

## THE TRANSMISSION OF LEPROSY BY COCKROACHES

TO THE EDITOR:

The common belief is that leprosy is transmitted directly from man to man by contagion and/or infection. I find it difficult to accept this as the sole method, because in my 15 years' experience at Ngomahuru Leprosy Hospital, many cases have occurred in which the histories seem definitely to preclude both family history and contact.

For 500 male patients, a definite history of family infection was obtained in 176, or 35.2 per cent; 64.8 per cent had no family history or contact. For

200 female patients, the comparable percentages are 49 and 51. For all patients, 60.9 per cent gave a negative history, in spite of lengthy and searching questioning.

I feel convinced therefore that there is some other method of transmission. I consider it quite impossible for a patient to have lived with a diseased person without knowing it, for the natives know leprosy more or less. In the old days the diseased person would be placed in a cave, with heavy stones rolled against the entrance. In later years, he would be isolated in a hut, at a distance from the Kraal, and given attention.

Moreover, the disease here is essentially rural, most patients coming from small Kraals of 3 or 4 huts only. Very few come from thickly inhabited places. Surely, if leprosy is infectious and contagious, the opposite would be the case.

Ngomahuru has 8,400 acres, is situated within a native Reserve and is 32 miles from the nearest town. There are about 500 patients and although contrary to the rules, they slip away to visit friends in nearby Kraals sometimes at weekends. Yet, in 15 years, only one patient has been admitted from these Kraals.

There is plenty of evidence here that leprosy is a family or house disease, but this by no means implies direct infection from man to man. Cases continue to appear from the same Kraal over a number of years. It looks as though some sort of infection is left behind when the patient is admitted to hospital. In what form is this supposed infection? Can it be accounted for by some insect, or damp soil, or mud walls, or thatch?

There is one pest in this country which is exceedingly common, as it is everywhere the world over, the cockroach. They hang from the thatched roofs in great numbers, and they bite humans savagely at night, producing a white scar, the size of a pin's head, very obvious features on these black skins. I asked one man why he always slept outside his hut. He said he preferred to give the hut up to the cockroaches, and sleep outside undisturbed!

We use large quantities of sodium fluoride, which is an effective poison for cockroaches. At first, the roaches died and were eaten by the fowls which also died, but the patients have now become wise and sweep up and burn the dead insects. It is now almost impossible to procure sodium fluoride here.

A few years ago an investigation of cockroaches was begun here, with a view to determine whether or not they could be concerned with the communication of leprosy from man to man. Others have investigated mosquitoes, fleas, bugs, ticks, lice, and flies with various results, mostly indecisive. Since leprosy is a cosmopolitan disease, any possible intermediate host must also be cosmopolitan.

It has been found that roaches ingest large numbers of *M. leprae*, espe-

cially when they feed on highly positive ulcerated patients. Experimentally, *M. leprae* have been demonstrated in the gut and feces of roaches that have been fed on dressings removed from leprosy ulcers. Dr. Lamborn in Nyasaland has found the bacteria in feces in such large numbers as to suggest multiplication.

The cockroach belongs to the order Orthoptera, *Family Blattidae*. The males only have wings and fly, but the family generally travel by means of their legs. They possess strong serrated opposed mandibles. No human food is free from possible contamination. They disgorge a portion of their meal at intervals and drop their feces everywhere. There are about a thousand species. Most of them propagate by eggs which are contained in a shell-like envelope, but some are viviparous. After several moultings, the young are fully grown in about a year. Some are said to live a long time without food or water, but roaches kept in bottles here without food or water die in a couple of days or so. One species here is light brown and about one half inch long. Another is almost black and twice as long. They have not yet been identified. The young are pale straw-colored.

It is known that roaches ingest cholera vibrios and pass them out in the feces unharmed. Also, they carry rat nematodes and are, in this case, true intermediate hosts.

As the result of these investigations, I advocate war on cockroaches and the burning down of dwellings of patients admitted from the native Reserves. The houses in a leprosarium should be as roach-proof as possible, built with little wood, concrete roofs, and walls washed with cement (not plastered, for plaster is apt to come away from the bricks, leaving cavities). Scrupulous cleanliness should be observed in and around the houses. Villages should be small and compact, so that they can be kept clean and inspected easily; with not more than about 25 patients in each; there should be ample space between villages. Spread them out over as much ground as possible and keep "nodulars" well away from the others.

Medical Superintendent  
Ngomahuru Leprosy Hospital  
Southern Rhodesia

B. MOISER, O.B.E.  
Leprologist to Gov't of  
Southern Rhodesia

*From Dr. Clay G. Huff, Professor of Parasitology, University of Chicago, Chicago, Illinois, to whom the Acting Editor submitted Dr. Moiser's letter.*

Doctor Moiser is not far from the truth in his statements. In regard to the wings of the two sexes, the females of some species have vestigial wings but this is not a general rule. The predominant species which he has observed must have this characteristic. Although it is not commonly believed that cockroaches attack man or other living animals, Patton (*Insects, Ticks, Mites and Venomous Animals of Medical and Veterinary Importance*, part II, 1931) says:

"In the Urals the cockroach (probably *Periplaneta Americana*) is described by Russian observers as a most annoying pest in workmen's houses. The rooms

are sometimes so heavily infested that the cockroaches attack the occupants, even when asleep; small babies are described as being covered with sores resulting from the bites of these insects."

I have been unable to find Patton's original reference. It would seem, however, in spite of this reference, rather improbable that cockroaches do attack man, since such a characteristic usually comes to be very generally known among all classes of people.

I am inclined to agree with the writer of this interesting letter that the subject needs to be further investigated.