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 themselves, 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 C_3 and C_4 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 bisphosphate 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 soild, 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 (waterlogged 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

Molecular biology. From Wikipedia, the free encyclopedia. Part of a series on.Â Researchers in molecular biology use specific techniques native to molecular biology but increasingly combine these with techniques and ideas from genetics and biochemistry. There is not a defined line between these disciplines. The figure to the right is a schematic that depicts one possible view of the relationships between the fields:[3].Â Methods in Enzymology. 530: 75â€“87. doi:10.1016/B978-0-12-420037-1.00003-8. PMC 4287216. Molecular biology /mÉ™ËˆlÉ›kjÊŠlÉ™r/ is the branch of biology that concerns the molecular basis of biological activity in and between cells, including molecular synthesis, modification, mechanisms and interactions. The central dogma of molecular biology describes the process in which DNA is transcribed into RNA, then translated into protein. William Astbury described molecular biology in 1961 in Nature, as: The chloroplast of Chlamydomonas reinhardtii and other microalgae represents an attractive new platform for the synthesis of recombinant therapeutics using synthetic biology (synbio) approaches. Transgenes can be designed in silico, assembled from validated DNA parts and inserted at precise and predetermined locations within the chloroplast genome to give stable synthesis of a desired recombinant protein.Â Advances in microalgae engineering and synthetic biology applications for biofuel production. Curr Opin Chem Biol 2013;17:489â€“495 [CrossRef] [PubMed]. [Google Scholar].Â Coragliotti AT, Beligni MV, Franklin SE, Mayfield SP. Molecular factors affecting the accumulation of recombinant proteins in the Chlamydomonas reinhardtii chloroplast. Molecular Biology methods used to study the molecular basis of biological activity. Most commonly used methods are protein methods, immunostaining methods, nucleic acid methods. These methods used to explore cells, their characteristics, parts, and chemical processes, and pays special attention to how molecules control a cellâ€™s activities and growth. Molecular Biology Techniques include DNA cloning, cut and paste DNA, bacterial transformation , transfection, chromosome integration, cellular screening, cellular culture, extraction of DNA, DNA polymerase DNA dependent, reading and writing DNA, D Chloroplasts and Chloroplast Genomes. Chloroplasts are chlorophyll-containing organelles in plant cells; they play a vital role for life on Earth since photosynthesis takes place in chloroplasts. Chloroplasts develop from proplastids, as do chromoplasts, leucoplasts, and other plastids. The existence of functioning DNA in chloroplasts (chloroplast DNA (cpDNA)) and other plastids is one of the main findings supporting their origin as prokaryotic (cyanobacterial) symbionts during the early evolution of life. The DNA contained in the different types of plastids of a higher plant is identical.