PENNSYLVANIA

Mosquito control in Pennsylvania dates back to the days of the first World War, when large industries along the Delaware River in Philadelphia and Delaware County were handicapped by swarms of mosquitoes that seriously retarded war production. The U. S. Shipping Board, which had sponsored the great Hog Island shipyard just south of Philadelphia, one of the largest in the world, with ways to construct 28 oceangoing ships at one time, cooperated with the State Health Department and the other industries, and together a short but effective control program was carried out.

It was not until 1935, however, that a state law was enacted to permit setting up of County mosquito control commissions. Blair County in the west, including the valley where Altoona and other cities are located, and Delaware County promptly took advantage of the law and organized commissions and have carried on continuously since. For the last 10 years local communities in Bucks County just north of Philadelphia have been cooperating in control efforts with good results, culminating last year in the organization of a county-wide program actively supported by the County Commissioners of Bucks County.

In addition many other communities, including the City of Philadelphia, have operated some form of organized control work, so that at the present time at least 3½ million people in communities in more than 20 counties in the State are receiving some measure of protection. At least $300,000 are being spent annually in this work, which is being generally sponsored by and under the technical advice of the State Health Department.

As serious mosquito trouble in Pennsylvania is rather spotty and localized, there has not been the need for a wide scale control set up for whole regions as has occurred in some other states; there simply has not been the demand for mosquito control work to that extent.

As there are no salt marshes within the State and only very occasional flights of salt-marsh mosquitoes into southeast Pennsylvania from Delaware to the south or New Jersey to the east, the problem has been that of fresh water mosquitoes. These are chiefly *Culex* house mosquitoes, fresh water *Aedes* swamp mosquitoes and some *Mansonia perturbans*. In the northwest and southeast parts of the State some *Anopheles* are found. Altogether about 35 species have been collected in the State.

The results in 1957, were generally very good, with few adult mosquitoes reported. Rather dry weather reduced mosquito breeding in many places normally wet, but many running streams partly dried up and bred, and catch basins were more of a problem than usual, so good inspection and quick follow up in spraying were necessary.

Highlights of the year in Pennsylvania were first the starting of another good county wide program in Bucks County, the continuation of airplane spraying and also extensive hydraulic fills on the marshes of Philadelphia and Delaware Counties, the tying in of the rapidly developing sanitary landfill program in many sections of the state with mosquito control through the filling in of local low and marshy areas, better use of insecticides and the strengthening of public relations and personnel and equipment in all three counties and many local areas to get better results for the money spent.—RUSSELL W. GIES, Executive Director, Mosquito Extermination Commission of Delaware County, Media, Pa.

NEW YORK

In terms of mosquito control, New York State may conveniently be divided into three regions: (1) Long Island, (2) New York City, (3) upstate New York. On Long Island, mosquito control has been a well-organized county activity in Suffolk and Nassau counties for many years, with

budgets of between half a million and a million dollars annually.

(1) Details of the work in Suffolk County have been described by C. T. Williamson, Director, in annual reports, and in a report given at the AMCA meetings in Miami Beach in April, 1957. (See *Mosquito News,* vol. 17, no. 3, for September, 1957.) In 1957, two occurrences worthy of note were two heavy flights of *Aedes sollicitans,* in the marshes bordering Moriches Bay and the east end of Bellport Bay. This emergence was caused by the clogging of Moriches Inlet and the consequent flooding of the marshes. Both of these flights were brought under control by aerial applications of DDT larvicide and adulticide.

During the latter part of May approximately 1500 acres of salt marsh were treated with 2½ percent dieldrin impregnated granules at the rate of 10 pounds per acre. This material was applied by helicopter and gave residual control from the date of application to the middle of September. One area of 300 acres was treated with the same material by a fixed wing plane. This method of application was found to be not as satisfactory as the helicopter application because of the narrow swath width and the inability of the pilot to overlap each swath sufficiently. Breeding was found in strips that had not been treated. It is planned this coming spring to treat by helicopter approximately 3000 acres of salt marsh with the dieldrin impregnated granules, re-doing the 1500 acres that were treated last year to determine whether this material will again give a long residual period.

