and W. Gentner: it appears possible from their work that some limestones will give useful potassium–argon ages. Potassium–argon and rubidium–strontium ages on micas are compared by J. L. Kulp and Joan Engels, and the complementary topic of whole-rock rubidium–strontium data is reviewed by P. M. Hurley *et al.* Investigations of uranium–lead ages in zircons are summarized briefly by L. T. Silver.

Two papers on dating by thermoluminescence show that this method is not yet capable of giving exact results. The natural decay of thermoluminescence is considered by B. E. Sabels in relation to his results obtained from basalts: unfortunately, the confusing mathematical interpretation of the data reduces the value of this paper.

The standard of both writing and editing is generally high, and there are few misprints. The record of the discussion following the presentation of each paper adds considerably to the interest of the book. While few of the papers are review articles suitable for a less-specialized reader, the volume contains a great variety of information and gives an accurate impression of the wide range of methods comprehended by its title. It will be of value both to those engaged in radioactive dating and to those whose sciences benefit from the use of these methods.

M. H. Dodson

REACTOR REFUELLING

Nuclear Fuel Handling

By A. D. Wordsworth. Pp. viii + 370. (London: Butterworth and Co. (Publishers), Ltd., 1963.) 75*s*.

THE advent of nuclear reactors and in particular of large civil power reactors has presented many challenging engineering problems, not the least of these being that of inserting fuel into a reactor and of withdrawing intensely radioactive fuel, often in circumstances where the reactor is on load and under pressure. For this purpose much extremely large and complex engineering equipment has been developed, and this book is, so far as is known, the first to deal specifically with this important category of nuclear equipment. In so doing the author has aimed at imparting a broad understanding of the subject rather than at producing a work of critical analysis or an engineers' handbook.

To this end, the first third of the book is devoted to a review in general terms of the principles and problems of reactor fuelling and servicing and of the types of equipment required for these functions. The remainder of the book, apart from a small appendix and glossary, is devoted to descriptions of charge, discharge and servicing machines as designed for many diverse reactors both in Britain and elsewhere.

The book is well written and eminently readable and is outstanding for the number and quality of illustrations and drawings; the latter add considerably to the value of the text and will undoubtedly be studied with interest. The appendix, which consists of one page of data on shielding glasses, appears out of keeping with the general character of the book and might well have been omitted. The glossary, however, is useful, but would have repaid rather more care in its compilation.

The book would certainly be useful background reading for engineers newly entering the nuclear power industry, and would indeed be of interest to any engineer outside the field who wishes to keep abreast of modern engineering developments. The author may, therefore, fairly be said to have met his modest objectives. Moreover, although of limited value to the specialist, the book does, for the first time, bring together a very comprehensive range of examples of equipment in use on reactors throughout the world.

In contemplating much of this equipment it is difficult to avoid a feeling of uneasiness at the very large and costly equipment necessary for reactor refuelling and servicing operations. It may well be that the size and complexity of the equipment are irreducible, but the art is in its infancy and any book which may serve to stimulate comparisons and critical analysis in the field is to be welcomed. For these reasons the present volume is a useful addition to the literature of nuclear power.

J. E. Bown

ENZYMATIC ANALYSIS

Methods of Enzymatic Analysis

Edited by Hans-Ulrich Bergmeyer. Translated from the German by Dermot H. Williamson, with the editorial assistance of Walter Bartley. Pp. xxiii + 1064. (Weinheim/Bergstr: Verlag Chemie, G.m.b.H.; New York and London: Academic Press, Inc., 1963.) 214*s*.

IT is now true to say that most of the quantitatively important pathways of metabolism are known, step by step, in a superficially complete sense. Thus one can trace, for example, the conversion of glucose to porphyrin pigments, or, in plants, the formation of carbohydrate from carbon dioxide and water. However, the 'livingness' of a catalytic system, its elevation to the status of organism, is denoted by its capacity for self-regulation and the absence of uncoordinated processes within it. Further progress in the understanding of living things, therefore, is dependent to a large extent on a knowledge of the processes of metabolic control. Indeed, one of the two most recent and rapidly developing fields of biochemistry is the study of the natural regulation of the activity of enzyme molecules (the other being the closely related subject of nucleic acid and protein biosynthesis).

Among others, two interdependent lines of approach are followed in this field: the measurement of enzyme activities *in vitro* and the investigation by sensitive analytical means of conditions within the cell or organism. As it is concerned with both these topics, this book (previously published in German) will be of the greatest assistance to those engaged in nearly all forms of biochemical research; in addition, as medicine evolves ever more into biochemistry (liberally blended with psychiatry), so clinicians will increasingly use the types of method described—in fact, one section of more than sixty pages is devoted to "The Importance of the Measurement of Enzyme Activity in Medicine". 'Pure' chemists also will benefit from the compilation of this work, for as specific reagents enzymes have no superiors.

More than a hundred workers (rather more than half of them German) have contributed to the volume, which has been excellently translated. The opening sections, by H. U. Bergmeyer, on the principles and techniques of enzymatic analysis, are readable and very helpful; among the subjects discussed (with examples) are spectrophotometric methods and the theory of 'coupled' assays which use more than one enzyme. This is followed by a short article by B. Hess on cell and tissue disintegration; the need for very rapid arrest of metabolism when labile intermediates are being determined is rightly emphasized.

The greater part of the work, Section *B*, is devoted to the assay of substances by enzymatic means; the individual papers are arranged according to the substance to be determined, rather than to the enzymes used. A standard lay-out has been adopted for each article, greatly increasing ease of use. Detailed descriptions of reagent solutions, procedures and calculations are given. Clearly, some of the methods used will be superseded in the course of time, and experience of a particular assay will no doubt always suggest modifications of detail; but the procedures given will, at the very least, suggest an approach. Sometimes the sample volumes suggested imply the use of concentrated solutions, rather than of the dilute extracts