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L. O. HOWARD, Entomologist and Chief of Bureau.

**THE DISTRIBUTION OF THE ROCKY MOUNTAIN
SPOTTED-FEVER TICK.**

BY

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Agent and Expert.

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United States Department of Agriculture,

BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

THE DISTRIBUTION OF THE ROCKY MOUNTAIN SPOTTED-FEVER TICK.

(*Dermacentor venustus* Banks.)

By F. C. BISHOPP,

Agent and Expert.

The demonstration of the fact that Rocky Mountain spotted fever, an important disease of man, is conveyed by the common wood tick of the Rocky Mountains, has naturally attracted considerable attention. In the year 1902 Drs. Wilson and Chowning advanced the theory that the "wood tick" acts as a carrier of the disease. In 1906 the late Dr. H. T. Ricketts began a series of admirably planned and executed experiments which showed that the tick *Dermacentor venustus* Banks is principally, if not entirely, responsible for the transmission of this disease to man.

While the disease appears in its most virulent form in the Bitter Root Valley in western Montana, it is known definitely to occur in a less severe form in parts of Idaho, Wyoming, Utah, and Nevada. Although no authentic records to that effect are to be found, there is little doubt that it occurs occasionally in certain sections of Colorado and Oregon. In the Bitter Root Valley from 70 to 80 per cent of the cases terminate fatally, while in southern Idaho there is a mortality of about 5 per cent. The cases of the disease which have appeared in the other States mentioned seem to be of this less virulent type.

Since it has been determined that a tick is the transmitter of this disease, the importance of ascertaining the distribution of the species concerned is at once apparent. In 1909 Prof. R. A. Cooley, as Entomologist of the Montana Agricultural Experiment Station, undertook the determination of the distribution of this tick in the State of Montana. He accumulated 172 lots of ticks, including 142 lots of *Dermacentor venustus*, from 49 localities. During the same season

Mr. W. V. King was employed as an agent of this bureau for the purpose of collecting specimens especially outside of Montana. In this investigation he worked under the general direction of Mr. W. D. Hunter, but under the immediate supervision of Prof. R. A. Cooley. At the same time Mr. J. D. Mitchell, Mr. F. C. Pratt, and the writer, as agents of the Bureau of Entomology, made collections in the southern and central portions of the Rocky Mountain region. In 1910 Mr. W. D. Hunter formulated plans for obtaining further information regarding the distribution of the species. By the use of circular and personal letters, the aid of several hundred individuals throughout the Western States was obtained. Through the cooperation of these correspondents a large number of ticks was procured. All of the material was sent to the laboratory at Dallas, Tex., where the immature ticks were reared to adults and all specimens were carefully determined. Mr. Nathan Banks, a specialist in this group of animals, identified much of the material received during 1909.

WHERE THE TICK OCCURS.

As a result of this investigation the distribution of the spotted-fever tick, as shown by the accompanying map (fig. 1), was determined. The map includes a number of localities in Montana where, in 1909, Prof. R. A. Cooley determined the species to occur. Our knowledge of the distribution is based upon 1,300 lots of ticks, 815 of which were *Dermacentor venustus*. The specimens of this species were obtained from 225 different localities. The numbers of localities in the different States in which this tick was collected are as follows: California 3, Colorado 15, Idaho 42, Montana 72, Nevada 11, New Mexico 2, Oregon 15; Utah 12, Washington 27, Wyoming 26. The shaded portion of the map includes all of the localities where the tick has been found. The darker shading indicates the regions where the species occurs in greatest abundance. There is no doubt that there are areas of considerable extent, within the territory indicated as being infested by the Rocky Mountain spotted-fever tick, where the tick is entirely absent or where it is found only occasionally.

The northern part of the Rocky Mountain region in the United States is the territory principally infested, but the river valleys and sagebrush plains to the west are more or less heavily infested. Although the spotted-fever tick occurs in the eastern edge of the Cascade Mountains, it does not appear to exist in the main Cascade range and has never been found to the west of the divide formed by those mountains. It has been found in the western portion of the Black Hills of South Dakota, and probably occurs throughout those hills. There is no doubt that the species is common in southern British Columbia and possibly eastern Alberta. Two females were collected by Dr. H. G. Dyar at Kaslo, British Columbia. This locality is about

65 miles from the United States boundary, directly north of the line between Idaho and Washington.

