endothelial cells, glomerular mesangial cells, parietal cells etc.).

As a final but important point, I should like to stress how useful it is to find plentiful 'useful tips'. Anyone like myself who has tried to adopt a methodology from the printed page must be aware that there are almost always hidden pitfalls for the novice. It is therefore nice to find plenty of warnings and helpful hints. For example, the differential elution of multitritiated 20:4 metabolites (p. 215), or the rival benefits of different separation cartridges (p. 346), or the problems in interpreting LTC_4 'receptors' (p. 429), the problems with getting RNA from seminal vesicles if you store the glands (high nuclease content, p. 471), procedures for minimising gastric cell clumping (p. 511) and so on.

My only serious grouse concerns the index. Although large (31 pages, about 1200 entries I guess), when I put it to the test it failed to identify many important things in the text. Thus it is not necessarily a reliable way of searching for information on your chosen topic.

This book will clearly be essential not only for the library, but also for the laboratory, and I am privileged to have been given the opportunity to review it.

R. Hoult

Channels, Carriers and Pumps: An Introduction to Membrane Transport; By Wilfred D. Stein; Academic Press; San Diego and London, 1990; xiv + 326 pages; $ 59.95

Recent developments in physical and, particularly, molecular biological methods for studying membrane proteins seem likely to illuminate a hitherto intractable problem in classical biochemistry - the mechanism of action of membrane transport systems. However, students - and practising researchers, for that matter - tend to be familiar with molecular biological methods, but far less comfortable with theoretical aspects of membrane transport, i.e. thermodynamics, kinetics, model-building, and so on. There is thus a need for a book that integrates these areas to provide an up-to-date account of structure/function relationships in membrane proteins, while not shrinking from a rigorous treatment of transport theory: this text goes a long way toward fulfilling that need.

Aimed at advanced students and at researchers entering the field, the book covers simple diffusion, ion channels, carrier-mediated transport, secondary active transport by symporters and antiporters, ATP-driven ion pumps, transport regulation and the integration (with particular reference to the kidney) of transport systems. Its opening account of membrane structure is the least successful chapter; it contains some questionable generalizations on the structures of membrane proteins, and in any case most textbooks of biochemistry cover this material in more depth. For most readers, however, this chapter will be superfluous, and no-one is likely to be disappointed with the authoritative and readable treatment of membrane transport which follows. In each section, essential theory is covered in the main text, with constant reference to experimental evidence, while mathematical derivations that are peripheral to the main thrust of the argument are 'boxed', as are many descriptions of individual transport systems. The result is that the text has a satisfying continuity and clarity, while the boxes not only supplement the argument, but can be read and understood on their own. There is a wealth of quantitative data, presented in tables, and each chapter has a reading list, which includes references up to 1989.

The strength of this book is the way in which rigorous yet lucid expositions of the theoretical basis of various types of transport are integrated with illuminating discussions of experimental results. Numerous ion channels and transport proteins are described, briefly but informatively. The account of P-type ATPases is outstanding, although that of F-type is rather brief, and V-types get only a mention. Respiratory-chain-linked ion transport is not discussed, and the treatment of the ion/ATP stoichiometry of pumps, a difficult and contentious issue, is surprisingly brief.

Any reservations about the treatment of particular examples are trivial when set against the real value of this book. It will continue to be rewarding reading when many symposium reports have become outdated, and it is warmly welcomed and recommended.

D.K. Apps

Molecular and Cellular Regulation of Calcium and Phosphate Metabolism (Progress in Clinical and Biological Research, Vol. 332); Edited by M. Peterlik and F. Bronner; Wiley-Liss; New York, 1990; xv + 239 pages; $ 72.00

In 1988 the Austrian pharmaceutical company, Chemofux, decided to institute an international award for an outstanding research paper published in the preceding two years in the area of bone and mineral metabolism. A jury was constituted, duly made its decision and then all came together in November 1988 in Vienna to make the award. This book represents a collection of the award winning article along with presentations by members of the jury of some of their published and unpublished work.

