

(National Fire Protection Association, Boston, 1946), which recommends 25° F. as the selected value. Errors in the structural formula of the following compounds were noted (page numbers in brackets): 3-methylpentane (55); 2,2-dimethylbutane (56); 2,2,3-trimethylpentane (65); *p*-xylene (76); 2-pentanol (99); 3-methyl-1-butanol (101); methylal (130); 4-methyl-2-pentanone (141); *o*-fluorotoluene (181); *m*-fluorotoluene (182); *p*-fluorotoluene (182); pyridine (243); and thiophene (248). The molecular formula for oleic acid (p. 151) is also incorrect.

The difficulties in producing a book of this type are considerable, but this compilation is so useful that it is to be hoped that a further twenty years will not be allowed to elapse before the appearance of the third edition.

CRYSTALLIZATION OF HIGH POLYMERS

Some Aspects of the Crystallization of High Polymers

By G. Schuur. (Communication No. 276.) Pp. 82. (Delft: Rubber-Stichting, 1955.) 5 Dutch florins.

THIS is a small monograph dealing with a topic which is of considerable current interest. The mechanism of crystallization of an amorphous solid to a crystalline substance is not easy to elucidate. When a polymer is being dealt with, the difficulties increase immensely, and mobility is restricted in a way that does not occur with simpler systems. The trouble here is to try to deduce something about the mechanism and structure of the crystallites formed during the process by observations on the rate of formation of the nuclei, the rate of growth of the crystallites, and the optical properties of the crystallites. Thus, there is a limited amount of experimental data that can be obtained in such systems, and the interpretation, therefore, is still open to considerable discussion.

The author is a member of the Rubber-Stichting in Delft, and naturally he has a considerable interest in the crystallization phenomena exhibited by rubber. In addition, however, he discusses work done on polyamides and superesters, which are equally relevant to this topic.

The book is divided into a number of chapters which introduce the subject to anyone who is not particularly familiar with it. First there are general remarks about crystallization and the problem of liquid crystals. Next is a factual description of what has been observed about spherulitic formation in solid high polymers, and then follow three chapters on the more controversial aspects of methods of crystallization, the rate of crystallization, and phenomena of melting in high polymers.

The book is lavishly illustrated with extremely good photographs of typical spherulites and their behaviour in a number of systems, which convey in a much better form than any tabular data the qualitative nature of these phenomena. The book will provide much stimulus to those engaged in similar work and should also be an extremely useful guide to those who want to know in a general sort of way what is happening in this field of polymer chemistry.

H. W. MELVILLE

MICROSCOPY OF CERAMICS AND CEMENTS

Microscopy of Ceramics and Cements, including Glasses, Slags, and Foundry Sands

By Herbert Insley and Prof. Van Derck Fréchet. Pp. xii+286. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1955.) 7.50 dollars.

THE use of the polarizing microscope for the study of ceramics and cements has developed considerably in recent years, and a book such as this is welcome. For each group of ceramics, and for refractories and cements, the authors give brief accounts of the raw materials employed and of the behaviour of ceramic materials during firing operations and of cement during hydration. There are short introductory chapters on the microscope and on optical mineralogy, but the authors very rightly refer their readers to standard text-books for further details and also for tabulated and classified data of the optical characters of the minerals and artificial crystalline materials concerned. The characters of the minerals used as raw materials are, however, given in a separate chapter and their thermal behaviour is outlined. Obvious characters by which the materials produced in firing processes may be recognized are described as the occasion arises. The photomicrographs illustrating these descriptions are excellent.

There are two chapters on the preparation of materials for the microscopic examination and on special techniques and, apart from these, there are separate descriptions of methods used for especially difficult materials such as cement clinker, hydrated cements and porcelain enamels on metal. A very high standard of section-cutting must be attained, sections of cement clinker being worked to less than half the thickness of 30 μ used for rock sections. Methods of impregnating friable materials and the use of synthetic thermoplastic cements in place of the old-established Canada balsam are described in detail. For the study of some materials too dense to give good results with transmitted light, polished thin sections are prepared and are viewed by reflected or oblique illumination. These are particularly useful for cement clinker, aluminous cements and basic refractories. Delicate etching with very dilute reagents enables the different components to be recognized.

The chapter on glass describes crystalline solids likely to be encountered as 'stones' in the glass. These may be derived from the batch itself, from the refractories in the walls of the pot, or by devitrification. A binocular microscope with oblique illumination can advantageously be used in this work on glasses, and another device, used in the examination of porcelain enamels on metal surfaces, illuminates the specimen through one eyepiece of a binocular, the observer looking through the other.

A criticism may be made that the authors have attempted too much in a small compass; but they have succeeded in giving an up-to-date summary, for each branch of ceramics and cements, and have supplemented every chapter with a fairly full list of references to modern literature on the subject which will direct workers in Britain to most of the recent American work in these fields.

W. CAMPBELL SMITH