A BRIEF HISTORY OF MEDICAL ENTOMOLOGY
IN FLORIDA

Bureau of Entomology and Plant Quarantine

The present war has focused attention upon the importance of medical entomology as never before during the history of man. Under these circumstances it appears that a brief review of the history of medical entomology in Florida should be of interest and value to members of this Society.

Florida probably has suffered as severely from the ravages of insect-borne diseases as any part of the United States. This is due primarily to the subtropical climate extending over the greater part of the State, which favors the propagation and development of large numbers of disease-carrying and pestiferous insects. A classic reference to the abundance of some of these forms of insect life was made by the first Federal entomologist, Townsend Glover, in his "Florida Litany":

From red bugs and bed bugs, from sand flies and land flies,
Mosquitoes, gallinippers and fleas,
From hog ticks and dog ticks and hen lice and men lice,
We pray thecc, good Lord, give usc case.
All the congregation shall scratch and say Amen.

A secondary factor is the proximity of the State to the West Indies, Mexico, Central and South America, which facilitates the introduction of insect-transmitted diseases from these countries.

Obviously, it is impossible on this occasion to present a complete account of the subject, which would involve a discussion of extensive work performed in the State on the various phases

---

1 Presidential address presented at the annual meeting of the Florida Entomological Society, November 24, 1944. Most of the information used in the preparation of this paper was obtained from the 1900-1942 annual reports of the Florida State Board of Health.
of medical entomology proper, including the control of pest insects and the allied field of veterinary entomology. Instead, I will mention only the more important insect-borne diseases of man that have occurred in the State, and sketch the efforts and progress that have been made in their control.

The most important of these diseases undoubtedly is malaria. Malaria has caused more ill health and loss of life in Florida than all other insect-borne diseases combined. It was the chief cause of sickness and death among the Spanish expeditions and early colonies. Furthermore, until comparatively recent times malaria was one of the chief factors retarding the development of the State. Even during the last 40 years the total number of cases annually has often been as high as 41,000 to 94,000 and the number of deaths from 205 to 470.

Although several malarial vectors occur in the State, only one *Anopheles quadrimaculatus* Say, is important in the transmission of the disease (King, et al. 4). For this reason malaria has never been prevalent in those sections of the State where this species cannot breed.

The story of the real campaign against malaria in Florida extends back only a little over 20 years. In the interim following the discovery of its transmission by mosquitoes, only superficial programs designed mainly for the education of the public were carried out. The first substantial malaria-control project was conducted between 1920 and 1921 at Perry, where 65 per cent of the population were afflicted with the disease. It is believed that this was the first time in the history of the United States when all the then known means of malaria control were utilized, including oiling, screening, stocking ponds with surface minnows, administration of quinino, and extensive drainage. The campaign was successful not only against malaria but also against dengue, as will be mentioned later.

In 1930 the Division of Malaria Research was established at Tallahassee by the Rockefeller Foundation under the direction of Dr. Mark F. Boyd, and in 1931 the Division of Malaria Control was organized in the State by the United States Public Health Service under the direction of Dr. T. H. D. Griffiths. The same year Dr. W. V. King, of the Bureau of Entomology and Plant Quarantine, who had just been stationed at Orlando after returning from foreign service, agreed to act as consultant in entomology to the State Board of Health. Thus the services of three of the leading malarialogists in the country were secured
by the State. It should be noted that a portion of Dr. Boyd's work has been the successful use of the malarial mosquito in the treatment of paresis. Thus some measure of compensation has been obtained for all the losses suffered by the people of the State from this disease.

Beginning in 1934 large-scale malaria-control projects were undertaken by the Civil Works Administration. This work was continued under the Works Progress Administration until the termination of that organization. An extensive demonstration program of malaria control was conducted in Escambia County from 1938 to 1940 as a cooperative project of the county, the United States Public Health Service, and the Rockefeller Foundation under the direction of Dr. J. E. Elmendorf, Jr.

