

## RADIOACTIVE ISOTOPES IN BIOCHEMISTRY

Radioaktive Isotope in der Biochemie  
Von Prof. Engelbert Broda. (Einzeldarstellungen aus dem Gesamtgebiet der Biochemie, Neue Folge, Band 3.) Pp. viii+326. (Wien: Verlag Franz Deuticke, 1958.) 294 schillings.

FEW techniques have had a more widespread or profound influence on modern biochemistry than the application of isotopes. Although the first experiments were carried out by Hevesy more than thirty-five years ago, many isotopes have been available for a much shorter time and the use of isotopes in biochemical research has increased remarkably in the past fifteen years, as shown in an instructive table in this book. During the same period there have been considerable improvements in the instruments required for radioactive tracer work and there is thus sufficient scope for a new book, despite the existence of several well-established works.

Prof. E. Broda of the University of Vienna has written a book which is intended to serve both as an introduction to the methods used in work with radioactive isotopes and as an outline of the major biochemical problems in which isotopes have been particularly useful. Thus, the first eight chapters of the book deal with the production of isotopes, the synthesis and biosynthesis of labelled compounds, the hazards involved in work with radioactive substances, precautionary and protective measures, and the measurement of radioactivity. The treatment is concise, easily intelligible and useful for those interested mainly in acquiring sufficient knowledge for applying radioisotopes to their own problems.

The next two chapters deal with analytical applications, such as the isotope dilution method, and with metabolic pools and turnover. Finally, there are five chapters on main problems (phosphorylation, photosynthesis, carbon dioxide fixation, the metabolism of carbohydrate, fat, protein and nucleic acids, the citric acid cycle, purine and pyrimidine biosynthesis) and one on special problems of metabolism (immunological problems, the biosynthesis of porphyrins, cholesterol and lignin). This last chapter also contains a very brief (five pages) and somewhat inadequate section on the metabolism of biologically active compounds such as vitamins, drugs and carcinogens.

Although the book has been deliberately restricted to radioactive isotopes, stable isotopes are fortunately not completely neglected. For example, double intramolecular labelling with deuterium and carbon-14 is briefly mentioned (p. 31) and the importance of the stable isotope nitrogen-15 is indicated on pp. 223-29. The only notable omission is the application of isotopes, both stable and radioactive, to studies of the mechanism of enzymic reactions.

The book is well produced and there are very few errors. In some cases, however, there are slightly misleading statements, as for example on p. 16 where it is suggested that oxygen exchanges between the two positions of a carboxyl group, which are, of course, equivalent because of the symmetry of the carboxylic anion. It is a little surprising to read that the basic outline of protein synthesis is still completely unknown (p. 216) and that carboxyl activation of amino-acids is regarded as merely probable (p. 221). Also on p. 221 there is some confusion between transpeptidation and *de novo* peptide bond synthesis. But

these are perhaps only minor matters in a book primarily concerned with isotopes.

The literature references are remarkably up to date, many of them being to publications which appeared in 1957. It is to be hoped that an English translation of this useful book will be forthcoming.

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## NUCLEAR ENGINEERING MONOGRAPHS

### Nuclear Engineering Monographs

No. 1, Elementary Nuclear Physics. By W. K. Mansfield. Pp. viii+60. 10s. 6d. net. No. 2, Nuclear Reactor Theory. By J. J. Syrett. Pp. viii+80. 12s. 6d. net. No. 3, Reactor Heat Transfer. By W. B. Hall. Pp. viii+68. 10s. 6d. net. No. 4, Nuclear Reactor Shielding. By J. R. Harrison. Pp. viii+68. 10s. 6d. net. No. 5, Nuclear Reactor Control and Instrumentation. By J. H. Bowen and E. F. O. Masters. Pp. x+78. 12s. 6d. net. No. 6, Steam Cycles for Nuclear Power Plant. By W. R. Wootton. Pp. vii+66. 10s. 6d. net. (London: Temple Press, Ltd., 1958.)

THE first three books in this excellent series were published about a year ago, and the final three quite recently. The six fall into two classes: Nos. 1, 2 and 4 provide summaries of matter which is readily available in greater detail elsewhere; and Nos. 3, 5 and 6 provide summaries of matter either not previously published or else dispersed rather widely.

There is general agreement that nuclear engineering is more appropriately studied at postgraduate level. However, nuclear physics is a useful subject for inclusion in the final year of undergraduate syllabuses and many universities provide this type of course. Advanced physics text-books are inappropriate at this stage, but the first monograph dealing with the modern concept of the atom, radioactivity, nuclear reactions and the detection of nuclear radiations is at a suitable level.

A physicist or engineer dealing in great detail with reactor physics might prefer to by-pass the monograph on reactor theory and work directly on the more comprehensive standard texts. The design of a reactor core is essentially a compromise of many conflicting criteria and a large number of engineering designers need to know the form in which the physicist does his calculations and the probable significance of changes in core geometry. Mr. Syrett's concisely written book outlines the framework of this important subject, and the text is sufficiently brief to assist in absorbing the principles. Even when reading the more detailed text-books it is useful to have the monograph to hand to show the way through what might otherwise appear a very complex analysis. The monograph deals with the slowing down and diffusion of neutrons, lattice calculations and the calculation of critical size. The chapter on "Reactor Operation at Power" is a particularly good introduction to the subject.

The third monograph in the first class mentioned above is that on reactor shielding. The author introduces his book by saying that a great deal of experimental and theoretical work is being undertaken on the subject of shielding and that 'art' is being replaced by science. Existing texts on the subject are bulky and contain masses of data. The monograph is welcomed as providing a guide to the important considerations; it is divided into three