THE EMPLOYMENT OF DISEASE-CAUSING MICROBES FOR THE DESTRUCTION OF FIELD MICE, MOLES AND SIMILAR VERMIN.

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THE loss annually caused by field mice, moles, gophers, hares and other rodents, is in the United States an indefinite quantity, but must in the aggregate amount to several millions of dollars. In California and Colorado the jack-rabbit, *Lepus Californicus*, and sage rabbit, *L. artemisia*, are very serious pests, while in the eastern states *L. sylvaticus*, the cotton tail, and *L. palustris*, the swamp coney, are depredators in grain shocks and growing crops.

The gophers, *Geomys*, and other genera, are very destructive in the grain fields of the arid West. The damage wrought during winter by gnawing mice and hares in the orchards of the eastern states is a matter of no small consequence to fruit growers, and nursery-men and gardeners raise a continuous howl against the ground mole.

The damage caused in Australia by the introduced rabbit is enormous—almost exceeding belief. In Europe the worst pests of the rodent family are the common field mice, *Arvicola arvolis* and *Mus sylvaticus*, called in France *campagnols* and *mulots*, respectively.

How to destroy these vermin on a large scale and over wide areas, without destroying at the same time useful animals, has recently engaged the attention of many European scientists. In the United States the use of poisoned grain, and more recently of carbon bisulphide for the burrowing species, has given the most satisfactory results, but in various countries of the Old World the employment of pathogenic bacteria for this purpose has given a gratifying success.

In a paper recently presented to the French Academy by M. Jean Danysz, a destructive, spontaneous epidemic among these animals in the Commune of Charny is described in detail, and experiments reported to show that while highly contagious and fatal to all small rodents, it is quite innocuous to cats, dogs, fowls, domestic animals and human beings. The specific bacillus was isolated by the culture method and was subsequently employed on a large scale to destroy the vermin infesting an area of about seventy-five hectares. The whole number of rodents infesting this space was calculated at from 10,000 to 30,000,—*Arvicola arvolis* being in the majority.

The process of infecting the field with the pathogenic germs was substantially as follows: The contents of ten dozen of gelatin culture tubes containing the bacillus were dissolved in fifty litres of water, and in this was soaked about 80,000 cubes of bread of about 1 c.c.m. The bread was then scattered throughout the field, a morsel being placed near every hole showing recent traces of an occupant. The operation occupied twenty persons two hours daily, from four to six P.M., for three consecutive days. The total cost of the treatment amounted to about 3 1/2 francs per hectare, or about thirty cents per acre. Within three days after the distribution of the infectious bread, sick and dying mice were plentiful in the field, and autopsies of several showed the presence of the microbe in their blood. The bread was distributed over the infested fields September 29 *et seq.*, and on October 15 scarcely a living mouse could be found in the infected area, though abundant enough in neighboring non-treated fields. Opening the burrows of the rodents showed their galleries to be filled with dead mice.

This same process was tried in several other departments of the republic, and always with similar success, insomuch that the author concludes that in this microbe farmers whose fields are infested by gnawing rodents have a simple, inexpensive and certain remedy.

The identification of the bacillus is not given in the paper referred to, but is promised in a future communication to the Academy. The author states that it is very similar to the bacillus of duck cholera, but not identical, nor are ducks or other fowls susceptible to the disease.

SCIENTIFIC WASHINGTON.

THERE are now seven associated scientific societies in Washington, having a combined membership of 1524, comprising 1138 persons. These societies and their membership are as follows:

Anthropological, 205; Biological, 190; Chemical, 102; Entomological, 38; Geographic, 619; Geological, 137; Philosophical, 233. These numbers indicate the active resident membership: there are in addition 472 members, a few honorary, the remainder active, though residing elsewhere.

These organizations include many men eminent in science and in official life. Among officials are Hon. H. A. Herbert, Secretary of the Navy; Hon. J. Sterling Morton, Secretary of Agriculture; Major J. W. Powell, Director United States Geological Survey; T. C. Mendenhall, Superintendent United States Coast and Geodetic Survey; Professors S. P. Langley and G. Brown Goode, Secretary and Assistant Secretary of the Smithsonian Institution; Col. Marshall McDonald, Commissioner of Fisheries; Prof. Simon Newcomb, Superintendent Nautical Almanac; Dr. Frank Baker, Manager National Zoölogical Park; Prof. W. J. McGee, in charge United States Bureau of Ethnology (who has the unique distinction of being a member of all seven societies); Prof. M. W. Harrington, Superintendent Weather Bureau; Prof. W. T. Harris, Commissioner of Education; Mr. A. R. Spofford, Librarian of Congress; Prof. John R. Proctor, President Civil Service Commission; General A. W. Greely, Chief Signal Officer; Surgeon-General George M. Sternberg; Dr. John S. Billings, of the Army Medical Museum; Dr. C. W. Dabney, Assistant Secretary of Agriculture; Dr. B. E. Fernow, Chief of Division of Forestry, Department of Agriculture; Professors Eastman, Hall and Harkness, of the United States Naval Observatory, and many other prominent officers of the Government.

Congress is represented by Senators Manderson, Vilas, Perkins, Squire, and Wilson, and Representatives Baker, Belknap and Stevens.

From the army and navy are many officers whose names are well known, among them General S. V. Benét, General J. C. Breckinridge, General T. L. Casey, Commodore O. C. Badger, Chief Engineer George W. Melville, Dr. J. Mills Browne, Dr. G. H. Beyer, Dr. N. L. Bates, Captain W. T. Sampson and Captain Rogers Birnie.

Every branch of science is represented in these societies, and among many distinguished names a few may be found that are eminent in more than one sphere of research. Here is Prof. Lester F. Ward, who is not only a noted paleobotanist, but a profound student of sociology, and the author of "Dynamic Sociology," "The Psychic Factors of Civilization" and other works; also that of Mr. W. H. Holmes, who is known not only as a geologist and archæologist, but also as an artist; and that of Mr. Henry Gannett, chief topographer of the United States Geological Survey and author of numerous sociologic and economic papers, including a recent book entitled "The Building of a Nation."

Among geologists are Professors G. K. Gilbert, S. F. Emmons, Arnold Hague, George F. Becker, J. S. Diller,