This tick does not seem to be limited particularly as regards life zones. It appears to be most abundant in the Transition Zone, but occurs commonly in the Canadian and Upper Sonoran Zones. It is probably also to be found in the Hudsonian Zone. Specimens have been collected at various elevations from slightly over 500 feet to

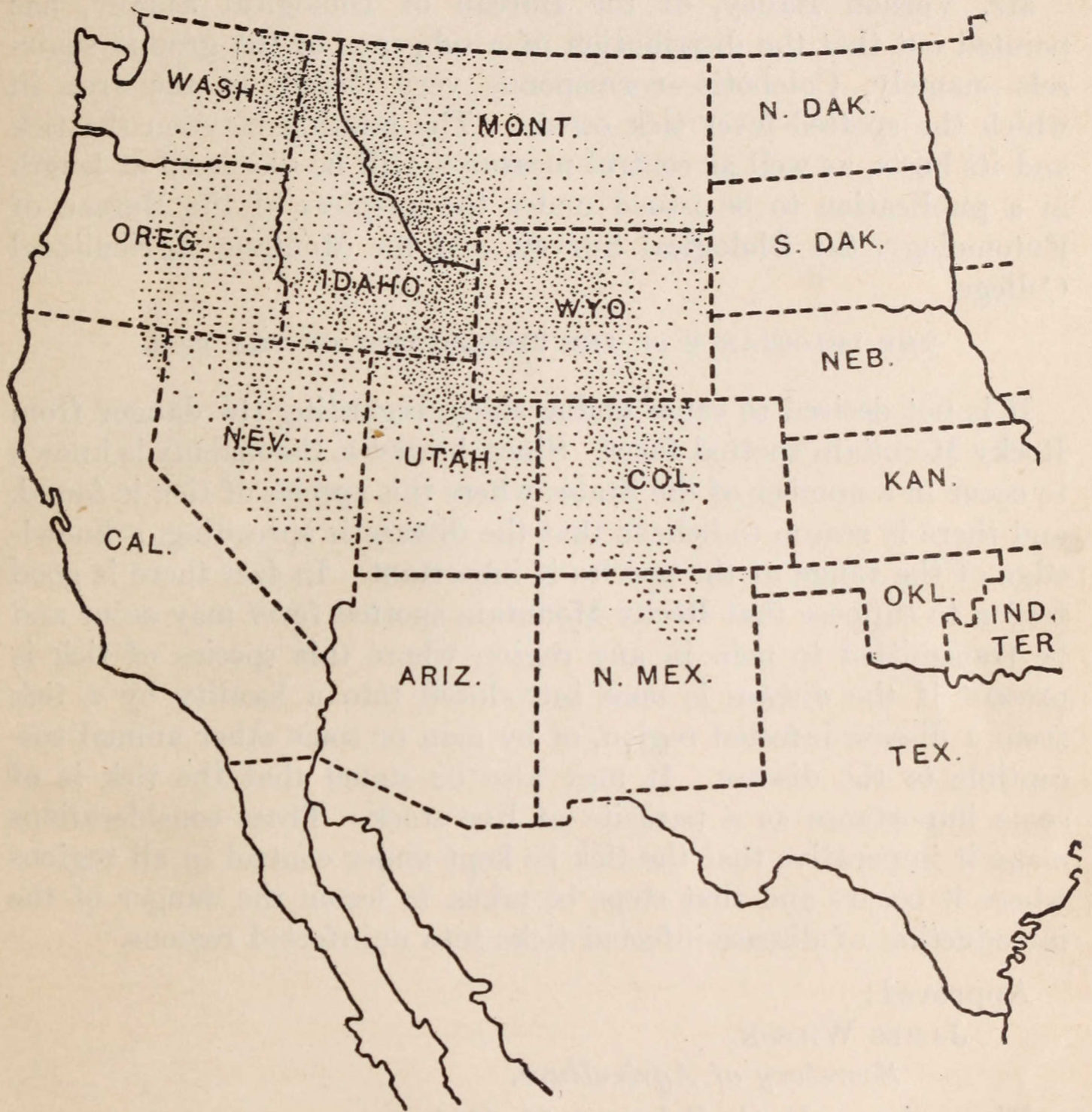


FIG. 1.—Map showing region in the United States in which the Rocky Mountain spotted-fever tick occurs. The degree of shading indicates the relative abundance of the tick in different sections. (Original.)

nearly 9,000 feet above sea level. The species seems to reach its highest development and occur in greatest numbers between 3,000 and 5,000 feet.

FACTORS INFLUENCING ABUNDANCE.

The abundance of the Rocky Mountain spotted-fever tick is greatly influenced by the presence of numerous host animals, as well as such

protection as is afforded by timber. Ticks have been found to be especially abundant in localities where there is much fallen timber and brush. The immature ticks have been found to feed almost exclusively on the small mammals, and adults on the large domestic animals. Hence, the absence or scarcity of either of these classes of hosts greatly influences the number of ticks occurring in a given region.

Mr. Vernon Bailey, of the Bureau of Biological Survey, has pointed out that the distribution of a subgenus of the ground squirrels—namely, *Colobotis*—corresponds very closely to the area in which the spotted-fever tick occurs. The relation between the tick and its hosts, as well as control measures, will be discussed at length in a publication to be issued under the auspices of the Bureau of Entomology, the Biological Survey, and the Montana Agricultural College.

