

The editors of this book have attained a high standard of writing and presentation from the individual authors so that the book is at once readable, authoritative and well documented—no mean feat from authors of seven different countries. The book has been published within a year of the symposium and includes author, chemical compounds, genus and species, and subject indices, and it should therefore be a valuable addition to any library and to any student or research worker with an interest in chemical taxonomy, bio-organic syntheses and metabolism, and in modern methods of spectroscopic analysis.

The concluding chapter in the book, on "Flavonoids and Photomorphogenesis in Peas" by A. W. Galston, is by far the most speculative. It illustrates the importance of definitive identification of closely related chemicals in a plant. The relationship of four different flavonoid conjugates to three light-induced effects in pea seedlings is analysed in relation to hormone influences on plant growth. This is an appropriate final chapter in that it attempts to correlate many fields of modern plant research.

D. O. HALL

UNWANTED PLANTS

Weed Control

(Principles of Plant and Animal Pest Control, Vol. 2.) (Publication 1597.) Pp. xvi+471. (National Academy of Sciences: Washington, DC, 1968.) \$8.

IN spite of the phenomenal advances in weed control technology in recent years, authoritative books on the subject are as scarce as herbicides are now numerous. This long-awaited book written by a group of leading American weed specialists is to be welcomed as a comprehensive review on the principles of weed control and its practice in the United States. It is the second of a series of six volumes concerned with the principles of plant and animal pest control sponsored by the Agricultural Board of the US National Research Council. Each is prepared by a subcommittee working under the direction of the Committee on Plant and Animal Pests. In the preface to this volume it is stated that the subcommittee had in mind a readership consisting of administrators of science programmes, scientists in weed control and related fields, advanced students in weed science, and weed control technologists seeking to broaden their understanding of control principles. The lists of some 170 contributors contain the names of many distinguished weed scientists from industry, universities and state and federal research organizations in the United States.

In its twenty-two chapters plus appendices the book provides a comprehensive account of the ecology and properties of unwanted plants, principles of control by physical, biological, ecological and chemical methods, herbicides, weed control practices, and weeds injurious to the health of man and animals. In the final chapter entitled "The Future of Weed Control", the crystal ball is in fact little used but there is a valuable discussion on current developments. Perhaps this cautious approach is justified because few would have guessed two decades ago the fantastic advances in weed control technology that lay ahead.

In this chapter there is also an interesting comment that throughout the United States in 1960 there were only 233 full-time workers employed from state and federal funds in all areas of regulatory, teaching, extension and research work in weed control—approximately 4.7 workers per state. In the North Central Region there were eight times as many people employed outside industry in entomology and plant pathology as in weed control, while American farmers spend \$2.5 billion on fighting weeds as compared with \$660 million against pests and diseases. This division of labour and funds within the field of crop protection is, of course, by no

means restricted to the United States and is a reflexion of the youth of weed science combined with the remarkable success of herbicides.

This book is concerned almost exclusively with the American scene, although occasionally information is given relating to other countries. For example, the account of the UK Pesticides Safety Precaution Scheme is remarkably detailed and the chapter on the biological control of weeds is international in character. Nevertheless, the book has much to interest students in weed control in all parts of the world. It is particularly to be commended for the emphasis which has been given throughout to ecological principles and the need to consider control measures in relation to the environment as a whole.

The book is well written and printed, but is rather spoiled by the use of poor quality paper and a thin card cover. The lack of an index is a serious omission, which will undoubtedly prevent the full value of an extremely useful text being obtained by the busy reader wishing to extract information on specific topics.

J. D. FRYER

PATHWAYS IN CELLS

Bacterial Physiology and Metabolism

By J. R. Sokatch. Pp. xii+443. (Academic Press: London and New York, April 1969.) 100s; \$14.50.

ALTHOUGH microbial biochemists, by and large, have learned the importance of not looking at the properties of enzymes in isolation but of paying most attention to the way in which they function as part of those concatenated series of reactions called pathways, there is a curious hesitation—particularly among those writing textbooks—in taking the kinetic approach a stage further and considering the organization of these pathways in the formation of macromolecular components, and discussing the way in which these structures are fitted into the growing cell. This is particularly evident in this book. The treatment of the chemistry of bacterial cells, of bacterial nutrition in overall terms and of the mathematics of bacterial growth are excellently done, and there is an extremely thorough coverage of the processes of energy metabolism in bacteria. The biosynthetic pathways necessary for macromolecular synthesis in bacteria are also described in very great detail. So much so, in fact, that one sometimes feels, looking through these sections of the book, that the effort needed to set out all these metabolic interconversions both in text form and in chemical notation could have been much better devoted to providing the information more compactly. After all, it is only the most conservative of microbiology teachers who would expect his students to assimilate even a fraction of the detailed information contained in this book, and it is probably only a minority of specialists that are really interested in the history of the elucidation of a particular biosynthetic pathway. Much better would have been a section on the principles underlying the organization and function of pathways in living cells. How, for example, the chemical changes brought about in degradative pathways tend to extract energy from the compound in packets (such as two hydrogen atoms or the electronic equivalent or by the generation of energy-rich phosphates) that can then be dealt with effectively by a restricted range of metabolic processes in the cell—for example, the cytochrome system.

The great detail expended on the biosynthetic pathways in this volume would not be so serious were it not for the imbalance that follows. Whereas thirty-five pages are devoted to amino-acid metabolism, there are only six on their regulation (there are some serious omissions here, for example, polarity) and very little on how the pathways fit into cell growth and metabolism