hypoxia/ischemia (with three chapters by L. M. Buja and J. C. Miller, D. D. Belke and G. D. Lopaschuk, and H. Wang et al.); as well as two chapters dealing with the lipids of clostridium (by H. Goldfine) and *E. coli* (by W. Dowhan) and the lessons they teach about structure/function relationships for lipids in general.

In a rapidly changing area, progress often outpaces publication of a book. Volume 2 of *Advances in Lipidology* has few citations after 1993, which is of some concern. Nonetheless, the chapters provide conceptual frameworks for understanding developments in their fields, rather than a mere cataloging of recent findings. Also, the selection of topics presents an interesting cross-section of research on different lipid classes—from the most basic aspects through disease. These features make the book valuable for readers who wish to broaden and deepen their understanding of "lipobiology".

Alfred H. Merrill, Jr., *Emory University School of Medicine*

JA975686I

S0002-7863(97)05686-2

Fuels and Chemicals from Biomass. Edited by Badal C. Saha (U.S. Agricultural Research Service) and Jonathan Woodward (Oak Ridge National Laboratory). ACS Symposium Series 666. American Chemical Society: Washington, DC. 1977. x + 356 pp. $119.95. ISBN 0-8412-3508-2.

This collection of papers presented at a meeting in New Orleans in March 1996 should be on the shelves of all researchers concerned with the processing of lignocellulose. They represent, for the most part, an American perspective of the future of bioenergy research, in which there is still an emphasis on growing plant material *de novo* for the specific purpose of conversion to liquid fuel by saccharification and fermentation steps. Such a process is the focus of the first two articles in the book, which are useful sources of current references. To this reviewer, though, it seems that more immediately useful results are likely to emerge from the use of a feedstock with negative value than from specifically harvested biomass: such material has been used as a transportation fuel for a century and a half (in wood-burning steam locomotives), and it is difficult to see how the efficiency of the process will improve much by the introduction of a series of complex steps between biomass and heat engine.

The worldwide shortage of cellulose fiber for paper and board making moreover makes it likely that lignocellulose crop plants will be grown in the first instance for cellulose fiber, and that bioethanol production will usually involve the use of waste. The emphasis in Ingram's and in Krishnan's articles on the fermentation of hemicellulose sugars thus seems entirely sensible. The modeling studies of Zacchi and his co-workers, indicating that integration of bioethanol plants with others (such as pulp mills) can increase efficiency significantly, are also telling. The MixAlco process described by Holtzapple and collaborators is ingenious, involving the fermentation of a range of largely waste products to carboxylic acids, formation of their calcium salts, pyrolysis to the ketones, and reduction.

The chemicals section of the volume has interesting articles on the production of lactic acid, succinate, 2,3-butanediol, and xylitol and biodegradable plastics from biomass. The section is something of a grab-bag, but focuses on the main current target products. There are also articles on photosynthetic hydrogen production and biodiesel and use of synthesis gas in fermentations from a chemical engineering perspective, as well as the effect of carbon dioxide on alcoholic fermentations and expression of a β-glucosidase in a soil bacterium.

Inevitably in a symposium series such as this, the level of coverage and target readership of the individual articles is very uneven, but I detected only one real horror: the article on butane-2,3-diol seemed entirely innocent of any mention of the stereochemistry(ies) of the alcohol(s) produced.

The major disappointment, though, was the gaps in the coverage. Firstly, biomass is not necessarily lignocellulose; marine biomass is based on chitin, which is produced in similar quantities globally to cellulose. Secondly, the "chemicals" part could have been more profitably a "feedstock" part, to include both bacterial polymers and cellulosic fiber; pulp treatments (bleaching, deinking, and refining) are now significant users of lignocellulolytic enzymes. Thirdly, if the social, political, and environmental rationale for much of the work was to be treated at all, at some point reasons should have been advanced as to why it was essential to devise new technologies of producing fuel, rather than improved technologies for burning less of it.

Michael L. Sinnott, *University of Manchester Institute of Science and Technology*

JA975677+

S0002-7863(97)05677-1

Genetic Engineering: Principles and Methods. Vol. 19. Edited by Jane K. Setlow (Brookhaven National Laboratory). Plenum Press: New York. 1997. xiv + 309 pp. $85.00. ISBN 0-306-45681-8

The ever increasing interdependence of biochemistry and molecular biology, especially in the arena of industrial and agricultural biotechnology, requires that chemists and biochemists working in these fields have a thorough understanding of gene structure, gene manipulation, and control mechanisms of gene expression. This outstanding series presents in-depth reviews of selected topics in genetic engineering. The emphasis is on recent advances that may be relevant to the pursuit of commercial genetic engineering projects. Although the series title mentions "methods", no laboratory procedures will be found here.

In this volume, most of the essays are related to plant molecular biology. Included are Novel Approaches to Engineering Disease Resistance in Crops (K. M. M. Swords, J. Liang, and D. M. Shah), The Structure of Plant Gene Promoters (T. J. Guilfoyle), Pathways and Genes Involved in Cellulose Synthesis (Y. Kawagoe and D. P. Delmer), Regulation of Protein Degradation in Plants (J. Callis), Genetic Engineering of Oilseeds for Desired Traits (A. J. Kinney), Switching On Gene Expression: Analysis of the Factors that Spacially and Temporally Regulate Plant Gene Expression (L. Meisel and E. Lam), Nucleic Acid Transport in Plant-Pathogen Interactions (R. Lartey and V. Citovsky), Leaf Senescence: Gene Expression and Regulation (L. M. Weaver, E. Himelblau, and R. M. Amasino), and Recognition and Signaling in Plant-Pathogen Interactions: Implications for Genetic Engineering (M. Lawton). It is noteworthy that several authors are from companies such as Monsanto and DuPont, which have active R&D efforts in plant biotechnology.

The minority of articles in this volume deal with prokaryotic subjects. These include Plasmid Stabilization by Post-Segregational Killing (K. Gerdes, J. S. Jacobsen, and T. French) and Termination of DNA Replication in Prokaryotic Chromosomes (D. Bastia, A. C. Manna, and T. Sahoo). The former provides a useful description of the *hok/sok* (host killing/suppression of killing) system for plasmid stabilization, in which errant plasmid-free cells are killed by intracellular residues of a toxic protein (*hok*), but plasmid-containing cells are protected by the *sok* anti-sense RNA that prevents expression of *hok*. The article by Bastia et al. describes structure−function relationships arising from the recent crystallographic study of the replication terminator protein (RTP) of *Bacillus subtilis*. In this article, and in Comparative Molecular Analysis of Genes for Polycyclic Aromatic Hydrocarbon Degradation (G. J. Zylstra, E. Kim, and A. K. Goyal), will be found almost the only chemical or molecular structural content in the book; the rest is molecular genetics.

This series is well edited and nicely produced. All articles are thoroughly documented with references through 1996. A good index is included. Due to its timely content, the series is a must for a biochemistry or microbiology library. Also, given the rather moderate cost, it can be recommended for the library of a specialist in plant molecular biology or biotechnology.

John W. Keller, *University of Alaska Fairbanks*

JA975611E

S0002-7863(97)05611-4