

'malaria-conscious' high command are essential if malaria is to be controlled in highly endemic areas."

Section VI deals with therapeutic malaria. The techniques and safeguards in using malaria as a therapeutic agent are well presented.

Of special value to the field entomologist are the keys to the adult and fourth instar larvae of the *Anopheles* of the world by regions, as presented in the appendix. Each chapter is accompanied by a useful, though of course far from complete, list of bibliographical references.

F. C. BISHOPP

THE STORY OF THE MOSQUITO. Associated Executives of Mosquito Control of the State of New Jersey, N. J. Ag. Expt. Sta., Rutgers Univ. and County Mosq. Ext. Comm. Circular 502. Dec. 1946. 32 pp. Mosquito control in the State of New Jersey will be greatly facilitated by the recent publication of this booklet. For the compilation of this excellent pamphlet we are indebted to the Associated Executives of Mosquito Control of the State of New Jersey. It is designed particularly for use in the schools and by interested citizens of the State, and should be not only an effective force for Mosquito Control in New Jersey, but also an inspiration to all who desire to place educative materials in the hands of the present and uprising generations.

The front cover page of this well-prepared booklet (see inset) not only shows how the mosquito larvae develop and sustain life, but also depicts some of the chief operations in their control. The booklet tells how the control movement was started in New Jersey at Rutgers University in 1902 by Dr. John B. Smith, and how it has been spread by county commissions throughout the State.

The moving spirit and directing genius of the mosquito control movement in New Jersey, for 31 years after Woodrow Wilson signed the county commission bill into law, was the late Dr. Thomas J. Headlee. When Dr. Headlee came to New Jersey as State Entomologist in 1912, mosquitoes were a tremendous menace to the economic progress of the State. It was he who envisioned the vast improvement that would result from the elimination of the mosquito pest. Working through the county commissions, which are composed of six men appointed by the Supreme Court justices of the various counties, Dr. Headlee and his technical assistants, through careful planning and indefatigable efforts, brought the mosquito menace under control in New Jersey. They made it possible for that State to become one of the world's leading industrial centers. The inspiring leadership and vast accomplishments of Dr. Headlee brought him recognition and renown as one of the world's leading entomologists. The booklet indicates that his great work is now being carried on by capable hands.

In fascinating style and by well-drawn diagrams

the booklet explains the life histories of the *Anopheles*, *Aedes*, and *Culex* mosquitoes, and how to identify them at any stage, particularly at the larval and pupal stages when their destruction is most desirable and readily effected. The relationship existing between mosquitoes and the incidence of malaria and other diseases is made quite clear.

A preliminary step in mosquito control, the pamphlet explains, is to determine both the density of the mosquito population and the kinds of mosquitoes prevalent. This is done by setting traps and studying the catch. Various methods of control are used for different kinds of mosquitoes which come from different breeding places.

Ditching is presented as the most feasible type of control for mosquitoes from salt water marshes. Ditches drain large areas, deter egg-laying by the tidal action of the water, and serve as highways for minnows which live on the larvae.

Fresh water, the booklet explains, presents a different problem. It must be drained off quickly after the rains, and oil applied where the drainage is incomplete. Toxic oils are more effective, because they both suffocate and poison the mosquito. Pyrethrum larvicide has all the values of oil, but is harmless to other aquatic life. Because of the dangers inherent in DDT its use is restricted, and it has not yet emerged from the experimental stage.

That the public should understand the principles and process of mosquito control is indicated throughout the pamphlet. How the public may participate is effectively presented in the explanation of what residents may do for the control of house mosquitoes. This section enumerates the ways of ridding the premises of all unnecessary mosquito breeding places, and advises the householder on everything from breeding fish in lily ponds to screening the house. "Ten commandments" of mosquito control climax the plea of the compilers for public cooperation.

The captivatingly conversational style and the wealth of well-selected illustrations will not only bring the lay reader a fascinating account of what is being done and what can be done for mosquito control, but will also develop the knowledge and inspire the desire to cooperate in the process.—Perry W. Ruth, Pres., Virginia Mosquito Control Assoc. and Past President, American Mosquito Control Association.

MOSQUITOES OF OKINAWA AND ISLANDS IN THE CENTRAL PACIFIC. By Richard M. Bohart and R. L. Ingram. NAVMED 1055. 110 pp., 16 plates and 2 maps. Bur. Med. and Surg., Navy Dept., Wash., D. C., 1946. This is another in the series of fine publications of the Navy Department on mosquitoes from relatively unsurveyed areas that became important during the war. The manual presents in readily usable form the available information on the taxonomy, distribution, and bionomics of the mosquitoes of Hawaii, Samoa, the Marshall Islands, the Caro-

lines, the Marianas, Okinawa, and Iwo. Much of the data is based upon personal collections but the extensive collections at the U. S. National Museum were also studied.

