

suffers materially. The effect is greater the higher the order of the spectrum. When the crystal under examination is contained within a suitable electric furnace and the atoms vibrate more violently through the rise of temperature, the intensities of all orders diminish, but those of higher order much more than those of lower. The effect was foreseen by the Dutch physicist Debije, and the amount of it was actually calculated by him on certain assumptions. I have found experimental results in general accord with his formula. In passing, it may be mentioned that as the crystal expands with rise of temperature the spacing between the planes increases and the angles of reflection diminish, an effect readily observed in practice.

This part of the work gives information respecting the movements of the atoms from their places, the preceding respecting their average positions. It is sure, like the other, to be of much assistance in the inquiry as to atomic and molecular forces, and as to the degree to which thermal energy is locked up in the atomic motions.

This brief sketch of the progress of the new science in certain directions is all that is possible in the short time of a single lecture; but it may serve to give some idea of its fascination and its possibilities.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—The death of the Chancellor of the University, the Right Hon. Joseph Chamberlain, cast a gloom over the annual Degree Congregation, and the festivities which had been arranged in connection therewith were all abandoned.

Mrs. Poynting has presented the scientific library of the late Prof. J. H. Poynting to the physics department of the University. The gift is a valuable one in itself and in its associations, and the spirit in which it is given is highly appreciated.

The opposition of the University to the proposal of the City Council to run a tram line past the front of Mason College has resulted in a compromise whereby the line is not to be used for the conveyance of passengers, and cars are only to be run along it during vacations or before 9.30 a.m. or after 6 p.m. on ordinary days, or on occasions of special pressure or emergency to be mutually agreed upon.

Dr. J. S. Anderson has been appointed assistant lecturer and demonstrator in physics for one year in succession to Dr. Fournier d'Albe. Mr. W. Hulse has been appointed demonstrator in mining in succession to Mr. Clubb. Mr. Gilbert Johnson has been appointed a member of the staff of the agricultural research section of the zoological department.

The degree of D.Sc. has been conferred on H. B. Keene and F. W. Aston, and the degree of M.D. on E. W. Assinder and O. M. Holden. The official degree of M.Sc. has been conferred on Prof. F. C. Lea and that of M.Com. on G. H. Morley, who has been secretary of Mason College and of the University since its foundation.

The University of Liverpool has conferred on Mr. T. F. Wall, D.Sc., the degree of Doctor of Engineering.

PROF. D. T. GWYNNE-VAUGHAN, professor of botany in the Queen's University, Belfast, has been appointed to the chair of botany at University College, Reading, vacant by the resignation of Prof. F. W. Keeble, who has been appointed director of the experiment station and gardens of the Royal Horticultural Society at Wisley.

We learn from *Science* that with the close of the present term at the Massachusetts Institute of Technology, Prof. R. H. Richards will retire from the active work of teaching which he has followed for forty-six years. He has been made professor emeritus and receives the benefits of the Carnegie Foundation. Prof. Richards has been identified with the institute since its beginning. In 1871 he was appointed to the chair of mineralogy in the department that afterwards developed into that of mining, engineering, and metallurgy.

The first Aitchison Memorial Scholarship is to be awarded next September. The scholarship was established by his friends and colleagues as a memorial of the late Mr. James Aitchison. Its value is 30*l.*, and it is tenable in the full-time day courses in technical optics at the Northampton Polytechnic Institute. Applications must be received by September 1 by Mr. Henry F. Purser, 35 Charles Street, Hatton Garden, London, E.C., from whom full particulars can be obtained.

It is announced in the issue of *Science* for June 26 that at the celebration of the centenary of the foundation of the Yale University Medical School, large gifts were announced in addition to the 100,000*l.* from the General Education Board of the United States. These donations included a provisional gift of 100,000*l.* for the Anthony N. Brady foundation, and 120,000*l.* from donors not officially named. Our contemporary also states that by the will of the late Mr. James Campbell, the St. Louis University Medical School will receive his entire estate after the death of his heirs, who have a life interest in it. The present value of the estate is estimated to be from three to eight millions sterling. Also that by the will of the late Mr. Thomas W. Holmes, of Troy, Rensselaer Polytechnic Institute is bequeathed the sum of 10,000*l.* From the same source we learn that Miss Susan Minns has given 10,000*l.* to the department of botany of Wellesley College, in memory of Susan M. Hollowell, the former head of the department.

