

Book Reviews

Biotechnology, A Comprehensive Treatise in 8 Volumes. Edited by H. J. REHM and G. REED, Weinheim; Deerfield Beach, Florida; Basel: Verlag Chemie. Volume 1: *Microbial Fundamentals* (1981). 520 pages, DM 495.

Biotechnology has become a much more fashionable word recently, with the growing realization that genetic engineering may actually be of more benefit than danger to mankind. The trend is reflected in the formation of several hundred companies to exploit the commercial possibilities of the new techniques, proposals to develop more biotechnology courses at universities, the launching of Derwent Biotechnology Abstracts in July 1982, and the announcement of an eight-volume comprehensive treatise on biotechnology, of which the first volume, entitled *Microbial Fundamentals*, is reviewed here.

We must certainly welcome such an ambitious project, which may be expected to encourage greater cultural exchange between university biology departments and industry, and perhaps even to reveal a number of trade secrets. It would be no less rash to judge eight volumes after reading the first than to judge a book from its first chapter. However, these volumes are so highly priced (DM 495 in the Federal Republic of Germany, \$309 in U.S.A., per volume), that their value will have to be outstanding if they are to compete successfully for the shrinking funds of university libraries and, according to recent reports, of the new generation of biotechnology firms. We have therefore to look rather critically at the present volume, which contains twelve chapters on a variety of topics, from the pens of eighteen contributors.

These chapters all have a refreshing emphasis on industrial microorganisms, but many of them contain much information which is readily available far more cheaply in recent text books of microbiology and biochemistry; and after reading them I feel rather like the Irishman in a country lane who, asked by a lost young couple of cyclists how to get to Ballybunion, replied 'Well, if I wanted to go to Ballybunion I wouldn't start from here.' The least satisfactory chapter is the first, on the characteristics of industrial microorganisms, which is a miniature textbook of microbial taxonomy in 68 pages, including viruses, phages and microbial eukaryotes, as well as prokaryotes. There is room for very little information on the characteristics of the multitude of organisms mentioned or on their industrial importance, and the very cryptic section on numerical taxonomy is quite useless. Many of the cited references would be difficult to obtain and are apparently in Russian or Czech. I think the author must have been given quite the wrong remit. This chapter could have given us much more detail on the most important industrial microbes, and introduced us more effectively to the relevant taxonomic literature. The editors surely knew of the preparation of a major work *The Prokaryotes: A Handbook on Habitats, Isolation and Identification of Bacteria*, Edited by M. P. Starr and others (2596 pages, Springer-Verlag, 1982), and might have mentioned it.

Chapter 2 concentrates on growth of microorganisms and its measurement and contains much useful information, with up-to-date references, not always complete enough. Thus table 3 lists 34 methods of estimating the cellular protein in a culture, and details of their application and relative merits would have been welcome. Chapter 3, on 'Basic Metabolic Processes', is the longest in the book and takes us rapidly through microbial biochemistry before concentrating on processes of industrial interest, but much

of it seems to me too condensed for a reader without training in biochemistry and redundant for one who has such training. This knowledge could have been assumed, or textbook references given, leaving much more space for industrial aspects. An article on secondary metabolites concentrates on pathways leading to a variety of antibiotics, often through unusual non-protein amino acids, of which some 200 are known. This article certainly ought to stimulate more studies on the specific pathways that channel essential precursors into non-essential secondary metabolites.

The chapters on genetic aspects include a valuable one on hybridization, which gives well-referenced lists of industrially important fungi, and of organisms in which genetic recombination has been achieved via protoplast fusion or attempted by transformation with external DNA. But the article on genetic engineering, though well written, is much too brief (23 pages) in view of its technological importance (the book reviewed below would fill this gap). Two chapters on the sources and the pure culture of industrial microorganisms maintain a firm practical approach. They tell us where to look for new microbes (in as many different soils as possible); how to isolate, enrich and screen them for a variety of different purposes (very few of the 50 000 known species of soil microbe have yet been exploited); and tabulate the main culture collections. No doubt these collections cannot supply the advanced strains developed by commercial laboratories, and one wonders how much money and scientific effort would be needed to identify or develop a new useful microbe, and how many new enterprises are in fact prospecting in this way. Two chapters finally discuss patent protection for biological inventions, and methods of batch and continuous culture of microbial, plant and animal cells.

In summary, this volume has a number of defects, reflecting perhaps uncertainty of editorial policy and a failure to decide what readership it should be aimed at. It cannot be recommended at the listed price, but it does contain much useful information not readily available elsewhere, and it would find a much wider readership and have much more impact if the price were substantially reduced. Future volumes in the series are entitled *Fundamentals of Biochemical Engineering*; *Microbial Products, Biomass and Primary Products*; *Microbial Products, Complex and Secondary Products*; *Food and Feed Production with Microorganisms*; *Microbial Transformation and Special Processes*; *Enzymes in Biotechnology*; and *Microbial Degradations*. We shall await sight of them with great interest.

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Man Made Life, A Genetic Engineering Primer, By JEREMY CHERFAS. Oxford: Basil Blackwell (1982). 270 pages, price £5.50.

This is a well-written and extremely readable book on the origins, present state and future prospects of genetic engineering, which can be recommended to biology students, professional biologists, prospective biotechnologists (in particular), and even the enquiring laymen. It is no cook-book, due to the fact that the author takes a historical approach which leads us easily from early work on DNA to the present state of the art, clearly explaining key experiments and the main problems encountered on the way. Chapters on 'Restriction', 'Tools', 'Manipulation', and 'Unravelling' leave us with a clear insight into what is involved in this art, including the two new techniques of sequencing DNA. Two chapters entitled 'Applications' and 'Vaccines' describe in considerable detail the progress towards commercial manufacture of medically important products such as human insulin, human growth and anti-growth hormones and interferon, achieved by