

in which there is recrystallisation in the solid state.

Following the brilliant theory of Osmond, the alloys of iron and of nickel in the case of meteorites ought to follow an analogous diagram.

Not long since this theory was entirely confirmed by the beautiful experiments of Benedicks. We see that in the two cases, in that of meteorites as well as in that of terrestrial iron, the appearance of these Widmanstätten figures is connected with two fundamental facts—the character of the primary octahedral crystallisation, and the separation of the solid solution into different phases during recrystallisation.

This structure, therefore, is not in the least confined to iron and its alloys; it might be equally well encountered in each alloy or each metal which crystallises in the regular system, and in which, after solidification, the crystallised solid solution throws out secondary deposits, that is to say, is subject to recrystallisation. In a pure metal there would be an allotropic change in the solid state, as, for example, the iron shown in Fig. 4—in an alloy, the separation of a new phase; and as diagrams of this kind are well known, it ought not to be at all difficult to find examples of the Widmanstätten structure in alloys other than iron.

To this class of alloys belong, for example, the different alloys of copper, particularly the brasses and bronzes. Gulliver, in his interesting volume on metallic alloys,<sup>8</sup> gives numerous examples of this, mentioning the separation of SnCu<sub>3</sub> in the alloys of copper and tin, of SbCu<sub>2</sub> in those of copper and antimony, of the constituent beta in brasses with about 35 per cent. of zinc (see Gulliver, Fig. 200), or of delta in the alloys with 70 to 75 per cent. of zinc (see Gulliver, Figs. 205 and 206). The author is able to reproduce here a photograph (Fig. 5) of a brass containing 55.1 per cent. of copper (cooled in sand and annealed), which was kindly sent to him by M. L. Guillet. This photograph has great interest, as it shows the action of reheating on the Widmanstätten structure.

Fig. 6 serves as another example of this structure, for which the author is indebted to M. Chouriguine; it represents an alloy of platinum-aluminium. M. Chouriguine,<sup>9</sup> in studying these alloys, found a transformation in the solid state, and this transformation manifested itself in a very marked Widmanstätten structure.

It is perhaps useful to remark that the first condition, that is to say, the primary octahedral crystallisation, is not difficult to find, for the majority of metals and alloys crystallise either in the regular or in the hexagonal system. In the last case the character of the Widmanstätten figures may differ in detail whilst preserving the same general aspect, as can be seen from Fig. 7,<sup>10</sup> representing a sample of zinc after melting and slow cooling.

These few examples, though taken somewhat haphazard, serve nevertheless as illustrations of the great extent to which the Widmanstätten structure exists in different alloys and metals. In the alloys of iron the Widmanstätten structure has an important industrial interest, as it gives rise to very poor mechanical properties in the case of cast steels and in overheated steels.

The chief object of this brief communication is to direct the attention of metallurgists and engineers to the study of alloys, other than iron, from the point of view of the production and the removal of the Widmanstätten structure.

<sup>8</sup> "Metallic Alloys," G. H. Gulliver.

<sup>9</sup> "Sur les alliages du platine avec l'aluminium," by M. Chouriguine. *Revue de Métallurgie*, 1912, p. 8735.

<sup>10</sup> This photograph was taken by M. Timothéeff.

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BELFAST.—Prof. R. H. Yapp has been appointed professor of botany in the Queen's University, Mr. C. W. Valentine professor of education, and Sir Hiram Shaw Wilkinson pro-Chancellor of the University.

GLASGOW.—Dr. W. J. Dilling, of Aberdeen, has been appointed to the new "Robert Pollok" lectureship, for research in materia medica and pharmacology, at the University of Glasgow.

The University Court has given leave of absence to Mr. A. Stevens, assistant in the department of geography, in order that he may accompany Sir Ernest Shackleton's Antarctic Expedition as geologist. The Court has also placed at his disposal a petrological microscopic equipment for the purposes of the expedition.

Temporary arrangements have been made for carrying on the work of a considerable number of the lecturers, assistants, and examiners, who, in consequence of the war, are absent on duty or detained abroad.

DR. D. A. CAMPBELL, of Halifax, has, says *Science*, promised 12,000*l.* to endow a chair of anatomy at Dalhousie University, Halifax, in memory of his son, the late Dr. George Campbell.

THE council of the Senate of the University of Cambridge has offered to professors, teachers, and students of the University of Louvain such facilities in the way of access to libraries, laboratories, and lectures, together with the use of lecture-rooms, as may secure the continuity of the work of that University during the present crisis. Hospitality in the way of living accommodation and so forth will probably be offered by the individual colleges and by private residents. The professors of the University of Oxford have offered a home for the winter to the young children of the professors of the University of Louvain; and the academic staff of University College (University of London) offers hospitality to about seventy members of French and Belgian universities, whether professors, teachers, or students, men or women, who may find it necessary to take refuge in this country.

