

protein at the ribosome, but this book starts on the outside, with endocytosis, and stays there for 386 pages. The initial "overview" by M. Willingham and I. Pastan is in fact a restatement of these authors' views: coated vesicles do not exist, the endosome (or "receptosome" in their terminology) forms by swelling and is delivered to the Golgi complex. Diversity of opinion is the lifeblood of science, but how should the beginning student cope with the ensuing chapters in which the coated vesicle's existence is (conventionally) taken for granted? No fewer than 11 chapters are largely devoted to endocytosis, in some cases one ligand at a time, with an inevitably massive amount of redundancy. The tenth chapter is an unusual one on autocrine targeting of hormones, and includes the remarkable proposal that certain growth factors enter the cell by way of endocytic vesicles which "fuse with the nuclear membrane, delivering the hormone to the nucleus". Again, authors have every right to present unorthodox models in print, but nonexpert readers have a greater right to be protected from the ensuing topological havoc.

Eventually the book progresses to the exocytotic pathway. This too has an "overview", which oddly is taken up with a discussion of the assembly of dolichol intermediates in glycoprotein synthesis. The persistent reader is then rewarded with an invigorating piece by V. Lingappa on translocation into the endoplasmic reticulum. The remainder of the secretory pathway is covered in varying depth, and there is an excellent presentation of polarized transport by A. Wandinger-Ness and K. Simons in conclusion. Almost as an afterthought, the rest of the subject of the traffic of proteins — transport from the cytoplasm

Technical tips

■ In *The Chemical Synthesis of Peptides*, John Jones surveys and details methods for proteins of all kinds, emphasizing the fundamental principles involved. Published by Oxford University Press, price £35.

■ *Antibody Engineering: A Practical Guide*, edited by Carl A. K. Borrebaeck, presents an overview of this rapidly growing field, covering topics from antibody structure to PCR cloning. Published by W. H. Freeman, price £27.95.

■ *Introduction to Flow Cytometry*, edited by James V. Watson, describes the fundamental principles, basic methods and applications of this technique for sorting macromolecules and cells. Published by Cambridge University Press, price is £50, \$79.50. *Quantitative Fluorescence Microscopy* by F. W. D. Rost is a companion book also recently published by Cambridge. Price is £40, \$69.50. *Flow Cytometry* edited by Z. Darzynkiewicz and H. A. Crissman is a comb-bound laboratory manual. Published by Academic, price is £35.50, \$49.95. □

— is covered in the last three chapters. Sadly, there is no mention of the chloroplast, an organelle which has transport problems all of its own and which has been the source of one of the most useful ideas in the field. But the contributions on mitochondria (M. Douglas, C. Smagula and W. Chen) and peroxisomes (S. Gould and S. Subramani) are among the best in the book.

Apart from the actual content, several aspects of the book's presentation might have benefited from more attention. For a textbook, several of the diagrams (so important in this subject) are muddled to the point of incomprehensibility; alter-

natively, for a reference book, the index is woefully incomplete. The system of numbered sections breaks down at times, leaving topics apparently adrift on the page, and there are few cross-references between chapters.

The editors of the book have taken on a near-impossible task, but could, in fact, have succeeded had not the healthy babies mentioned above been immersed in some suspiciously murky bathwater. □

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Principles and processes

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The Solid Earth: An Introduction to Global Geophysics. By C. M. R. Fowler. Cambridge University Press: 1990. Pp. 472. £40, \$59.50 (hbk); £19.50, \$37.50 (pbk).

HERE at the Massachusetts Institute of Technology, every graduate student of Earth sciences goes through a grisly rite of passage called the 'general examination', which includes a three-hour oral exam. When asked by anxious students for advice on how best to prepare, I usually recommend, in addition to a good night's sleep and a tranquil state of mind, a sound basic textbook that emphasizes the concepts of Earth processes. This fine new geophysics textbook will now be added to the top of my list of recommendations, as it promises to be excellent both for teachers and for those seeking a review of these processes from a geophysical point of view. Indeed, one of the reasons that I like it is that it focuses primarily on the structure and dynamics of the Earth, rather than developing geophysical theory while its application to the Earth remains a secondary concern. As such, it unites many elements that in teaching are all too often ignored because they fall between the traditional disciplines of geophysics and geology. This practice is especially unfortunate because this is an area where many of the recent advances in Earth sciences have been made.

The book begins with a discussion of plate motions on a plane and a sphere, examining triple junctions, propagating ridges and present-day plate motions. A commendable feature is the way in which Fowler intermingles theory and observation in his examples of Earth structures and processes. For the most part this approach succeeds admirably, although a few of the more complex

examples are difficult to follow, particularly in the sections on past plate motions and the continental lithosphere. But in all fairness, many real examples are complex; it may be difficult, if not impossible, to describe in simple terms the evolution of, say, the Indian Ocean.

One of the few places where the book falls short is in the section on the growth of the continents. I would like to have seen this section cast in the light of the Wilson cycle (the repeated rifting and reassembly of the continents), and it would have benefited from more emphasis on the many different and continual reworkings of continental material. The section would then have followed on naturally from the ones on plate motion. Fowler's examples from the Alps and the Himalayas are good, although they lack the succinct theoretical framework that is needed to give them structure. But these are small quibbles. Most of the book is excellent, in both the quality and the clarity of its presentation.

Many of the chapters are reasonably self-contained, making them suitable for a variety of introductory courses. And as a whole, the book will prove to be a superb review text, even for researchers. It will probably not appeal to the casual reader because much of the material requires a certain diligence if it is to be absorbed; a better book in this regard would be *The Earth* by S. Press and R. Siever (W. H. Freeman, 1986). Nor will it supplant *Geodynamics* by D. Turcotte and G. Schubert (Wiley, 1982), which is the cornerstone of introductory geophysical theory and equations, but which fails considerably in the application of these concepts to the Earth. *The Solid Earth* is much needed in that it presents a simple quantitative approach that goes hand-in-hand with an abundant supply of examples illustrating the richness and complexity of the processes that have shaped the Earth. □

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