REVIEWS AND ABSTRACTS

PRACTICAL MALARIA CONTROL, A HANDBOOK FOR FIELD WORKERS. By Carl E. M. Gunther, 1944. With foreword by Prof. Harvey Sutton, 91 pages. Published by Philosophical Library, Inc., 15 East 40th Street, New York. (The price is listed at $2.50.)

In his foreword Prof. Sutton points out that Dr. Gunther has spent many years as Medical Officer in the Mandated Territory of New Guinea in the midst of the tropical jungle, and in an area where malaria is highly endemic. In addition to being a successful physician, Doctor Gunther is also an entomologist of note.

The book is written in four parts; Part I deals with Antimalarial Measures (pp. 9-39); Part II deals with Diagnosis (pp. 40-59); Part III, Treatment (pp. 60-82); Part IV, Complications of Malaria, — blackwater fever and herpes (pp. 83-91).

Gunther points out that malaria control aims at reducing the important breeding grounds, protecting the majority of inhabitants from mosquities, and reducing the number and severity of attacks of malarial fever per inhabitant (the entire elimination of the infection is not the object). By comparison with elimination its cost is negligible, and it achieves results which are satisfactory for all working purposes.

He emphasizes the importance of knowing which of the local species of *Anopheles* are vectors and what their breeding habits are. This he illustrates by citing a situation in which malaria was rampant in spite of what seemed to be a favorable hillside location near some clear springs and streams, a lower swampy location having been declared dangerous. It was found that the swamp-breeding species was not a vector in that district, and that the vector was a species which bred in the clear sunlit running streams. The solution of the problem, however, was not to move the community away from the hillside breeding places, but rather to make the sunlit foci unsuitable by growing shade trees and overhanging shrubs.

The booklets contains practical standard advice on general methods of treating breeding places. It is pointed out that complete screening of houses is the most important single measure against malaria. The real difficulty in screening is the style of tropical houses. Suggestions are made as to how to meet this difficulty. There are some excellent pointers on standards of living in the tropics.

Every physician who elects to practice his profession in tropical malarial regions will be indebted to Doctor Gunther for this very useful booklet.—W. B. Herms, Department of Entomology and Parasitology, University of California, Berkeley.

THE MORPHOLOGY AND BIOLOGY OF *Culex molestus:* OBSERVATIONAL NOTES FOR INVESTIGATORS. By J. F. Marshall, 1944. British Mosquito Control Institute (Hayling Island, Hants), No. 34, 15 pp., 11 figs., 2 tabs., 15 refs.

Written with the purpose of collecting information on the habits of *Culex molestus,* this pamphlet, put out by the British Mosquito Control Institute, clearly outlines definite morphological and biological characters to distinguish this species from *Culex pipiens,* with which it was confused in England until October 1934. As little is known regarding the habits and breeding places of *C. molestus,* the author has given explicit instructions for collecting mosquitoes and differentiating them from other insects. In addition, he has indicated the type of data to be submitted with specimens. These include locality, kind of water, location of water, degree of infestation, whether insect was caught biting or resting on a wall, and other needed facts. Sufficient information is given so that a person not trained in entomology could collect specimens and send in records of much value to the Institute.

As an aid in separating *Culex molestus* and *C. pipiens,* many excellent diagrammatic photographs and drawings appear throughout the paper. Records of *C. molestus* are well tabulated and show almost at a glance the history of the situation up to 1943. Of particular interest to entomologists is a list of mosquitoes occurring in Britain, given at the end of the paper.

In a compact 15 pages the results of studies gathered on *Culex molestus* up to the end of 1943 are given. This attempt on the part of the British to gain more facts about an insect of economic importance by putting out such a pamphlet is an excellent idea. The plan might well be followed by other groups of entomologists to further the gathering of data on insects or arachnids concerning the habits of which we are in doubt or about which we possess scanty information.—Helen Sollers, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

DICHLORO-DIFENIL-TRICHLORO-ETANO (DDT) NO COMBATE AS LARVAE DE CULICIDEOS. [DDT IN THE CONTROL OF COLICINE LARVAE.] By R. Wasick and O. Unti. Arquivos de Higiene e Saude Publica 9(21): 87-102. 1944. Sao Paulo, Brazil.

Out of Brazil comes a detailed paper in which the results of two investigations are presented, (1) DDT as a larvicide and ovicide, and (2) the toxicological effects of DDT on laboratory animals.

The authors relate their experiments with DDT in various concentrations against larvae of *Culex* sp., *C. quinquefasciatus, Anopheles* sp., *A. stroedi,* and *A. albitarsis* placed in aquaria simulating

their natural habitats. All strengths of DDT from 1 part per 1000 parts of water to 1 part per 60 million parts killed the larvae. The time required to kill all the larvae depended upon the amount of DDT used. The authors seem to agree with other entomological workers in their findings on the long-lasting properties of DDT. In the strengths tested in the aquaria containing larvae of the above-mentioned species, DDT retained its efficiency for 4 months. The results are arranged clearly in a table.

