Introduction to the Biochemistry of Foods is a courageous attempt to bring together the wide range of information which exists regarding the biochemistry of foods. It also touches inevitably on the physical chemistry of foods as well as hinting at physiological aspects (as taste), clinical aspects (as the effects of vitamin deficiency), and sociological aspects (as the importance of producing acceptable high-protein foods for growing populations). It deals with tannins, essential oils and plant pigments, as well as with the phenomena of enzymatic and non-enzymatic browning, rheology and colloidal state.

Much of this information is put together in a way which will be of considerable usefulness for the food technologist. Some of it, however, pre-supposes a fairly advanced knowledge of chemistry which many food technologists are unlikely to have. Some again seems somewhat irrelevant to the food technologist. Does he really know what a resonance hybrid is, and is he really concerned with the structure of viruses ?

The sad and premature death of the author, Dr. Braverman, no doubt accounts for some of the loose ends. One is the reference to the date of Hopkins's discovery of the vitamins as 1912, and a line later as 1906. The simple explanation is that the earlier date was that of a preliminary communication and the later that of a full publication; the uninformed reader, however, will simply regard one or other as a mistake.

There is no doubt that this book will see many editions, for it remains the best single source of information on the chemistry of foods. This will provide an opportunity for the correction of several irritating errors, such as 'cataclism', 'cristal' and 'premordial'. With these and a few other changes, the book well deserves to become the classic which it undoubtedly will.

J. YUDKIN

THE ONION—A WORLD FOOD

Onions and their Allies

Botany, Cultivation, and Utilization. By Dr. Henry A. Jones and Prof. Louis K. Mann. (World Crops Books.) Pp. xviii+286+58 plates. (London : Leonard Hill (Books), Ltd.; New York: Interscience Publishers, Inc., 1963.) 75*s*. net.

THE recorded history of the onion goes back at least four thousand years—the pyramid builders of Egypt are known to have consumed large quantities of onion and it is depicted in tombs of that period. Since that time the amount of information on the onion has so increased that compilation of records into book form has become an urgent necessity. It is, therefore, fitting that *Onions and their Allies* should have as its senior author a man who can properly be regarded as pre-eminent in onion research, particularly in the sphere of breeding and genetics.

Dr. H. A. Jones has spent a lifetime investigating the common onion, while his co-author, Prof. L. K. Mann, has worked mainly with related species, garlic and the more obscure Alliums including the decorative species. The genus *Allium* is vast and unwieldy with nearly 1,100 species, although about 600 of these may be synonymous with one another. This book makes little attempt to sort out the confusion of species, but limits itself to creating order among the cultivated types, with the result that description is restricted to seven species only.

The book's 29 chapters include three (dealing with classification and identification, morphology and development, and breeding) which are of such value that they alone make publication worth while. The chapter on classification shows that cultivated species range from the common onion, which forms bulbs and reproduces sexually, to the sterile garlic which can be propagated only by cloves (axillary buds), and the rhizomatous chinese chives. Species are morphologically well defined and, with the exception of *Allium cepa* × *fistulosum*, are cross-incompatible, but groups within species are all cross-compatible and tend to overlap because of the presence of intermediate forms. According to the authors, one of the most reliable characters for identification of the cultivated *Allium* is the pronounced odour and taste although other genera contain species with similar odours. Because of their pungency, onions are widely used as flavouring agents, yet they have a definite food value (p. 64) being "relatively high in food energy, intermediate in protein content and rich in calcium and riboflavin", and further, "starch is generally absent from all onion species".

The chapter on morphology and development, like that preceding it, contains simple but explicit drawings which help considerably to clarify the text.

One of the more important genetic events of this century was the discovery of cytoplasmic male sterility in the common onion by the senior author in 1925, and the chapter on breeding is mainly concerned with the description of the application of cytoplasmic male sterility to the production of *F*1 hybrid onions. Because of the common onion's various physiological requirements for bulbing, storage and flowering (amply described in Chapter 4) one of the main advantages of *F*1 hybrids is that they can be 'tailor-made' to fit a specific environment. The United States is still the main producer and consumer of *F*1 hybrid onions, but other countries, particularly those of Europe, are benefiting from American experience and are now busily engaged in producing *F*1 hybrids to meet their own needs.

The book opens with a summary of world production and consumption of onions, and shows the United Kingdom as the largest importer with no exports. It is salutary to note that the Netherlands, with a similar climate, is the second highest exporter (Egypt is first) and imports only minor quantities of onions.

One of the difficulties with this type of book—intended to be read by a world-wide public—is the adoption of a standard terminology. One becomes accustomed to the use of the American 'seeding' for 'sowing', but there are minor confusions in other respects such as that on p. 184 where 'Zineb' spraying is recommended both in litres per hectare and in pounds to gallons within only six lines of print. As tables in the introductory chapter express their figures on metric scale in tonnes, with which the majority of readers will probably be unfamiliar, the mistake in the conversion tables of appendix 2, where we read that 1 tonne equals both 0·984 and 1·102 (short) tons, is unfortunate. In this chapter also the first four tables would be greatly improved by the addition of averages for countries' onion production, etc.

It may be carping to criticize a book of this high quality, but too frequent repetition of facts or phrases (pp. 91, 78 and 93, and 155, for example) can irritate, while the enthusiasm of the authors for their work sometimes tends to lead to over-sentimentality as in the opening paragraph of Chapter 4. In spite of obvious difficulties, it might be worth including a recommended list of varieties for each country (or each latitude and temperature) in further books of this series while a restricted number of colour plates, for example, showing disease symptoms, need not substantially increase the cost of production. Illustrations are of excellent quality and the sprinkling of hints throughout (burying rogue seed heads, p. 168; planting rows in the direction of the prevailing wind to prevent downy mildew infection, p. 183, etc.) confirms the authors' wealth of experience with all aspects of *Allium* culture. Printing is of a high quality and the only mistake noticed in the text is 'circular' for 'cultivar' on p. 127. In summary, this book is an undoubted asset to student, research worker, grower or seedsman interested in extending his knowledge of the onion and its relatives.

L. E. WATTS