SOCIETIES AND ACADEMIES.

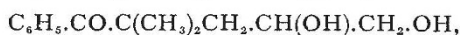
LONDON.

Linnean Society, June 18.—Prof. E. B. Poulton, president, in the chair.—R. D. Laurie: Reports on the marine biology of the Sudanese Red Sea.—On the Brachyura.—G. Matthai: A revisior of the recent Colonial *Astræidæ* possessing distinct corallites.—C. F. M. Swynnerton: Short cuts to nectaries by blue tits. The author referred to his previous account of African ornithophilous flowers, read on March 5 last, and showing photographs of injured shoots of *Ribes* on the screen.—W. West: Ecological notes, chiefly cryptogamic. This paper was the outcome of a suggestion by Prof. Engler, that whilst abundance of observations existed of ecological facts regarding phanerogams, the cryptogams had been neglected. It was intended as the first of a series, which has been cut short by the death of the author. The observations extend over parts of Scotland, Wales, Ireland, and the Lake District.—R. J. Tillyard: Life-histories and descriptions of Australian *Æschinæ*, with a description of a new form of *Telephebia* by Herbert Champion.—Miss Olga G. M. Payne: The life-history and structure of *Telephorus lituratus*.—A. Grouvelle: Cucujidæ, Cryptophagidæ, avec une description de la larve et de la nymphe de *Protominia convexiuscula*, Grouvelle.—H. Scott: Mallophaga, Aphaniptera, and Diptera Puparia.

Challenger Society, June 24.—Dr. A. E. Shipley in the chair.—Commander Campbell **Hepworth**: The origin of the Gulf weed. Commander Hepworth initiated a discussion by referring to a form of Sargassum found in the central part of the Sargasso Sea. Seed-like bodies were stated to have been seen from which small leaves sprouted in various stages of growth up to 4 or 5 in. long. It was suggested that these might represent a mode of reproduction not hitherto recognised in Sargassum.—G. C. **Robson**: Lo Bianco's work on the periods of sexual activity in marine animals. The lists compiled by Lo Bianco from observations over a period of thirty years on the animals of the Gulf of Naples were analysed, and an attempt was made to discover causes for the differences of breeding period in various species, genera, and larger groups. It was concluded that while in certain cases it seemed possible to correlate these differences with the mode of life of the animals, in other cases the differences appeared to be non-adaptive.

PARIS.

Academy of Sciences, June 29.—M. P. Appell in the chair.—G. **Bigourdan**: The various classifications of nebulae and star clusters and the abbreviations employed for describing these objects. A historical account of the systems of classification and the corresponding abbreviations due to J. Herschel, Schultz, Kobold and Wirtz, Wolf, S. I. Bailey, Stone, and Merecki. The author proposes a system partially based on these, and gives a list of the principal abbreviations which he suggests might be universally adopted.—J. **Meyeringh** and A. **Haller**: Dimethylallylacetophenone and its oxidation products. Careful oxidation with weak alkaline permanganate gave the glycol,



