It seems almost impertinent to criticize, if indeed criticism is necessary, someone who can write so well on every aspect of limnology. Doubtless every specialist will have his reservations. Probably it is a mistake to read the book straight through. At times this reviewer's interest flagged, notably as page after page was read about the elemental contents of the plants. One wonders whether we need more than a bibliographical reference to data on yttrium, scandium, neodymium, and the like. It is not obligatory to read everything, however. The information is there if needed.

The book is indeed a mine of information, and one that sparkles with gems of insight and interpretation. Though similar remarks have been made before and may seem trite, one can only say that every limnologist who can afford the book should buy it.

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Pest Control in the People's Republic of China

Nung tso wu pin chung ti ch'ün chung hsing ts'e pao (Monitoring and Forecasting of Crop Diseases and Insects). "Monitoring and Forecasting of Crop Diseases and Insects" Writing Committee. Shanghai People's Press, Shanghai, China, 1973. 317 pp. + plates. Paper, 85¢.

Chih pao yuan shou ts'e (Plant Protection Workers' Handbook). "Plant Protection Workers' Handbook" Writing Committee. Shanghai People's Press, Shanghai, China, 1974. 251 pp. + plates. Paper, $2.05.

Li yung p'ing fu hsiao feng fong chih li chih ch'un hsiang (Use of *Anastatus* to Control Lichee Stinkbug). Kwangtung Institute of Entomology and Biology Department, Chungshan University. Kwangtung People's Press, Kwangchow, China, 1973. 40 pp. Paper, 10¢.

During a trip to the People's Republic of China as a member of the Insect Control Study Group of the Committee on Scholarly Communication with the People's Republic of China (*1*) in August 1975, I acquired over 40 books on economic entomology published since 1971 and some 20 earlier works (*2*). The majority of the books deal with injurious species and are in the form of pictorial guides and handbooks, with information on life history, host relations, and control for each species and in some cases lists of scientific names of insects.

In China books in this field, with a few exceptions, are published by the Scientific Press, the Agricultural Press, or the People's Presses. The first two publishers are national and are located in Peking, whereas the People's Presses are provincial and municipal and the materials they publish are of more localized importance. All these books are available, perhaps only, at the Hsin-hua (New China) Bookstore, which has branch stores in various cities.

Most of the books are paperbound, 18 to 19 centimeters in size. The printing is of good quality, the color plates are excellent, and the prices are very reasonable.

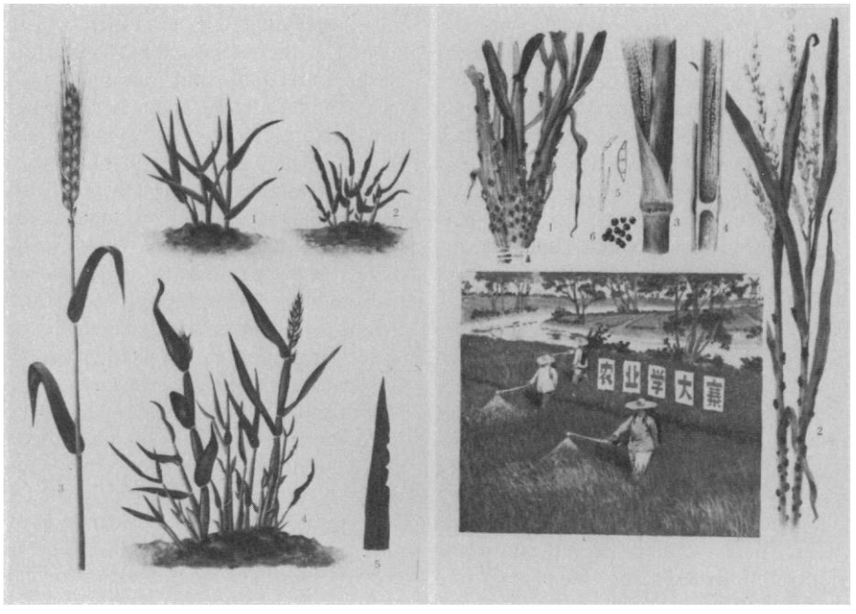
In the last two or three years, more and more of the practical books have been prepared by and are credited to editorial committees rather than individuals. The process of preparation described for "Monitoring and Forecasting of Crop Diseases and Insects" may serve as an illustration.

