etiologic agent is specified as well as the specific vector, distribution, reservoir and diagnostic procedure; also under envenomization and dermatoses the effects on man are briefly described.

For a manual of this nature the Arachnida are unusually well treated; this section comprises 24 pages. A few additional illustrations would have added much to the value of the section, e.g., further illustrative material pertaining to "soft ticks." To gain further knowledge concerning the tick vectors of the spotted fevers and the relapsing fevers one must consult the appropriate sections dealing with these infections. This procedure, of course, avoids repetition and, no doubt, the authors of these sections did consult medical entomologists familiar with the natural vectors.

The section (pp. 541-646) dealing with the Insect is excellent and reasonably well illustrated. Medically important insects in twelve different orders receive consideration. Two Australian species of Collembola are recorded as attacking man resulting in "irritation and papules similar to mosquito bites with pruritus." The authors have succeeded in striking a fairly good balance between the orders with much emphasis on the Diptera, which is as should be. However one feels that not sufficient emphasis is given to important differences in the breeding habits of anopheline vectors. This is not as bad as it seems because a six page table (Table 23) in the section on "Malaria" takes care of this matter very well indeed. Furthermore in a manual of tropical medicine one would expect a more adequate treatise on tsetse flies. The section on Myiasis is very well done and includes an excellent table (Table 65) on "Types of Myiasis in Man."

The chemical control of arthropods of medical importance is excellently summed up in Table 63 covering four pages. The letters "DDT" appear at least 30 times in this table alone and many more times in the text.

To gain a good notion of the importance of arthropods in the field of tropical medicine one would certainly wish to consult this valuable manual. —W. B. Herms

THE ANOPHELINE MOSQUITOES OF THE AUSTRALASIAN REGION. By David J. Lee and A. R. Woodhill. Publications of the University of Sydney, Department of Zoology, Monograph No. 2, December 15, 1944 (pp. i-xii and 1-209, 13 text figures, XXXIV plates, VIII maps).

Except for the work by Swellengrebel and Rodenwaldt on the anophelines of the Netherlands Indies, which included only the northwestern corner of the Australasian region, there has been no adequate taxonomic treatment of these most important mosquitoes of this region. The present work covers the species of *Anopheles* and *Bironella* found in the Moluccas, Ceram, and Timor and those lands of the Pacific south and east from these islands. Thirty-four species or subspecies are treated in detail, with an illustrated description of the female, male and larva as far as these are known. Under each species there is included a discussion of its biology, relation to disease, and distribution, with a map of the latter. In addition, 12 species reported from the western fringe of the area are discussed briefly. The introductory portion includes remarks on the importance of anophelines, their biology and control, and a very sound discussion of superspecies and infraspecific categories. A well-illustrated section on morphology carefully defines the terms used in the descriptions, and by means of diagnoses and tables the tribe Anophelini is defined as well as the divisions within the tribe. Keys are given to the adults and fourth-stage larvae, and to the eggs of a few species. Of particular interest is a map showing the type localities of all the species and synonyms.

The authors are to be congratulated on the care with which every aspect of the subject has been handled, and it is to be hoped that they will do the same with other genera of mosquitoes. In so excellent a work there is very little to criticize, particularly since the authors admit that it should serve only as a basic work to which inevitable revisions should be added as increase in knowledge makes them necessary. We do feel, however, that they were overly cautious in not recognizing *Anopheles farauti* Laveran as a valid name and in not treating it as a species distinct from *punctulatus* Doenitz. —Alan Stone

STUDIES ON THE ANOPHELINE COMPLEX OF WESTERN AMERICA. By Thomas H. G. Aitken, 1945. Univ. Calif. Publ. Ent. 7 (11): 273-364. 277 ref., illus.

Malaria in Europe often does not occur in areas where *Anopheles maculipennis* Meig., an important vector of the disease, is numerous. Investigators, in attempting to account for the spotty distribution of malaria there, discovered that this species is a complex consisting of six or more subspecies, only a few of which are effective transmitters of this disease. Owing to the widespread interest in the subspecies and varieties of anophelines and the need for accurate knowledge of the disease-bearing insects, the author has studied the possibility of such complexes in *A. maculipennis, A. pseudopunctipennis* Theo., and *A. punctipennis* (Say) in this country.

