S.C.I. Monograph No. 30; Properties and Applications of Polyvinyl Alcohol

1968, 8½ in. × 5½ in. 224 *pp.* 70s.

THIS monograph is a compendium of papers (with discussions) read at a Joint Symposium on Polyvinyl Alcohol, organised by the Postgraduate School of Polymer Science of the University of Bradford and the Plastics and Polymers Group of the Society of Chemical Industry. The papers were submitted by Internationally recognised experts in their own particular fields and accordingly the general standard attained is extremely high.

The papers deal in considerable detail with many of the more important techno-commercial aspects of polyvinyl alcohol including its industrial preparation and major applications. In addition to the more familar uses of polyvinyl alcohol in the U.K. as an emulsifier, stabiliser and thickener in polymer emulsions and as an excellent aqueous adhesive in its own right, the less familiar but increasingly important applications in textile treatment and fibre manufacture are described. The extremely variable and complex physico-chemical behaviour of polyvinyl alcohol is discussed and related to fundamental considerations of structure.

The valuable information contained in the papers is supplemented in the Monograph by a record of the discussions which ensued. These act themselves as a useful stimulus and serve to demonstrate the interest generated.

Although the Monograph is by no means an exhaustive treatise on polyvinyl alcohol, it contains much useful information and should prove a welcome addition to the polymer chemist's library.

W. HODGSON.

Physical Methods in Macromolecular Chemistry, Volume 1.

Edited by BENJAMIN CARROLL. Marcel Dekker: New York and London, 1969, 9½ in. × 6½ in. 383 *pp.* $17.75

ONE is inclined to be cautious of books with general titles of this kind since they are frequently republications of standard methods of characterisation. This book has the advantage that it discusses some lesser known techniques, which although not commonly employed, have potential uses for specialised applications.

One of the more important topics presented is the use of surface chemistry for the study of the orientation and conformation of polymers at interfaces and for the determination of the molecular weights and dimensions of polymers. Also discussed are methods of investigating surface properties of polymer liquids. The study of polymer properties using two dimensional solutions appears to offer no major advantages over bulk procedures with the exception that very small quantities of material can be used. Of scientific interest is the observation that the derived equations relating colligative properties or viscosity with size, shape and concentration of macromolecules for a two dimensional solution applies reasonably well for stiff molecules.

A fairly concise review is given by the Du Pont scientists J. K. Barr and P. A. Flournoy of internal reflectance spectroscopy applied to polymer systems. The work is mainly concerned with infra-red and polarized infra-red studies of films and fibres for the purpose of chemical analysis or the study of orientation (Dichroic ratio measurements). Less important, from the practical point of view, are the use of electrical property measurements or fluorescence techniques in the study of size, shape or configuration of polymers. The limited amount of experimental data given makes the assessment of their value difficult, and hardly warrants their treatment in separate chapters.

The concluding section deals with the difficult, but important problem of determining the molecular weights and distributions of polymers which are insoluble. Stress-relaxation measurements of polymer melts is the technique which has been studied in greatest detail and is probably the only method available at present. At best this approach is very approximate, but recent work with monodispersed standards shows that it is capable of further development. Unfortunately, this is not brought out in the review, the author confining himself exclusively to polytetrafluorethylene.

The book is attractively set out and easy to read, but the chapter on assessing radiation effects in polymers should not have been included in this volume as it is quite out of place.

D. G. H. BALLARD.