The editorial committee included producers, scientists, and administrators, representing peasant farmers, plant protection technicians from communes and brigades (the commune is a production unit of thousands of hectares and the brigade a subunit about one-tenth the size of a commune), the staffs of the County Agriculture and Water Bureau and the County Crop Seed Stock Station (the county is a political administrative unit below the province, containing numerous communes), the Provincial Agricultural Research Institute, and the publishing press. Such collaboration ensures that the information in the book meets practical needs and is technically sound and that the measures recommended are administratively feasible. During the preparation of the book field data were solicited from neighboring counties and references and specimens from neighboring provinces were checked. The material was integrated, and before publication drafts were reviewed by all concerned. The entire task had the support of the County Revolutionary Committee (the top political administration of the county).

To illustrate the type of coverage I shall describe this book and two others I acquired.

"Monitoring and Forecasting of Crop Diseases and Insects" deals with methods of identifying fields in which insect control is needed and the time at which control measures should be taken. For rice it covers ten insect pests and two diseases, for cotton eight insects and one disease, for wheat five insects and one disease, for rapeseed one insect and two diseases, for corn two insects, and for green manure crops five insects and one disease. The book contains numerous figures, color plates, and sketches. In many cases forms for recording data are included.

To illustrate the nature of the coverage I shall summarize the treatment of the cotton bollworm, *Heliothis armigera*, which is an important pest of cotton in the United States also. The material oc-



Facing pages from "Monitoring and Forecasting of Crop Diseases and Insects," showing planthopper damage and control measures.

cupies 12½ pages of text and two color plates.

General aspects are dealt with first. The injury to the host is described and compared with that caused to cotton by four other caterpillars, *Pectinophora gossypiella, Earias cupreaviridis, Prodenia litura*, and *Ostrinia nubilalis*. Nine hosts of *H. armigera* other than cotton are listed. Then morphological characteristics of all life stages, including the six larval instars, are set forth, again with comparisons with other caterpillars found on cotton. The habits and fecundity of adults and the distribution of eggs on cotton plants are then described, and, finally, the phenology of development and damage is outlined.

This general account is followed by practical recommendations, which are as follows: Starting in late May, set up light traps in central locations in a commune. When moth flight begins monitor oviposition in target fields (fields with an abundance of buds and flowers). In each field select five sites and five to ten plants per site. Examine tender top leaves and buds for eggs. Make two examinations three days apart during the peak moth flight. The threshold for chemical control is 15 eggs per 100 plants, and chemical control should be started when hatching is first observed. When light traps are not available, "poplar twig traps" may be used. In this procedure, eight to ten twigs each about 2 feet (0.6 meter) long are made into a bundle and pushed into the soil so the tips are 0.5 to 1 foot above the cotton plants. Six to eight bundles are placed per mu (1 mu is 0.15 acre, or 0.06 hectare). Each morning before the dew dries place a plastic bag over the bundle, shake the bundle, and squash the moths as they are counted. The twigs are effective from the 3rd to the 12th day. When one-third of the leaves have dropped or the leaves have rotted, new twigs are to be used. In dry weather twigs should be sprinkled with water. Avoid using new twigs during heavy moth flight, for the twigs are not effective during the first two days.

This procedure can serve as an example of the many methods of native origin that are used. Such methods are simple and need only material available locally, but they involve interesting biological relations and must have been proven effective.

"Plant Protection Workers' Handbook" deals with the identification and control of diseases and insect pests of a variety of crops: rice, cotton, wheat, corn, soybean, vegetables, fruit trees, and stored products.

I shall summarize the information on the aphids on wheat as an example. The material occupies two pages and one color plate. Morphological characteristics of four species of aphids—the greenbug, *Toxoptera graminum*; the apple-grain aphid, *Rhopalosiphum prunifoliae*; the English grain aphid, *Macrosiphum granarium*; and the corn leaf aphid, *Aphis maidis*—are described. Then information on the phenology of development, hosts other than wheat, and damage to hosts is given. The control methods recommended are: application of river mud to reduce the overwintering English grain aphid, greenbug, and corn leaf aphid populations (no effective methods for the overwintering stage of the apple-grain aphid are available); a communal effort to clean up weeds on field edges, river banks, and ditch banks; use of chemical pesticides.

