the box experiments.—H. Boschma: The nature of the association between Anthozoa and Zooxanthellæ. Coral polyps containing algæ are substantially parasitic on them, apparently owing to lack of organic food. Given organic food, they cease to ingest the algæ.—T. L. Davis: The mechanism of reactions in the urea series. The mechanism in many cases is the reversible combination of molecules: the urea derivatives de-arrange or break down in a predictable manner analogous to the de-arrangement of urea into ammonia and cyanic acid.—L. J. Gillespie: An equation for the Haber equilibrium.—G. Glocker: A critical potential of methane and its absorption in the ultra-violet. The maximum in the current-potential curve of three- and four-electrode methane tubes is not due to a resonance potential.—H. W. Underwood, Jr.: Studies in catalysis. Negative catalysts or "stabilisers" seem to act by the formation of loosely combined molecular compounds.—W. J. Crozier and H. Federighi: On the measurement of critical thermal increment for biological processes. The logarithm of

frequency of heat-beat in the silk-worm bears a linear relation to the reciprocal of the absolute temperature; elaborate precautions are necessary to eliminate chance variations.—P. Bailey and Harvey Cushing: Micro-chemical colour reactions as an aid to the identification and classification of brain tumours.—S. Flexner: Virus encephalitis in the rabbit. The contents of febrile herpes vesicles and allied substances from man set up this inflammation of the brain in the rabbit. The virus appears to have at times a general distribution throughout the human body.—W. J. Luyten: Notes on stellar statistics: II. The mathematical expression of the law of tangential velocities.—G. C. Evans: Economics and the calculus of variations.—E. Kasner: Separable quadratic differential forms and Einstein solutions.—D. N. Lehmer: On a new method of factorisation. Legendre's method of factorisation, which makes use of the fact that all numbers having a given quadratic residue contain only such prime divisors as belong to certain linear forms, is to be utilised to construct stencils. The combination of any number of sets of these forms can then be accomplished by piling the corresponding stencils one on top of the other.—A. D. Michal: Functionals of curves admitting one-parameter groups of infinitesimal point transformations.—E. C. Jeffrey: (1) Resin canals in the evolution of the conifers. Contrary to current opinion in Europe, it is concluded, from the evidence of wound resin canals in fossil coniferous woods, that the Abietinæ (pines) represent the parent stock of the group. (2) The origin of parenchyma in geological time. Storage parenchyma has been derived from tracheids; it appeared first at the end of the annual ring, being related to the extra supplies required by the cambium in spring, and often shows every gradation towards tracheary elements.

Official Publications Received.

- University of Illinois Engineering Experiment Station. Bulletin No. 145: Non-Carrier Radio Telephone Transmission. By Hugh A. Brown and Charles A. Keener. Pp. 26. (Urbana, Ill.) 15 cents.
- Shirley Institute Memoirs. Vol. 3, 1924. Pp. vi+362+iv. (Manchester: British Cotton Industry Research Association, Didsbury.)
- State of Illinois Department of Registration and Education: Division of the Natural History Survey. Bulletin, Vol. 15, Art. 4: A Preliminary Report on the Occurrence and Distribution of the Common Bacterial and Fungous Diseases of Crop Plants in Illinois. By L. R. Tehon. Pp. viii+173-325. (Urbana, Ill.)
- Records of the Botanical Survey of India. Vol. 10, No. 2: The Botany of the Abor Expedition. By I. H. Burkill. Pp. 115-420+10 plates. (Calcutta: Government of India Central Publication Branch.) 5.3 rupees; 8s. 6d.
- Statens Meteorologisk-Hydrografiska Anstalt. Årsbok, 5, 1923. V: Hydrografiska mätningar i Sverige. Pp. 36+4 plates. (Stockholm.) 5 kr.
- Meddelanden från Statens Meteorologisk-Hydrografiska Anstalt. Band 3, No. 1: Meteorologiska Resultat av en Sommarseglats runt de Brittiska Öarna (Meteorological Results of a Summer-Cruise round the British Isles). With an English Summary. Av Carl-Gustaf Rosaby. Pp. 16. (Stockholm.) 1 kr.
- Abisko Naturvetenskapliga Station. Observations météorologiques à Abisko en 1917. (Meteorologiska fakttagelser i Abisko år 1917.) Rédigées par Bruno Rolf. Pp. 75. (Stockholm.)
- Board of Education. Vacation Courses in England and Wales, 1925. Pp. 18. (London: H.M. Stationery Office.) 6d. net.
- The Quarterly Journal of the Geological Society. Vol. 81, Part 1, No. 321, March 25th. Pp. xlviii+112+9 plates. (London: Longmans, Green and Co.) 7s. 6d.
- Reports of the Progress of Applied Chemistry. Issued by the Society of Chemical Industry. Vol. 9, 1924. Pp. 700. (London: The Society of Chemical Industry.) 7s. 6d.; to non-members, 12s. 6d.

Diary of Societies.

SATURDAY, APRIL 18.

- MINING INSTITUTE OF SCOTLAND (Annual Meeting) (at Royal Technical College, Glasgow), at 3.—Prof. H. Brigg: Sinclair's Treatise on Coal-mining, 1672 (Seventeenth Century Mining in East Lothian).—J. H. Coekburn: The Principles and Operation of the Mines (Working Facilities and Support) Act, 1923, Part 1.—C. N. Kemp and W. M'Laren: Demonstration on Coal Washing.
- INSTITUTE OF BRITISH FOUNDRYMEN (Lancashire Branch, Junior Section) (at Municipal College of Technology, Manchester), at 7.—A. Hill: Foundry Materials.