ON THE POTENTIAL TRANSMISSION OF B. LEPRAE BY CERTAIN INSECTS

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The author records the observations made by him during his stay at the Leprosy Sanatorium near Taihoku, relating to adult flies and their larvae, mosquitoes, and cockroaches.

1. Among these insects the flies in their adult stage seem the most likely to spread the germs; next come the cockroaches while mosquitoes and fly larvae are evidently rather negligible factors.

2. The flies examined in this connection belong to Musca, Lucilia, and nearly related genera. Of the 689 flies caught in the serious case wards 28.37 per cent, and of the 723 caught in the slight-case wards 24.4 per cent carried B. leprae in their guts.

3. I also found a B. leprae-like acid-fast bacillus in the guts of the flies caught in the administration building and in the dwelling house situated 200 meters away from the institution.

4. The flies caught in the wards, and, at a lower rate, those caught in the administration building and in the dwelling house carried B. leprae also on the outside of their body.

5. When the flies were fed with an emulsion of leprous nodules, the bacilli in their guts proved most numerous until 24 hours after the feeding; after 36 to 48 hours their number was greatly reduced, but some could be found as late as 72 hours after.

6. In view of this gradual reduction and certain morphological changes, I conclude that B. leprae does not multiply in the body of the flies, nor is it affected by the bactericidal action of their secretions.

7. When the flies were experimentally contaminated with emulsion of leprous nodules on the surface of their body, the bacilli were found to propagate in comparatively short time, but I noticed that after 24 to 48 hours their number was considerably reduced.

8. From the stools in the toilet of the serious-case wards 307 fly larvae were taken, of which as many as 17.5 per cent were found to harbor an acid-fast bacillus, though I am not prepared to state its identity with B. leprae. However, I could not find such acid-fast bacilli in the maggots taken from the stools in the toilet of the dwelling house.

9. There is the question whether B. leprae, when ingested by the maggots, will pass through the pupa into the adult fly. My experiments with 300 pupae that in the larva stage had been fed with material containing B. leprae gave a negative result in every case. My observations showed that the fly larvae in very short time expel the microorganisms contained in their intestinal canal, especially in the later stages and immediately before pupation. Although this excretion is due to the mechanical function of the intestine, and therefore in a sense cannot be held to be perfect, it yet seems to be fairly efficient, and practically we may exclude the probability of even such a minute organism as B. leprae remaining in the alimentary tract, or passing into the pupa or the imago of the fly.

10. The mosquitoes coming under my observation belonged to the genera Culex, Anopheles, and Stegomyia. Out of 203 mosquitoes in all caught in the serious-case wards after sucking blood, only two were found positive.

11. Of 195 mosquitoes caught in the wards, and showing no indication of having sucked blood recently, all were negative.

12. Of cockroaches only Periplaneta americana and P. australasiae were observed. Of 67 cockroaches caught in the serious-case wards 26.8 per cent, and of 105 caught in the slight-case wards 12.3 per cent carried a B. leprae-like acid-fast bacillus.

13. When cockroaches were fed an emulsion of leprous nodules, some of them began to excrete B. leprae in their feces within 8 hours. This excretion of bacilli may continue for 94 hours, but shows the highest positivity 20, 32, or 44 hours after feeding.

14. The bacilli excreted by the cockroaches are fairly normal, morphologically as well as in staining properties; in other words, they exhibit no signs of having been weakened in any way by their passage through the digestive tract of these pests. In my opinion the cockroaches, at least the two Periplaneta species examined, are eminently apt to spread, besides other pathogenic bacilli, also the Leprosis bacillus wherever they visit and deposit their feces.