

No. 7, pp. 1-53), under the title "Les cristaux de glace," an interesting *résumé* of what is as yet known of this the commonest of substances, in which he points out the lacunæ that remain and the questions that are still unsettled. He has himself studied no fewer than 3000 photomicrographs of actual ice crystals under the microscope, the photographs being taken from the fine collections formed by A. W. Bentley, G. Nordenskiöld, and F. Hallberg. There appear to be three different types of habit of natural crystals of ice, viz. lamellar, rod-like, and acicular, of which the first is by far the commonest. The author hazards the suggestion that the other two result from the transitory presence in the air of certain unstable gases, but hesitates to say which. From a study of the tapering, rod-like crystals he concludes that ice belongs to the tourmaline class of the hexagonal system, which is characterised by a trigonal polar axis of symmetry. No measurements which will permit of the determination of a satisfactory value for the ratio of the crystallographical axes have yet been published; that quoted in the text-books is based upon some extremely rough observations made by Nordenskiöld, and is quite untrustworthy. In the rod-like and acicular types twinning about 0001 is common, as is shown by the existence of groups in which two tapering ends are aligned in contact. It is well known that laboratory experiments have produced different kinds of crystals of ice. For instance, water when containing more than 50 per cent. of alcohol forms cubic crystals on freezing. For a smaller percentage such crystals, if formed, are unstable, and their occurrence in Nature would therefore appear doubtful. Certain photomicrographs taken by Bentley and by Hallberg appear to suggest cubic symmetry, but, failing optical tests, it remains uncertain whether they may not be merely distorted forms of the ordinary type of crystals.

THE following volumes are announced for early publication in the "University of Chicago Science Series" by the University of Chicago Press (London: Cambridge University Press):—"The Origin of the Earth," T. C. Chamberlin; "The Isolation and Measurement of the Electron," Prof. R. A. Millikan; and "Finite Collineation Groups," Prof. H. F. Blichfeldt. Other volumes in preparation for the same series are:—"The Evolution of Reptiles," S. W. Williston; "Food Poisoning," E. O. Jordan; "The Problem of Individuality in Organisms," C. M. Child; "The Development of a New System of Organic Chemistry, based on Dissociation Concepts," J. U. Nef and J. W. E. Glattfeld; "The Living Cycads," C. J. Chamberlain; "Mechanics of Delayed Germination in Seeds," W. Crocker; "The Rigidity of the Earth and of Materials," A. A. Michelson; "The Problem of Fertilization," F. R. Lillie; and "Linear Integral Equations in General Analysis," E. H. Moore.

MESSRS. CONSTABLE AND CO., LTD., announce the following books of science:—"The Flying Machine from an Engineering Standpoint," F. W. Lanchester (the James Forrest Lecture, 1914, including a discussion concerning the Theory of Sustentation and the Expenditure of Power in Flight); "Some Modern Methods of Ventilation, with Special Reference to Public Buildings," R. Grierson, illustrated; "Mining and Mine Ventilation," J. J. Walsh, illustrated; "Practical Surveying," E. McCullough, illustrated; "Colour and its Applications," M. Luckiesh, illustrated; "Atoms," J. Perrin, translated by D. L. Hammick, illustrated; and a new and enlarged edition of "Manual of Reinforced Concrete," C. F. Marsh and W. Dunn.

OUR ASTRONOMICAL COLUMN.

PONS-WINNECKE'S COMET AND THE METEORIC SHOWER OF JUNE 28.—Mr. Denning writes:—"That the remarkable display of June 28 was due to the earth passing through or very near a cometary orbit appears highly probable. The elements of the meteoric shower present some resemblances to those of Pons-Winnecke's comet of 1819, which has a period of about 5.8 years, and last reached perihelion on September 1, 1915. Any meteoric shower connected with Pons-Winnecke's comet, though not visible in past years, may well be perceptible in future times. In 1869 the perihelion distance was 0.7815, or about 21½ millions of miles inside the earth's orbit, but in 1915 the P.D. had increased to 0.9725, or only 4 millions of miles inside our orbit. Planetary perturbations have effected changes in the orbital elements of the comet, and brought it so near to us at one section that a meteoric *rencontre* seems very likely."

DIFFERENTIAL MEASUREMENT.—Mr. H. H. Plaskett has made an interesting study of some questions involved in measures of the distance between a pair of lines with the object of tracing the origin of differences found when different observers measure the same spectrograms, with special reference to spectrographic determinations of the solar rotation (Journal Roy. Ast. Soc. of Can., vol. x., No. 5). He finds the chief source of these differences is the "attitude" of the observer, and defines two modes of measurement, the "attentive" and the "automatic," according as the measures are made under the influence of prepossessions or otherwise. It must suffice to add that the automatic mode is found to possess the desirable advantages of speed, accuracy, and economy of effort, but is marred by high fortuitous error (apparently, greater p.e.). Mr. Plaskett is of the opinion that the highest accuracy can only be attained in replacing differential measures by determinations of changes of wave-length with the help of standard absorption lines. A very successful application of these results has already been made at Ottawa (NATURE, May 18).

WAVE-LENGTHS IN THE IRON SPECTRUM.—Interferometer measures of the wave-lengths of some 400 lines in the spectrum of the iron arc in the region covered by the international secondary standards have been made by Messrs. Burns, Meggers, and Merrill in continuation of the revision of wave-lengths undertaken at the United States Bureau of Standards (Scientific Paper No. 274). The poles used were either of electrolytic or Norwegian iron, and only iron lines were measured. The reductions were based on the international secondary standards, and the final wave-lengths were corrected by means of a smoothed curve obtained by plotting the differences between observed and normal wave-lengths of the standard lines. The mean difference is stated to be about one part in four millions. Three interferometers have been used in measuring each line, and, in addition to the work on wave-lengths, considerable attention has been devoted to observations of the physical characteristics of the lines. Thus, more than five hundred lines have been divided into four groups according to the limiting path difference at which interference is shown, and the data have been examined in connection with pole-effect, intensity, and pressure shifts. It appears that lines showing negative pole shift are never sharp; lines of faint or moderate intensity are sharper than strong lines, whilst the lines shifted by pressure are more likely to be broad than unaffected lines.