After a general introduction which points out the need for further study, especially of the medically important species, there is a brief account of the technique used in collecting, preparing, and preserving specimens. Sections on the mosquitoes of the various islands follow a description of the local characteristic terrain. Fifty-five species and subspecies are treated in detail, including the description of 3 new species and 1 new subspecies. Keys are given to the adults and larvae of Samoa, the Carolines, the Marianas, and Okinawa. Only 3 or 4 species are known from the other islands but these are well figured and hence keys are unnecessary. The keys are dichotomous, almost invariably contain 2 characters, and cite page references but usually not figure references. The keys employed are valid and are well illustrated and readily worked. In the text are descriptions of the male, female, larva, and egg (where possible). Notes on the biology, distribution, and relation to disease are included. Such description and discussion usually extends between one and two pages in length.

The plates are assembled at the end of the article. Morphological characters generally used in classification of adults and larvae are figured and labelled. These include side view of mosquito adult head, thorax and first abdominal segment, wings venation, *Aedes* and *Culex* male genitalia, head and abdominal segments eight and nine of larvae. A beginner can therefore easily learn the characters employed. The other 15 plates contain 64 sets of figures arranged according to species and illustrating important taxonomic features. Some sets actually include 7 figures under one number but all pertain to the one species. The figures are very good and clearly show the essential details, although the grade of paper employed by the printers does not do them justice. The plates are accompanied by an explanation and a list of sources of figures. The outline maps of Guam and Okinawa render distribution records meaningful.

The 3 pages of references cite Chinese, Japanese, and Russian publications, indicating that every effort was made to include all known records. The authors merit congratulations on their preparation of such a well illustrated and highly useful manual. Not only have they made determination of the known mosquito fauna of Okinawa and the Central Pacific Islands easy but they have stimulated further research.—Robert Traub, Dept. of Parasit., Army Medical Center, Wash., D. C.

páginas, 16 cuadros y 2 mapas. Bur. Med. and Surg., Navy Dept., Wash., D. C., 1946.

Es ésta una más en la serie de magníficas publicaciones del Departamento Naval sobre los mosquitos de zonas relativamente poco pesquissadas pero que recabaron importancia a causa de la guerra. El manual presenta en forma fácil de consultar los datos disponibles sobre la taxonomía, difusión y ecología de los mosquitos de Hawaii, Samoa, las Islas Marshall, las Carolinas, las Marianas, Okinawa y Iwo. Gran parte de los datos se basan en colecciones individuales pero también fueron estudiados las grandes colecciones en el Museo Nacional de los EE. UU.

A continuación de un prefacio general que pone de relieve la necesidad de estudios más amplios, especialmente de las especies de importancia médica, se presenta un breve relato de la técnica adoptada en recolectar, preparar y conservar los ejemplares. A seguir de descripciones de las características propias del terreno, hay secciones sobre los mosquitos de las varias islas. Se da un trato detallado a 45 especies y subspecies, incluso la descripción de 3 especies y 1 subespecie nuevas. Se presentan claves de adultos y larvas provenientes de Samoa, las Carolinas, las Marianas y Okinawa. Solamente se conocen 3 ó 4 especies de las otras islas pero éstas han sido bien dibujadas y por lo tanto no requieren claves. Las claves son dicótomas, casi siempre conteniendo 2 características y se citan las páginas a las cuales se refieren pero generalmente los dibujos no. Las claves empleadas son válidas, bien ilustradas y fáciles de aplicación. El texto contiene descripciones del macho, la hembra, la larva y el huevo (de ser posible). Se incluyen notas sobre la biología, difusión y la relación con las enfermedades. Dichas descripciones y discusiones por lo general ocupan una ó dos páginas.

Los cuadros se presentan juntos al fin del artículo. Las características morfológicas generalmente empleadas en la clasificación de los adultos y las larvas están numeradas y rotuladas. Estos incluyen una vista lateral de la cabeza del mosquito adulto, del tórax y del primer segmento abdominal, nervadura de las alas, genitales masculinos de *Aedes* y *Culex*, cabeza y segmentos abdominales octavo y noveno de la larva. Por lo tanto es fácil para los aprendices llegar a conocer las características empleadas. Los otros 15 cuadros contienen 64 juegos de dibujos arreglados según la especie e ilustrando importantes aspectos taxonómicos. De hecho algunos de los juegos incluyen 7 dibujos bajo un solo número pero todos pertenecientes a una sola especie. Los dibujos están muy bien hechos e indican claramente los detalles esenciales, no obstante que la clase de papel usado por los impresores no les hace justicia. Acompañan los cuadros una explicación y una lista de fuentes de los dibujos. Los mapas de contorno de Guam y Okinawa facilitan la comprensión de los datos sobre la difusión.