Cohen and Stewart clearly enjoy science fiction at least as much as science, and the most amusing parts of the book involve sequences where they attempt to illustrate their points by inventing different science-fiction alien species. My favourite involves 'The Sensual Tribble'. They also show their clear affection for science fiction by incorporating throughout the text mini-summaries of many of the classic stories of this genre over the past 50 years. I found that this adds little to their argument and instead tends to be distracting. Alas, this may merely represent my own bias, which is that science fiction tends to be less imaginative, and therefore less interesting, than science, because nature generally exceeds the limits of the human imagination when it comes to exotic and unexpected phenomena.

Probably the most refreshing aspect of *Evolving the Alien* is the authors' continued insistence that when it comes to the biology of extraterrestrial life, which they dub 'xenoscience', the possibilities are probably literally limitless. The pair work hard to expand horizons, but at times I found that their optimism strains the bounds of credulity. When their scientific arguments stray away from biology, they sometimes lapse into proposals that seem to make no sense.

Arguments that aliens living during 'inflation' (which ostensibly occurred when the Universe was 10^{-35} seconds old) might somehow trick us about the current age of the Universe (10^{10} years), or that the vacuum of space-time might possess sufficient complexity to organize itself into some form of life by carrying out a complete thermodynamic work cycle, seem to me to be serious misconceptions of physics. The repeated assertion that the Sun is 10 billion years old, and that the Earth is between 5 billion and 6 billion years old, also grates, because we know with great accuracy that the Sun is about 4.5 billion years old and the Earth younger still.

My respect for Cohen and Stewart as popularizers of science meant that I wanted to enjoy this book. But ultimately, while I was relieved to find out what this book was not, I couldn't get a feel for what it actually is. I expect that ardent science-fiction enthusiasts who have the patience to work through the authors' polemics, and who enjoy the many references to the authors' favourite science-fiction works, may feel differently. At the very least, many readers of this book will be inspired to expand their horizons when pondering the remarkable possibilities for life in the Universe. ■

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A molecular view of the cell

Cell Biology
by T. Pollard & W. Earnshaw
Saunders: 2002. 834 pp. $59.95/£34.99.
Electronic Image Collection (CD-ROM) $395/£425

Joe Howard

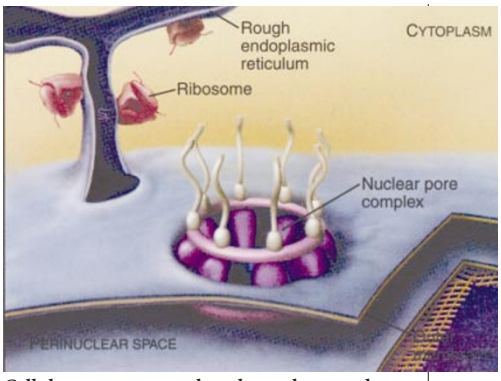
Do we need another cell-biology textbook? After all, the classic *Molecular Biology of the Cell* by Alberts *et al.* (Garland Science, 2002) is still going strong in its fourth edition; and *Molecular Cell Biology* by Lodish *et al.* (W. H. Freeman, 2000) and *The Cell: A Molecular Approach* by Cooper (Sinauer, 2000) are worthy alternatives. So there is no excuse for cell biologists, be they undergraduates or cutting-edge researchers, not to have a broad knowledge of their field. What, then, does this new textbook, *Cell Biology* by Pollard and Earnshaw, have to offer?

The first thing that struck me is that this is not a book about cells. Go to the index and you won't find any neurons, glia, chromaffin cells, keratinocytes, melanocytes, hepatocytes, myoblasts or hair cells. This is partly due to the poor indexing, but mainly it reflects the book's molecular emphasis. With a few exceptions, such as the cells of the blood and connective tissues, there is little detailed information about the biology of cells, and how cells are adapted for their functions in tissues and organisms. For this you'll have to go to a specialized text such as *Cell Movements* by Dennis Bray (Garland Science, 2000).

Unashamedly, *Cell Biology* is about molecules. As such it is a magnificent piece of work. Most of the chapters begin with the structures and family trees of the key molecules. In this post-genomic era, this is the logical way to organize our knowledge of biology. The danger is that the approach can be dry. But by focusing on mechanisms and principles, the book shows the connections between different cells, and between the different organisms. And this is gratifying.

Perhaps the most stunning feature of the book is its illustrations. Molecules leap out from every page. Proteins, DNA, membranes and small molecules are all beautifully rendered by Graham Johnson. Atomic structures are used when available. In each figure, molecules are drawn in proportion to create a vivid impression of the scale and intricacy of the cell's building blocks . And the book is lavishly illustrated with electron micrographs, many from Don Fawcett, one of the pioneers of cell biology. This goes a long way to redress the molecular bias. All of the illustrations are available on the accompanying CD-ROM.

Have the authors got their facts straight? For the most part, yes — this is a very scholarly text. But there are notable exceptions.



Cellular structures, such as the nuclear envelope, are important even in the post-genomic era.

For example, Figure 1.1A is a phylogenetic tree showing the radiation of the Eubacteria, Archaebacteria and the Eucarya on the basis of rRNA-sequence comparisons. But the structure of this tree has been dramatically altered as a result of recent developments in molecular phylogeny. The problem is not that the information is out of date; biology is a living subject, so this is inevitable. Rather, this example illustrates how important it is to not present hypotheses as fact. Another example is the promulgation of the common misconception that the microtubule is the only cytoskeletal polymer that can resist compression. Yet the protrusion of moving cells is driven by the polymerization of actin filaments that must act in compression. One of my pet peeves is about units: there is no place for non-SI units such as the centimetre, and the use of the mole runs counter to the molecular spirit of the today's biology.

Now to the bottom line. First, *Cell Biology* is short, only half the length of Alberts *et al.* Second, it is based in bioinformatics and protein structure. And third, it contains a lot of data upon which knowledge in cell biology is based. The sections on the cytoskeleton and the cell cycle, Pollard and Earnshaw's research fields, are particularly strong in this respect. Thus *Cell Biology* is a higher-level textbook than *Molecular Biology of the Cell.* The illustrations and the inclusion of kinetics make it a superb choice for an advanced undergraduate or graduate textbook in cell biology. It is essential reading for all workers in the field. ■

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