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United States Department of Agriculture,

BUREAU OF ANIMAL INDUSTRY—Circular No. 43.

D. E. Salmon, D. V. M., Chief of Bureau.



WASHINGTON, D. C., February 12, 1904.

SIR: Last October this Bureau published, with your approval, Circular No. 41, entitled "A form of hog cholera not caused by the hog cholera bacillus," in which it was stated that there is in this country an infectious disease among hogs which may be reproduced by infecting with material containing no hog cholera bacilli. It was also stated in that circular that the experiments along this line were not yet completed, and this is still the situation; but it is deemed wise to offer for publication a few additional notes on this disease which have been prepared in the Biochemic Division of this Bureau. I therefore recommend that the manuscript herewith transmitted be published as Circular No. 43 of the Bureau of Animal Industry.

Respectfully,

D. E. SALMON,
*Chief of Bureau.*Hon. JAMES WILSON,
*Secretary of Agriculture.***IMMUNIZATION FROM HOG CHOLERA.**

On October 1, 1903, this Bureau published as Circular No. 41 a preliminary note on some new facts in regard to the etiology of hog cholera. As experiments in this line and also in methods of producing immunity from this disease have been in progress for some years, it seems that, in view of the results, the important points of the investigations should be published, so that the State experiment stations and others, if they so desire, may make experiments on a large scale along the lines of work which have proved most successful.

The underlying principle of the entire work, which has been carefully studied by de Schweinitz and Dorset, of the Biochemic Division, has already been indicated in Circular No. 41. They have had charge of the general plan of the work and proposed the use of blood from diseased and immunized animals. The practical inoculations and autopsies at the Experiment Station of the Bureau have been carried out under the supervision of Dr. E. C. Schroeder, who also made, at the request of the Chief of the Bureau, some immunity experiments with dried diseased blood. The work in Iowa has been in charge of Dr. W. B. Niles.

On account of the often discordant results which were secured some years ago when the Bureau was treating diseased hogs with serum from animals which in their turn had received large and repeated doses of hog cholera and swine plague cultures, it appeared that some other

factor must be considered in the efforts to produce immunity. The first suggestion of de Schweinitz was that some parasite of the hog, such as the louse, should be studied. This was carefully done, but the results obtained were such as to make it appear that, while a louse might under certain conditions convey disease from a sick to a healthy animal, it was not the important agent in spreading so-called hog cholera.

A large number of specimens of blood from sick and healthy hogs were also examined, and while very small, peculiar, round bodies were found both inside and outside of the corpuscle, and sometimes bodies with distinct amœboid movement were noted, the relation, if any existed, of these bodies to the disease could not be determined satisfactorily. It was noted, however, that in cases of so-called hog cholera the disease could be readily conveyed from a sick animal to a healthy one by giving the latter a subcutaneous injection of the blood serum or defibrinated blood obtained from the former. It was found that a small fraction of a cubic centimeter would produce the disease, though we have in most of our experiments fixed 1 cubic centimeter as the most satisfactory dose for use. As has been indicated by de Schweinitz and Dorset in Circular No. 41, blood from a diseased animal which was passed through the finest Berkefeld or Chamberland filter produced in hogs the typical disease. This blood had been proved to be free from microorganisms detectable by the ordinary bacteriological methods, or by the inoculation of small animals, such as the guinea pig or rabbit, which are known to be very susceptible to the ordinary hog-cholera bacillus. It appeared, therefore, that immunity could be produced by the use of blood in which the disease-producing property had been attenuated or partially neutralized. The experiments have well established the fact, which is also true of the so-called hog cholera, that animals once immunized against this disease will resist repeated large doses of disease-producing blood and also subsequent exposure to diseased hogs in the field.

The basis of the immunity experiments, therefore, has been the use of attenuated and disease-producing liquid or dried blood, or the use of this blood mixed with blood obtained from immune animals, in which animals the immunity has been increased by the injection of large doses of disease-producing blood obtained from hogs known to have the disease; or, in other words, disease-producing blood and antitoxic blood separate and combined have been successfully used.

In order to test the immunity of the treated animals, they were either exposed by inoculating them with known disease-producing blood or by placing them in the field or pen with sick animals.

The previous work of this Bureau has shown very clearly that animals immune from hog cholera are not necessarily immune from swine

plague, or vice versa, and, furthermore, that many different diseases may at times be mistaken for hog cholera. In making practical exposure tests, therefore, it is absolutely necessary to prove the character of the disease by careful autopsies and by the use of a large number of checks, which checks should succumb to the disease in order to prove the positive virulence of the exposure.

Although we are still trying the experiments on a large scale and will continue them during the coming summer, before recommending the details of a plan for practical adoption, we feel that these results of the extensive and laborious experiments, which have been carried on by the Bureau for a number of years, should be presented now in this concrete form, as it will require a number of months to prepare the detailed reports of the experiments for publication.

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