into each topic. The author writes in a relaxed style and manages to make each subject sound easy. The computer simulations appear to be done effortlessly.

As I read the chapters, I felt I was learning a lot. But when I came to subjects that were familiar to me (such as the van Cittert–Zernike theorem, or the Shack–Hartmann sensor), I realized that I would have presented the subject differently, probably placing more emphasis on the fundamentals. Partial coherence of light is fundamentally about the statistical nature of light, but this is not really emphasized here, even though it can be illustrated graphically using computer-generated examples. I suspect that there is some non-uniformity in the coverage of each topic.

Even so, I thoroughly recommend this book to anyone in optics who is interested in doing something useful. Everyone will learn something, and refresh their memory on subjects that are fundamental to so many practical devices that use optics. ■

Chris Dainty is in the Optics Section, Blackett Laboratory, Imperial College, London SW7 2BZ, UK.

Swimming lessons

Molecular Biology of the Cell, 4th edition

by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts & Peter Walter

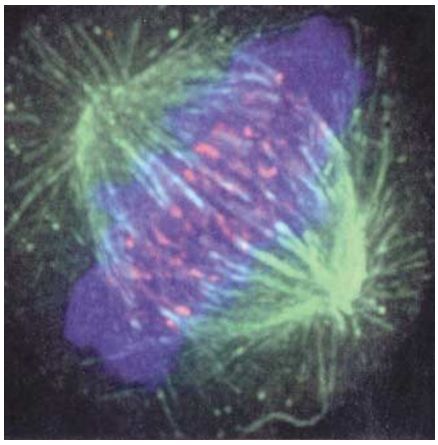
Garland Science: 2002. 1,400 pp. £75, $102 (hbk); £44 (pbk)

Angus I. Lamond

A generation of students have learned the basics of molecular cell biology thanks in no small part to courses based on the pioneering textbook *Molecular Biology of the Cell*, which was first published 18 years ago. Through three editions it has established an enviable record for high-quality presentation, with the authors showing a remarkable ability to make both basic concepts and cutting-edge research topics accessible to readers. The arrival of the fourth edition prompts the obvious question: "What's new?"

Not surprisingly, size is the first thing. The new edition is even larger than its predecessors, reflecting the vigorous activity of the field and the inexorable expansion of detailed information regarding cellular processes and molecular structures and interactions. In an era when we are drowning in information, the job of a textbook such as *Molecular Biology of the Cell* is to help teach its readers how to swim. This it does admirably, and the punctilious attention to detail and effort devoted by the authors to covering this huge field in a lucid and easy-to-read style shines through on every page.

The material is now presented in five sections, with the one previously entitled 'Molecular Genetics' now being divided into 'Basic genetic mechanisms' and 'Methods'. The latter section highlights the importance of experimental approaches to cell biology and explains how most of the key findings discussed elsewhere in the text were made. This is something I try to emphasize when I lecture to students. The section is not a guide for a practical course, nor does it provide laboratory protocols; rather, it explains the basic theory behind a wide range of commonly used molecular and microscopy techniques.



Seeing cells: composite stained micrographs can reveal the cell's activities, such as mitosis.

The descriptions are generally clear and well illustrated, although I noticed a few rare exceptions. For example, fluorescence resonance energy transfer is poorly explained and oversimplified to the point of being quite misleading. The now widely used application of proteins tagged with green fluorescent protein for photobleaching studies is a surprising omission, and in several cases, such as the discussion of two-dimensional gel electrophoresis, I feel that some comment on the limitations of the technique, as well as its advantages and applications, would have offered a more balanced view. But overall, the methods section is comprehensive, well written and a genuine improvement on the previous edition.

The availability of complete genome sequences for many model organisms is an obvious new topic for the fourth edition, and material has been added to many chapters to incorporate this information. Major advances in understanding specific processes, such as nucleo-cytoplasmic protein transport, histone modification and chromatin remodelling, are all included. A new chapter on the exciting advances in studies of innate immunity and interactions between host cells and pathogens is a particularly timely and welcome addition.

With such a wide range of subjects being covered, I am impressed at how well the information has been incorporated into a house style. In most cases the topics are summed up clearly and succinctly, making good use of illustrations to explain each point or concept. Students can use many of the chapters directly as cram notes for exams, and I expect that many examples of prose from the text will be appearing verbatim in future essays. Although this is a generally successful formula, it doesn't work well for some topics where the field has simply not advanced far enough to lend itself to a short and simple explanation.

I do wonder, however, whether *Molecular Biology of the Cell* has now outgrown its present format. Its sheer physical size renders it somewhat unwieldy and I found myself spending a lot of time flicking between chapters and from one section to another to follow up on linked topics. More extensive cross-referencing to help the reader find related material would have been useful, but ultimately there is no way to avoid this dispersal of information in a printed textbook. As a result, I kept wanting to 'click' on highlighted keywords that would provide these cross-references and links between topics and sections.

The material is crying out for presentation in an electronic format. I therefore turned to *Cell Biology Interactive*, the new CD-ROM that accompanies the fourth edition, to see if it would add this missing ingredient. Unfortunately, it does not. Unlike the comprehensive presentation and uniform style of the printed text, I found the CD patchy and variable, both in terms of the topics covered and the quality of the material provided. Nonetheless, there are some very useful items on the CD, and the ability to view and rotate three-dimensional protein and nucleic-acid structures and to see time-lapse movies of cellular processes, including cell movement, cytokinesis and gastrulation, will undoubtedly be helpful to students.

Overall, the CD convinced me that an interactive format, rather than increasingly bloated printed volumes, is the best way to present molecular cell biology to students in the future. But in my opinion, *Cell Biology Interactive* is more of an 'add-on' than an integral part of the fourth edition. It scratches the surface of what is now possible with this format and fails to live up to the level of innovation that we have come to associate with the book.

In conclusion, the fourth edition of *Molecular Biology of the Cell* is an outstanding textbook of the sort I would have liked to have when I was an undergraduate. I will certainly recommend it to my own students. The clear and concise style and copious informative diagrams and illustrations set an impressive standard, and the comprehensive coverage of the field that has been achieved is quite remarkable. I hope that a future fifth edition will not only maintain this standard, but will do more to take advantage of new technologies and interactive material. ■

Angus I. Lamond is at the Wellcome Trust Biocentre, University of Dundee, Dundee DD1 5EH, UK.