or 2-benzoyl-2-methyl-4:5-pentanediol. The reactions of this glycol with benzoyl chloride and phenyl isocyanate have been studied, and the products are described.—André **Blondel**: Analysis of the induction reactions in alternators.—C. **Guichard**: Surfaces such that the osculating spheres to the lines of curvature of a series form an O or a 2I system.—Georges **Charpy**: The influence of time on the rapid deformations of metals. In testing metals by shock, the variation of the time of deformation was varied from 0.01 to 0.001 second, and this variation produced no practical differences in the work absorbed by the breaking.—H. **Parenty**: An experimental law for the flow of gases and steam through orifices.—F. W. **Dyson** was elected a correspondant for the section of astronomy, in the place of the late Sir David Gill.—A. **Buhl**: The normal curvature of closed contours.—R. J. **Backlund**: The zeros of the function $\zeta(s)$ of Riemann.—Theodor **Poeschl**: An evaluation of potentials.—Leonida **Tonelli**: A direct method for the calculus of variations.—Harald **Bohr**: The function $\zeta(s)$ of Riemann.—André **Léauté**: The problem of two electric lines branched in series.—A. **Schidlof** and A. **Karpowicz**: The evaporation of globules of mercury maintained in suspension in a gaseous medium. It was found in experiments designed to measure the elementary charge on fine mercury particles in suspension that the velocity of fall diminished continuously, an effect possibly due to evaporation. This phenomenon would vitiate the conclusions drawn by Ehrenhaft from his experiments.—Mlle. Paule **Collet**: The variations of resistance of crystals and residual electromotive forces.—J. **Minguin** and R. **Bloc**: The influence of solvents on the optical activity of the ortho- and allo-acid methyl camphorates and the

neutral camphorate. The solvent exerts a very considerable influence on the optical activity. Thus the ortho-methyl camphorate in formic acid gave $\alpha=8.16^\circ$, in cinnamene, $\alpha=13.46^\circ$, numerous other organic solvents giving intermediate values.—M. **Leprince-Ringuet**: The inflammability of mixtures of methane and various gases.—F. **Ducelliez** and A. **Raynaud**: The bromination of cobalt and nickel in presence of ethyl ether. The compounds, $\text{CoBr}_2(\text{C}_4\text{H}_{10}\text{O})$ and $\text{NiBr}_2(\text{C}_4\text{H}_{10}\text{O})$, are produced. These are decomposed by heat and give the anhydrous bromides.—O. **Hönigschmid**: Revision of the atomic weight of uranium. Analyses of the bromide gave 238.175 as the mean value of fourteen determinations.—C. **Gaudfroy**: The dehydration of gypsum. The transformation of the hemihydrate into the soluble anhydride is reversible. This accounts for the different temperatures given by various observers as that at which the anhydrous calcium sulphate is produced the temperature depends on the hygrometric state of the air in the oven.—E. **Gley**: The function of the suprarenal capsules in the action of vaso-constrictive substances. Indirect vaso-constrictive substances.—J. **Chaîne**: A fairly frequent error of interpretation in comparative anatomy.—A. **Vayssière** and G. **Quintaret**: A case of hermaphroditism in *Scyllium stellare*.—Maurice **Caulery**: The Siboglinidæ, a new type of invertebrates collected by the Siboga expedition.—MM. **Bonnefon** and **Lacoste**: Experimental researches on the grafting of the cornea.—H. **Busquet** and M. **Tiffeneau**: The rhythmic oscillations of the tonicity of the ventricles on the isolated rabbit's heart.—T. **Bézier**: The existence of a Carboniferous flora, possibly Westphalian, at Melesse (Ille-et-Vilaine).—R. **Tronquoy**: Some new data concerning the geology and petrography of the Congo.—Jacques **Deprat**: The Palæozoic strata and the Trias in the region of Hoa-Binh and of Cho-Bo (Tonkin).—J. **Giraud**: The sedimentary strata of the south and west of Madagascar.—Maurice **Lugeon**: The extent of the Morcles strata.—Jean **Chautard**: Contribution to the study of the origin of petroleum.—Pereira de **Sousa**: The effects in Portugal of the earthquake of November 1, 1755. The results of the study of a document by the Marquis de Pombal, recently discovered in the national archives of Lisbon.

CAPE TOWN.

