

Western CDC Laboratory Reorients Its Wild Rodent Plague Investigations

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e/ The U. S. Public Health Service has been concerned with wild rodent plague since 1908 when ground squirrels (*Citellus beecheyi*) were first found plague-infected in Contra Costa County, Calif. Previous to this time, it was thought that all plague in the United States was a domestic rat disease from which human cases were derived. As long as the reservoir of this disease was rats and rats only, it could be eliminated by effective rat control measures in the few California cities on the San Francisco Bay and in Seattle, Wash., where it was known to occur. The demonstration of the infection in ground squirrels indicated that there might be a rural reservoir complementing that produced by rats in cities. The possibility of eliminating plague through reduction or elimination of the reservoir depended on the geographic extent of the infection in ground squirrels.

To determine the scope of the problem in California, the Public Health Service in 1909 began to examine ground squirrels from Contra Costa and other Bay area counties, obtained by shooting. The infection was found to be so widespread that ground squirrels from other more interior counties were also sampled, and in 1911 the survey of the ground squirrels extended into parts of Nevada, Oregon, and Arizona, but with negative results in these three States. Surveys of ground squirrels and their control continued in California, and the results indicated that there were infected ground squirrels in most of the counties in California and that in spite of the control efforts, scattered human cases of plague (apparently of wild rodent origin) continued to occur. In 1934 such a case occurred in Lake County, Oreg., and for the first time led to evidence in the following year that ground squirrels in a State outside of California were involved in plague transmission.

The above knowledge led the Public Health Service to establish more flexible mobile survey units for the purpose of determining just how

widespread plague was in the wild rodents of the West. Each unit consisted of a two-man crew with a truck containing all the necessary equipment for hunting and trapping rodents and for field dissection of the specimens. The number of this type of mobile unit eventually reached 14 and the area surveyed extended from the Pacific Coast into the Great Plains. Plague was demonstrated as far east as the Dakotas, Kansas, Oklahoma, and Texas. Furthermore, the mobile units have shown that plague is a disease of many species of wild rodents and that the elimination of the disease by attempting to control all the rodents involved in such a large area is not economically feasible. Instead, the findings of these units have led to the emphasis that is now being placed on preventing (by domestic rodent control) the possibility of wild rodent plague spreading into city rat populations where the greatest danger of human infection occurs. These preventive measures consist largely of reducing the contacts between humans and rats through city-wide rat control programs. The problem of preventing the scattered human rural cases is unsolved, though prompt medical treatment of those cases that do occur should lead to rapid and uneventful recoveries. The reduction of the number of scattered human cases and also the danger to urban populations rest on an increased knowledge of wild rodent plague.

During the past 14 years the Western CDC Laboratory (formerly the Plague Suppressive Laboratory) has had the Public Health Service's responsibility for the above-mentioned plague investigation work in Western States. Since January 1950 this laboratory has also had the Service's responsibility for promoting domestic rodent control programs in Western cities. Dr. Vernon B. Link, the present Medical Officer in Charge of the Laboratory, has recognized the need for reorienting the plague investigation functions of the Laboratory along lines that would be more productive in furnishing answers to the problems

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involved in: (1) preventing the scattered human rural cases of plague, and (2) lessening the danger of urban populations from plague of wild rodent origin. To assist in obtaining answers to these problems, an intensive ecological study of wild rodents in a single area is to be undertaken.

This study is under the supervision of a mammalian ecologist and will utilize an entomologist and four rodent survey aids. The study will be established in a known plague area and will function throughout the year. The testing of ectoparasites and rodent tissue for plague for the ecology study as well as for several cooperating agencies will, as in the past, be done at the Laboratory headquarters in San Francisco.

One of the objectives of the unit will be to illustrate fluctuations in the rodent populations and the factors responsible for them. With such information, it may be possible to predict when conditions will be ideal for epizootics. Another objective will be to determine the principal reservoir host and the principal vectors; this determination may elucidate how and when the disease spreads from one species of rodent to another. A further objective will be to learn how plague

is maintained over the winter period and how and when it is practical to control rodent epizootics.

The study will be based on an extensive live-trapping program in which the captured animals will be observed while alive; each will be given a suitable permanent distinctive mark and then will be released for future recapture. The lives of known individuals will be followed to learn the length of the life span, reproductive activities, changes in ectoparasite species, and numbers of ectoparasites harbored at various times and how they are affected by such factors as changes in climate.

Immediate spectacular results undoubtedly will not be produced by the type of investigation contemplated; but sound control measures can be founded only on the type of basic information that will be provided by the proposed study of the ecological interrelationships between the various mammals and their ectoparasites. It is believed that only through such a study can the complexities of plague be solved, provided such a study is undertaken in a limited carefully chosen area and is conducted on a year-in, year-out basis.

The Development of Local Mosquito Control Districts in Virginia

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The 1940 session of the Virginia Legislature passed an act providing for the creation of mosquito control districts. Under this law, a district could be created in Tidewater Virginia, to include a town, city, or county, or any portion or combination thereof. Two members were to be appointed locally to serve on a commission that would conduct the affairs of the mosquito control district. The Virginia State Health Commissioner was designated to serve on all commissions as chairman ex officio. The State health department was empowered to contribute State funds in an amount equal to 25 percent of the funds collected locally, not to exceed \$5,000. Local funds could come

from a direct tax, an appropriation, or contributions. Subsequent legislatures have amended the law allowing any community in the State to create a mosquito control district and raising the maximum State contribution to \$10,000. On July 1, 1940, a mosquito control district was established under this law at Virginia Beach. No doubt, more districts would have been created at that time except for the gathering war clouds.

With the advent of World War II, the Hampton Roads section of Virginia became very important from a military standpoint. The U. S. Public Health Service working in cooperation with the State health department inaugurated the Malaria Control in War Areas program. Under this program, operated largely throughout the Southeastern States,

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