to chapters on muscle and nerve cells.

Integration of cellular and molecular matters could be improved in places; for example, discussion of self-assembly is divorced from some of its best examples, the G/F transitions of filaments and tubules, and there seems to be no hint of the possible role of glycosylation in intracellular traffic. There is a moderate if uneven emphasis on experimental evidence. For example, we meet puromycin in relation to protein synthesis, but not EGTA in excitation-contraction coupling. Though X-ray diffraction appears amongst instrumental methods, the task of explaining the importance of low-angle diffraction by intact muscle is avoided. Further there seem to be rather too many small oddities, even for a volume with so wide a sweep: EDTA works in one experiment by "binding to phosphate groups"; freeze fracture may "disclose the outer or inner surface of a membrane or may even split the membrane lengthwise". Worst, in context of cancer "normal cultured cells generally divide every 24 hours as long as they float freely in the medium". This last points to a wider weakness: of the two main tools of cell biology today, the electron microscope and cell-culture, the authors are clearly more at home with the former. Otherwise they would not propagate the myth of contact inhibition of mitosis, subsume the locomotion of tissue cells with that of amoebae, or omit all but the vaguest reference to fibronectin. The indexing could usefully be three times denser.

Nevertheless, though this book looks more successfully down the hierarchy than up, it does show that teaching centred on the cell (rather than the animal or enzyme) need not lack coherence or excitement. For such a course it would be useful but far from definitive. □

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Textbook evolution

K. Murray

DNA Replication. By Arthur Kornberg. Pp.724. (W.H. Freeman: 1980.) £19.20, $34.95.

IF ONE regards *DNA Replication* as a second edition of *DNA Synthesis,* one should read the two side by side. One then sees a remarkably concise summary of the advances in nucleic acid enzymology that have occurred in the five years that separate the two volumes, and a lucid integration of the role and interrelations of several newly discovered enzymes in the complex and intricate processes whereby genetic information is maintained and utilized. The evolution of *DNA Replication* from *DNA Synthesis* has involved a number of deletions, an appreciable amount of rearrangement and, not surprisingly since it is nearly twice the size of its progenitor, numerous insertions that confer a clear advantage upon the descendant.

The introductory chapters on the structure and functions of DNA and the biosynthesis of DNA precursors are expanded appreciably, while the chapters on DNA polymerase I of *E. coli* and other prokaryotic DNA polymerases remain largely as the classic accounts that they were, which I believe should still be read by all students of nucleic acid biochemistry — incidentally I am glad that one of my favourite quotations of Kornberg remains: "Failure to detect an enzyme activity in a cell-free extract means only that." (p.160).

It is in the discussion of eukaryotic DNA polymerases in Chapter 6 that the expansion and reorganization of material becomes really apparent. The many enzymes involved in various phases of DNA replication are now allotted individual chapters and this, in my opinion, improves the subsequent discussion of replication mechanisms and their regulation. The chapter on bacterial DNA viruses is appropriately updated and expanded, and animal viruses are similarly treated in a new chapter of their own. As before, chapters on DNA repair, recombination and restriction (and now transformation also) and on the synthesis of genes and chromosomes conclude the book. The final chapter is completely revised and introduces modern advances in DNA sequence determination and recombination DNA technology, topics that merit a book of their own. It is, as one expected, an excellent book written with clarity and an economy for transferring information which makes small bacterial viruses look extravagant, and with the authority of one who has done much to lay the foundations of the subject and set standards for others to emulate.

Like *DNA Synthesis, DNA Replication* will be widely valued both as text and as a reference book. It should be on the shopping list of all students in biological subjects — and chemists too, for that matter, in this era of biotechnology — but it will be equally valuable to research workers. If it stimulates the need for a third version, I am sure Kornberg will feel suitably rewarded. □

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Biomembranes — agreement and discord

Dennis Chapman

Biological Membranes: Their Structure and Function. 2nd Edn. By R. Harrison and G. G. Lunt. Pp.288. (Blackie/Halsted: 1980.) Hbk £17.95; pbk £7.95, $21.95.
Introduction to Biological Membranes. By M. K. Jain and R. C. Wagner. Pp.382. (Wiley-Interscience: 1980.) £18.40, $43.25.

THE ways in which a scientific consensus is reached on a subject must always be fascinating to philosophers of science. The consensus view on biomembrane structure is often expressed in terms of the fluid-mosaic model. At the same time it is appreciated by all the workers in the field that biomembranes exist which are not fluid but rigid, where the proteins are fixed in position, not mobile, and where a mosaic structure does not occur — instead, the proteins are arranged in a crystalline manner.

These topics and the relationship between structure and function are discussed in these two books. Both are up to date and deal with broadly the same area, covering electron microscopy, membrane preparations, structural organization, transport and receptor functions. The book by Jain and Wagner is perhaps the more elegantly written, and contains good diagrams with clear summaries and useful references, but both books will be useful to graduate and undergraduate students interested in having a concise review of the present situation.

Given two such similar books, it was interesting to see how they discussed an area of research which has excited interest over the last two or three years. This is the topic of protein–lipid interactions in biomembranes. Jain and Wagner comment

> . . . various lipid activated enzymes contain an annulus of tightly bound lipid molecules . . . . Such lipid has distinctive properties, cannot be readily extracted, is *not* readily exchangeable with the more fluid lipid . . . .

Harrison and Lunt comment

> . . . a number of membrane-bound enzymes have been shown to be surrounded by an annulus of immobilized boundary lipid, the local phase transitions of which are reflected in the activity of the enzyme . . . and boundary lipid does not preclude *rapid exchange* with surrounding lipid molecules.

Perhaps in the next editions a new consensus view on boundary lipids will be reached! However these quotations merely show how difficult it is to give a snapshot impression of a scientific area which is still alive and active. □

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