DDT in colloidal suspensions and as dusts was also tested in accumulations of natural water such as puddles and pools created by heavy rains. In either form this material was successful in killing mosquito larvae, but it was found that larvae died more quickly when DDT was applied in water suspensions than as dusts.

When daily dosages of DDT were administered to a limited number of domestic animals, no injurious effects were noted from the following total dosages, except as indicated: Two dogs each fed 7.75 grams in 31 days; two cats fed 0.315 and 0.048 gram in 6 days and two given intramuscularly 0.048 and 0.072 gram in 6 days; six rats each given orally 1.2 grams in 6 days (1 died); two mice each given intramuscularly 0.015 gram in 5 days (both grew thin), and two mice each fed 0.015 gram in 5 days; three pigeons given intravenously 0.024, 0.034, and 0.041 gram in 5 days, two given intramuscularly 0.015 and 0.034 gram in 5 days, and two fed 0.036 and 0.050 gram in 5 days; one chicken given intravenously 1.0 gram in 5 days, and another fed 2.0 gram in 5 days.

Frogs (*Leptodactylus ocellatus*) and toads (*Bufo marinus*) were exposed 2 to 3 hours daily for 4 days in a vivarium treated with 0.2 gram of DDT per 12,500 liters of water without any ill effects. Some fish which were also exposed succumbed, and experiments are to be continued with other species. The authors believe that DDT used in the proportions they recommend for larvicides would not be harmful to man or domestic animals, or to the frogs and toads tested. The possibility of using DDT in drinking water at the rate of 1 gram per 25,000 liters (approximately 1 part in 25,000,000) is foreseen.

DDT powder has been found to cause no irritation or burning on the skin of man for 24 hours after application in various concentrations or in the pure state.

An added feature of the paper is the English summary, which gives a rather full account of the material presented. The statement in the summary referring to the ovicidal effect of DDT is confusing, but the text makes it clear that mosquito eggs did hatch in treated water and that the larvae died immediaely after hatching.

In general the results obtained by Wasicky and Unti are in accord with the findings of Knipling and associates, Calvery, and Neal in the United States, much of which has not yet been published for security reasons. The recording of data on the effect of DDT on various species of mosquitoes under different conditions is of distinct value. The authors are continuing their work, and we look forward to further progress with this important insecticide under tropical conditions.— Helen Sollers, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

TOXICITY OF DDT AND THANITE SPRAYS TO ADULTS OF ANOPHELES QUADRIMACULATUS SAY. By Paul L. Rice, Carl B. Huffaker and Richard C. Back. Abstract of a paper read at the Entomological Society meetings in New York City, December 13-15, 1944.

This study was initiated in an attempt to develop satisfactory substitutes for pyrethrum in adult mosquito sprays. Experiments were conducted with *Anopheles quadrimaculatus* adults both in the laboratory and in the field. The laboratory tests were carried out in a Peet-Grady chamber using the standard procedure for flies with two exceptions: (1) only 6 ml. of spray was used and (2) the exposure was reduced to 2½ minutes. Records were kept on the per cent of knockdown at the end of the exposure period and the per cent of kill after 24 hours. Field tests were conducted in a cattle shed, open on one side. Cages containing *A. quadrimaculatus* adults were hung within a test area on the wall comprising 48 square feet, and 6.5 ml. of spray was used to cover this area. Evaluations of the test materials were made on the basis of knockdown after 5 minutes and kill after 24 hours. The toxicants employed in all tests were in solution in deodorized kerosene.

The laboratory tests showed that one per cent DDT gave only a 57 per cent knockdown but a 24-hour mortality of 100 per cent. A one per cent Pyrethrol "20" spray gave excellent knockdown (97 per cent) and kill (94 per cent). One per cent of a combination of 20 per cent DDT and 80 per cent Thanite gave results which compared quite closely with the Pyrethrum, namely, 92 per cent knockdown and 96 per cent kill; while the corresponding results for the spray made up of one per cent of a combination of 40 per cent DDT and 60 per cent Thanite were 86 per cent knockdown and 99 per cent kill.

The poor knockdown produced by DDT alone in the laboratory led the investigators to restrict field tests to combinations of DDT and Thanite, using Pyrethrum as a standard spray for comparison. The results obtained from nine replications were as follows: 1.5 per cent Pyrethrol 20—88 per cent knockdown and 73 per cent kill; 1.5 per cent of a combination of 20 per cent DDT and 80 per cent Thanite—86 per cent knockdown and 94 per cent kill; 1.5 per cent of a combination of 40 per cent DDT with 60 per cent Thanite—84 per cent knockdown and 98 per cent kill. Both the DDT-Thanite sprays gave good results, but the 20-80 combination appears to be particularly promising.

Authors' abstract. (Original article to be published in the magazine *Soap and Sanitary Chemicals* for March, 1945.)