

most of the groundwork on which our present knowledge is based. Of the 36 contributions, most are concerned with the relation of the thymus and bursa of Fabricius with lymphocytopoiesis and the development of immune responsiveness. Much of this material has been published elsewhere, and some has been reviewed also. Thus, it is a pity that this book was not published more promptly after the symposium (held in 1962) when it might have had greater value.

Many of the old problems still remain: there is still no convincing evidence that the thymus, either directly or via the lymphocyte, has any trophic function on other tissues; and there is still no convincing way of determining whether thymic lymphocytes have an epidermal or mesodermal origin. However, the distinct functions of the thymus and bursa in the chicken become clearer now that thymectomy has been achieved while leaving the bursa intact.

There are lighter moments: as when one author presents the same unconvincing experiment which he first described in 1953. Another author, starting with an *idée fixe* that the thymus is concerned with growth, is continually frustrated by finding that each of his 'thymic' growth factors is a general tissue constituent. The clinical papers, though often long-winded, are perhaps the most valuable, since much of this material is not always readily accessible. Here is a fascinating collection of facts which will correct any tendency to over-simplify from the results of pure research.

There are many illustrations, which are mostly good, although the finer points of lymphoid tissue structure are not well conveyed by the usual black-and-white print. While the book will be of value in some libraries, there may be few individuals to whom it is worth the high cost.

R. B. TAYLOR

#### Advances in Enzyme Regulation

Vol. 2. Edited by George Weber. (Proceedings of the Second Symposium on Regulation of Enzyme Activity and Syntheses in Normal and Neoplastic Liver, held at Indiana University School of Medicine, Indianapolis, Indiana, September 30 and October 1, 1963.) Pp. xii + 405. (London and New York: Pergamon Press, 1964.) 100s. net.

THE symposia on "Regulation of Enzyme Activity and Syntheses" seem now to be established annual events, and the proceedings of the second meeting show that enzyme regulation in mammalian systems is nowadays the subject of as much research as is that of micro-organisms.

The volume, like the symposium, is arranged in six sections, each under a distinguished chairman. The first, on the regulation of gluconeogenesis, contains valuable discussions on the roles of the enzymes pyruvate carboxylase, phospho-enol-pyruvate carboxylase and fructose diphosphatase in gluconeogenesis and suggests an action of insulin as a repressor of some essential enzymes of this pathway. The second and third sections remain centred on carbohydrate metabolism and present data on acetyl-coenzyme A metabolism, the role of some steroids in gluconeogenesis, human hypoglycemia and the regulation of glucokinase. The synthesis of this last enzyme is inducible, being stimulated by glucose and by insulin.

Section four, on feed-back regulation in hepatic systems, contains papers on the enzymes lactic dehydrogenase, aspartic transcarbamylase and phosphofructokinase, on glucose regulation of enzyme synthesis and on regulation of cholesterol biosynthesis. Section five includes discussion of the substrate and coenzyme-stimulated induction of tyrosine transaminase; the final section, on enzyme regulation in hepatomata, presents studies of the variation of enzyme activities in tumours of different characteristics. Some correlation between enzyme activities, metabolic patterns and growth rates is analysed.

The volume is attractively presented, and represents a valuable progress report on a very active field of research.

C. J. R. THORNE

#### Seed-borne Fungi

Description of 77 Fungus Species. By J. P. Malone and A. E. Muskett. (Proceedings of the International Seed Testing Association, Vol. 29, No. 2.) Pp. 179-384. (Wageningen: Association Internationale d'Essais de Semences, 1964.) n.p.

THE authors of *Seed-borne Fungi* are well known for their experience in seed testing, and theirs is a compact and strictly practical production. After a brief historical introduction, the book contains a description of 77 species of seed-borne fungi, each illustrated by clear photographs of growth habit, fructification and/or spores, as may be appropriate to the species. The approved method of testing for its presence is indicated under each. Most of the fungi found on germinating seeds are harmless saprophytes but it is important that the tester shall be able to recognize these for what they are, and they are accordingly figured as carefully as the known parasites. The latter include 5 smuts (one, however, a common contaminant from cereal weeds) and 14 ascomycetes, or conidial states presumed to belong to ascomycetes. The 57 species in 36 genera of saprophytes described include 4 genera of ascomycetes which normally produce perithecia under test conditions, including 11 species of *Chaetomium*, 2 of *Melanospora* and 2 of *Sordaria*, all clearly figured, as well as 4 genera of phycmycetes. The fungi are arranged alphabetically, irrespective of their systematic position, often under the name of the ascus state even though only the conidial state is to be expected to appear under the test conditions. This has the awkward effect of dispersing the species of *Fusarium* described under *Fusarium*, *Gibberella* and *Griphosphaeria*, while those of *Helminthosporium* have to be sought under that name and under *Cochliobolus* and *Pyrenophora*. The treatment is not consistent, for *Botrytis cinerea* appears under that name, not as *Sclerotinia fuckeliana*, nor does *Cladosporium herbarum* masquerade under *Mycosphaerella tulasnei*, though to find *Stemphylium botryosum* we must look under *Pleospora herbarum*. Such difficulties as may arise from this treatment are resolved by an adequate index, but if one has to find a species through the index after all, the advantage of an alphabetical arrangement over a taxonomic one is lost. One feels that a taxonomic arrangement based on conidial states where they exist would be more helpful to an inexperienced worker seeking to name an unfamiliar species.

R. W. G. DENNIS

#### Methods for the Examination of Root Systems and Roots

By Dr. J. J. Schuurman and Dr. M. A. J. Goedewaagen. Pp. 86. (Wageningen: Centro for Agricultural Publications and Documentation, 1964.) 10.50 D.fl.; 21s.; 3 dollars.

THE underground parts of plants have been consistently neglected by botanists, most of whom have little idea how to set about investigating the morphology of a root system. This little book is therefore to be welcomed, for it describes concisely the various methods of investigation which have been used, those favoured by the authors being supported by numerous practical hints. The methods covered include the transferring of a soil monolith to a pinboard, the mapping of a profile face, the sampling of root systems by means of auger borings, and the growing of experimental plants in special containers. The scope of the book is confined to methods, and the sceptical are left to wonder whether the arduous task of disinterring roots yields a commensurate return of information. Production of the book is good; but the reader will encounter a few eccentricities of vocabulary, such as pendulum for crank handle.

W. D. CLAYTON