What has happened in biotechnology

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Biotechnology: A Comprehensive Treatise in 8 Volumes. Vol. 1 Microbial Fundamentals; Vol. 3 Microbial Products, Biomass and Primary Products.
Edited by H.-J. Rehm and G. Reed.
Verlag Chemie: 1982/1983. Each volume pp.520, $309, £130.

MOST industrial folk would agree that biotechnology is likely to have its greatest impact in converting low-grade natural products, such as cellulose, into materials of significantly higher added value. Implicit in this view is the recognition that fermentation processes are generally inefficient and that biology is best used to generate molecules of great complexity. Such messages have clearly been taken on board by the publishing fraternity who have something to teach us in the way they carry out complex cellulose conversions. Each volume of this proposed eight-volume series on biotechnology contains about 1.5 kg of cellulose and sells at £130. Its bulk price therefore comes out at about £87,000 per metric tonne, not a bad mark up by any biotechnological (or literary) standards.

What are we offered for this investment? The editors have gathered together a distinguished editorial board to oversee the preparation of the series, the objective of which is to provide researchers and teachers alike with a comprehensive biotechnological reference work. Volumes 1 and 2 aim to set the scene by providing the microbial and engineering fundamentals, while subsequent volumes will deal with the usual range of products and product areas.

Sadly, a scan of the proposed product coverage (to date only Vols 1 and 3 are available) suggests some notable omissions. The list of complex compounds and polymers, for example, does not include polypeptides and proteins. Monoclonal antibodies and vaccines are nowhere to be seen. Are we to conclude — as one does from a more detailed inspection of Vols 1 and 3 — that we have here more a description of the biotechnology of times gone by, important though some of this may be? Surely it is the new biology of cell, gene and antibody cloning that has given biotechnology its uplift and while some of its undoubted promise will take longer to realize than most of the pundits would have us believe, the new and the old need to be put into a more believable perspective than we are given here. The chapter on genetic engineering, for example, does scant justice to a most exciting technology. We are not brought up to date with its scientific achievements nor are we made aware of its present limitations. Similarly the chapter on mutations does not even mention site-directed mutagenesis which will surely become more important as more key synthetic and regulatory genes are cloned.

We are promised critical assessments of industrial applications yet there is little evidence of this. For instance, in Vol. 3 human food from algae is mentioned as a challenge to the industry with little or no guidance as to what problems need to be addressed to bring this to reality. There is a description of single-cell protein production from alkanes yet little mention of why it is not now being exploited vigorously. Industrial acetic acid fermentation processes are discussed, but there is no comparison of their economics with those of production methods based on petrochemicals.

As with many other multi-author volumes, the standards of individual chapters show great variation. Some are so compressed as to be almost not worth publishing. Others, such as the chapter on ethanol from biomass, are well written but need the space they are given to do justice to their subject (the ethanol chapter takes up a quarter of Vol. 3). This section, along with those on amino acids and polysaccharides are the highlights of Vol. 3. Adequate space is also devoted to an article in Vol. 1 on sources of microorganisms and we are rewarded with a most comprehensive and readable account of the subject. For future volumes the editors must encourage the inclusion of more up-to-date material and a more detailed coverage of those areas they judge to be important. Otherwise this background work will only fill a few background shelves in the more affluent libraries. □

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Biology by numbers

S.D. Dover

Computing in Biological Science.
Edited by M.J. Geisow and A.N. Barrett.
Elsevier Biomedical: 1983. Pp.445. Dfl.160, $65.

THE best description of this book is that it would not be out of place as one volume in an annual series. The articles are interesting and thorough, but they are with one or two exceptions descriptions of research projects as they have been conducted by particular groups. In this sense the book is not a collection of review articles. Nor does it attempt, in the editors' own submission, to be complete, but rather to be illustrative of what can be and has been done.

Despite these criticisms the structure and quality of the articles make it a very readable book for browsing and picking up ideas. Many of the computational techniques are going to be applicable in a number of areas of biology and their methods and use are made very clear.

The editors have divided their subject matter into four sections — modelling, image analysis, numerical analysis, and microprocessors. The last two sections cover well established specialist areas. Unlike the other, major sections, however, these have not been described in ways which bring out the particular importance to any one part of biology. Modelling has been broken down into subsections which deal with diverse aspects such as the modelling of cells and cell components, and the building of molecular models of macromolecules. Similarly, the section on image analysis covers the processing of electrophoretic gel pictures and electron microscope three-dimensional image reconstruction.

In conclusion I am faced with a contradiction. There is no one topic for which I could justify purchasing this book, but I shall use it often, particularly for final-year undergraduate projects and for its useful examples. □

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