

## REVIEWS

Mass Spectra and Isotopes. By F. W. Aston. (Edward Arnold and Co., London), 1942. Pp. xii + 276. Price 22-6-0.

This is a very readable book written with authority by one who is master of the field. It is not a treatise on the subject in which every development is dealt with in equal detail, but is written, rather, from a more personal angle, and since the personality of the author has occupied a central position in the field from the beginning, a very balanced account of the whole development of the subject from its inception to its present more or less completed stage has resulted. The book is in four parts, and is illustrated with twelve well-chosen plates.

The first part traces the history of the subject, which really entered its modern stage when the idea of isotopes was put forward by Soddy in 1910, up to about 1925. There is a chapter devoted to a description of the details of Aston's first mass spectrograph and an elementary account of the theory underlying it. I feel, however, that the full mathematical theory of the spectrograph as worked out by Aston and Fowler should have been given in the book for the benefit of those who wish to understand the working of the instrument in greater detail, and this might well have been done in an appendix in order not to encumber the text. Similarly, the questions of dispersion and resolving power might also have been treated at greater length.

The second part of the book deals with the modern technique of mass spectrography and the development of high precision instruments. It is a very well written survey of the field which enables the reader to appreciate the triumph of modern technique in the enormous increase in the precision of the modern instruments over the original mass spectrograph.

The third part of the book is a most useful and authoritative compilation and deals with each element in the order of its atomic number. For each element all the known stable isotopes, and of the naturally radio-active substances, those stable enough for mass spectrum analysis, are mentioned, and the best figures for their relative abundance and packing fractions, when known, are given. In the words of the author, "This account constitutes a summary with references, of all the data upon which have been based the first International Table of Stable Isotopes in 1936 and each of its annual publications since". It forms a most useful place of reference for the research worker in the field, whether experimental or theoretical.

The fourth part of the book deals with several distinct themes. There is an elementary chapter on modern ideas about the structure of nuclei. In this connection I doubt the wisdom of publishing a diagram like Fig. 37, which might give to the beginner a completely outmoded picture of the atom, when with the

help of the ideas of state, energy and angular momentum an accurate knowledge of the atom could have been conveyed with equal simplicity and at hardly greater length. There is a very good chapter on the isotopic effect in molecular spectra, and one on the isotopic effect in atomic spectra and the allied properties of nuclear spin. Finally there is a good chapter on the separation of isotopes. I think that the separation of isotopes by electrolysis is of sufficient importance to have merited a more detailed description of its technique, since it is the application of this method to the isotopes of hydrogen which has led to the only complete separation of a rarer isotope on a large scale that is so far known.

The author is to be congratulated on having treated a bulky subject in such a clear and simple way and yet with completeness in its main essentials. The above remarks have been made merely as suggestions, which might be considered when a new edition is contemplated, in order to increase the completeness and usefulness of what is really an excellent little book. The book is to be warmly recommended not only to the student, but also to the theoretical physicist who wishes to get a knowledge of the methods and experimental results from which the facts upon which he builds his theories are derived.

H. J. BHABHA.

Polarography. By I. M. Kolthoff and J. J. Lingane. (Interscience Publishers, Inc., New York, N.Y.), 1941. Pp. xvi + 510, with 141 illustrations. Price \$6.00.

The book is intended "to present a complete and critical account of the present status of polarographic analysis ... and the newly developed 'amperometric titration' methods". The book is divided into eight parts and thirty-three chapters. The captions of these eight parts indicate the subject-matter of the book and are: Introduction; Theoretical Principles; Apparatus and General Technique; Inorganic Polarographic Analysis; Organic Polarographic Analysis; Biological Applications of Polarography; Voltammetry with Platinum Micro-electrodes; Amperometric Titrations.

The theoretical principles underlying these methods of analysis have been treated in some detail and the experimental evidence on which they are based have been amply cited. The recent work of the senior author and his collaborators have been drawn upon extensively. The book gives a full account of the present position of our knowledge regarding polarographic analysis. It will be found very useful by those interested in this branch of electrochemical analysis and more particularly by research workers in this subject. Its very wealth of detail, however, may cause embarrassment to those who are concerned more with the use of the method than with the details of numerous investigations some of which have