The cooperative research program on biting flies, carried on jointly by the Suffolk County Mosquito Control Commission and the New York State Science Service was continued. In 1957, additional experimental treatments for the salt-marsh tabanids were made, and increased emphasis was placed on the sand flies (Heleidae). These studies are described in separate papers, by Jamnback, Wall and Collins.

Granular dieldrin discharged over the salt marsh at a rate of .3 lb. per acre from a helicopter by means of a whirling disc arrangement, under certain conditions gave control of the greenhead *Tabanus nigrovittatus,* as judged by both larval and adult counts. Of the three species of Heleidae studied, only *Culicoides melleus,* which was found to breed in a narrow intertidal band on protected sandy beaches, was the subject of control studies. The larvae were killed by topical applications of DDT emulsion.

From Nassau County, LeRoy Kinsey reported that "mosquito control was very successful in 1957, the 41st year of operation." Routine activities included the complete reconditioning of about 200 miles of the salt-marsh drainage system, or about a quarter of the total of 800 miles of ditches which drain 10,000 acres of marsh. The work was done mostly by hand labor.

An interesting development was the use of "Tossits" in catchbasins along the heavily traveled parkways, where it was unsafe to use vehicles which would have to stop or slow down in the traffic lanes. The inspectors, carrying Tossits, traveled on foot on the grass side strips beyond the curbs, thus permitting mosquito control vehicles to be kept off the parkways.

There were fewer mosquitoes captured in traps and less insecticide used than in the previous year. The trap catches of salt-marsh species were the second lowest in the history of the operations, and the number of service requests (complaints) relating to mosquito annoyance was the lowest on record—only 234 from a population of over a million and a half persons.

(2) Within the limits of New York City, which comprises five counties, there are thousands of acres of potential salt-marsh mosquito breeding areas as well as the usual urban breeding sites of freshwater species. In 1956 an unusual abundance of mosquitoes prompted the City Health Department to request the service of a consultant from the Public Health Service. His report was issued in January of 1957. It included recommendations for

the organization of a permanent comprehensive mosquito control program as soon as possible, with a director, entomologist, and borough supervisors and inspectors, and with emphasis on source reduction.

To date, there has not been sufficient time to put this program, or such portions of it as were adopted, into operation, and mosquito control in 1957 in New York City was limited to chemical control by helicopters, and fogging from ground operated equipment. The planning, administration and supervision of the program was under the direction of the Bureau of Sanitary Engineering of the Department of Health of the City of New York. The following details were supplied by the Assistant Commissioner, Environmental Sanitation.

"Approximately 7,500 acres of marshes were sprayed 7 times this year by helicopters at sunrise and sunset. Spraying cycles were initiated on June 8 and 28, July 20, August 2, 14 and 30, and September 14. The last 5 sprayings were scheduled to start 5 days after the peak high tides. There are usually two peak high tides a month in this area. These sprayings constitute larviciding operations.

"In the Boroughs of Richmond, Brooklyn and Queens, the Borough Presidents operated fogging machines. The chemicals employed were pyrethrins, butoxide and DDT in #2 fuel. Most of these sprayings could be considered an adulticiding operation. As a result of the program, it was difficult to find salt-marsh mosquito larvae or adult mosquitoes in this area this year. The control of other mosquitoes, though activities were limited due to inadequate funds, was generally satisfactory.

"Mosquito light traps were installed in, near, and distant from marshes. A control standard of 10 female mosquitoes caught in a mosquito light trap in 24 hours was considered a Nuisance Factor of 1. In a few instances, 90 female *Culex pipiens,* a Nuisance Factor of 9, were caught in 24 hours in a single light trap. Most of the time, the 20 light traps were found free of female salt-marsh mosquitoes. The largest number caught in any trap was 3 or 0.3 Nuisance Factor."

(3) Mosquitoes in upstate New York continued to arouse only local interest in comparatively small areas, and since no disease problems were involved, there was no pressure toward organizing for regional control. Thus far, the state health law, which permits a town board of health to engage in mosquito control and related activities, seems to have been adequate to meet whatever nuisance insect problems have aroused public interest, including, especially, mosquitoes and blackflies. There were about 1000 square miles included in regional blackfly control programs. The blackfly control programs involved larviciding in April and May. The most successful programs include two airplane sprays, one to control *Prosimulium hirtipes* and one to control *Simulium venustum*. These are the most troublesome species in New York State. A pint of 20 percent DDT per acre is sufficient to effect control.