THE IMPORTANCE OF THE DISTRIBUTION OF THE TICK.

It is not desired to cause undue alarm regarding the danger from Rocky Mountain spotted fever. Since, however, the malady is known to occur in a number of the States where this species of tick is found, and there is reason to believe that the disease is spreading, a knowledge of the range of the species is important. In fact there is good reason to suppose that Rocky Mountain spotted fever may occur and be transmitted to man in any region where this species of tick is present if the disease is once introduced into a locality by a tick from a disease-infected region, or by man or some other animal susceptible to the disease. It may also be stated that the tick is of some importance as a parasite of live stock. These considerations make it imperative that the tick be kept under control in all regions where it occurs and that steps be taken to lessen the danger of the introduction of disease-infected ticks into uninfected regions.

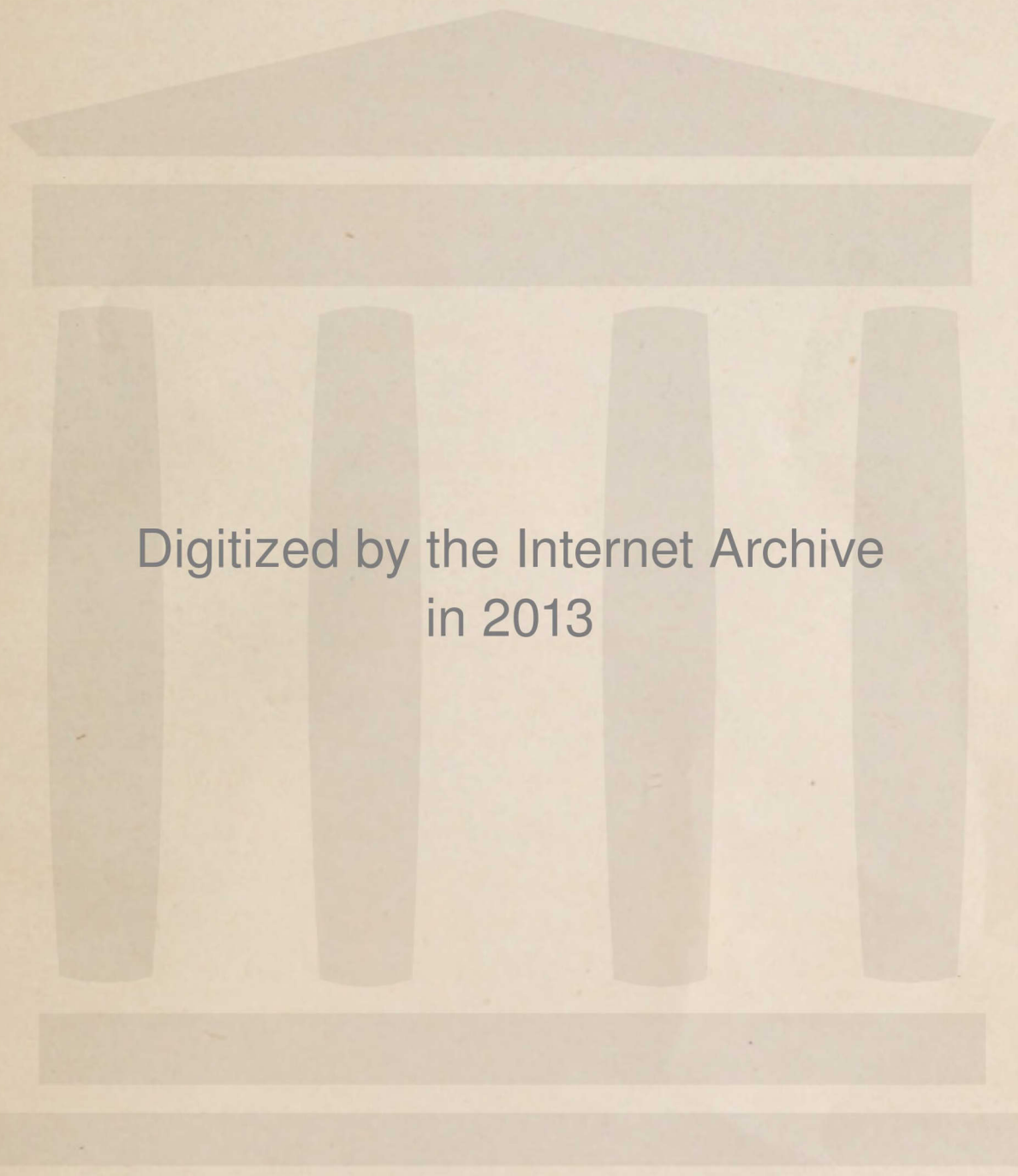
Approved:

JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., *February 15, 1911.*





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