

### Karl Ludwig Harding, 1775-1834

On July 15, 1834, at Göttingen, the death occurred of Karl Ludwig Harding, whose name will always be remembered in connexion with the search for a planet between Mars and Jupiter, which led to the discovery of the asteroids. Born at Bremen in 1775, Harding was working under Schröter, "the Herschel of Germany", at Lilienthal when through the efforts of von Zach an association of twenty-four astronomers, mostly German, was formed for the search for the unknown planet. The honour of finding the first asteroid, Ceres, fell to Piazzi at Palermo on January 1, 1801, while the second, Pallas, was first seen by Olbers at Bremen on March 28, 1802. Two and a half years later, on September 2, 1804, the third, Juno, was discovered by Harding. The finding of these small planets aroused immense interest and Harding was awarded the Lalande Medal by the Paris Academy of Sciences. About the same time he was appointed professor of astronomy and director of the observatory in the University of Göttingen, where for many years Gauss was his colleague. An interesting episode in his career was recalled in NATURE of July 19, 1877, p. 237, in a reference to letters which had passed between Gauss and Laplace in 1807 when the professors at Göttingen had had to make contributions to the French Army occupying the town.

### Prout and the Atomic Theory

When Francis Henry Egerton, eighth Earl of Bridgewater (1756-1829), died, he left £8,000 to be given to the author or authors, appointed by the president of the Royal Society, who should write an essay "On the Power, Wisdom, and Goodness of God, as manifested in the Creation". The writing of the essays was entrusted respectively to Sir Charles Bell, Drs. Chalmers, Kidd, Buckland, Roget and Prout and the Revs. William Whewell and William Kirby. The essays were published in 1833-35. In some cases they led to much controversy, and that by Dr. William Prout (1783-1850) on chemistry led Dr. W. C. Henry to criticise his views in the *Philosophical Magazine*. In reply to these remarks, Prout, writing from his house in Sackville Street, Piccadilly, on July 18, 1834, to the editor of the *Magazine*, said that he anticipated his opinions would provoke discussion, but that he had no time or inclination to enter into a controversy. "I have always," he said, "adopted the fundamental principle of atomic weights, or definite proportions, established by Dr. Dalton, and have always reflected with pride that this most important doctrine was first taught by an Englishman; but that I never did adopt, and I fear, never shall be able to adopt, some of the details of his atomic theory. Indeed I have always considered the atomic theory, as explained by Dr. Dalton, far less satisfactory and complete, as a whole, than his theory of gaseous bodies and of vapours; which had he done nothing else, would have placed him at the head of modern physical inquirers in this, and in every other country."

### Chimneys and Chimney-Sweeping

Among the many social questions engaging attention a century ago was the wretched condition of young children employed on sweeping chimneys. In a Bill for the Better Regulation of Chimney-Sweepers and the Safer Construction of Chimneys and Flues discussed in Parliament in 1834, it was laid down that

chimneys not being circular of 12 in. diameter should be not less than 14 in. by 9 in. with no angles less obtuse than 120°, and that partitions in chimneys and flues should be at least half a brick thick with joints well filled with mortar or cement. Commenting on this Bill, the *Mechanics Magazine* of July 19 said: "Should the bill, with these enactments pass into a law, something will certainly be gained to the cause of humanity, but it seems to us, notwithstanding, to be conceived altogether in a very petty spirit of legislation. The shortest, and at the same time, the only effectual way to put an end to the stifling and burning of infants in chimneys, is to prohibit absolutely and entirely the sweeping of chimneys by infants." Some years, however, passed until the age of chimney-sweepers' apprentices was raised to sixteen years, and after 1842 no one of less than twenty-one years of age was allowed to be employed on this work. The invention of the chimney-sweeping machine, which did away with the need of a person climbing the chimney, was the work of the philanthropist, Joseph Glass (1791?-1867), and was never patented.

