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A Characteristic Exanthem in Epizootic Plague and the Experimental Reproduction of This Lesion in the Guinea Pig.

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Just subsequent to the outbreak of the epidemic of bubonic plague in New Orleans, the occurrence of a concurrent rodent plague was revealed. Every rat trapped, captured or found dead, either from disease or from fumigation, was sent to the Health Department Laboratory for full investigation.

Because of the occurrence of this epizootic, the opportunity for study of approximately 150,000 rats was presented. While engaged in this routine work, we observed that many of the rats presented a peculiar discoloration of the feet. This discoloration occurred in the living trapped rats, as well as those that were dead. The lesion was so striking in appearance that the investigation of its significance seemed justified. A special study of the rats having this discoloration was made and it was noted that, in all instances, these animals were proven to be infected with plague.

Character of Lesion: The color presented is very apparent in the feet of the infected rodent animal and occurs in both extremities; it varies from a pink to a salmon tint. The lesion is clear cut, having a distinct line of demarcation and varies in its extent of distribution. In slight infections, it is confined to the feet alone, covering both the dorsal and plantar aspects, hence the appellation "pink feet" was applied. In more marked infections, the color extends over the entire extremities and, at times, appears upon the abdominal and thoracic walls. The discoloration is not due to petechial hemorrhages such as seen in hog cholera or the hemorrhagic septicemias nor is it analogous to a scarlatina erythema, but rather suggests the tissue discolorations that are seen in carbon monoxide poisoning. It appears that there occurs either some hemolytic change, causing a laked blood aspect or that the hemoglobin is, in some manner, modified and permeates the structure. The reason for the localization of this color has not been ascertained.

The occurrence of this peculiar marking was found in the greater majority of rats in which plague was present. Only approximately 25% of rats positive for *B. pestis* infection failed to show "pink feet." When this sign was absent, the animal was apparently only

recently infected as the lesions of the visceral organs were not so marked, although positive *B. pestis* cultures were obtained. Eventually the observations of this phenomena became so generalized in our laboratories that, before starting dissections, the workers established the custom of making a gross examination of the entire catch and sorting them into two groups, those with discolored feet and those with the normal appearing feet.

Experimental: In connection with the study of the exanthem of the epizootic plague, experiments were carried out with the view of ascertaining if this lesion could be reproduced in the laboratory animal. Two hundred and fifty guinea pigs were inoculated with materials from the rats dying of plague in which "pink feet" were present. While certain of the guinea pigs were injected subcutaneously with the heart's blood, splenic emulsion, and cultures from the heart's blood of the plague rats, the procedure, for the greater part, consisted of scarification of the abdominal parieties and inoculation of the infected splenic pulp therein.

In the guinea pigs thus inoculated, all developed plague and 95% of these animals demonstrated the pedal exanthem. This lesion developed in about 72 hours after the inoculations and became intensified as the disease progressed. As in the natural rodent disease, the extent of its reproduction was dependent upon the virulence of the infection. The definite presence of plague in these guinea pigs was established through autopsy with accompanying smear preparations and the cultural recovery of *B. pestis*.

In a careful review of the literature, the type of lesion herein described and reproduced has not been heretofore reported either in rodent plague or in other infectious diseases of the rat.

Based on these observations of epizootic plague and upon the experimentally induced disease in the guinea pig, it is our opinion that the lesion described is a characteristic exanthem of rodent plague, which can be reproduced in these animals by the action of the *Bacillus pestis*.