place of olive oil or lard for cooking. The seeds are an excellent poultry food, and, after expression of the oil and removal of the indigestible husks, the crushed residues form a valuable feeding cake for stock.

In Britain the sunflower is a familiar sight in every cottage garden, but we had no experience of it as a crop plant. Accordingly, in 1940, with the support of the Ministry of Agriculture and the Agricultural Research Council, Prof. G. E. Blackman started experiments to discover whether sunflowers could be grown successfully in Britain as a new oil-seed crop. The work followed many different lines—varieties suitable to British soils and climatic conditions, problems of soil preparation, sowing, cultivation, harvesting, seed treatment and disposal of residues, pest and disease control—and Prof. Blackman's two published reports (*Agriculture*, 1944, 1946) together with the data given in this book hold out considerable promise that the crop can be grown and utilized successfully. With the present varieties, however, the crop is suitable only for the earlier soils in the drier parts of England, that is, the region east of a line running from Hampshire to the Wash. Further, it would seem that the industry should be planned on an area basis, as with flax and sugar beet, each area centring about a station for seed-drying and the utilization of the by-products.

Mr. Hurt's well-illustrated book deals with the husbandry of the sunflower crop rather than with the botany of the plant. He gives a clear picture of the development and the present situation of commercial sunflower growing in Britain with interesting comparisons of the industry in other lands, of the problems which have been solved and of the difficulties that confront us. Unfortunately, as Mr. Hurt states, this promising industry has been "the plaything of various interests—the agricultural seed trade, the bird seed trade, some earnest growers, and a number of speculators". It will be a great pity if these and the many other interests that tend to bedevil agriculture interfere too much with the natural evolution of the industry, the future of which, in Britain, in the long run, must depend on world prices for farm products and the relative yields and costs of production.

W. B. BRIERLEY.

AMERICAN TECHNIQUES IN PHYSICAL CHEMISTRY

Physical Methods of Organic Chemistry

Edited by Arnold Weissberger. Vol. 1. Pp. vii+736. (New York: Interscience Publishers, Inc., 1945.) 8.50 dollars.

VOLUME 1 on "Physical Methods of Organic Chemistry" which Interscience Publishers of New York have issued in a new series on "Techniques of Organic Chemistry" is one of the many recent American scientific books which will, on grounds of cost, probably be consulted in reference libraries by most English readers and not purchased for personal use. It has to a surprising extent copied in style both the merits and the defects of German technical handbooks. The printing and illustrating are excellent, and references have been included with Teutonic frequency; but most contributors have treated their subjects very narrowly, by referring almost exclusively to recent American work, and describing specialized instruments of particular American firms or university laboratories.

The book is intended to explain modern physico-chemical techniques to the organic chemist; it does in fact deal throughout with theoretical and practical requirements for the attainment of high accuracy in the determination of physical data. Hence the title is a definite misnomer, since apart from the inclusion of a useful account (by E. E. Jelley) of microscopic methods, the practical organic chemist will find in it little to widen his everyday range of laboratory techniques. Either the term 'organic chemistry' has a good sales value in the United States, or else the American chemist must begin to specialize so soon that he can only be brought by subterfuge to read basic physics.

The separate chapters vary widely in their scope and treatment. Those on determination of melting point (by E. L. Skau and H. Wakeham), condensation temperature (by W. Swietoslawski), density (by N. Bauer), solubility (by R. D. and M. J. Vold) and diffusivity (by A. L. Geddes) describe few particularly novel methods, but go into theoretical detail. Two chapters (100 pages) by W. D. Harkins on surface tension and properties of mono-layers deal, extremely thoroughly, with particularly accurate methods developed in the author's own laboratory, but give very little space to indicating the value of such data to the organic or bio-chemist.

A long (124-page) chapter on calorimetry by J. M. Sturtevant has obviously been written by a man with the interests of a physicist. Thus while the physical sources of error in bomb calorimetry are discussed in detail, the possibility of formation of oxides of nitrogen during an organic combustion is mentioned in but a single sentence, and the serious difficulties encountered in dealing with halogen or sulphur compounds are ignored completely.

Osmotic pressure is dealt with too briefly, but well, in 24 pages by R. H. Wagner, and a 14-page account of viscosity by H. Mark is quite inadequate for this important subject. The author is only able to refer sketchily to the Ostwald viscometer and to a few of the standard formulae for estimating the molecular weights of high polymers. Refractometry (by N. Bauer and K. Fajans) gets 80 pages, however, and deals with the standard Pulfrich and Abbe instruments in a way that is most helpful to the organic chemist.

Two chapters on determination of crystal form (by M. A. Peacock) and crystallochemical analysis (by J. D. H. Donnay) and one on X-ray diffraction (by I. Fankuchen) cover the theoretical principles of these subjects in a total of 90 pages, but none of them details laboratory methods or attempts to show, by practical examples, the especial values, and limitations, of these techniques. In contrast, L. O. Brockway's 30-page account of electron diffraction concentrates very successfully on putting this new subject in its proper perspective.

Whereas "Physical Methods of Organic Chemistry" is a sound scholarly book taken part by part, it bears evident marks of having been assembled hurriedly from the manuscripts of enthusiastic specialists who have not considered the requirements of the majority of their readers. More careful editing, to attain co-ordination in scope and outlook, will be needed if future volumes of this series are to find their proper place among useful works of reference. They will, however, be awaited in Britain with interest, for there is a real need for books in English which will replace such obsolescent German "Handbuchs" as Houben-Weyl's "Arbeitsmethoden". W. A. WATERS.