A unique feature of this book is the inclusion of an integrated control program for all major diseases and insects of individual crops. With wheat, the emphasis is on preventive measures. Between harvest and sowing the following measures are recommended: Establish disease-free seed plots, selecting from disease-resistant and high-yield varieties. Use muddy water or brine to float out debris and diseased kernels. Treat seeds to prevent diseases; use lime solutions to soak the seeds, then sun-dry them; in fields with insect infestation, apply BHC (lindane) as seeds are sown. Manage irrigation; remove weeds and dead plants of wheat, rice, or corn; use them as fuel or compost. Plow deep to bury diseased plant parts, sawfly larvae and pupae, and mites, applying BHC to control soil insects. Dig ditches around the field to lower the water table and thus reduce diseases. To protect the plants between germination and tillering, it is recommended that fertilizer be applied at planting so they will attain good growth before the winter, that river mud be applied, and that diseased leaves, weeds, mites, and aphids be buried so as to reduce disease transmission. From booting to maturity the measures recommended are: Prevent water stagnation in the field; clear the ditches after rains to allow water flow. In March and April, set out syrup bait to reduce cutworm moths. In early April, check for diseases and take control measures when they are found. Starting in late April, monitor the cutworm population and make an all-out effort to kill insects before they reach the third instar; also make a collective effort to control aphids and mites. The booting stage is crucial for good yield, and control measures for diseases and aphids should again be taken.

Lichee, *Litchi chinensis* Sonn, is a tropical fruit native to south China. In Kwangtung Province, it is attacked by the stinkbug, *Tessaratoma papillosa* Drury, and suffers severe damage. Between 1962 and 1967 the usefulness of a parasitic wasp, *Anastatus* sp., was explored, established, and demonstrated on a production scale. The biological information and practical procedures of this program are compiled in "Use of *Anastatus* to Control Lichee Stinkbug." The book has the following parts: (i) bionomics of the lichee stinkbug—distribution, damage to host, morphology, life history, habits, and control methods; (ii) bionomics of *Anastatus*—morphology and development; (iii) artificial propagation of *Anastatus*—procedures of propagation, and regulation of development; (iv) large-scale release—time and quantity of release, procedure of release, and evaluation of results.

A great many results of research on the biology of the parasite are included: length of reproductive period, fecundity relative to female age, sex ratio of progeny of sexual and parthenogenetic reproduction, success of parasite oviposition and development in relation to age of host eggs, sex ratio of wasps emerged from host eggs of different sizes and ages, behavior of adult wasps under field conditions, tolerance of wasps to rain and low temperature, wasp survival, oviposition and diapause as affected by temperature and humidity.

The practical biological control program was made possible by such basic studies. Thus the image of Chinese entomology as ignoring basic research may be an oversimplification. In this connection a chronology is of significance. This book is comparable to an agricultural extension publication in the United States, and was published in August 1973. The same information in greater scientific detail was published in *Acta Entomologica Sinica*, the leading entomological journal in China, over a year later, in November 1974 (*3*). This situation highlights the priority the Chinese give to putting scientific results into operation.

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References and Notes

1. The Committee is sponsored by the U.S. National Academy of Sciences, the American Council of Learned Societies, and the Social Science Research Council.
2. The complete list of publications can be found in the Insect Control Group Trip Report, which is

to be published by the National Academy of Sciences and which, it is expected, will be available early this summer. The publications are now accessions of the Entomology Library, University of Minnesota, St. Paul.
3. Huang Ming-dau, Mai Siu-hui, Wu Wei-nan, Poo Chih-lung, "The bionomics of *Anastatus* sp. and its utilization for the control of lichee stinkbug, *Tessaratoma papillosa* Drury," *K'un Ch'ung Hsueh Pao* (*Acta Entomol. Sinica*) **17**, 362 (1974).

Pleasures of Entomology

Mites of Moths and Butterflies. ASHER E. TREAT. Comstock (Cornell University Press), Ithaca, N.Y., 1975. 362 pp., illus. $35.

"The magic of the microscope is not that it makes little creatures larger, but that it makes a large one smaller. . . . The microscope takes us down from our proud and lonely immensity and makes us, for a time, fellow citizens with the great majority of living things."

Asher Treat then leads the mite-sized reader into a moth's ear and reveals sights blind mites can never see. But the book is not just a popularization. It is an impeccable work of science that reveals a search for understanding. It is not surprising to find this from a naturalist. Naturalists may well be the most contented scientists. In their enterprise there are no prizes to seek and no grand theory to create or pick apart, and they quietly search for insight and understanding in other worlds.

