

although the extremely small print may make it difficult late night browsing for all but the youngest of readers.

The volume is set out in three sections. The first deals with some aspects of structure/function relationships of haemoglobin S and also has some chapters on membrane function and red cell deformability in the sickling disorders. The second part is devoted entirely to a discussion of inhibitors of gelation and sickling and the final section covers the more clinical aspects of the anti-sickling agents including the still-veiled problem of extracorporeal carbamylation as an approach to the management of the disease.

The book is well produced, is full of new and

interesting data and contains one or two particularly good chapters on the red cell membrane and the molecular mechanisms of sickling. Having read it one is struck by the fact that although there has been a vast amount of work done over the last few years we are still far from developing a useful agent for the management of sickle cell anaemia. However, this book should be available to everybody working in the sickle cell field and because it contains one or two excellent chapters on membrane function and structure/function relationships of haemoglobin, it will be of interest to an even wider audience.

D. J. Weatherall

A Clinical Companion to Biochemical Studies

by V. Schwarz

W. H. Freeman; San Francisco, 1978

xii + 116 pages. \$13.50 (hardcover), \$6.50 (softcover)

This book is designed to help the linking of biochemical knowledge to medicine with a view to improving the motivation of the preclinical student to learn the numerous concepts and data involved in biochemistry itself. It is hoped that it would dispel the doubts about the relevance of a biochemistry course to medicine. As a result clinical case presentations have been tried in many medical schools to illustrate the relevance and usefulness of biochemistry, both to the understanding of normal and also disease states.

There are a wide range of biochemical problems involved in clinical disorders which are amenable for study. It is quite obvious the choice cannot be comprehensive for the diseases with known biochemical factors are too numerous. The author chose to describe diseases which he thought led to insights into biochemistry and did not relate the choice either to the incidence of disease or the frequency with which a student was likely to meet it during his clinical studies. Another choice was made in that the disease descriptions are adequate for understanding the underlying basic biochemical disorder, but need to be supplemented with reading from standard bio-

chemical texts. Because of these aims the great tendency was to investigate in detail inherited enzyme defects, in other words 'inborn errors of metabolism'.

The book begins with an investigation into lactase deficiency, fructose intolerance, galactosaemia, glycogen storage disease, glucose 6-phosphate dehydrogenase deficiency, phenylketonuria, homocystinuria, hyperammonaemia and orotic aciduria. Only hyperlipidaemia and myocardial infarction represent cardiovascular disorders. On the endocrine side thyrotoxicosis, diabetic ketosis, pseudohypoparathyroidism, congenital adrenal hyperplasia are dealt with. On the toxicological side, lead poisoning, alcoholism and monosodium glutamate toxicity are interestingly described. The haematological disorders include pernicious anaemia, sickle cell disease and hereditary spherocytosis. The clinical pictures are clearly and briefly delineated. However, the brief presentation tends to hide some of the clinical interest in the interpretation of data. The biochemical interpretations are clear and further reading indicated where necessary. On occasion results are given in the text but references have to be consulted for further information.

This is a fairly classical response to an important

need for medical students to have the relevance of preclinical studies made clear, so as to increase their motivation and learning capacity. However, it is apparent that already we have outstripped the abilities of the human memory to deal with the conceived and possible data load, so choices have to be made. This volume illustrates one very important route which has the advantage of having medical history on its side. Other choices could be made in relation to common medical disorders but the interest may not be as great to a biochemist. The emphasis placed on enzyme reactions is perhaps too great and this is its major thrust. Perhaps we should consider more the

mechanisms of cell and organ failure as was briefly illustrated in the presentation of myocardial infarction.

Overall this is an important contribution which shows to medical students the links of biochemical knowledge to the practice of medicine. The idea of using it with standard texts is to be applauded and this enables the student to learn to integrate his own knowledge. It will certainly help to keep a very large area within manageable proportions and will undoubtedly be consulted by preclinical students now and in future.

John Anderson

Plant Organelles

Methodological Surveys (B) Biochemistry, Volume 9

Edited by E. Reid

Ellis Horwood; Chichester, 1979

x + 232 pages. £18.50

The principles of quantitative subcellular fractionation and of the correct use of marker enzymes were formulated many years ago and were summarised in detail by de Duve in 1971 (*J. Cell Biol.* 50, 520–550). These principles are only just beginning to penetrate into general biochemical practice. How often have detailed studies on, for example, liver 'mitochondria' been carried out on fractions contaminated with lysosomes, peroxisomes and other organelles! We have recently been exposed to the embarrassing discovery that β -oxidation of fatty acids in animal tissues, which generations of students have memorised as occurring only in mitochondria, actually occurs partially in the peroxisomes.

Correct fractionation techniques, accompanied by appropriate balance sheets, are even more rarely used upon plant tissues. It is often widely assumed, without checking, that markers developed for animal tissues can be applied freely to plants or that the localisation of enzymes will be the same in different plant tissues. *Plant Organelles* reports the proceedings of a meeting held at the University of Surrey in 1978 at which these problems were critically examined. For

example, Hall and Taylor (chapter B5) conclude that there is no reliable marker enzyme for the plant-cell plasma membrane.

The book discusses the isolation methods for plant-cell mitochondria, chloroplasts and their envelopes, peroxisomes, vacuoles, microtubules, plasma membrane and Golgi apparatus. Each chapter critically evaluates the purity of the fractions so obtained and how the quality of the preparation may be assessed. The editor has appended brief notes of the discussions that took place after each paper had been presented, although a more extensive reporting of the discussion might have been helpful. The book ends with an excellent summary (page 207) of suitable and unsuitable marker enzymes for plant organelles.

Overall, I found the book to be excellent and I would recommend it to anyone contemplating enzyme localisation work on plant tissues or even studies on a single isolated organelle, so that they can at least know what they are getting in their preparation. Nevertheless, the book has some irritating faults apart from the paucity of reported discussion. It has been reproduced from camera-ready copy, but the