## Societies and Academies

### LONDON

**Physical Society, June 15.** R. L. SMITH-ROSE and J. S. MCPETRIE: Measurement of the electrical constants of soil by a Lecher-wire method at a wave-length of 1.5 m. A parallel Lecher-wire system was set up and coupled to a source of oscillations of the desired frequency. The length of the stationary waves set up on the wires in air was measured and compared with the corresponding wave-length when the wires were immersed in the sample of soil under examination. The ratio of these wave-lengths gives directly a quantity involving both the conductivity and the dielectric constant of the soil. For conditions of normal moisture content the dielectric constant is 10 or 12, while the conductivity lies within the range  $10-28 \times 10^8$  e.s.u. J. S. MCPETRIE: A determination of the electrical constants of the earth's surface at wave-lengths of 1.5 and 0.46 m. The most sensitive condition for finding the electrical constants of a substance from a study of its reflecting properties for electromagnetic waves is obtained when the radiation is incident normally on the reflector. The experiments described show that in this case the reflection coefficient of copper gauze is practically unity at both wave-lengths. There appears to be little difference in the reflecting properties of ordinary soil and soil covered by grass, probably because the bulk of the reflection takes place at a small distance below the surface. O. DARBYSHIRE: (1) A spectrometer determination of the metrical thickness and dispersive power of a thin film. By counting the numbers of Edser-Butler and Talbot bands produced within the same spectral range by a thin film of glass and a prism spectrometer, the metrical thickness of the film can be determined. The refractive index of the film for light of any standard wave-length can then be calculated from a count of the number of Talbot bands passing the position of the corresponding line in the spectrum as the Talbot echelon is rotated about the vertical edge of the film through an accurately measured angle. Two spectrometers are used in conjunction as a double-table spectrometer, and the other apparatus required is of the usual student-laboratory type. (2) Application of the theory of



the transmitting echelon to the explanation of Talbot's and Powell's bands. On the basis of the theory of the transmitting echelon, the formation and the asymmetrical character of Talbot's bands, which are produced when a plate and aperture are placed in certain positions in the beam of a prism spectro-scope, are explained analytically and represented diagrammatically. R. W. POWELL: The thermal and electrical conductivity of metals and alloys: (1) Iron from 0° to 800° C. A longitudinal-flow method has been used to determine the thermal conductivity, at mean temperatures ranging from 30° to 800° C., of a nickel-plated rod of Armco iron containing approximately 99.92 per cent of iron. After allowance for the effect of the nickel plating, and extrapolation to 0° C., a value of 0.177 c.g.s. units is obtained for the thermal conductivity of the iron. This value is higher than that usually attributed to iron, but a chemically prepared iron of greater purity has been examined also and found to have a thermal conductivity of 0.194 c.g.s. units at 0° C.

## DUBLIN

Royal Irish Academy, May 28. A. FARRINGTON: Glaciation of the Wicklow Mountains. Two local glaciations occurred in the area. The first was an ice cap and was earlier than the last Ivernian ice-sheet, while the second was a valley glaciation and was later than the last Ivernian maximum. Modifications in the accepted edge of the Ivernian ice sheet are suggested; and, from the distribution of the local ice of the last phase, it is inferred that the direction of the prevailing wind was about the same as at present. The height of the snow-line of late glacial times was discussed.

## PARIS

Academy of Sciences, May 23 (C.R., 198, 1821-1888). P. A. DANGEARD: Notice on the work of the late Robert Chodat. GABRIEL BERTRAND and R. C. BHATTACHERJEE: The combined action of zinc and vitamins in the nutrition of animals. Results of experiments showing that vitamins cannot exert their normal action in the absence of zinc. JEAN BAPTISTE SENDERENS: The action of sulphuric acid, cold or at a moderate temperature, on the aromatic esters. From the point of view of sulphonation, sulphuric acid acts upon aromatic esters and acids similarly. E. GUYÉNOT, MLES. K. PONSE and I. TROLLET: The masculinising action of urine from the pregnant woman. LÉON POMEY: Unicursal involutions of the fourth order. ELISHA NETANJAHU: The term and the maximum modulus of Dirichlet's series. R. SAN JUAN: The problem of moments. EDMOND LAHAYE: A method of resolution of a category of transcendental equations. B. EDLÉN and P. SWINGS: The prohibited transitions of atoms with electronic configurations  $2s^2 2p^2$ ,  $2s^2 2p^3$ ,  $2s^2 2p^4$ , and on the interpretation of the lines of nebulae and novæ. GEORGES POIVILLIERS: The perspective property of certain surfaces and its application to aerial phototopographic surveys. Discussion of certain cases in which distortion may arise in the course of stereotopographic surveys. AUREL POTOP: Natural convection is a very well defined phenomenon. Study of the heat loss from a small electric furnace. In the case of a furnace dissipating 0.5 watt, experiments can be repeated with an accuracy of one in five thousand. JEAN BECQUEREL, W. J. DE HAAS and J. VAN DEN HANDEL: The paramagnetic rotatory power of dysprosium ethylsulphate at very low

