

guistic analysis, folklore, and critical examination of various other hypotheses. He conjectures that camels were first domesticated for their milk by seafarers along the South Arabian coast and then came to be used as pack animals for changing settlements. The author never loses sight of the relationship between the camel and the camel breeder and their relation to larger society. Key factors in his analysis are camel saddles and packs and utilization of camel products. One might wish for a comparative discussion of social structures of the various camel breeders, but perhaps unfairly, for such a discussion would change the scope and the focus of the book.

Bulliet also discusses the camel as a draft animal, raising the possibility of the Tunisian camel harness design and single-animal harnessing as the prototype for the European harness. In addition the book touches on other aspects of the subject, including more recent Western experiments and failures. The Australian one has ended today with an ecological threat posed by the camel in its reversion to a wild form. Bulliet concludes with the final victory of the wheel over the camel in this century, and the reader is slightly saddened, after having gained a new esteem for the ship of the desert, by what appears to be the final outcome of this process. Bulliet is to be commended for his appreciation of the complexity of the historical problem and his ability to delineate clearly all aspects of it.

GENE R. GARTHWAITE

*Department of History,
Dartmouth College,
Hanover, New Hampshire*

Interdependences

Insects, Science, and Society. Proceedings of a symposium, Ithaca, N.Y., Oct. 1974. DAVID PIMENTEL, Ed. Academic Press, New York, 1975. xxviii, 284 pp., illus. \$15.

The occasion was the centennial celebration of the first department of entomology in the United States. Edward H. Smith, the new chairman of the department at Cornell University, organized the program and dedicated it to the department's founder, John Henry Comstock (1849-1931). Eleven speakers were chosen by the faculty to represent the best of the science and its administration, both nationally and internationally. The theme that emerged was that multidisciplinary approaches are rapidly being developed for insect pest control and basic insect biology.

In his introduction to this volume, David Pimentel describes the special role of en-

tomology in meeting the challenges of human overpopulation, food shortages, fuel shortages, and environmental degradation. At the focus of its applied mission is pest management. According to L. Dale Newsum, this is an ecologically based strategy for regulating pest populations at levels below economic-injury thresholds by use of the best tactics available.

In a historical sketch of Comstock's varied interests, Howard E. Evans concludes that the old master would have been delighted, but not surprised, to see the modern array of control strategies that depend on sound studies of insect taxonomy, physiology, and ecology. Comstock sensed the unity in insect biology and control. Yet his legacies and that of the first integrator of techniques, Dwight Isley, were swept aside by the advent of DDT. For over two decades, chemical pesticides dominated pest control because they were cheap and dependable. The ecological and evolutionary consequences were seen only dimly until pest after pest evolved resistant populations and the environmental hazards were dramatically publicized.

Neglected during the pesticide era and now among the tactics being refined are the selection of crop plants resistant to insect attack, biological control of pests by natural enemies, and disruption of pest reproduction. Each of these is delineated with textbook clarity in papers that provide excellent introductions to the subjects. Mano D. Pathak gives a lucid account of heritable qualities of plants that confer resistance to insect feeding. He further adds an account of those instances in which insects have coevolved to overcome the plant's defense. The complex trophic relationships among predators, parasitoids, and their hosts are described by Powers S. Messenger, who points out that unexpected features in population dynamics may hinge on seemingly minor details of behavior and species interaction. Wendell L. Roelofs defends a new role for chemicals in pest management, namely, as species-specific sex pheromones useful in attracting pests to traps or in disrupting their mating.

The development, integration, and application of these and other strategies require extraordinary organization and financial support. John J. McKelvey, Jr., describes international efforts to coordinate programs in a presentation enhanced by interesting sidelights. Directly to the point are the cost/loss analyses of Waldemar Klassen. He describes a series of federal programs in pest management totaling more than \$100 million a year.

The contributions of Richard D. Alexander, John S. Kennedy, T. R. E. Southwood, and Edward O. Wilson emphasize

basic evolutionary and ecological theory. Wilson outlines the traits of social insects and the role of kin selection in social evolution. The selective advantages of chorusing behavior in acoustical insects are reinterpreted by Alexander in terms of individual rather than group benefits. Kennedy evaluates the adaptive functions of migration for *r*-strategists. A fine summary of population dynamics in theory and in fact is provided by Southwood.

A human endeavor of great complexity and far-reaching importance is taking shape in the pest management field. The gap between theoretical biology and practical applications is closing fast. This book is a benchmark in the revival of the study of insect biology in relation to human welfare. Let us hope that the interdependences seen so clearly by Comstock will not be obscured again.

HOWELL V. DALY

*Department of Entomological Sciences,
University of California, Berkeley*

Books Received

Advances in Cryogenic Engineering. Vol. 20. Papers from meetings, 1973 and 1974. K. D. Timmerhaus, Ed. Plenum, New York, 1975. xii, 518 pp., illus. \$39.50. A Cryogenic Engineering Conference Publication.

Biochemical and Biophysical Perspectives in Marine Biology. Vol. 2. D. C. Malins and J. R. Sargent, Eds. Academic Press, New York, 1975. xvi, 360 pp., illus. \$30.

Explorations in Child Psychiatry. E. James Anthony, Ed. Plenum, New York, 1975. xx, 500 pp. \$25.

Fiber Deficiency and Colonic Disorders. Papers from a conference, Chicago, May 1974. Richard W. Reilly and Joseph B. Kirsner, Eds. Plenum, New York, 1975. x, 186 pp., illus. \$19.50.

Ion Implantation in Semiconductors. Science and Technology. Proceedings of a conference, Osaka, Japan, Aug. 1974. Susumu Namba, Ed. Plenum, New York, 1975. xvi, 742 pp., illus. \$49.50.

Kinetics of Enzyme Mechanisms. J. Tze-Fei Wong. Academic Press, New York, 1975. xiv, 294 pp., illus. \$20.25.

Lemur Biology. Ian Tattersall and Robert W. Sussman, Eds. Plenum, New York, 1975. xiv, 366 pp., illus. \$22.95.

The Life-Giving Sea. David Bellamy. Crown, New York, 1975. 320 pp., illus. \$15.95.

Lunar Mineralogy. Judith W. Frondel. Wiley-Interscience, New York, 1975. xii, 324 pp., illus. \$18.95.

Man-Environment Interactions. Evaluations and Applications. Papers from a conference, Milwaukee, May 1974. Daniel H. Carson, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1975 (distributor, Halsted [Wiley], New York). 3 vols., illus. xiv, 198 pp.; xiv, 288 pp.; and xiv, 212 pp. \$50. Community Development Series, 22.

Methods in Membrane Biology. Vol. 4, Biophysical Approaches. Edward D. Korn, Ed. Plenum, New York, 1975. xx, 298 pp., illus. \$22.50.

(Continued on page 1320)