

## FILARIASIS IN THE PACIFIC

FROM A CORRESPONDENT

FILARIASIS is widespread in Polynesia and is indeed the main bar to progress in these beautiful and fertile islands. The International South Pacific Commission set up in 1949,<sup>1</sup> which now has its headquarters in Naumea, New Caledonia, is concerned, among other things, with suppression of the disease. The parasite responsible is a non-periodic microfilaria, whose adult form is now known as *Wuchereria pacifica*, and it is transmitted by the day-biting mosquito, *Aedes pseudoscutellaris* (probably in reality *A. polynesiensis* Marks).

Since 1948, American workers have been active in the study of Polynesian filariasis, especially in Samoa and Tahiti, and some results of their researches have now been published. A group of entomologists, parasitologists, and pathologists from the University of California has been working in close association with members of the French Medical Research Institute at Papeete, the capital of Tahiti.<sup>2</sup> In this historic island the proportion of inhabitants harbouring microfilariae in their blood and showing clinical signs of the disease is higher than it is in any other Pacific island yet investigated. Among the large number of people examined, no male over the age of 50 was free from signs of filariasis. (In all parts of Tahiti the proportion of males harbouring microfilariae was higher than the proportion of females, which points to some discrepancy in exposure to, and acquisition of, the primary infection.)

Following the example of Fiji, an all-out effort is being made with the eventual aim of eradicating the main mosquito vector, *A. pseudoscutellaris* (*polynesiensis*), from the island of Tahiti and its satellite Maiao (approximately 60 miles west).<sup>2</sup>

To assess the prevalence of filariasis, studies were undertaken in nine areas, of which eight were on the main island and one on Maiao. The indices chosen to determine the ultimate effect of control measures were based on the average number of microfilariae per 20 c.mm. of blood per person, the proportion of persons whose blood contained microfilariae, the number of attacks of lymphangitis or filarial fever per person in the area, and the density of *A. pseudoscutellaris* (*polynesiensis*) in the larval and adult stages as well as the rate of filarial infection in wild-caught mosquitoes. A census of the adult mosquito population was made by means of observations at three "resting" and three "biting" stations in each of the nine areas; at the former collections were made between 8 and 9 A.M., and at the latter between 1 and 2 P.M. Here the captured mosquitoes were dissected to ascertain whether they were infected. A comparison between the mosquito populations and the average number of infected larvae found in them, before and during the experiment, provided valuable information about differences in transmission-rates.

In the nine areas the average total percentage of the population with microfilariae in the blood before the inauguration of control measures was 32.2. (In one area in Tahiti it was 58.3, while in Maiao it was 21.1.) One area (with a percentage of 38.6) was retained as a control, while in the other eight the measures varied. In some of them sanitation alone was employed; in others sanitation plus destruction of mosquitoes with D.D.T. In some the population were given 'Hetrazan' (2 mg. per kg. body-weight three times daily for seven days); and in others both hetrazan and insecticide were used. Sanitary measures were directed to mosquito breeding-places, with the object of draining or destroying

them. Anti-mosquito measures consisted mainly in spraying the interior as well as the exterior of houses with 5% D.D.T. emulsion in water every three months while all vegetation within thirty yards was treated with 1% of this insecticide.

Of the nine species of mosquito, *A. pseudoscutellaris* (*polynesiensis*) and *Culex fatigans* were the most abundant. The former was found breeding in a great variety of places, the most important being coconuts, especially when rat-eaten. It seems that neither sanitation alone, nor D.D.T. alone, reduces the numbers of this aedes as effectively as it reduces the numbers of other species. It was found, however, that where the population of an area had been treated with hetrazan the proportion of mosquitoes with infective filaria larvae was reduced—in one area from 10 to 0.6% in a year.

The percentage of people with microfilariae was estimated before, at six, and again at twelve months after treatment had been instituted. In each of the four areas in which hetrazan was administered, the percentage of positives fell appreciably; but a comparison of those positive before and after treatment does not show the effect of the drug so clearly as does a comparison of the actual numbers of microfilariae per 20 c.mm. of blood, which on the average were less than 10% of the original number. It is particularly difficult to assess the influence of the drug on the frequency of attacks of lymphangitis, but in general it may be stated that the effect on other filarial manifestations was disappointing. The investigators feel that their data do not yet permit of statistically significant conclusions regarding the absolute superiority of any single method. In the attempt to formulate a programme for the control of filariasis which must extend over a long period, many points had to be taken into consideration. Necessarily it will require years of further study in order to determine how far the clinical manifestations of filariasis are reduced by the measures adopted.

A good deal of evidence on the transmission of filariasis outside the villages has been collected by Jachowski and Otto<sup>3</sup> in American Samoa. There a survey of ten villages was undertaken, and four collecting-stations were established for each village at varying distances from the open green or *malae* and at various distances in the bush leading to the banana or coconut plantations. Collections made within a period of 1½ hours on a single afternoon yielded over 2000 mosquitoes which were then dissected for larvae of *W. bancrofti*. In the bush itself the frequency of infected mosquitoes seemed to be related to the amount of native traffic, none being found in the areas devoid of human beings. The index of transmission was obtained by multiplying the density by the proportion of mosquitoes infected. From this it appears that mosquitoes in the houses and in the open *malae*s are of little importance compared to those in nearby bush or in houses close to it. The index is very high 175-275 yards from the centre of the villages. It thus appears that, in Samoa at least, one hour spent in the bush offers greater opportunities for infection than twenty-three hours spent in the village.

The age and sex distribution of microfilaræmia in Samoans added to the habits of the people, or to the biting habits of *A. pseudoscutellaris* (*polynesiensis*), support the conception of non-domestic transmission which is common also to *W. malayi*. Consequently in American Samoa residual spraying of native houses cannot be expected to be useful. The attack on the mosquito must be made in the bush. The same appears to be true for Tahiti and other islands of the Pacific where the non-periodic microfilaria is found.

1. See *Lancet*, 1951, ii, 1082.

2. Beye, H. K., Edgar, S. A., Mille, R., Kessel, J. F., Bambridge, B. *Amer. J. trop. Med. Hyg.* 1952, 1, 637.

3. Jachowski, L. A., Otto, G. F. *Ibid.*, p. 662.