OBSERVATIONS ON MOSQUITO AND MALARIA CONTROL IN THE CARIBBEAN AREA
PART 5 — VENEZUELA
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While attending the Fourth Pan-American Malaria Conference in Maracay, Venezuela, in January 1947, the senior author had the good fortune to observe the extensive malaria program under way in that country. It is apparent that progress in malaria control throughout the world has reached its peak in Venezuela, both in expenditure per capita and broadness of the program. The approximate cost of the 1947 program was $2,800,000, or between 50 and 60 cents per capita. The total number of employees was about 1,000, including 31 DDT crews with from 7 to 9 men in each. In 1947 these crews treated regularly 87,276 houses (Fig. 1) in the States of Apure, Barinas, Bolivar, Sucre, Monagas, Anzoátegui, Guarico, Miranda, Aragua, Carabobo, Yaracuy, Lara, Cojedes, Portuguesa, Trujillo, Zulia, and Territorio Amazonas (Fig. 3).

The Division de Malariología dates from 1935. Its remarkable growth and efficiency are due in no small measure to its able and energetic director, Arnoldo Cabaldón. Fortunately, he has had the excellent support of A. Arreaza Guzman, Director de Salud General; and Edmundo Fernández-Ministro de Sanidad y Asistencia Social.

From 1931 to 1935, before the program was initiated, there were approximately 500,000 to 1,000,000 cases of malaria annually. Free treatments given to the pub-

1 Parts 1, 2, and 3 have already appeared; part 4 will appear in a subsequent issue. Exigencies of space have dictated changing the order of publication of parts 2 and 4.
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cover the expenses of the student for room and meals.

Manuals of procedures which have been prepared for most of the activities pertaining to malaria control are now in use.

*Antimalaria activities*—The engineering activities of the Division for the Control of Malaria include the forestation of swampy areas with eucalyptus and other trees; the paving of ditches totaling more than 278 kilometers (172 miles) in some 30 towns; the filling in of swampy areas; and other comparable measures.

A laboratory for testing the materials
used in paving ditches was installed in 1946. Here Panama inverts, pipes, half pipes, and other concrete structures are tested with a Universal Testing Machine of 200,000 pounds capacity.

Antimalaria Drugs—Various antimalaria drugs were distributed without charge in schools, post offices, telegraph offices, and other places readily accessible to the public. In 1946, for example, 575,834 doses of quinacrine were distributed under this program. Several villages were selected for testing chloroquine. Preliminary reports show satisfactory reduction of malaria by this means.

Control of Anopheles Mosquitoes—Until DDT became available late in 1945 to control Anopheles mosquitoes, oil and paris green were the only larvicides used. The present plan is to use DDT residual sprays on practically all rural homes in northern Venezuela wherever malaria is a problem.

Cooperation with International Health Division of the Rockefeller Foundation—Special mention should be made of the cooperation between the International Health Division of the Rockefeller Foundation and the Division de Malariologia. A Section of Special Studies of the Foundation is studying the use of DDT in the field in order to lower the cost of application and to study and appraise the influence that spraying of houses with DDT may have on the general health and welfare of the people. This section is also examining the blood protozoa of local
birds, reptiles, and bats, and is continuing taxonomic studies, which have been under way for a number of years.

Species of *Anopheles* in Venezuela.—


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ADDITIONAL STUDIES ON THE LARVAE OF Uranotaenia syntheta DIAR AND SHANNON (DIPTERA: CULICIDAE) 1

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The adult of this mosquito was described in 1944 from a female specimen reared from a larva collected at Mission, Texas (Dyar and Shannon 1943). Damp (1943) described the male, and published observations relative to the biology and distribution of the species in Mexico. In 1946 the larva was described from a specimen col-

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1 Supported by the University of Texas Research Institute.

2 The writer wishes to express his appreciation to Mr. John E. Porter and Dr. H. H. Ross of the Illinois Natural History Survey, who allowed him to examine the larva from which the original description was made. Mr. Porter has kindly informed the writer that he is no longer in the area where the species occurs, and that he therefore welcomes additional studies by other workers. The suggestions of Dr. Alan Stone regarding distinguishing features of the larva of *Uranotaenia* are greatly appreciated. The writer is grateful to Miss Lucille Hagan who made the drawings.

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Lected at Fort Worth, Texas (Porter 1946).

During the past two years, the writer and his associates have collected many larvae of *Uranotaenia syntheta*, and have reared some to adults, thereby correlating adult and larval stages. A few notes relative to the status of *U. syntheta*, and some observations on biology have recently been published (Breland 1948). The original larval description was made from a single specimen, and consequently it was not possible to note individual variations that might occur in a series of larvae. For this reason, it has seemed advisable to study many larvae so that these variations may be noted. The following description is based upon a study of several dozen larvae collected over a period of two years from Palmetto State Park.