In 1941 the Bureau of Malaria Control, supported jointly by the United States Public Health Service, the Florida State Board of Health, and the Rockefeller Foundation, was incorporated within the State Board of Health organization. That Bureau is concerned with the making of surveys, formulation, promotion and supervision of control projects, and the training of personnel. Since 1941 work at military bases in the State has been given priority.

It is evident that considerable effort has been expended in the control of malaria in Florida. However, although the results have been encouraging, progress has been slow. Even as late as 1939 the death rate from malaria was third highest in the United States, being 17.3 per 100,000 population as compared with 2.6 for the entire country. During the last few years malaria incidence has reached an all-time low over the entire Southeast, but it appears that natural causes may be partially responsible.

Before leaving the subject of malaria, I should like to mention an interesting and important discovery which resulted from the early attempts to combat the disease at a time when even the causal organism was unknown. Early in the nineteenth century at Apalachicola, Dr. John Gorrie invented the first ice-making machine, in the course of his attempts to develop a cure for malaria (Fairlie 3). The purpose of this device was to cool the rooms of patients suffering from the disease. Thus indirectly the struggle against malaria in Florida led to the development of artificial refrigeration with all its attendant benefits.

Yellow fever undoubtedly has caused more panic and disruption of business, and probably more sickness and loss of
life, than any other disease during the relatively brief periods it has been prevalent in the State. Its common vector, *Aedes aegypti* (L.), occurs over the entire State ready to spread the disease whenever given an opportunity. However, climatic conditions as a rule do not permit breeding throughout the year, and this has prevented the disease from becoming endemic.

Yellow fever was introduced into Cuba from Central America in 1750 (Peabody 5). From there it spread to Florida. One of the first records of the disease in the State is that of a severe epidemic at Pensacola in 1822. The disease continued to reappear in that city at intervals during the next 60 years, the most severe outbreak occurring in 1882 with 2,200 cases and 252 deaths.

An epidemic struck the thriving Gulf coast community of St. Josephs (now Port St. Joe) in 1848 and is said to have destroyed 75 per cent of the population (Dau 2). This was one of the chief factors which led to the complete abandonment of the town shortly thereafter.

The town of Fernandina suffered severely from the disease in 1877, and 1,000 cases and 94 deaths occurred. The appearance of the disease caused the usual panic, and for several weeks all business was at a standstill.

By far the most widespread and devastating epidemic occurred in 1887-88 (Chapin 1, Rerick 6). In May 1887 yellow fever appeared in Key West, having been brought by ship from Havana. From Key West it spread to Tampa, becoming epidemic by fall and spreading to Manatee and Plant City. Following a mild winter, it sprang up again in the spring, appearing in Jacksonville by August and spreading from there to Macclenny, Sanderson, Fernandina, Gainesville, Enterprise, Live Oak, and Green Cove Springs. There were several thousand cases, and over 500 persons lost their lives, including many prominent people of the State.

One of the methods tried against the disease during the early stages of the epidemic in Jacksonville will serve to illustrate the pitiful ignorance with respect to insect-borne diseases existing at that time. This method was based on the theory that explosion of gunpowder at night would destroy the germs of the disease by concussion of the atmosphere. A battery of six cannons was used, but after five nights the ammunition was exhausted and before more could be obtained the artillery men had fled the city and the test had to be terminated. It is re-
ported (Rerick 6) that nothing was proved by the experiment except that the patients could not endure the noise.

The seriousness and magnitude of the epidemic of 1887-88 was responsible for the establishment of the Florida State Board of Health, whose chief function was to prevent a recurrence of this terrible scourge. This function was conducted so thoroughly that between 1883 and 1905 three threatened epidemics of the disease were averted. Since that time the Board has maintained constant vigilance to prevent reintroduction of the disease. It has also taken the lead in the prevention and control of all other insect-borne diseases and has broadened its functions to the point where it represents one of the most effective and valuable organizations in the State. Thus yellow fever inadvertently made a great contribution to the welfare and development of Florida.

