BOOK REVIEWS

PHOSPHORUS METABOLISM OF BRAIN. P. J. Heald. Pp. vii + 195 (Including Index). Pergamon Press, Oxford, 1960. 42s.

Progress in the biochemistry of brain has been gaining momentum continuously over the last ten years, and Dr. Heald's book is a valuable contribution to existing knowledge on the relation between phosphates and the functioning of the brain. In presenting this subject Dr. Heald divides the book into two parts, the first dealing with metabolism *in vivo* and the second an examination of information relating to changes occurring *in vitro*.

Part I begins with a critical assessment of phosphorus metabolism in the normal functional state, outlining the phosphorus compounds found in the brain and their mode of entry and relative rates of exchange of both acid-soluble and acid-insoluble phosphates. The pathways by which phosphorus enters the brain, mainly followed by measuring uptake of radioactive phosphorus, have been critically examined, and Dr. Heald gives a lucid account of the available knowledge.

To assess the significance of the relative rates of exchange of phosphorus by phosphate derivatives the author describes two techniques that have been used: firstly, alteration of the normal functioning of the brain and an examination of this changed cerebral activity on phosphate metabolism. Alterations in the cerebral activity such as those induced by anaesthesia, hypoglycaemia, hypoxia, hypothermia, the administration of electro-shock and convulsive agents, have all provided changes in cerebral phosphate levels. Secondly, use is made of changes taking place in metabolism during brain development when signs of its co-ordinated functioning are appearing in the whole animal.

Observations on preparations of cerebral tissue slices, homogenates and particulates *in vitro* discussed in Part II show the usual limitations brought about by a change in many characteristics when cellular structure is disrupted. Nevertheless, a much more detailed examination of the metabolic potential of the tissue and its response to different conditions can be made by elucidation of the synthesis, degradation and interactions of the various cellular constituents *in vitro*. Studies of general metabolism *in vitro* of tissue preparations under a variety of conditions have provided close parallels with changes taking place *in vivo*. Whenever possible, the difficult task of correlating and interpreting the studies of phosphorus metabolism *in vivo* with observations *in vitro* is achieved, and most convincingly.

Factors affecting the metabolism in cerebral tissue slices *in vitro* which bear close relation to those factors similarly active *in vivo* are dealt with in two groups. In the first group are included different oxidisable substrates and metabolic inhibitors, and in the second group are factors whose activity is linked to physical changes, for example, electrical stimulus and concentration changes in inorganic ions. Dr. Heald also discussed levels of inorganic phosphate and phosphate acceptors which increase oxygen uptake in the different brain preparations he examines.

A chapter of particular interest is devoted to the effect of therapeutic agents on phosphate metabolism in brain preparations observed *in vitro* and correlated to effects found *in vivo*. Dr. Heald examines the effects of substances known as tranquillising agents and depressants on the level of energy-rich phosphates and phosphate acceptors, and on the efficiency of the phosphorylating systems and the oxidative phosphorylation process; the account is extended to electrically stimulated systems. In this field it is not possible to generalise on the parallelism between results *in vivo* and *in vitro*; in some instances it exists, whilst in others it is absent or insufficient evidence is available.

The book ends with a short discussion on the analytical methods employed in the determination of phosphorus in cerebral tissue.

We are indebted to Dr. Heald for his valuable contribution to the understanding of phosphate metabolism in cerebral tissue, and his book is thoroughly recommended to workers in biochemistry, pharmacology and medicine who are interested in this field of research. N. ROBINSON.

OFFICIAL METHODS OF ANALYSIS, A.O.A.C., NINTH EDITION, 1960. Pp. xx + 831 (including Index). Published by the Association of Official Agricultural Chemists, Inc., Washington, D.C., U.S.A. U.S.A., $17.50; elsewhere, $18.00.

The latest edition of this well-known volume has changed in comparison with its predecessors. In previous editions the increasing number of pages had been kept in check by the abbreviation of words and by shortened scientific nomenclature. In the present volume, however, the increase in new material has necessitated a larger page with two columns of type.

This growth in the number of analytical methods closely reflects the increasing importance of analysis in the application of legislation to pharmacy, food and agriculture. The present volume includes a number of analytical methods directed towards the enforcement of the pesticides amendment to the Federal Food, Drug and Cosmetic Act which requires a method for the determination of a given pesticide residue on a treated crop. Of the methods tested by the A.O.A.C. collaborative procedure, eight: aramite, benzene hexachloride, captan, malathion, methoxychlor, piperonyl butoxide, sulphenone and tetramethylthiuram disulphide have been found to be suitable for inclusion. Nevertheless, it is obvious that it is becoming increasingly difficult for methods of analysis to keep pace with the necessary regulations.

Most of the methods given in the book are essentially the same as in previous editions, but certain changes should be mentioned. The chapter on soils has been omitted although the classical scheme of elementary analysis has been retained elsewhere. Bacteriological methods for disinfectants now constitute a separate chapter, and methods for the analysis of additives in animal feeding stuffs are given.

Many new analytical procedures are included. Chromatography is used for the detection of commercial glucose in honey, and to differentiate technical benzene hexachloride from lindane. A radioactive tracer method using ^{36}Cl for the determination of benzene hexachloride in pesticide formulations is included and there is an infra-red method for the identification of gums in foods. Microbiological methods for vitamins constitute a useful chapter and a biological test is given for paralytic shell-fish poison.

There are those analysts who hold that the increasing complexity of modern analytical methods makes so-called "standard" methods undesirable. And, indeed, methods are likely to become both more specific and more complex with the wide variation of analytical problems particularly in the fields of food and agriculture. Nevertheless, the existence of a method which has been tried and found satisfactory by a collaborative trial such as the A.O.A.C. organises, is of great value to analysts who, when confronted with a new analytical problem, are often at a loss to decide which of several published methods is most likely to be satisfactory. This volume is an essential for the food and agricultural analyst and for many others as well. R. E. STUCKEY.