

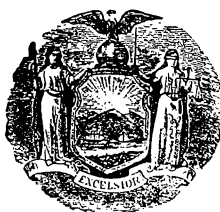
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TWENTY-TWO YEARS OF TUBERCULIN TESTING
IN THE SAME HERD

A. C. DAHLBERG



PUBLISHED BY THE STATION

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TWENTY-TWO YEARS OF TUBERCULIN TESTING IN THE SAME HERD

A. C. DAHLBERG

INTRODUCTION

Much information has been disseminated thru agricultural literature on the cause and control of tuberculosis. It should now be quite generally understood by the owners of cattle that the disease is caused by specific bacteria, that it is contagious, that diseased animals can be identified by the tuberculin test, and that re-infection of the herd can be prevented. It is not intended to repeat this information here for it is already given in other available publications.¹

Criticisms of the tuberculin test and of its application are not uncommon. Without attempting to enter into a discussion of the present methods of controlling tuberculosis, it may be advantageous to review the history of tuberculosis in the Station herd of Jerseys at Geneva to illustrate the success in eradicating the disease and in maintaining a tubercular-free herd.

The tubercular history of the herd may be divided into three distinct periods. The first period (1898-1900) extended from the beginning of the herd to the time when the cattle were first tested for tuberculosis. During this time cattle that looked well were considered healthy. The second period (1901-1905) began with the infected tubercular herd and ended with a herd free from the disease. The third period (1906-1922) began with a tubercular-free herd and is still in progress. Fortunate, indeed, is the owner of a herd that begins its tubercular history in the third period. The large majority of herds when first tested are found to contain tubercular animals and the infected animals are slaughtered. The owner is then confronted with the everlasting problem of preventing re-infection of his herd.

FAILURE OF PHYSICAL EXAMINATION FOR TUBERCULOSIS

The establishment of the Station herd of Jerseys began in 1898 and 1899 with the purchase of 15 cows from 9 different herds in New York State. These cattle were carefully selected so that productive, healthy animals of good type would be obtained. They were not

¹The problem of tuberculosis in cattle. *Cornell Univ. Agr. Exp. Sta. Bul. No. F 146*.
Tuberculosis in live stock. *United States Dept. Agr. Farmers' Bulletin 1069*.
Tuberculin testing of live stock. *United States Dept. Agri. Circ. No. 249*. 1922.

tested with tuberculin but their health was considered on the basis of their physical appearance. These animals, together with 2 cows raised at the Station, and the 11 heifers raised from them constituted the herd in 1900.

During the fall of 1900, one cow that had been purchased in 1898 lost weight so rapidly that her health was rather doubtful. In November a local veterinarian examined her physically and pronounced her tubercular. She was slaughtered and found to be infected with generalized tuberculosis. Rabbits which were inoculated with the tubercular lesions and milk from the udder developed generalized tuberculosis. It was evident that not only did this cow have tuberculosis but that the calves were being raised on milk containing active tubercle bacilli.

Physical examination of the herd failed to detect any other cases of tuberculosis, but there was little doubt that other animals were infected. For this reason all of the animals that were more than six months of age were given the tuberculin test. Eighteen of the 28 animals in the herd reacted. When post-mortem examinations of the carcasses were made in later years, the results of the test were verified and found correct. Physical examination failed to be of any material value in detecting the tubercular cattle.

A HEALTHY HERD FROM A DISEASED ONE

The usual method of handling a tubercular herd is to slaughter the infected cattle and replace them with purchased animals. The advisability of this procedure under average conditions cannot be questioned. A healthy herd of proper size was a necessity for experimental work at the Station. The breeding of the diseased animals was especially good, and the expense of purchasing animals of equal breeding would have been rather great. To save this quality of breeding it was decided to replace the herd by the calves raised from both the healthy and the diseased animals. In October, 1901, therefore, the herd was divided into a healthy herd and a tubercular herd. These herds were cared for according to the method originally devised by Professor Bang.²