Dengue, also transmitted by *Aedes aegypti*, is not a spectacular disease but has caused considerable sickness and suffering in the State. Fortunately, the mortality from this disease has been comparatively low. Records of its occurrence are relatively recent, apparently because it was formerly confused with yellow fever, malaria, or even typhoid. In 1905 there was a heavy outbreak at Key West, Tampa, Miami, and Jacksonville, and a total of about 11,700 cases was reported. In 1907 it was reported from Hillsborough County, but also was known to have been epidemic at Key West. The 1921 outbreak along the lower East Coast stimulated such public interest in mosquito control that a campaign was initiated at Miami in 1922. In 1922 there was heavy recurrence of the disease in 47 counties, with a total of 82,681 cases and 69 deaths reported. A striking example of the value of mosquito-control work was furnished by the fact that Miami and Perry remained free of the disease. It will be recalled that the malaria-control project at Perry was completed in 1921. An epidemic at Miami in 1934 was responsible for a State-wide clean-up of the breeding places of domestic mosquitoes. Owing to closer attention to mosquito control, there have been fewer cases of the disease in recent years.

Diseases carried by houseflies (*Musca domestica* L.) also have caused much sickness and death in the State. Early in the present century the newly established urban centers in keeping with the times were equipped with very primitive sanitary systems. Under these conditions houseflies were given every
opportunity to spread such diseases as dysentery, typhoid, and tuberculosis.

In 1899 there were 200 deaths from typhoid and 197 from dysentery, and in 1900 typhoid was considered one of the most dangerous diseases in the State. As late as 1913 inattention to the screening of kitchens and dining rooms was said to have resulted in a heavy toll of sickness and death from typhoid, and in 1914 the State health officer reported that flies were mainly responsible for the disease and recommended the screening of all privies. In 1915 an outbreak of dysentery at Lakeland, costing the city about $20,000 and causing 8 per cent mortality, was traced directly to transmission by houseflies. The records are not so definite with respect to tuberculosis, but it is highly probable that a great deal of the dissemination of this disease during the same period may be attributed to houseflies. Since 1916 there has been a rather sharp decline in the incidence of all these diseases except tuberculosis, and although other factors are involved, the improvement of housefly control undoubtedly has played a large part in bringing this about.

Flea-borne diseases have been absent from Florida until comparatively recent times. Bubonic plague appeared at Pensacola in June 1920 and there were 10 cases and 6 deaths, but the disease was promptly eradicated.

Endemic typhus appeared in Florida about 12 years ago. This disease, first discovered by Dr. Nathan Brill among immigrants at New York City in 1898, disappeared for over 20 years, and then spotted outbreaks began to appear in the South. In 1932 four deaths from typhus were recorded in Florida, and since that time the incidence has risen steadily. In 1937, 107 cases were reported, and in 1943 almost three times as many, or 314 cases, occurred. The disease is being combated by extensive rat-control projects, and possibly the peak has been reached.

Reference should be made to the recent work at the Orlando laboratory of the Bureau of Entomology and Plant Quarantine on the prevention of insect-borne diseases. This laboratory was established in 1930 for research on mosquitoes, and in 1942 was reorganized for the purpose of discovering more effective methods of protecting the armed forces from attack by these diseases. For security reasons details of the work cannot be given at this time, but it has been instrumental in reducing sickness and loss of life among our own troops and those of
our allies. Thus, research conducted in Florida has not only been of considerable importance in the war effort, but has also provided new and more powerful weapons for future use against disease-carrying insects in the State.

In conclusion, it should be stated that, although considerable progress has been made in the field of medical entomology in Florida during the past 40 years, much remains to accomplished. Several endemic insect-borne diseases are still of medical importance. Furthermore, the danger of introducing additional diseases of this nature or their insect vectors from other endemic areas, such as Africa and the Orient, has been greatly increased by the development of more rapid means of transportation. To offset these factors, however, recent research has provided more effective means of combating the insects involved.

Florida entomologists share the responsibility with the medical profession for the continued progress of the struggle against insect-borne diseases in the State. Our primary obligation is to provide continuous improvements in insect-control measures. Even those of us not actively engaged in the field of medical entomology may be of assistance in various ways. Probably the chief manner in which we can help is by acquainting our fellow citizens with the important bearing that the control of insects of medical importance has upon the future health and development of the State.

LITERATURE CITED