workers who, while they may be experts in their own fields of study, have no specialized knowledge of radioactive theory and technique. A general knowledge of elementary physics is the only qualification which is assumed." Whitehouse and Putman have succeeded admirably in their purpose and also have produced a book which many specialists, teachers and students of nuclear science will find useful.

The scope is indicated by the eight chapter titles: Nuclear reactions applied to the production of artificial radioactive isotopes (15 pp.); modes of nuclear disintegration (32 pp.); properties of the radiations (40 pp.); the production of radioactive isotopes (51 pp.); detection and measurement of the separate particles (72 pp.); gross effects of the radiations (49 pp.); some applications of radioactive isotopes (69 pp.); the manipulation of radioactive material [remote handling, avoidance of contamination, health physics considerations] (31 pp.). An abridged table of isotopes, 37 pp., is included as the principal appendix. There are adequate indexes.

The presentation is simple, clear and quantitative throughout, with many useful formulas. There are a few over-simplifications, but in general the authors have been unusually successful in combining rigor with simplicity. The most noticeable omission (a deliberate one) is an almost complete absence of information on chemical techniques involved in the preparation and manipulation of radioactive isotopes. As the authors point out, radiochemical techniques are described in other books to which reference is made in the text. A minor disadvantage is the fact that little material published after 1950 is covered. Since the preface and forward were written in mid 1951, one wonders why publication was delayed until late 1953.

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Methoden der organischen Chemie. Vierte Auflage. Band II—Analytische Methoden. By EUGEN MÜLLER (Editor). Georg Theime Verlag, Diemershaldenstrasse 47, Stuttgart, Germany. 1953. xxii + 1070 pp. 18 × 26.5 cm. In moleskin gebunden DM 139, (Vorbestellpreis DM 125.10).

The general plan of this work was outlined in the review of Volume VIII, which was the first volume of this important revision of the well-known "Houben–Weyl" to appear (THIS JOURNAL, **75**, 3613 (1953)). Volume II, the second now available, deals primarily with chemical methods of analysis of organic compounds. In general, both qualitative and quantitative methods are discussed, and macro, semimicro and micro procedures are given. Ultramicro methods are only mentioned.

Analysis for the elements takes up 240 pages. The section dealing with functional groups is the largest and amounts to 438 pages. Sections of less than 70 pages each are devoted to gasometric methods, determination of melting and boiling points, thermal analysis of molecular compounds, chromatographic analysis, and analysis of solvent mixtures. Presumably physical methods other than those in the present volume will appear in Volume III.

Those familiar with the last edition of twenty years ago know that the aim has been to provide a summary of the practical methods of organic chemistry, and the editors and authors of this revision have tried to be selective rather than all-inclusive. However, several methods usually are described for a given element or functional group. The more important procedures are given in sufficient detail to be used without reference to the original literature, whereas other useful methods are described briefly and a reference is given. Occasionally as on p. 620, the concentrations of reagents are not given. Although it is probable that concentrations in this instance are not critical, the lack of definite specifications always leaves the user in doubt. Each section indicates the date through which the literature has been reviewed, this being at least up to 1952 and often up to 1953.

As with Volume VIII most of the contributors are employed by the German chemical industry, although no technical methods of analysis are included. Over half of the book is written by H. Roth of the Badische Anilin und Sodafabrik and the remainder by twenty other contributors, over half of whom are industrial chemists.

There is little in this volume to criticize adversely. Confronted with an increasingly insurmountable mass of chemical literature, the chemist has come to depend more and more on compendia. However, the number and size of review publications and reference works is reaching the point where even keeping up with these condensations is difficult. It would seem to be in the interest of all concerned to avoid duplication as much as possible. Several excellent books on quantitative analysis for the elements are available and one may question the necessity of duplicating such material in this revision. Similarly, the 39 pages devoted to chromatography cannot take the place of numerous standard works on the subject. Since other technical methods of analysis have been omitted, one questions the desirability of including the chapter on the analysis of solvent mixtures.

As to the mechanical features of the book, only a few typographical errors were noted, and the illustrations appear to be newly drawn and up-to-date with the exception of the Van Slyke apparatus on p. 689. Although the bibliographies on pages 782 and 984 are in alphabetical order according to author, those on pages 710 and 909 are in neither alphabetical nor chronological order. A few checks made on the index indicate that it is inadequate. Under the first general entry for "Ester," p. 931 refers to the detection of cellulose nitrate in solvents. There is no general entry for the detection of esters but only one for the detection of esters of monocarboxylic acids as the β-hydroxyethylamides, although five other procedures are given in the text. There is no entry for the estimation of esters. The only entry is under "esterzahl, Mikrobestimmung," although the text gives also a macro method. The single reference under "Esterverseifung" relates to the saponification of esters in solvent mixtures. Although one well may question the necessity for an entry for color reactions, if such an entry is given it should list all references to the subject. Such is by no means the case. As an example, under "Farbreaction auf Phenole" are entries only for the color reactions with iron chloride and nitrous acid, but numerous additional reactions are given in the text. The best way to find material in the volume appears to be to make use of the extensive tables of contents. Unfortunately they precede each section instead of being collected at the front of the book.

This volume is without question the outstanding work on the analysis of organic compounds. The appearance of this revised and completely rewritten edition of Houben–Weyl is another indication that German chemists are resuming their former role as the foremost compilers of chemical literature. Although one welcomes the fact that outstanding industrial chemists have been permitted by their employers to give their time to this work, one cannot but be uneasy about the minor role that organic chemists of the academic profession have played in the volumes of this work that have appeared to date.

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Neutron Optics. By D. J. HUGHES, Brookhaven National Laboratories, Upton, Long Island, New York. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. vii + 136 pp. 13.5 × 20.5 cm. Price, $2.50.

In this period of rapid scientific progress, there are two opposing demands for scientific literature. On the one hand, there is always the demand for a comprehensive treatise on a given subject for specialists working in it. On the other hand, there is also a demand for a concise summary of the subject for those who wish to keep pace with progress outside their particular fields. In the field of neutron optics, Dr. D. J. Hughes, formerly of the Argonne National Laboratory and now of the Brookhaven National Laboratory, has done an excellent job for both. Having written a chapter on the topic in the "1953 Annual Review of Nuclear Science," he has now completed a book on the same subject. Since the subject matter is relatively new, the book is not voluminous. However, it contains all essential features of basic principles and significant experiments.

The book deals primarily with physical optics, because geometric optics has not been developed fully in either theory