sodium and chloride ions from the gut; and so brings about the accumulation of fluid in the gut that leads to the diarrhoea of cholera.

For further information, readers may be interested in *Cholera: The American Scientific Experience 1947–1980* by W. E. van Heyningen and J. R. Seal, The Westwood Press, Boulder, CO, USA, 1983.

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Book Reviews

More reviews for the cell biologist

Modern Cell Biology (Vol. 3)

edited by Birgit H. Satir, Alan R. Liss, 1984. £38.00 (ix + 314 pages) ISBN 0 845 1336 2

The publishers, Alan R. Liss, are perhaps best known to cell biologists for the compendia of conference proceedings they seem to produce in deluges after every conference season. For this reason, any book from them is likely to induce glazed eyeballs and deep yawns from potential readers. This makes it the more pleasurable to be able to say that Birgit Satir, in the latest of her series *Modern Cell Biology*, has produced a volume of generally readable reviews which cover a diverse field. More unusual still is that, in a volume of reviews in cell biology, she has brought in subjects covered by a molecular biological approach (for instance, 'the molecular diagnosis of human genetic diseases' by Kidd and Woo, and 'RNA splicing' by Mount and Leitz) and put them alongside the cell biologists' more traditional fare (for instance 'high molecular weight microtubule associated proteins' by Vallee and Bloom). The book's preface also states that each article has been shown to 'appropriate editors', so presumably some refereeing has occurred, which may ensure an accuracy not always so noticeable in Liss' volumes of (essentially unrefereed) conference proceedings. The authors of the reviews have also done their best to be comprehensive: Vallee and Bloom's review (covering essentially only two classes of protein, MAPs 1 and 2) has 50 pages and about 120 references. However, there are limits beyond which 'comprehensive' should surely not go: Mount and Leitz's five pages of closely typed RNA splice-site sequences are a strong deterrent to reading the article. All of which makes me wonder who this book is intended for? It is surely too specialized and too expensive to be bought by undergraduates, and although one might recommend some of these reviews to postgraduate or other cell biologists (especially Vallee and Bloom's review for graduates interested in MAPs) they are more likely to get the book from the university library than buy it. Indeed, the book's diversity is probably its greatest weakness in this respect; probably no more than one review will interest any one cell biologist. I cannot imagine any scientist I know being willing to shell out the money it would take to buy that one review. So, Liss are probably relying on enough university libraries being willing to buy this book. Let us hope so, because, in view of the value of individual reviews, it would be a shame if this series did not run a longer course.

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A curiously complementary pair

From Cells to Atoms: an Illustrated Introduction to Molecular Biology

by A. R. Rees and M. J. E. Sternberg, *Blackwell, 1984. £6.80 (viii + 94 pages) ISBN 0 632 00888 1*

Lecture Notes on Biochemistry

by J. K. Candish, *Blackwell, 1984. £9.80 (vi + 290 pages) ISBN 0 632 01253 6*

These are two attractively produced paperbacks which aim to help the student conquer Molecular Biology and Biochemistry, respectively. They differ from the average textbook in not attempting to present a systematic view of the science but rather to provide a concise introduction to molecular biology and a guide to passing examinations in biochemistry. Both succeed in their aims to a reasonable extent, and the educational principles and devices used are certainly worth the consideration of teachers. Both are very thin on quantitative aspects and problem-solving.

From Cells to Atoms is a large-format book in which each double-page spread of the book deals with a single topic – 'The Structure of DNA', 'How Antibiotics Work', 'Antibodies at Work' and so on (43 sections in all). Each section has several diagrams, usually one major one occupying half a page or more and then some smaller ones. The diagrams are mostly simple and well drawn, with intelligent use of a second colour and shading and I thought that these were the best feature of the book. Molecular biology is defined early on as '. . . the study of the function of biological organisms in terms of the chemical structure of their component molecules and atoms'. In practice this means biochemistry without all that boring metabolism: the relevance of this comment may become clear later.

A paragraph entitled 'How to use this Book' recommends that you '. . . glance at the main figure, then read through the accompanying text and finally return to the figure for a more detailed study'. In fact, the book aims to provide an introduction to molecular biology for the beginner or a summary for the more seasoned student. I thought it would succeed better as a revision aid for the more seasoned and perhaps more cynical student. My reasons for saying this are that I did not find the writing (in contrast to the diagrams) all that exciting or stimulating and the brevity of the explanation might not, in my opinion, help the beginner's understanding of the topics very much. In addition to a good deal of inelegant phraseology (e.g. '. . . the enzyme glycogen synthetase which sequesters glucose in the form of