The book is designed for use by people who find mites on Lepidoptera, to provide them with "basic information . . . regarding the chief characteristics, biology, and known history (in relation to Lepidoptera) of each mite species thus far reported from these insects." There is an elegantly simple key to living mites that will usually permit a prompt determination of the group to which a mite belongs. The timid can look at a list that gives all the records of mites from each host species and, since all the mites are well illustrated, a glance at the sketches will make it easy to guess at the identity of the mite. The masochist has the choice of using a technical key for mounted specimens.

After making a presumptive identification, the text gives a full accounting of taxonomy and nomenclatural status, followed by detailed information on the biology. I know of no acarological writings that are as clear and easy to follow as Treat's. Tedious nomenclatural matters are covered with grace and clarity. Life histories and biology are explored with ingenuity and enthusiasm to define opportunities that should stimulate others.

In an early chapter Treat writes,

The search for mites on insect hosts is an adventure as exciting as any treasure hunt. Every insect, looked at closely enough to reveal a mite, is an exotic island whose bays and coves may harbor a lurking pirate or the telltale traces of some hidden thief. Date and locality labels on pinned specimens carry the imagination to olden times and far-off places. Collector's names evoke memories of old friends and thoughts of colleagues unknown or perhaps forgotten. The thrill of discovery is always imminent and, once experienced, is ample reward for hours of unproductive search. As an old seeker after buried treasure, I can tell you what is needed for such a voyage of discovery and how to pursue the hunt.

This Treat has done beautifully. His book is one to emulate for both its science and its humanity.

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Origins of a Neuroscience

Pioneers in Neuroendocrinology. JOSEPH MEITES, BERNARD T. DONOVAN, and SAMUEL MCCANN, Eds. Plenum, New York, 1975. viii, 328 pp., illus. $22.50. Perspectives in Neuroendocrine Research, vol. 1.

Neuroendocrinology, a relative newcomer to the established hybrid subcategories of neural science, is the study of relationships between the nervous and endocrine systems of biological information transfer. It deals with physiologic, anatomic, and biochemical approaches to such problems as hypothalamic regulation of the anterior and posterior pituitary, environmental influences on reproductive and metabolic phenomena, and the relationships between hormones, brain, and behavior. While neuroendocrinology has shared in the explosive growth of many scientific fields in the last quarter century, there has been a further impressive spurt in activity in the field during the 1970's, resulting from the isolation and synthesis of three of the highly elusive hypothalamic factors that control anterior pituitary function (the gonadotropin and thyrotropic-hormone releasing factors or hormones, and a growth-hormone inhibiting factor, somatostatin). Two international societies with their own scientific journals have recently been founded. In short, a new scientific miniestablishment is becoming institutionalized and has now called upon its founding fathers to preserve for posterity the circumstances surrounding the genesis of the field.

Pioneers in Neuroendocrinology is a collection of reminiscences by an assortment of distinguished neurophysiologists, endocrinologists, anatomists, and pharmacologists, who did early work relevant to the field. The term "pioneers" is apparently meant to designate early explorers who opened pathways, not necessarily those who made the major discoveries. The book will nevertheless be used as a chronicle of neuroendocrine origins, and from this point of view the choice of contributors shows errors of both commission and omission. Of the 21 contributors, fewer than half remained, or in some cases ever were, in the mainstream of the development of neuroendocrinology, and behavioral endocrinology is represented only by Bard's tangentially related work on sexual reflexes. The editors wished initially to obtain personal accounts from some of the older investigators and intend to produce other, similar volumes in which the omissions should be corrected. Actually, some of the authors who did not make major contributions to the field (and some who did) play a role as representatives of colleagues who are no longer with us. The image of Markee is invoked by Hinsey, of Pincus by Hoagland, of Moore by Price, of Ernst Scharrer by Berta Scharrer, and of Harris by Jacobsohn.

The book will be of little interest to neophytes. For workers in this and related fields, however, it provides a palatable mixture of information on the origins and development of neuroendocrine concepts supplemented with some entertaining material on the lives of leading scientists in the first half of the century.

A book like this should be read continuously rather than piecemeal, so that recurrent themes will have full impact. One such theme is the overwhelming role of chance factors in the determination of scientific careers. The often cyclic nature of investigational activity is another theme that careful reading will reveal. For example, the role of biogenic amines was actively investigated at both