temperatures. The experiments described represent the first case known of paramagnetic saturation. ALBERT LAMBRECHTS: The spectrographic study of phlorhizine and its derivatives. The ultra-violet spectrum of phloretine, phlorine and phloroglucinol. MILE. SUZANNE VEIL: The systematic examination of the periodicities of precipitation by the two drop method. MILE. M. QUINTIN: The heat of dilution of salts. The heat of dilution of copper sulphate solution has been determined by measurements of E.M.F. and application of the Gibbs-Helmholtz formula. JACQUES LEFOL: Hydrated calcium sulphoaluminate and calcium chloroaluminate. PIERRE VALLET: A recording apparatus for the study of reactions with regularly varying temperatures. This apparatus records simultaneously the variations of mass of a substance as a function of its temperature and the variations of its temperature as a function of the time on the same plate. R. SUTRA: The degradation of starch under the action of phosphoric acid, of glycerol and of acetic anhydride in the presence of sulphuric acid (acetolysis). JOSEPH HOCH: The action of organomagnesium compounds on ketoxims. L. ROYER: The structural relations which should exist between two substances *A* and *B* for *B* to modify the facies of crystals of *A*. New examples. PAUL LEMOINE, R. HUMERY and R. SOYER: The impoverishment of the stratum of green sand of the Paris region. The effects of the increase in the number of wells drawing water from the green sand. In ninety-three years the water level has been lowered 93 metres in the Seine synclinal. MIECZYSLAW PRONER: Researches on the idioblasts in the family Crassulaceæ. MAX VACHON: The act of nutrition of a pseudoscorpionid, *Chelifer cancrroides*. PAUL CHABANAUD: The basisphenoidian complex and the nadiral orbital septum of the heterosome fishes. EMILE HAAS: A method for locating the retinal impressions with respect to the fovea. Application to the study of acuteness of vision at low illuminations. R. BONNET: The neuro-muscular action of amides and cyanic derivatives. From a pharmacodynamical point of view, urea behaves as an amide and not as a cyanic derivative: this is not in agreement with the Werner formula for urea. JACQUES MONOD: Galvanotropism and physiological age. MAURICE DOLADILHE: New observations on the physical properties of blood serum.

## SYDNEY

Royal Society of New South Wales, December 6. A. R. PENFOLD and F. R. MORRISON: The essential oils of the genus *Calythrix*. (1) *Calythrix virgata*. The essential oils from various consignments were obtained in a yield of 0.5 per cent and possessed a very pleasant Tea Rose odour. The essential oil was found to contain *d*-*a*-pinene, citronellol and geraniol both free and combined as acetic, formic, citronellic and dehydrocitronellic acid esters. The range of chemical and physical constants of the essential oil was determined. M. B. WELCH: Some mechanical properties of Alpine ash. (1) *Eucalyptus Delegatensis*, R.T.B. (1) There is no uniform increase in strength towards the top of the tree, and in some instances the wood is decidedly weaker in the uppermost log than in the lowest. The weight per cubic foot varies from 32 lb. to 46 lb. and except for wood of low density it possesses considerable strength with a high modulus of elasticity, whilst the toughness, as indicated by the work to the maximum load, and also the elastic resilience, is



