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THE TRANSMISSION OF TYPHUS FEVER

In September, 1909, Nicolle, Comte and Conseil¹ reported the successful transmission of typhus fever from one monkey to two others by means of the bite of the body-lice (*Pediculus vestimenti*). In their report they showed that body-lice that had fed on an infected monkey were able to convey typhus fever some time between the first and the seventh day thereafter.

Independently of Nicolle and his co-workers, Anderson and Goldberger,² in their studies on typhus fever in Mexico in November, 1909, reported two attempts to transmit Mexican typhus from man to the monkey by means of the bite of the body-lice. In one of their experiments the monkey showed a slight elevation of temperature eight days after the last exposure to the bites of the infected lice, but they stated that circumstances made it impossible to test the immunity of this animal. In view of later studies by them and by others, they concluded that it was very probable that the elevation of temperature was due to infection with typhus.

Ricketts and Wilder,³ also working on the Mexican typhus, reported in 1910 that they were able to transmit the virus of typhus fever by means of the bite of the body-lice from man to monkey and from monkey to monkey. They also reported the successful transmission of the typhus virus to the monkey by introducing into scarifications of the skin the abdominal contents of infected lice. They stated that, as a rule, in their louse experiments, the monkeys had no very significant temperature reaction and that proof of infection was dependent on immunity tests with virulent blood.

In 1911, Nicolle and Conseil,⁴ continuing their work of two years previously, reported further successful

experiments on the transmission of typhus to the monkey by means of the bite of infected body-lice.

Subsequently, in 1912, Anderson and Goldberger,⁵ continuing their work on typhus in both the United States and Mexico, reported the successful transmission of both the Mexican and New York typhus by means of infected lice. They also reported the first evidence incriminating the head-lice (*Pediculus capitis*) as a possible agent in the transmission of typhus.

All the work above referred to on the transmission of typhus fever by means of the louse has been on the transmission of the disease to the monkey by means of body-lice that had fed either on infected monkeys or on human beings, and until recently no exact experiments had been reported on the transmission of the disease from man to man by means of the bite of infected lice. There are a number of instances in the literature which strongly suggest this possibility, but the evidence has not been conclusive. Sergent, Foley and Vialatte,⁶ however, have recently reported the successful transmission of typhus to man and to the monkey by means of the body-lice and possibly also by means of the eggs from infected lice.

In one of their experiments about two hundred infected body-lice were allowed to feed daily on the authors and individuals who volunteered for this service. On the fourteenth day after the beginning of the feeding one of the subjects developed typhus fever. Lice taken from the individual, after being made into an emulsion, were used to inoculate a monkey which, after four days' incubation, developed typhus. Blood was drawn from this animal and used for the inoculation of a second monkey which, after an incubation period of seven days, developed typhus fever.

Sergent and his co-workers conclude that the mere bite of infected adult lice is sufficient to transmit typhus fever to man and that lice taken from a person so infected are infective for the monkey, by either subcutaneous or intraperitoneal inoculation of an emulsion of the ground-up lice. They maintain also that the inoculation of the eggs from infected lice will produce typhus fever when inoculated into man by slight scarification of the skin.

These experiments of Sergent seem conclusively to settle, by means of experiments on man, the rôle of the body-lice in the transmission of typhus fever. It is a matter of sincere congratulation that much of the recent advance in our knowledge of this once dreaded disease have been due to the work of American investigators, although the toll through the loss of life of two of the investigators — Ricketts and Goldberger — has been severe.

1. Nicolle, Charles; Comte, C., and Conseil, E.: Transmission expérimentale du typhus exanthématique par le pou du corps, *Compt. rend. Acad. d. sc.*, Sept. 6, 1909, p. 486.

2. Anderson, John F., and Goldberger, Joseph: On the Infectivity of Tabardillo or Mexican Typhus for Monkeys and Studies on Its Mode of Transmission, *Pub. Health Rep.*, Feb. 18, 1910, p. 177.

3. Ricketts, Howard T., and Wilder, Russell M.: The Transmission of the Typhus Fever of Mexico (Tabardillo) by Means of the Louse (*Pediculus vestimenti*), *THE JOURNAL A. M. A.*, April 16, 1910, p. 1304.

4. Nicolle, Charles, and Conseil, E.: Etiologie du typhus exanthématique, *Ann. de l'Inst. Pasteur*, xxv, p. 68.

5. Goldberger, Joseph, and Anderson, John F.: The Transmission of Typhus Fever, with Especial Reference to Transmission by the Head-Louse (*Pediculus Capitis*), *Pub. Health Rep.*, March 1, 1912.

6. Sergent, E.; Foley, H., and Vialatte, C.: Transmission à l'homme et au singe du typhus exanthématique par les poux d'un malade atteint de fièvre récurrente et par des lentes et poux issus des précédents, *Compt. rend. Acad. d. sc.*, March 30, 1914, p. 964.