

tological. Another pleasant aspect, somewhat of a rarity in bacteriological discourses in recent years, is that genetic engineering is mentioned on no more than two or three pages!

This is a book about living bacteria and their relationships to living plants. It derives from a symposium which took place at Aberystwyth in July 1980. Most of the volume is devoted to a presentation of properly illustrated and referenced papers although at the end a few pages carry about a dozen abstracts selected from among those presented at the conference; one wonders what happened to the rest. The contrast produces a slightly odd effect but, while the abstracts contribute little by way of content, they do not detract from the value of the full papers.

The book opens with three reports discussing interactions between bacteria and plant roots; one deals with bacteria in the root environment and two with their roles in nitrogen fixation. These are followed by several concerned with infections suffered by growing plants, including accounts of the entry of pathogenic bacteria into plant tissues, the progression of disease within the plants them-

selves, invasion by mycoplasmas and the biology of crown gall disease. The emphasis then moves to matters of practical and commercial importance with papers on diseases of food plants, post-harvest spoilage, the production of foods and beverages by microbes and the hazards to human health of toxic bacterial dusts originating from plants. A final paper described light microscope techniques appropriate for the examination of plant materials.

The whole book is produced to the high standard we have come to associate with this publisher: the figures and photographs are clearly presented and the plentiful sub-headings allow the reader no doubt as to stages in the argument. The individual contributions carry full bibliographies and in some articles trouble has been taken to include references to works appearing after the conference itself. This book will indeed provide both a valuable supplementary text for lecture courses and a general background account for research workers.

V. Moses

Methods in Chloroplast Molecular Biology

Edited by M. Edelman, R.B. Hallick and N.-H. Chua

Elsevier Biomedical Press; Amsterdam, New York, 1982

xiv + 1140 pages Dfl 430.000; \$ 200

This large book is designed as a 'bible' of techniques for researchers in the field of chloroplast molecular biology, something along the lines of *Methods in Enzymology* but rather better set out. Each chapter is written by scientists experienced in the particular area and gives the full technical details necessary to perform the experiments from scratch, even including names and addresses of suppliers of reagents and lists of stock solutions with precise instructions as to how to make them up.

The first part of the book covers induction and selection of mutants in higher plants and algae,

techniques of chloroplast isolation from C₃ and C₄ leaves, methods of obtaining etioplasts and chloroplast envelopes and a detailed examination of methods for studying protein synthesis, with especial attention to electrophoretic separation of products. The preparation of DNA, RNA, ribosomes and 'factors' of protein synthesis is described and full technical details of nucleic acid hybridisation, electrophoresis, gene mapping and recombinant DNA experiments are included.

Other topics covered include purification of Calvin cycle enzymes, (ribulose biphosphate carboxylase being covered in exceptional detail),

some enzymes of nitrogen assimilation and the ATPase complex involved in photophosphorylation. Isolation of cytochromes and other components of the electron-transport chain is described in detail. There is also a section on freeze-fracture and freeze-etching techniques for examining chloroplast membrane structure.

The book is well laid out with a pleasant typeface and the uniformity in style between different chapters says a great deal for the co-ordinating

efforts of the editors. The index is reasonably good and there are few misprints.

Overall, the book seems expensive but fulfils its purpose admirably and is worth the price. This reviewer has had no practical experience of experiments with nucleic acids and protein synthesis, but would not hesitate to 'have a go' with the aid of this book.

B. Halliwell

Denitrification

by W.J. Payne

Wiley-Interscience; London, New York, 1981

xiv + 214 pages. £ 25.90

In view of the huge and costly amounts of nitrogen fertiliser that are used in agriculture much attention has rightly been given to the energy intensive process of biological nitrogen fixation and ways of exploiting it. We hear less about the other side of the nitrogen cycle, bacterial denitrification of fixed nitrogen back to dinitrogen gas. Logically, this process deserves an equal degree of attention by scientists. If we could discourage this enormously wasteful loss of nitrate from the soil, it would not be necessary to replenish it so much. This book gives a clear description of present knowledge about all aspects of denitrification. The author does not spare us the bad news. Denitrifiers are ubiquitous and we are stuck with them. At least, as more becomes known about them, we can learn what not to do. For example, addition of organic manures causes the anaerobic conditions in which denitrifiers thrive.

The book is written in a forceful style, and gives a comprehensive description of what is known about the denitrifying bacteria and their activities. The denitrifiers cover a wide range of genera and taxonomically have few common features. The biochemistry and enzymology of the denitrification, via nitrite then (surprisingly) nitric oxide nitrous oxide, and finally dinitrogen, is covered in

as much detail as available. While some bacteria carry out the whole process, specialists can be found which exploit each particular section of the pathway in their energy metabolism.

Indeed not all bacteria use nitrate as a respiratory substrate in this way; some reduce it to ammonia instead and are wholly beneficial. The great diversity of nitrogen metabolism is exemplified by the extraordinary observation that there are strains of *Azospirillum* and *Rhizobium* which can fix dinitrogen using energy derived from simultaneous denitrification.

The second half of the book is devoted to the ecology of denitrification in the soil. The techniques employed to assess the extent of denitrification in the field are described. Despite their associated problems these are necessary to assess the conditions which favour denitrification (water-logged soils) and what we can do to inhibit it (not much). Denitrification can be managed, to some extent and even exploited, in removal of nitrate from waste waters, one of its few beneficial effects. The book gives hope that although we cannot beat the denitrifiers we can at least learn to live with them.

R. Cammack

Contig assembly. *Methods in Molecular Biology* 70: 75–89. pmid:9089604. View Article. PubMed/NCBI. 66. Sugita M, Sugiura M (1996) Regulation of gene expression in chloroplasts of higher plants. *Plant Molecular Biology* 32: 315–326. pmid:8980485. View Article. PubMed/NCBI. Google Scholar. 67. Boudreau E, Turmel M (1995) Gene rearrangements in *Chlamydomonas* chloroplast DNAs are accounted for by inversions and by the expansion/contraction of the inverted repeat. *Plant Molecular Biology* 27: 351–364. pmid:7888624. View Article. PubMed/NCBI. Biology4Kids.com! This tutorial introduces plant chloroplasts. Other sections include plants, animal systems, vertebrates, and microorganisms. Chloroplasts - Show Me the Green. Chloroplasts are the food producers of the cell. The organelles are only found in plant cells and some protists such as algae. Animal cells do not have chloroplasts. Chloroplasts work to convert light energy of the Sun into sugars that can be used by cells. The entire process is called photosynthesis and it all depends on the little green chlorophyll molecules in each chloroplast. Plants are the basis of all life on Earth. They are classified as the producers of the world. In the process of photosynthesis, plants create sugars and release oxygen (O₂). Start by marking "Methods In Chloroplast Molecular Biology" as Want to Read: Want to Read saving... | Want to Read. Currently Reading. Read. Methods In Chloroplast by M. Edelman. Other editions. We'd love your help. Let us know what's wrong with this preview of *Methods In Chloroplast Molecular Biology* by M. Edelman. Problem: It's the wrong book It's the wrong edition Other.