

: Special Projects

Rickettsialpox Survey in New York City

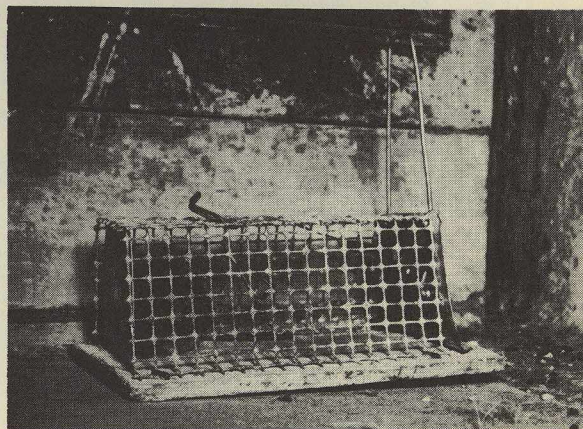
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In 1946 there occurred in New York City an outbreak of a relatively mild disease of unknown etiology. Upon investigation a new rickettsial organism, named *Rickettsia akari*, was shown to be the causative agent of the disease, and a mouse-borne mite, *Allodermanyssus sanguineus*, the arthropod vector.

The need for further field and laboratory study of rickettsialpox led to a cooperative agreement between personnel of the Communicable Disease Center Activities stationed in U. S. Public Health Service District 1 and the New York City Health Department. The program, designed to run for 1 year, started in July 1947 and proposed to determine the extent of rickettsialpox infection in mice throughout the city. During the course of the investigation additional factors were to be considered: whether other rodents, particularly rats, were involved in the disease, and whether there were other vectors of the disease in addition to the mite, *A. sanguineus*.

In order to achieve these objectives, live mice and rats were trapped all over the city under a variety of conditions. For purposes of this survey, New York City was divided into a series of zones in each

of which a weekly intensive trapping campaign was conducted. Wire-mesh mouse cages were baited with either odorous cheese or sausage, and normally set in the basement of homes, restaurants, commercial establishments, hospitals, zoos, or any suspected or reported mouse habitat. Wherever mice were caught, both trap and mouse were placed in a white paper bag which was tied tightly and marked with a tag indicating the date and specific location of the set trap. Steel-jaw traps were used for trapping rats and sturdy cloth bags were used for



Mouse trapped near established mouse run. Note droppings near wall.

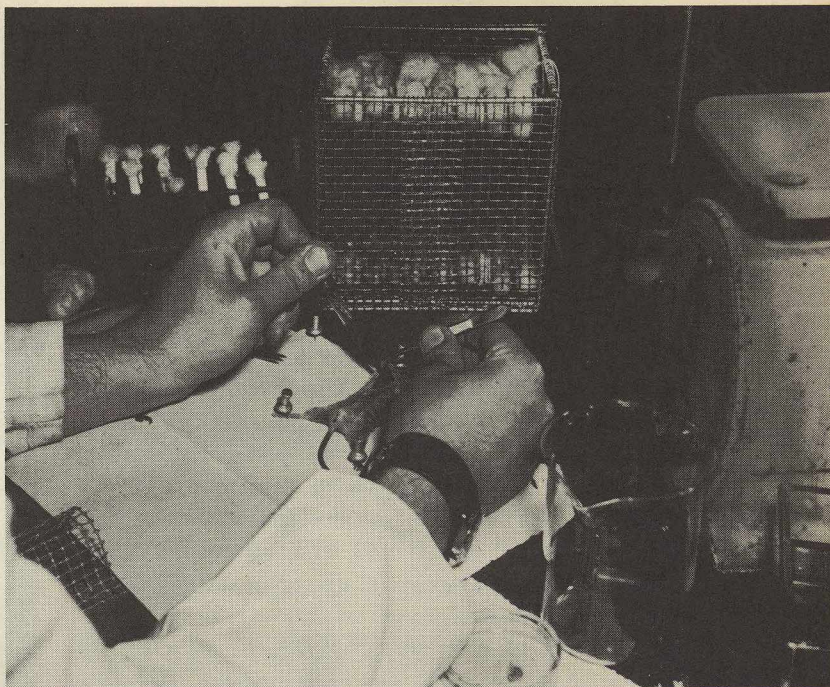
Drawing blood from severed axillary artery of mouse.

transporting them to the laboratory. Wall areas and runways were carefully examined for mites which may have escaped from the rodents. All bags were removed to the laboratory where a thorough scrutiny of the bag followed the removal of the rodent and trap. The mouse cages also were examined for mites. All ectoparasites which were collected were placed in vials of saline solution and later identified.

The mice were placed in battery jars and supplied with food and water for 24 hours in order that a sufficient amount of blood could be taken for a complement fixation test. The method of bleeding the mice consists of cutting away a small section of the skin underneath the right foreleg, opening the right axillary artery and collecting the blood outside of the chest cavity. The blood samples were then tested by complement fixation for rickettsialpox reactions. Small surgical clips were used to fasten the skin before proceeding with the recovery of ectoparasites.

The method of ectoparasite recovery consists of washing rodents with a wetting agent, Aerosol OT, dissolved in water. Butyl cellosolve is added to clear the solution for microscopic examination. The rodent is thoroughly washed in 50 cc. of the solution. Two rinsings of 50 cc. tap water bring the total liquid washing to 150 cc.

Several methods for separating the ectoparasites from the wash water have been tested with varying degrees of success. The use of sedimentation and separation with separatory funnels, filtration through filter paper, and centrifuging of wash water have all been discarded. It is believed that the most satisfactory, and ultimately the most time-saving method



is the complete microscopic examination of the wash liquid.

Thus far the following rodent ectoparasites have been recovered:

Allodermanyssus sanguineus
Liponyssus bacoti
Myocoptes musculus
Radfordia spp.
Myobia musculi
Cheyletus eruditus
Laelaps nuttali
Xenopsylla cheopis
Nosopsylla fasciatus
Leptopsylla segnis
Ctenocephalides canis
Polyplax spinulosa

Positive rickettsialpox complement fixation reactions have been reported for several rats as well as many mice. It is hoped that transmission tests will be made to investigate the possibility of the existence of arthropods other than *A. sanguineus* that are vectors of the disease.