Following the introduction to this extensive paper is a key to all stages of the anophelines of western America. Although much confusion has existed in the American *maculipennis* group, the author believes that the present time three subspecies of *A. maculipennis* in North America should be recognized: *A. m. occidentalis* (D. and K.), *A. m. freeborni* Aitken, and *A. m. aztecus* Hoffmann. Under each of these subspecies may be found the description of stages, distribution, and a general discussion. The morphological distinctions not only between the life stages but also between the male terminalia of *A. quadrimaculatus* Say and the American races of *A. maculipennis* are pointed out in an extensive

table. It is exceedingly helpful to have such differences tabulated so that ready reference may be made to them. The title of this table is probably in error since it mentions *Anopheles* where it obviously refers to *A. quadrimaculatus.*

The old and new world forms of *Anopheles maculipennis* are compared taxonomically. It is concluded that sufficient differences exist between them to consider them as distinct. The three new world subspecies are then compared as to larval and adult bionomics and disease relationship. In western America the most important vector of malaria is *A. m. freeborni.*

Owing to the variability in the *Anopheles pseudopunctipennis* group, the author feels that two subspecies and one variety should be recognized at present; namely, *A. pseudopunctipennis pseudopunctipennis* Theo., *A. pseudopunctipennis franciscanus* (McCracken), and *A. pseudopunctipennis franciscanus* var. *boydi* (Vargas). Although this fine differentiation of the species into subspecies and varieties may help to clarify the situation, it is becoming unwieldy in our binomial system of nomenclature.

Anopheles punctipennis is capable of carrying malaria but its role in this disease is considered of minor importance. It is thought that this species may be the cause of some of the malaria in the Mother Lode region of the Sierra Nevada of California. The species, however, does not readily enter houses.

This paper is a good contribution to our knowledge of mosquitoes in their relation to malaria and should prove useful to mosquito control workers as well as to taxonomists.—Helen Sollers, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

TOXISCHE WIRKUNG VON NEOCID AUF LARVEN, PUPPEN UND IMAGINES VON *Anopheles* UND *Culex.* (Toxic effect of Neocid upon Larvae, pupae, and adults of *Anopheles* and *Culex.*) By A. Mandekos, 1944. Deut. Tropenmed. Ztschr. 48 (3/6): 84-88.

Neocid, "polychlorodiphenylethane 5 per cent powder 'adspers. cp. q. s.," (DDT) has been found by the Germans to be more effective against the larvae of *Anopheles superpictus* Grassi, than other known insecticides.

Mandekos' experiments with Neocid, carried out in 1943, were conducted along three lines: (1) as a dust, (2) as a water suspension, and (3) as a petroleum-water suspension.

It was found that the dust killed adults after 3½ hours but even after 15 minutes convulsive spasms were noticeable.

Scarcely more than 2 per cent of *Anopheles* and *Culex* larvae could be found alive after the application of the water suspension, in dilution of 3.5 per cent and at the rate of 0.035 g. of pure substance per square meter. This was applied in the open and in strong currents. When the suspension was sprayed in three cow stables in Saloniki all anophelines present were killed and the stables remained free of anophelines for one to five weeks.

Neocid-petroleum-water suspension is more effective than the water suspension alone when used in places with considerable current. The author recommends an increase in concentration Neocid to 4-5.5 per cent at the rate of 0.8 g. of Neocid per square meter for strong currents and for places where much organic material exsits, in which *Culex* particularly is found.

Mosquito eggs and pupae tested appear to be little if at all affected by the use of Neocid.

In the weak concentrations of Neocid used in these experiments, no toxic effect on man was observed.

Another insecticide, calcium arsenite, mixed with road dust in proportions of 3.5 per cent and tested against mosquito larvae in standing water, proved to be as satisfactory as paris green.

Note: From the facts presented, the procedures and results are difficult to interpret.—Helen Sollers, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.