Biochemical grand tour

Barry Robson

Companion to Biochemistry: Selected Topics for Further Study. Edited by A. T. Bull, J. R. Lagnado, J. O. Thomas and K. F. Tipton. Pp. 700. (Longmans: London, June 1974.) £7.00.

ONCE upon a time young Englishmen would make 'the grand tour' through the countries of Europe as finishing touches to their educations. This book is just such a tour through selected areas of biochemistry. Despite a cautiously worded preface, it is unmistakably an audacious attempt to present, in one volume, the greater part of the background reading for advanced students of biochemistry.

There are 21 contributions by 25 different authors, most of them well known in the field of work they present. Of course, certain topics are inevitably sacrificed, and the emphasis is on structural aspects of biochemistry rather than on the traditional metabolic approach. In fact, the book has that unmistakable, if undefinable, molecular biology flavour. Certain topics which may seem to be of diminished interest to the main stream biochemist, such as B. A. Newton's article on "Protozoa as tools for the biochemist", compensate by conveying the enthusiasm of the contributer, and make surprisingly compulsive reading. Although some chapters sacrifice a certain degree of readability to information content, or *vice versa*, this is in no instance well marked, and all the contributions are presented in the style of a well written textbook.

The book falls naturally into two halves. The first deals with the biogenesis, structure, and function of biopolymers. Proteins, nucleic acids, polysaccharides, viruses, and bacterial and plant cell walls are discussed. Three contributions concern the application to proteins of chemical modification, nuclear magnetic resonance, and electronic spectra and optical activity. This experimental emphasis on proteins makes it all the more surprising that no chapter has been dedicated completely to protein structure and stability. After all, equally important and complex discussions are presented for the secondary and tertiary structures of transfer RNAs and polysaccharides, systems which are in some respects less well understood. Two excellent articles together present a particularly comprehensive review of enzyme kinetics. The first of these introduces fast reaction techniques, emphasising their importance with the observation that the slowest step in an enzyme reaction typically has a half-life of seven milliseconds or less. The second presents material which will be more familiar to the average student, but even here the Michaelis–Menten equation and Lineweaver–Burk plot are infused with new life in such a way as to dispel the notion that the study of enzyme kinetics is ". . . . an esoteric pursuit which has little relevance to the general study of biochemistry".

The second half of the book is largely concerned with cells and their components. The emphasis is still structural, but several contributions give detailed consideration to the use of intact and living cells as tools for the biochemist. One of these introduces to the student the concept of the chemostat as a device for quantitative investigation of the growth kinetics of cell populations, and skillfully avoids incensing him against yet another "esoteric pursuit". An article which discusses the biochemistry of microbial pathogenicity is dropped right in the middle of these contributions, reminding the reader that micro-organisms are not simply nature's beneficial gift of a research tool.

The book concludes with a heterogenous mixture of exceptionally good reviews on lysozomes and peroxisomes, mitochondrial oxidative phosphorylation, hormonal control, immunoglobulins and the contractile apparatus of muscle.

The preface states that the editors have tried to select topics that are poorly treated in the textbooks, or poorly understood by the average final year undergraduate. Despite the fact that many teachers will inevitably feel that neglect of their pet subject has not been justified by at least one of these conditions, the student will probably finish the epic journey from pages 1 to 700 with a sense of completeness and the feeling that this particular grand tour is a considerable *tour de force*.

Living with cosmic rays

Space Radiation Biology and Related Topics. By Tobias and Todd. Pp. xvi+648. (Academic, subsidiary of Harcourt Brace Jovanovich: New York and London, May 1974.) £15.85.

IT is perhaps surprising to see the publication of this volume now when support for space research is declining. It is, however, soon apparent that the manuscripts for all but the final chapter were conceived and written in the late 1960s when the achievements of the US space programme were at a climax and the future for space research looked a good deal brighter than it does today.

The 12 chapters of the book have been written by 16 authors, including the editors, who are expert in a wide range of subjects relating to space radiation biology. After a historical survey, two chapters are concerned with the physics of radiations in space. In the first of these the composition and intensity of the radiation fields encountered around the Earth and in the Solar System are described in detail and the radiation doses received by astronauts taking part in the US missions up to Apollo 11, the first lunar landing, are tabulated. In the second, consideration is given to techniques for the simulation of the heavy-ion component of space radiation fields using accelerators.

From chapter 4 onwards the emphasis is on biology, commencing with a review of cellular radiation biology with special reference to heavy-ion radiations. This is followed by a review of the various theories of molecular and biological evolution, again with special reference to the possible role of solar and galactic radiation. One chapter is concerned with the effects of magnetic field on biological systems and another with the results of experiments carried out in satellites where weightlessness can modify the effects of radiation. The three following chapters deal with mammalian radiobiology in general, the influence on the biological response to radiation of circadian rhythm and the actue and late effects of radiation observed in man.

Chapter 11 is a discussion of the mathematical models used to described recovery from radiation induced injury and the effects of radiation on ageing. The final chapter entitled 'Current Topics ni Space Radiation Biology' briefly refers to some of the more impontant developments that have taken place up to 1972.

The volume is very readable, well referenced and adequately indexed and will no doubt be read with interest by both biologists and physicists working in areas related to space radiation biology. It is, then, a great pity that the reader is so often reminded by, for example, the absence of any mention of the chemistry of interstellar clouds in the chapter on evolution, that the book was written several years ago.

K. F. Baverstock