glycogen in mammalian cells . . .' or '. . . one such pathway is called the complement system which consists of a series of molecules . . .'), there are quite a lot of typographical and conceptual errors. For example, the authors think that the plural of flagellum is flagellae. They cannot decide whether ATP is an energy *storage* molecule or a *carrier* of energy. Since the origin of ATP is hardly mentioned, except to say that it may come from the glycolytic *cycle* [sic] because of the absence of metabolism, this may not be important (at least to the molecular biologist). Another example is the total confusion about sedimentation coefficients. It is clear that the authors have never measured one of these beasts, and again it may not be important even though we all still specify 'sizes' of ribosomes and their subunits in terms of 'S'. An illustration of the confusion is found on p. 38: 'The Svedberg unit (S), or sedimentation coefficient, is a measure of the mass of a macromolecule. . .' When, in the Appendix 1/S is defined as 10^{-13} s, the confusion between *s*, for sedimentation coefficient, s, for seconds and S, for Svedberg unit (10^{-13} seconds) is complete. In several places the diffusion coefficient, *D*, wrongly referred to as a rate, is given the units $m^2 s^{-1}$, $cm^2 s^-$ [sic] and $cm^2 s^{-1}$. Better for the molecular biologist to stick to X-ray crystallography where he won't have these problems.

Lecture Notes on Biochemistry is in contrast very 'metabolic' with little of the molecular biology. For a set of lecture notes, it is quite long; as long and large as many text-books. In places the writing is refreshingly down to earth; in others it is diffident, if not downright cynical. For example, in the Preface '. . . the majority of students . . . see Biochemistry . . . as a hurdle to be overcome during the progress to a professional qualification'. His thesis is that with a minimum of chemistry and basic biology, students can be introduced to a concise compendium of metabolic pathways which comprise the main part of the Biochemistry Examination – this is surely debatable. The author also says that understanding is not neglected but is subordinated to the presentation of readily reproducible facts. All the diagrams, he says, are reproducible by the student, and there are no photographs of famous biochemists.

Teachers will find several features in the book useful and these are not mere gimmicks. Many students will find the few pages on 'The Language of Chemistry' helpful and may be reassured that they can 'get away with' learning ten basic formulae (although some teachers might argue with the ten chosen). Frequently, there are glossaries of keywords that the student should know and this is probably valuable as a revision aid and/or checklist. I also think it is useful to have a list of Latin and Greek roots to help understanding. (It is a pity that although the word for haemoglobin is given additionally, in Chinese characters, thalassaemia is spelt incorrectly, except in the index.)

It would have been nice to see a section on 'How to use this Book', although one chapter opens with the phrase 'To learn biochemistry you do not have to know as much chemistry as is often supposed'. This is reminiscent of the opening to *1066 And All That*, which goes something like 'History is not what you thought, it's what you can remember'. I would have preferred to see 'understand' biochemistry rather than 'learn' biochemistry, but then this is supposed to be an examination aid and practically speaking *learn* is what most students do rather than understand. It is the author's firm conviction that 'If you can *only* recall principles, I fear you cannot pass examinations', thus the advice is that you must remember and reproduce facts. This may be the situation in many institutions; I hope it is not true of all and that the situation is changing.

Although I know that most students coming to University are fairly convinced that biochemistry *is* metabolic pathways, with this great emphasis on metabolic pathways some more modern topics get short shrift and the result is an imbalance of topics. To give a few examples, dansyl chloride is not mentioned, though FDNB (1-fluoro-2,4-dinitrobenzene) is, exon and intron appear in a glossary, but there is practically nothing on eukaryotic gene structure in the text and nothing about antibody biosynthesis. It is stated that there are 'two theories' to explain oxidative phosphorylation, and although the chemiosomotic theory is said to be 'well accepted', the requirement for an intact mitochondrial membrane is hardly mentioned.

The central section of the book (pp. 51–182) deals with metabolism. Subsequently, Chapter 13 is entitled 'Distilled Topics'. These shortish summaries may be useful in revision, but the arrangement is a bit of a hotch-potch. Examples include: 'Haemoglobin', 'Complex lipids', 'An organ: the liver', 'Photosynthesis', 'Vitamins' and so on, and each of these is 3–6 pages long. I would have liked to see more logical order in this because logical order helps the student build up a framework within which he can understand as well as remember.

The final chapters contain a 'Roundup of Principles', some checklists (e.g. the major pathways and cycles, the principal activities of cell organelles) and some (rather long-winded) hints on how to approach examinations in biochemistry. This may be a good selling point for the book. Some students may be helped although some could be somewhat disillusioned by the cynicism or the somewhat patronizing air.

In summary, a curiously complementary pair of books in the sense that one has no metabolism and the other concentrates very heavily on it. I would prefer something more systematic in both cases, calculated to promote an understanding of principles. But, for the student whose major concern is to get over the hurdle, both books have their good points. However, in my opinion not *all* of their points are educationally sound.

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