A WELL illustrated prospectus for the present session of the Municipal Technical Institute, Belfast, has been issued. The chief object of the institute is to provide instruction in the principles of the arts and sciences which bear upon the trades and industries of Belfast, and to show by experiment how these principles may be applied to their advancement. The evening classes are designed for persons engaged during the day in handicrafts or business who desire to supplement and develop the knowledge and experience they have gained in the workshop and warehouse. It is satisfactory to notice that the prospectus insists that the successful prosecution of special studies is in proportion to the student's knowledge at the beginning of such work of the elements of mathematics and drawing. The day technical course provides instruction in the science and technology of mechanical and electrical engineering, the textile industries, and pure and applied chemistry; and it gives a sound training to youths who aim at filling responsible positions in these departments of activity. We notice that the Queen's University of Belfast and the Belfast Corporation have entered into an agreement whereby the institute is recognised as a college in which students of the University may study to qualify for a degree or diploma in science of the University. It is impossible in view of the completeness and multiplicity of the arrangements which have been made to meet the needs of every class of student, to mention them all, but attention



may be directed to the public textile testing and conditioning house which has been opened at the institute. This house examines textile materials with the object of ascertaining and certifying their true length, weight, condition, and strength; and of carrying out other investigations required by merchants and manufacturers.

THE Northampton Polytechnic Institute, London, E.C., has issued its "Announcements Educational and Social for the Session, 1914-15." The announcements form a volume of 298 pages, and give full particulars of a varied and comprehensive curriculum. The work of the institute is divided into two main sections: an educational section for technological subjects, and a social and recreative section. The educational aim is to provide classes in technological and trade subjects, special attention being directed to the immediate requirements of Clerkenwell, the district in which the polytechnic is situated. Prominent among the day courses is that provided in technical optics. The aim in this department is to provide the thorough theoretical and practical training now required in various branches of the optical industry. It is believed that there is now, and that there will be for some time to come, a considerable demand for well-trained men. In connection with the practical side of this training the department has had the benefit of advice and assistance from prominent members of the optical trade. The full course as at present established extends over two years, and is divided into two sections, for opticians and optical instrument makers respectively. The engineering day college is organised in two departments for civil and mechanical engineering, on one hand, and for electrical engineering on the other. In the former arrangements have been made for the teaching of aeronautical engineering. The course in aeronautical engineering will follow the same plan as the other engineering day courses, that is, the first two years will be devoted to the subjects which form the ground work of all engineering, and the necessary specialisation will take place in the third and fourth years. These are a few examples of the practical character of the instruction given, and a reference only is possible to some of the other courses, which include watch- and clock-making and horological engineering generally, many branches of technical chemistry, and subjects connected with the jewelry, silversmiths', and metal-working trades. Evening classes on an even more comprehensive plan have also been arranged.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 7.—M. P. Appell in the chair.—G. Bigourdan: Observations of the Delavan comet (1913f) made at the Paris Observatory. Positions given for September 2 and 3. The comet was visible to the naked eye in spite of the size of the moon. It appeared to be of the fifth magnitude.—M. Appell: A transformation of certain functions deduced from C functions of higher degree.—L. Mangin: The polymorphism of certain diatoms from the Antarctic. It is shown that the classification of diatoms by the markings or values is faulty, since these show for a given species much less fixity than the structure of the endochrome. The paper is accompanied by numerous illustrations.—M. Fournier: The resistance of a fluid to the horizontal translation of a spindle-shaped body, moving in the line of the axis of the figure.—P. Gaubert: The faces of solution of dolomite. A study of the relations between the crystalline symmetry and etching figures produced by the action of very dilute nitric or hydrochloric acids.

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BOOKS RECEIVED.

Northampton Polytechnic Institute, St. John Street, E.C. Announcements Educational and Social for the Session 1914-15. Pp. 298. (London: Northampton Polytechnic.)

Uganda Protectorate. Annual Report of the Department of Agriculture for the Year ended March 31, 1914. Pp. 67. (Kampala: Uganda Printing and Publishing Co., Ltd.)

Transactions of the Leicester Literary and Philosophical Society, together with the Report of the Council and Annual Reports of the Sections. Vol. xviii. Pp. 103. (Leicester: W. Thornley and Son.) 2s. 6d.

Poems of the Great War, published on behalf of the Prince of Wales's National Relief Fund. 2nd edition. Pp. 39. (London: Chatto and Windus.) 1s. net.

Dove Marine Laboratory, Cullercoats, Northumberland. Report for the Year ending June, 1914. Edited by Prof. A. Meek. Pp. 108. (Newcastle-on-Tyne: Cail and Sons.) 5s.

Chemical Technology and Analysis of Oils, Fats, and Waxes. By Dr. J. Lewkowitsch. Fifth edition, entirely re-written and enlarged. Vol. ii., edited by G. H. Warburton. Pp. xiv+944. (London: Macmillan and Co., Ltd.) 25s. net.

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