



Review: [Untitled]

Reviewed Work(s):

Biochemical Interaction Between Plants and Insects. Recent Advances in Phytochemistry, Volume 10. by James W. Wallace; Richard L. Mansell

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inflammability limits (4-75% in air), and is difficult (sometimes dangerous) to store as a liquid.

Its principal benefits are that it would allow the storage of energy in a post-fossil-fuel era, when electricity is expected to play a major role; it can be converted to electricity cleanly and efficiently, using fuel cells; and, in liquid form, it can be burned in jet aircraft. Hydrogen can also be burned in internal combustion engines, though less efficiently than in fuel cells.

The overall impression from the book is that, although hydrogen offers much in terms of cleanliness and efficiency, a great deal of technical development is still needed to reduce costs and to cope with safety and other problems.

The book consists of 19 chapters. The first three introduce the hydrogen economy and the generic problems of growth and the exhaustion of resources. Chapter 4 deals with coal as an intermediate source of fuels until solar and nuclear sources can be widely introduced. Chapter 5 reviews the status of various emerging energy sources. Chapters 6 and 7 are devoted to solar technologies, their performance, promise, and costs. Chapter 8 discusses the transmission of energy; Chapter 9, the production of hydrogen from water; Chapter 10, the storage of energy; Chapter 11, safety problems with hydrogen; and Chapter 12, embrittlement. Chapters 13, 14, and 15 deal with technologies, existing and needed, for using hydrogen in transportation, industry, and buildings. Chapter 16 is a short discussion of environmental effects of hydrogen. The last three chapters discuss alternatives to the hydrogen economy, such as one based on methanol; the evolutionary stages leading to widespread hydrogen use; and the political prospects for actually moving forward with some of his proposals.

Although the book contains a wealth of technical information, it is not well edited; it is difficult in places for the non-specialist to read. A number of sections will be understandable only to physical chemists or chemical engineers. Additionally, the book has many equations with undefined symbols, and is somewhat marred with confusing notation, occasional arithmetic mistakes, mislabeled figures, misspellings, repeated paragraphs, and non-sentences.

In spite of these annoyances I found the volume to be a valuable reference work for a topic that is likely to grow in importance.

JAMES J. MACKENZIE, *Scientific Staff, Massachusetts Audubon Society*

MAN'S PLAGUE? *Insects and Agriculture.*

By V. G. Dethier. *The Darwin Press, Princeton (New Jersey)*. \$9.95. 237 p. + 4 pl.; ill.; index. 1976.

In this readable and scholarly tour de force, Vincent Dethier gives a balanced review, a critique, of the present approach to the control of agricultural pests, woven through a narrative both historical and biolog-

ical. With fascinating detail of astonishing reach, his exposition of somewhat neglected biological principles flows from his broad awareness of entomology, botany, and society. He will stir your reading appetite; there are no reading deterrents in this book.

Large human populations rest upon agriculture — a human invention, an ecological disturbance — and on economic genius. As man multiplies his crop plants, the insect species that prefer them or adapt to them increase and prosper. This may be a familiar observation, but do we fully exploit our knowledge of its biological basis? Are we sufficiently aware that agriculture marches in an "evolutionary parade" to a "biological tune"?

With unmatched flair and freshness, Dethier constructs a veritable network of arguments promoting more investment in ecological approaches to insect control. But even the most hard-bitten devotee of chemical control, this reviewer included, finds comfort as Dethier insists upon the necessity for judicious use of insecticides and criticizes those who make extreme claims for ecological pest management.

I recommend this book to policy makers and professors, to researchers and practitioners, to students and to the public — to all who have a stake in the insect-plant-man relationship.

MARTIN M. BARNES, *Entomology, University of California, Riverside*

BIOCHEMICAL INTERACTION BETWEEN PLANTS AND INSECTS. *Recent Advances in Phytochemistry, Volume 10.*

Edited by James W. Wallace and Richard L. Mansell. *Plenum Press, New York*. \$35.00. xii + 425 p.; ill.; index. 1976.

This symposium proceedings should be read by every serious student of the chemistry of animal-plant interactions, but read cautiously and for more than just facts.

Evergreen foliage on conspecifics in dense stands should be protected typically by high concentrations of rather similar digestion-inhibiting large molecules; foliage of scattered annuals should be protected by a great diversity of small-molecule physiological poisons in low concentrations. It says something about this area of science that presenting this quite reasonable hypothesis can be the entire subject of two large papers by different authors (Feeny, Rhodes and Gates) that cite 285 references with only 15 in common. After indulging in 34 pages of secondary compound phytosociology, Beck and Reese finally give up. "In the past, most of us have been obsessed with the idea that an insect-plant relationship can be explained on the basis of the presence or the quantity of one identifiable chemical factor. It seems to us unlikely that such a simple approach will often succeed. The plant contains a typical complex of non-nutrient allelochemicals, and it is this complex profile . . . with which the insect must cope" (p. 74). Roeske, Seiber,