The work comprises 13 articles, the first and longest of

which is the object of the symposium – the award winning paper by T.J. Martin and P.R. Ebeling on the role in physiology and pathology of a novel parathyroid hormone-related protein. Although the award was for a *published* paper, there is no indication of where or when the previous publication occurred. Detective work in the library revealed it to be a revised and updated version of Martin et al. (cited in the article) that appeared in the golden jubilee issue of the Australian and New Zealand Journal of Medicine in 1988.

Three major areas of calcium and phosphate metabolism are considered. Martin and Ebeling's paper falls into the first (and largest) category discussing novel aspects of calcitropic hormone action. The six articles deal with various aspects of PTH-related protein, vitamin D, the calcitonin receptor and a speculative paper on the secretory protein-I produced by the parathyroid. The two smaller sections cover aspects of calcium (and to a much lesser extent phosphate) transport and bone pathophysiology.

As with most multi-author symposium proceedings, the styles of the articles are mixed. A few are in the strict format of reviewed papers in journals detailing methodology and results, whereas the majority are in the less formal style of most symposium papers being a mixture of review and experimental data, often without detailed methodology.

One disappointing aspect, which I feel is all too frequent today, is the somewhat misleading title of the book. It is really about calcium and not phosphate. On scanning the index, references to phosphate occur on only 21 out of 230 pages, and many of these are minor. Only two chapters deal with phosphate to any significant extent, and even in those it is not the major thrust of the article.

Because of the camera-ready production (presumably retyped by the editors as the typeface is consistent throughout) the book has been published relatively quickly for a symposium report. As many of the chapters deal with work that was in progress at the time and many of the conclusions may have been somewhat speculative, this work represents a 'snapshot' of what was happening towards the end of 1988. It covers a reasonably wide area of research ranging from a mechanistic analysis of renal calcium transport to treatment of osteoporosis and I found a number of the articles interesting. However, because of the background to its production the book falls between two stools; the articles are not adequate reviews for the uninitiated and probably cover information known to those working in the field. As such it is difficult to see where the market for this book might lie.

K. Elliott

Animal Cell Culture (Methods in Molecular Biology, Volume 5); Edited by J.W. Pollard and J.M. Walker; Humana Press; Clifton, New Jersey, 1990; xiv + 713 pages; £59.10

There is quite a shortage of specialised method-oriented books relating to animal cell culture, so that the publication of a volume such as this is a welcome event. The book contains 55 short 'stand-alone' chapters by experts in particular topics including basic culture techniques, culture of specific cell types (e.g. keratinocytes, lung, brain, thyroid, liver, muscle and kidney cells, and lymphocytes, haemopoietic cells and their precursors) and specific techniques including in situ hybridisation, flow cytometry, hybridoma technology and transfection. **Animal Cell Culture** therefore covers a wide range of areas but the choice of the specific topics by the Editors seems to have been a little arbitrary, so that even within the chosen areas the coverage is not comprehensive. The most serious criticism, from my point of view, is that in many of the chapters the references stop in the mid-1980s or earlier, and often important recent references are not included; it is difficult to understand the reason for this, since several of the chapters have recent references right up to 1989.

On a more positive note, the format is extremely clear and easy to follow; detailed practical information including recipes for solutions and valuable hints based on the authors' experience is given. For example, Reid's Chapter on 'Defining Hormone and Matrix Requirements for Differentiated Epithelia' has a very useful appendix on sources and storage.

This book will certainly be used in my laboratory. It partially fills the need for a cell culture manual covering details of specific techniques at a more advanced level than is possible in Ian Freshney's very useful introductory practical manual *Culture of Animal Cells – A Manual of Practical Technique* (Alan R. Liss).

I would recommend it as a useful acquisition for science libraries and for laboratories very much involved in animal cell culture, but because of the outdated referencing in many chapters and the somewhat random choice of topics, it must be considered as *one* of the methods books to have at hand, rather than *the* essential lamina flow-side manual for every cell culture researcher. The Gold Standard in this regard, Kruse and Patterson's *Tissue Culture Methods and Applications* (published by Academic Press in 1973 and therefore now a little out-dated) has yet to be equalled.

M. Clynes