In practice the two airplane sprays are usually supplemented by hand treatments in limited areas, and sometimes, also, a third spray is applied, where *venustum* develops over an extended period owing to differences in the rate of warming up of the streams.

The city of Ithaca (population about 30,000) has continued to contract with a local firm of "tree experts" to control mosquitoes. This is accomplished, apparently satisfactorily, largely by using a mist blower for both larviciding and residual adult spraying. All accessible potential breeding areas are covered several times during the season, either with or without the benefit of surveys. "Tossits" are also used.

In Geneva (population 18,000), about 50 miles from Ithaca, a similar program has not been so successful, possibly due to the fact that a large swampy area, a presumed mosquito source, is just outside the city limits and is not included in the program.

The City of Oneida (population 11,367)

contracted with an airspray operator to larvicide 650 acres of swampland and drainage ditches with 6 percent DDT at the rate of 1 gallon per acre. This was preceded by a dipping survey undertaken by the pilot himself, to determine species present. The larvae obtained were identified in the State Entomologist's office. They included: *Aedes stimulans, A. sticticus, A. fitchii, A. intrudens, A. communis, A. riparius and A. impiger.* Later, *Aedes excrucians* adults were collected.

No scientific evaluation of the control was made. All that can be said was that after the spraying no larvae could be found at most of the sites from which the pre-spray collections had been made, and that the community appeared to be satisfied with the results.

Residual applications of DDT by mist blower were made around state campsites as a routine procedure, and many summer hotels and private summer camps had fogging and mist-blowing contracts with local pest control operators.

It is probable that the gypsy moth control programs, which consisted of airplane spraying with DDT in early spring at the rate of ½ to 1 pound per acre, were responsible for a considerable abatement of the biting fly nuisance, especially in the counties of Delaware, Sullivan and Dutchess, and to a lesser extent in other eastern counties.—D. L. COLLINS, State Entomologist.

NEW ENGLAND

If mosquito control efforts in New England in 1957 were to be characterized in one word, that word would be "expanding."

In Massachusetts two new county projects, Plymouth and Dukes, were formed and two others, Bristol and Essex, came under consideration.

In Rhode Island a 60 percent increase in state matching funds is to be noted. Also in that state three new private groups in towns not organized joined the state program. Here might well be the beginnings of the realization in these towns of the benefits to be gained from organized mosquito control.

Another area of expansion is that of the development and use of mechanical devices for salt-marsh ditching. For many years the State of Connecticut has worked on this problem. The "scavel" plow is a concrete example of achievement. Several years ago a power backhoe was built at the mosquito control headquarters in Madison. Recently a clamshell bucket has been adapted to the same boom and dipper stick. Change-over from one to the other takes approximately two hours. More recently, another such machine has been designed, based on an Oliver OC–4–68 tractor. This machine will be fully hydraulic with a boom turning radius of 200°. Turning will be accomplished by a chain and sprocket arrangement with operator and cab turning with the boom, thus allowing the operator to face his work at all times. Mounting will be so that no outriggers will be necessary. Cost estimates for this machine total $6,500 exclusive of labor which will be done in the off season by the mosquito control personnel.

In Massachusetts the South Shore Project has been using a "scavel" for three years. This past year a hydraulic trencher mounted on a crawler tractor was added. The success of the South Shore "scavel" interested the Cape Cod Project, which resulted in their adding a unit to their equipment. These operations are being watched by other projects with the idea of adapting such machines to their area.

Although the interrelationship of the activities of mosquito control operations and those of wildlife conservation groups has been recognized in New England for as long as the writer has been active there, no concerted effort of the two groups to get together on an area-wide basis was made until this past year. The Northeastern Mosquito Control Association last winter had a speaker from the U. S. Fish and Wildlife Service at its 3rd Annual Meeting. Last summer a group