very satisfactory. The fibre stress at the proportional limit, modulus of rupture and modulus of elasticity increase comparatively regularly with the density, but the effect of density is more irregular on the work to the proportional limit and to the maximum load. J. C. EARL and A. W. MACKNEY: The action of nitrous acids on dimethylaniline (2). The substance described previously (*J. Proc. Roy. Soc. N.S.W.*, 67, 231; 1933) as the principal product from the reaction in the absence of strong acids, has now been identified as *p*-nitroso-dimethylaniline nitrate. It is difficult to obtain correct values in the estimation of nitrogen in this compound. F. P. DWYER and D. P. MELLOR: X-ray diffraction studies of the crystallisation of amorphous silica. X-ray powder photographs show that, as a result of the crystallisation of amorphous silica or opal in the presence of molten potassium chloride below 870° C., cristobalite is the first crystalline modification of silica produced. The occurrence of cristobalite as a form intermediate between amorphous silica and tridymite thus brings these transformations into line with Ostwald's principle. Cristobalite produced by heating silica gel and opal with potassium chloride at 810° C. was found to persist in the (β) high form for several months and eventually appeared to invert to (α) low tridymite. The formation of cristobalite from vitreous silica is consistent with the crystallite theory of the glassy state put forward by Randall and Rooksby. ADOLPH BOLLIGER: Volumetric micro-determination of perchlorates with methylene blue and picric acid. Perchlorates form, with methylene blue, a methylene blue perchlorate which is only slightly water soluble. By adding a known excessive amount of methylene blue the excess can be determined by titration against standardised picric acid. Complete removal of the methylene blue perchlorate formed is necessary with small amounts of perchlorate exceeding 1 mgm. A double precipitation method may be used whereby the excess of the methylene blue added is precipitated with an excess of picric acid. After filtering off the combined precipitates the remaining excess of picric acid is determined by titration with methylene blue. R. J. NOBLE: Note on the longevity of spores of the fungus *Urocystis tritici*, Koern. Chlamydo-spores were exposed to a series of relative humidities at 13°–31° C. for ten years. During the first two years, germination was first observed on the 50 and 64 per cent relative humidity series. No germinations were recorded at 72 per cent or 89 per cent at any time. Viability was lost at 64 per cent relative humidity after 2 years and at 50 per cent after 6 years. More than 50 per cent germination has been recorded in the 0–33·5 per cent relative humidity series each year.

### Forthcoming Events

BRITISH PHARMACEUTICAL CONFERENCE, July 16–20. To be held at Leeds.

SOCIETY OF CHEMICAL INDUSTRY, July 16–20. Annual Meeting to be held at Cardiff.

July 17, Dr. J. T. Dunn: "Science and Industry—the Fertility of Ideas" (Presidential Address).

July 19, Prof. H. Freundlich: "Plasticity the Servant of Industry". Sir Harry McGowan: "The Uneven Front of Research".

July 20, Col. C. H. Bressey: "British Roads Development during the past Fifteen Years".

BRITISH MEDICAL ASSOCIATION, July 20–23. Annual General Meeting to be held at Bournemouth.

### Official Publications Received

#### GREAT BRITAIN AND IRELAND

Transactions of the Royal Society of Edinburgh. Vol. 58, Part 1, No. 1: Studies on the Physiology of Reproduction in the Ewe. Part 1: The Symptoms, Periodicity and Duration of Oestrus; Part 2: Changes in the Vagina and Cervix; Part 3: Gross Changes in the Ovaries. By Dr. R. Grant. Pp. 47 + 2 plates. 6s. 6d. Vol. 58, Part 1, No. 2: Notes on the Kidston Collection of Fossil Plant Slides. No. iii: Some Points in the Anatomy of *Sigillaria elegans* Brongniart; No. iv: On the Nature of the Corona and its Relationship to the Leaf-Traces in the Lepidodendreae and Sigillaria, with special reference to certain "Diploxyloid" Specimens in the Kidston Collection. By Dr. Mary G. Calder. Pp. 49–62 + 1 plate. 2s. Vol. 58, Part 1, No. 3: The Spermatogenesis of the Axolotl (*Amblystoma trigrinum*). By Robert Carrick. Pp. 63–74 + 3 plates. 3s. (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.)

Proceedings of the Royal Society of Edinburgh, Session 1933–1934. Vol. 54, Part 1, No. 7: Spermatogenesis in *Drosophila pseudo-obscura* Frolowa. 2: The Cytological Basis of Sterility in Hybrid Males of Races A and B. By Dr. P. Ch. Koller. Pp. 67–87. (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.) 1s. 9d.

Department of Scientific and Industrial Research. Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for the Year 1933. Part 1, with Report of the Geological Survey Board and Report of the Director. Pp. iii + 93. (London: H.M. Stationery Office.) 1s. 6d. net.

#### OTHER COUNTRIES

Royal Observatory, Hong Kong. Meteorological Results, 1933. Prepared under the direction of C. W. Jeffries. Pp. iv + 120. (Hong Kong: Government Printers.) 3 dollars.

Commonwealth of Australia: Council for Scientific and Industrial Research. Bulletin No. 77: Studies on the Phosphorus Requirements of Sheep. 1: The Effect of a Diet deficient in Phosphorus but containing Digestible Proteins and Vitamins. By Sir Charles J. Martin and A. W. Peirce. Pp. 44 + 2 plates. (Melbourne: Government Printer.)

