

the field. In this volume the lectures are brought together in the hope of reaching a wider audience. The opening lecture is by the population biologist G. Ledyard Stebbins, who traces four revolutions affecting biology generally, the Mendelian, macromolecular, and transfer-of-energy revolutions and a second molecular revolution involving nucleic acids and the genetic code. Understanding of nitrogen fixation is the subject of the second lecture, by Robert H. Burris, who concludes an account beginning with the work of Boussingault and Liebig 150 years ago with the observation that selection of rhizobia to improve the process remains essentially empirical, as distinct from rational. Bruce Griffing then reviews the contributions of quantitative genetics to plant breeding, outlining basic concepts and methodologies and noting the work of Ronald Fisher (1918) and its later generalization by Cockerham and Kempthorne as special milestones. Turning to plant pathology, Arthur Kelman argues the case that that area of study has contributed importantly to other fields of biology, citing as examples the recognition of a fungus as the cause of smut in wheat and the fact that viruses were first identified as plant pathogens and also considering abiotic disorders such as frost damage. Ralph Riley in a lecture on crop cytogenetics reviews efforts at chromosome manipulation in such plants as rice, wheat, watermelon, and sugar beet, *Triticale* being a notable example of success. Charles S. Levings III and two coauthors discuss implications of recent biotechnology, including the development of *Agrobacterium* as a vector for gene introduction, the utility of *Arabidopsis* as a model system, and resistance to viruses and insects. In the last two lectures John W. Dudley and Neil F. Jensen both discuss plant breeding, the former considering issues of quality, crop yield, and production efficiency and the latter finding continuities from pre-scientific agriculture to the present, giving attention to such advances as the practice of artificial hybridization and the recognition of "hybrid vigor." Each lecture is preceded by a brief biography of the author. A list of literature cited follows each, and there is an index to the volume as a whole.

Katherine Livingston

American Chemical Enterprise. A Perspective on 100 Years of Innovation. MARY ELLEN BOWDEN and JOHN KENLY SMITH. Chemical Heritage Foundation, Philadelphia, 1994. 96 pp., illus. Paper, \$15. Chemical Heritage Foundation Publication no. 14.

The Society of Chemical Industry was founded in London in 1881 "to advance applied chemistry in all its branches," and



"A plant for making linear olefins for biodegradable detergents, Chocolate Bayou, Texas." [From *American Chemical Enterprise*; courtesy Monsanto Company]



"James Franklin Hyde demonstrating a silicone-based product. Hyde began to develop silicones—products which became the foundation of Dow Corning Corporation—in 1935 at Corning Glass Company." [From *American Chemical Enterprise*; Chemical Heritage Foundation]

the effort was extended overseas with the establishment of an American Section in 1894. This publication celebrates the centennial of the latter event with a series of copiously illustrated historical sketches of aspects of industrial chemistry in the United States. The introductory essay is devoted to the early days of the American Section, which distinguished itself from the then more theoretically and academically oriented American Chemical Society and "found its niche in conviviality and communication, not lobbying or education." Other essays take up enterprises concerned with "mineral wealth" and industrial gases, from alloy steels to helium; the development of electrochemicals and related processes, including the economical production of aluminum, once considered a precious metal; and efforts prior to World War II to convert natural products into more valuable substances, results including dyestuffs, Celanese, celluloid, Bakelite, and smokeless powder or gun cotton. A chapter then recounts the development of chemical engineering as an academic discipline, the Man-

hattan Project being discussed as one of its "payoffs." Petroleum and petrochemicals, synthetic materials such as nylon and plastics, pharmaceuticals, and semiconductors and environmental technologies, the last two categorized together on the basis of their relevance to the "global village," are the subjects of the final chapters. The treatment is centered on the work of American Section award-winners, who include many famous chemists, and the emphasis throughout is on the contributions of the chemical industry to the general welfare; Howard Sorgenti comments in his foreword that "If today the 'romance' has gone out of industry, that is probably the greatest compliment we pay to the innovators of the past." The work ends with listing of officers and award-winners of the American Section and a page of suggestions for further reading.

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Books Received

Accounting as Social and Institutional Practice.

Anthony G. Hopwood and Peter Miller, Eds. Cambridge University Press, New York, 1994. xii, 324 pp., illus. \$59.95; paper \$19.95. Cambridge Studies in Management, 24.

Active Assessment for Active Science. A Guide for Elementary School Teachers. George E. Hein and Sabra Price. Heinemann, Portsmouth, NH, 1994. xiv, 155 pp., illus. Paper, \$18.

Advances in Bioprocess Engineering. Enrique Galindo and Octavio T. Ramírez, Eds. Kluwer, Norwell, MA, 1994. xvi, 541 pp., illus. \$260 or £172.50 or Dfl. 420. From a symposium, Cuernavaca, Mexico, June 1994.

Advances in Integrated Optics. S. Martellucci, A. N. Chester, and M. Bertolotti, Eds. Plenum, New York, 1994. viii, 343 pp., illus. \$95. From a conference, Erice, Sicily, June 1993.

Bearing the Dead. The British Culture of Mourning from the Enlightenment to Victoria. Esther Schor. Princeton University Press, Princeton, NJ, 1995. x, 290 pp., \$35 or £27.95. Literature in History.

Behavior and Evolution. P. J. B. Slater and T. R. Halliday, Eds. Cambridge University Press, New York, 1994. x, 348 pp., illus. \$59.95; paper, \$24.95.

Behavioral Mechanisms in Evolutionary Ecology. Leslie A. Real, Ed. University of Chicago Press, Chicago, 1995. x, 469 pp., illus. \$80 or £63.95; paper, \$29.95 or £23.95.

Between Copernicus and Galileo. Christoph Clavius and the Collapse of Ptolemaic Cosmology. James M. Lattis. University of Chicago Press, Chicago, 1995. xx, 293 pp., illus. \$54 or £43.25; paper, \$22.50 or £17.95.

The Cambridge Atlas of Astronomy. Jean Audouze and Guy Israël, Eds. 3rd ed. Cambridge University Press, New York, 1994. 471 pp., illus. \$75. Translated from the French edition (1994) by Andrew King.

Cancer Prevention and Control. Peter Greenwald, Barnett S. Kramer, and Douglas L. Weed, Eds. Dekker, New York, 1994. xiv, 801 pp., illus. \$195. Basic and Clinical Oncology, 6.

Cell Adhesion. Fundamentals and Biotechnological Applications. Martin A. Hjortso and Joseph W. Roos, Eds. Dekker, New York, 1994. xii, 273 pp., illus. \$135. Bioprocess Technology Series, vol. 20.

Cellular Bioenergetics. Role of Coupled Creatine Kinases. V. A. Saks and René Ventura-Clapier, Eds. Kluwer, Norwell, MA, 1994. vi, 346 pp., illus. \$195 or £138.50 or Dfl. 375. Developments in Molecular and Cellular Biochemistry, 13. Reprinted from *Developments in Molecular and Cellular Biochemistry*, 133/134 (1994).

Curves and Fractal Dimension. Claude Tricot. Springer-Verlag, New York, 1994. xiv, 323 pp., illus. \$42.

Death and Deliverance. "Euthanasia" in Germany