Brower and Moffitt tell a beautiful story of the micro-distributional ecology of milkweed cardiac glycosides in monarchs, and what it means; they show what can be understood through careful research guided by evolutionary concepts. Hedin, Thompson and Gueldner tell us several thousand facts about boll weevil and cotton biochemistry (214 references), but no story. They state "no one concept has been found which can explain the variations in the degree of preference of the boll weevil for its hosts" (p. 295). Yes there has, and it's called fitness. It is very useful to have a compilation of the parallels and convergences among plant and animal secondary compound chemistry (Rodriguez and Levin). I detect the makings of a fantastic secondary compound story behind Mothes' brief review of the ergot and opium poppy alkaloids. But the sentence to stand for all time is Hendry et al.'s statement that "repeated forest defoliations by the oak leaf roller cause the eventual production of an abundance of acorns. In this manner, oak trees may insure continuance of the species albeit by sacrificing the adult" (p. 379-380).

DANIEL H. JANZEN, *Biology, University of Pennsylvania*

SOIL COMPONENTS. *Volume 1: Organic Components; Volume 2: Inorganic Components.*

Edited by John E. Gieseking. Springer-Verlag, New York.
(1) \$72.80; (2) \$74.80. (1) x + 534 p.; (2) xii + 684 p.; both vols. ill. and with index. 1975.

This extensive two-volume reference work consists of chapters by soil physicists and chemists who are well-known international authorities in their fields. Volume 1 deals with the biochemical cycles of organic substances that are returned to the soil when organisms die and their tissues decay. Humus — its development, physical properties, and micromorphology — is reviewed in three chapters; the other five chapters concern the breakdown and fate of carbohydrates, nitrogenous substances, organic phosphorus compounds, sulfur, fats, waxes and resins in soils. The combination makes a full and authoritative treatment of the subject.

Volume 2 examines the inorganic components of soils, particularly their importance in the overall structure of soil and in the formation of soil colloids. The chapters discuss soil silicates and oxides, micas, smectites, vermiculites, chlorites, interstratified clay minerals, fibrous minerals, allophane, oxides and hydrous oxides of silicon, feldspar and heavy minerals, bioliths, and soil water relationships.

The exhaustive treatment makes this work an essential and up-to-date reference work, useful both to soil chemists, physicists, and pedologists, and to workers in peripheral fields who need fundamental information on soil structure and composition.

CLIVE A. EDWARDS, *Entomology, Rothamsted Experimental Station*

OUR LANDED HERITAGE. *The Public Domain, 1776-1970. Second Edition, Revised.*

By Roy M. Robbins. University of Nebraska Press, Lincoln. \$17.50 (hardcover); \$5.95 (softcover). xii + 503 p.; ill.; index. 1976.

The second edition of *Our Landed Heritage* has appeared after three and a half decades. Each of the older chapters has benefited from new studies. Two additional chapters describe the bitter controversies between those having vested interests in the public lands and those having a growing awareness of the national interests. The account of this period starts with the Taylor Grazing Act of 1934. Secretary of the Interior Harold Ickes had the task under the Act of preventing overgrazing, soil deterioration, and trespass. He was attacked by Senator McCarran of Nevada who fronted for livestock interests, seeking to sell them the public range or even to cede it to the states. The struggle widened as timber, minerals, hydroelectric power, irrigation, and other natural resources were recognized as important to the whole nation, not just to those who had been getting direct benefits at cut-rate prices. Concern and involvement increased as a result of struggles in Congress, strong contrasting party-line positions, and effective writing such as Bernard DeVoto's in *Harper's* "Easy Chair."

Robbins notes a remarkable series of changes in national posture during the latter decades. Although each has received book-length treatments elsewhere, he comments on the Civilian Conservation Corps, the shelter-belt along the 100th meridian, reinvestment in federal title of Oregon and California lands, the practice of sustained-yield forestry, building the great multiple-purpose dams and expanding irrigation and hydroelectric power, and development of the Tennessee Valley Authority. Step by major step, such developments were a combination of leadership and public response that left the traditional vested interests frustrated but still vocal.

There is never any uncertainty over where the author stands on any of the issues, but he cites the pertinent literature and, in my opinion, uses it fairly. As a midwesterner, he looks over one shoulder to the West and the other to the East, trusting his scholarship to pull him through a long gauntlet of hotly, often angrily, contested public conflicts.

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FENNOSCANDIAN TUNDRA ECOSYSTEMS. *Part 2: Animals and Systems Analysis. Ecological Studies: Analysis and Synthesis, Volume 17.*

Edited by F. E. Wielgolaski. Springer-Verlag, Berlin and New York. \$57.00. xiii + 337 p.; ill.; subject index. 1975.

Volume Two of the Fennoscandian International Biological Program studies, like Volume One on plants and microorganisms, is a composite of many short