Mitteilungen der Naturforschenden Gesellschaft Bern aus dem Jahre 1933. Pp. lxii + 215. (Bern: Paul Haupt.)

Comparative Psychology Monographs. Vol. 10, No. 1: Modes of Behavioral Adaptation in Chimpanzee to Multiple-Choice Problems. By Robert M. Yerkes. (Serial No. 47.) Pp. 108. (Baltimore, Md.: Johns Hopkins Press.) 1.50 dollars.

Department of Science and Agriculture, Jamaica. Entomological Circular No. 14: Pests of Banana in Jamaica; Lecture delivered on the occasion of the Agricultural Open Week, held at Hope by the Department of Science and Agriculture, in July 1933. By W. H. Edwards. Pp. 20 + 11 plates. (Jamaica: Government Printing Office.)

Transactions of the San Diego Society of Natural History. Vol. 7, No. 30: Notes on some Types of North American Birds. By A. J. van Rossem. Pp. 347–362 + plate 27. Vol. 7, No. 31: Two New Races of the Black Chachalaca from Central America. By A. J. van Rossem. Pp. 363–366. Vol. 7, No. 32: A New Race of Piranga bidentata from Central America. By A. J. van Rossem. Pp. 367–368. Vol. 7, No. 33: A Northwestern Race of the Varied Bunting. By A. J. van Rossem. Pp. 369–370. Vol. 7, No. 34: A Subspecies of the Brown Towhee from South-Central Texas. By A. J. van Rossem. Pp. 371–372. Vol. 7, No. 35: A New Form of Pocket Gopher from Southern Mono County, California. By Laurence M. Huey. Pp. 373–374. Vol. 7, No. 36: The Mammals of Southern Nevada. By William Henry Burt. Pp. 375–428. Vol. 7, No. 37: West American Species of the Genus *Lotia*. By A. M. Strong. Pp. 429–452 + plates 28–31. Vol. 7, No. 38: Some Corrections needed in Recent Carcinological Literature. By Steve A. Glassell. Pp. 453–454. Vol. 7, No. 39: A Review of the Races of *Geococcyx velox*. By Robert T. Moore. Pp. 455–470. (San Diego, Calif.)

Boston Society for Psychic Research. Bulletin 22: The "Walter"–"Kerwin" Thumb Prints. Pp. 85 + 8 plates. (Boston, Mass.)

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. 85. Pp. iii + 438 + 17 plates. (Philadelphia.) 6.25 dollars.

State of Connecticut. Public Document No. 24: Fifty-sixth Report of the Connecticut Agricultural Experiment Station, New Haven, for the Year 1932. Pp. xii + 832 + 57. (New Haven, Conn.)

Kungl. Sjökartverket. Jordmagnetiska Publikationer Nr. 9: A Magnetic Survey of Sweden made by the Hydrographic Service in the Years 1928–1930. By Gustav S. Ljungdahl. Pp. 37 + 6 plates. (Stockholm.)

Smithsonian Miscellaneous Collections. Vol. 90: World Weather Records, 1921–1930. Collected from Official Sources by Dr. G. C. Simpson, Robert G. Mossman, Sir Gilbert Walker, Frances L. Clayton. Assembled and arranged for publication by H. Helm Clayton. (Publication 3218.) Pp. viii + 616. (Washington, D.C.: Smithsonian Institution.)

New York Zoological Society. Report of the Director of the Aquarium. Pp. 23. (New York City.)

#### CATALOGUES

Alloy Steels: an Historical Survey. By Prof. Sir Harold Carpenter. (Nickel, A21.) Pp. 8. (London: The Mond Nickel Co., Ltd.)

A List of Books on all branches of Natural History. Pp. 20. (Sunninghill: Sunninghill Book Co.)

Absorptiometer for Liquids designed by Moll, Burger and Reichert. (Aso 34.) Pp. 4. Standard Thermopile of Moll and Burger. (Bolo 34.) Pp. 4. Non-Recording Microphotometer. (Nomi 34.) Pp. 2. (Delft: P. J. Kipp en Zonen.)

The Wild-Barfield Heat-Treatment Electric. Vol. 1, No. 1, June. Pp. iv + 14. (London: Wild-Barfield Electric Furnaces, Ltd.)

The National Park of the Gran Paradiso. Pp. 20. The National Park of Abruzzo. Pp. 20. (London: Italian State Tourist Department.)