

New Books

The Principles of Biological Control

By HARVEY L. SWEETMAN. 560 pages. Wm. C. Brown Co., Dubuque, Iowa. \$8.75. Reviewed by PAUL DEBACH, University of California, Riverside.

THIS BOOK will be of considerable value as a reference source for field workers in biological control. Sweetman has made a very intensive survey of the literature on biological control; his book brings together a great deal of literature which otherwise would be unavailable to the average student. Many excellent illustrations (over 300) are included.

Although the title indicates "principles" are to be stressed, actually they constitute a small portion of the book and in most instances are hidden in a mass of literature references. The title of Chapter 1, "The Theoretical Basis of Biological Control," likewise is misleading because virtually nothing but early history and definitions of terms is covered. Later there is a short discussion of the theoretical basis of biological control in Chapter 14, but this is entitled "The Evaluation and Results of Biological Control Against Animals." As these comments indicate, organization of the book is somewhat confusing to the reader although a given subject can be found readily from the index.

In this book the term "biological control" has been widened in scope as compared to that usually understood by economic entomologists, who originally coined the term and developed the field. Sweetman includes the use of resistant host plants and of antibiotics, especially in medicine, but he then limits the discussion of antibiotics to about one page. Somewhat disproportionate stress is laid on the use of nematodes, mollusks, and vertebrates as compared to insect parasites and predators.

Over one-third of the book is devoted to condensed biologies of individual species of insect parasites and predators. There is much valuable source material here for workers interested in particular species. However, much of this was already available in Clausen's book on entomophagous insects.

Inasmuch as most of this book is based upon a review of the literature, the accuracy of review and interpretation is of great importance. The review of projects upon which I have personally worked, or upon which I have first-hand knowledge, shows too many misinterpretations, omissions, or

errors. For instance, on page 248 *Cryptognatha* is stated not to prey on hard scales, although the coconut scale which it is credited with controlling is a hard scale; on page 329 *Cryptolaemus* is stated as still being used against *P. adonidum*, whereas it is used against *P. citri*; on page 351 the Japanese race of *Comperiella* is supposed to reproduce on second-instar California red scale only, whereas actually it reproduces only on yellow scale in the field; on page 360 *Comperiella* is supposed to have taken 10 years to become effective on yellow scale; however it was not colonized on yellow scale until 7 years after its introduction, and it then controlled the scale on release trees, within 1 year; on pages 406-7 it is indicated that most successes in California have supposedly occurred in the San Joaquin and Sacramento valleys, whereas most have occurred elsewhere in the state; on page 418 some of the statements regarding California red scale are misleading or wrong; also on page 418 Flanders is supposed to have credited the control of cottony-cushion scale entirely to *Cryptochaetum*—this is a misinterpretation; on page 422 the coccinellid predators supposed to attack the citrus red mite are actually California red scale predators.

Finally, in the list of successful cases of biological control (pp. 409-415), about 10% are cases of control by indigenous parasites, while on the other hand some complete or important partially successful cases of biological control are left out, including those of *Pseudococcus kenyae* in Kenya, *Epilachna philippinensis* in Guam, *Hormona coffearea* in Ceylon, *Pseudaulacaspis (Diaspis) pentagona* in Argentina, Austria, Bermuda, Italy, and Uruguay, *Laspeyresia nigricana* in Canada, *Pseudococcus citriculus* in Israel, *Phenacoccus iceryoides* in Java, *Pieris rapae* in New Zealand, *Plutella maculipennis* in New Zealand and partially in Java, *Lepidosaphes ulmi* in California, *Hypera postica* in some U. S. areas, *Grapholitha molesta* in Canada and partially in the U. S., *Stilpnothia salicis* in Canada, New England, and Washington, *Ceratitus capitata* partially in Hawaii, *Cnidocampa flavescens* in Massachusetts, *Pulvinaria psidii* in Puerto Rico, and *Nygmia phaeorrhoea* in the U. S.

Some of the conclusions or concepts in this book will be challenged by many specialists in biological control. One instance must suffice: the book infers that chances of success in biological control are much greater on islands or in ecological islands (such

as California or Italy) than in continental areas. I agree that more successes have occurred in such situations, but believe that the advantage has been due largely to intensity of effort, favorable climates, and the presence of a large proportion of introduced pests in the areas receiving the most research on biological control.

LITERATURE AVAILABLE

Amino Acid Analyzer. Bulletin describes automatic recording amino acid analyzer (Model K-5000). Included are schematic diagrams of flow systems used, descriptions with photos and actual curves on separation of amino acids as recorded. It lists applications, sensitivities, ranges, and other important data. Dept. A&F, PHOENIX PRECISION INSTRUMENT CO., INC., 3803-05 N. 5th St., Philadelphia 40, Pa.

Conditioning Agents for Fertilizers. Diatomaceous silica product, known as Celite, is highly absorbent and has affinity for both granular and prilled fertilizers. Its efficiency as an anticaking agent lies in its different particle structure, its loose weight density (less than 10 lb./cu. ft.) and its high liquid absorption (200%). Micro-Cel, a synthetic outgrowth of Celite, has absorptive capacity, low bulk density, and high surface area. For complete details on both products, write Dept. A&F, JOHNS-MANVILLE CORP., 22 E. 40th St., New York 16, N. Y.

Fertilizer Spreader. Positive feed, self-loading lime and fertilizer spreader offers either a single spinner with 18-in. conveyor or twin spinners with 24-in. conveyor. Complete literature may be obtained by writing Dept. A&F-A-25-5, HIGHWAY EQUIPMENT CO., 616 D Ave. N.W., Cedar Rapids, Iowa.

Mouse Control. Booklet entitled "Mice in Buildings," is designed for sanitarians, agricultural leaders, farm youth groups, pest control operators, teachers, health agencies, and others interested in rodent control. Dept. A&F, WISCONSIN ALUMNI RESEARCH FOUNDATION, P.O. Box 2217, Madison, Wis.

Safety Equipment. Four-page bulletin briefly assembles information on history, use, hazards, and protection for users of modern insecticides and fumigants, and describes mask equipment available. Ask for Bull. No. 591 from Dept. A&F, ACME PROTECTION EQUIPMENT CO., 1201 Kalamazoo St., South Haven, Mich.