Royal Society of South Africa, May 20.—The president in the chair.—T. **Muir**: Properties of Pfaffians and their analogues in determinants.—J. C. **Beattie**: The secular variation of the magnetic elements in South Africa during the period 1900-13. The annual changes in the magnetic declination vary from an average decrease of 1.5' of westerly declination at Mauritius during 1900-9—a change which has turned into an increase of 1.4' a year between 1907-9—to a decrease of 14' a year in the neighbourhood of Durban; from the latter place the decrease becomes less as we go in a north-westerly direction, and attains a value of 5' at Loanda; the decrease as we go west or south-west is also quite definite, though not so great, and at Cape Town has the value of 8'. It appears also that the absolute value of the decrease is increasing all over South Africa at the present time. A comparison of the results given in the paper with those of the American and British Admiralty declination charts for approximately the same epoch shows no continuity between the land values of the secular change and those over the sea, the high values over the land find no place over the sea except in the case of the result obtained from the *Gauss* and *Carnegie* observations. The greatest annual change of dip is found in the

south-western part of the continent in the neighbourhood of Cape Town; it amounts to an increase of southerly dip of 8' a year. The line of no change passes through Madagascar; east of that there is a decrease of southerly dip. The annual change in the horizontal intensity shows a decrease in absolute magnitude towards the north; over the greater part of the Union it has a value of from 80 γ to 100 γ yearly, and is a decrease.

BOOKS RECEIVED.

Historical Sketches of Old Charing. By Dr. J. Galloway. Pp. 82. (London: John Bale, Ltd.) 10s. 6d. net.

Le Musée d'Histoire Naturelle Moderne. Sa Mission, son Organisation, ses Droits. By G. Gilson. Pp. xii+256. (Bruxelles: Académie Royale.)

A First Course in Plant and Animal Biology. By W. S. Furneaux. Pp. viii+232. (London: University Tutorial Press, Ltd.) 2s.

Die Europäischen Schlangen. By Dr. F. Steinheil. Sechstes Heft. Tafel 26-30. (Jena: G. Fischer.) 3 marks.

Handbuch der Pharmakognosie. By A. Tschirch. Lief. 35, 36, 37. (Leipzig: C. H. Tauchnitz.) 2 marks each Lief.

Berliner Botaniker in der Geschichte der Pflanzenphysiologie. By G. Haberlandt. Pp. 29. (Berlin: Gebrüder Borntraeger.) 1 mark.

Grundzüge der Weltpolitik in der Gegenwart. By J. J. Ruedorffer. Pp. xiii+252. (Stuttgart and Berlin: Deutsche Verlags-Anstalt.)

Principles of Metallurgy. By A. H. Hiorns. Second edition. Pp. xiv+389. (London: Macmillan and Co., Ltd.) 6s.

The Continents and their People. Africa. By J. F. and A. H. Chamberlain. Pp. vii+210. (London: Macmillan and Co., Ltd.) 3s.

Every Child's Series. How Man Conquered Nature. By M. J. Reynolds. Pp. v+249. (London: Macmillan and Co., Ltd.) 1s. 8d. net.

The Happy Golfer. By H. Leach. Pp. vii+414. (London: Macmillan and Co., Ltd.) 6s. net.

The School Algebra. By A. G. Cracknell. Pp. viii+568+lxxvii. (London: University Tutorial Press, Ltd.) 5s.

Pond Problems. By E. E. Unwin. Pp. xvi+119. (Cambridge University Press.) 2s. net.

Handbuch der Morphologie. Edited by A. Lang. Vierter Band. Arthropoda. Vierte Lief. Pp. 421-640. (Jena: G. Fischer.) 5 marks.

Roberts-Austen: a Record of his Work. Compiled and edited by S. W. Smith. Pp. x+382+xxiii plates. (London: C. Griffin and Co., Ltd.) 21s. net.

Historical Account of Charing Cross Hospital and Medical School. By Dr. W. Hunter. Pp. xxi+309+xl plates. (London: J. Murray.) 21s.

County Borough of Halifax. Bankfield Museum Notes. Second series. No. 4. Coptic Cloths. By L. E. Start. Pp. 37. (Halifax: King and Sons.) 2s. 6d.

Memoirs of the Geological Survey. England and Wales. The Water Supply of Nottinghamshire from Underground Sources. By G. W. Lamplugh and B.

Smith. Pp. iv+174. (London: H. M. Stationery Office.) 5s.

Memoirs of the Geological Survey. Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for 1913. Pp. iv+107. (London: H.M. Stationery Office.) 1s.

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