The tuberculin-test record of the diseased herd, summarized in Table 1, is an object lesson for the present day in eradicating tuberculosis. It illustrates the danger of infection by the purchase of cattle from tubercular herds, even tho the cattle pass the tuber-

²The experience of this Station with tuberculosis in the dairy herd up to and including the year 1905 was published as Bulletin No. 277, entitled "The Bang Method of Controlling Tuberculosis and an Illustration of its Application."

culin test. This tubercular herd in 1901 consisted of 17 animals that had reacted to the test. One of these animals in October, 1901, did not react to the second test. In December, 1903, only two out of the remaining six tubercular animals reacted to the test. A total of 64 tests were made on the 17 tubercular cattle and only 53 reactions were obtained. Examination of the carcasses of these animals and inoculation of rabbits with the lesions of some gave positive evidence that every animal was infected with the disease.

TABLE 1.—TUBERCULIN TESTS ON ISOLATED TUBERCULAR HERD.

DATE TESTED	TOTAL NUMBER TESTED	NUMBER OF FAILURES TO REACT
1901, October	17	1
1902, June	14	0
1902, December	8	1
1903, December	6	4
1904, May	7	1
1904, November	6	2
1905, November	6	2
Total	64	11

This limitation of the tuberculin test has been frequently mentioned in the literature and is usually explained as being due (1) to failure of badly diseased animals always to react, and (2) to the encysting of lesions which actually separates the tubercle bacilli from the body tissues. These explanations do not interest the farmer so much as does the fact that these animals are or may become dangerous spreaders of the disease. Cattle should not only be given the tuberculin test before putting them into a herd free from the disease, but they should also come from tubercular-tested herds if one wishes to take special precautions in protecting his herd.

The cattle that passed the tuberculin test constituted the healthy herd and were isolated and protected against re-infection by the diseased animals. Calves of both healthy and diseased animals were handled according to the Bang method and placed in the healthy herd. The tuberculin tests of the isolated healthy herd are given in Table 2. After six months of isolation, four more animals reacted to the test. They represent the animals that were exposed to the disease at the time of the first test and had contracted it before the second test.

In 1904 a cow reacted and when she was slaughtered tubercular lesions were found. This cow had been purchased the previous year from a tubercular herd, but she passed the test and was placed in the

herd. Her history illustrates again the danger of buying animals from infected herds, even tho they pass the test. In 1905 another cow reacted to the test and was immediately removed from the healthy herd.

The healthy herd, which had been successfully raised from a diseased herd, had now increased to the desired number. The six remaining animals in the diseased herd were slaughtered in 1905, and all were found to have tuberculosis.

MAINTENANCE OF A TUBERCULAR-FREE HERD

Too large a percentage of cattle owners have failed to recognize the fact that protecting the herd against re-infection is just as important as testing for tuberculosis. The natural tendency is to think that the work is done for all time to come after the herd has been tested and the diseased animals slaughtered. The belief that testing the cattle once a year and slaughtering any reactors would free any herd of the disease regardless of the general farm practices is erroneous. The literature on bovine tuberculosis contains numerous instances of failure under such conditions, while definite precautions for the prevention of re-infection are recommended.

The first tuberculin test on the Station herd after there were no tubercular animals on the premises was made in 1906. The results of the tests from 1906 to 1922, inclusive, are given in Table 2. A total of 631 tests were made during this period and only three positive reactions were obtained. Assuming that these three reactors were tubercular, the number of tubercular cattle in the herd has been a negligible quantity. Post-mortem examinations, altho very carefully made, did not reveal any tuberculosis in two of the animals, and animal inoculation with their tissues failed to produce tuberculosis. It can be truthfully said that since 1905 there never has been a proved case of tuberculosis in the Station herd.

The first reactor was a bull which had passed the test in 1914 but gave a typical temperature curve in 1915. He was isolated according to the Bang method and kept for three years. He never gave another reaction, altho tested in three subsequent years, and careful post-mortem examination failed to reveal any tubercular lesions. In 1919 a heifer born and raised at the Station gave a temperature reaction and was immediately slaughtered. No tubercular lesions could be found. In November, 1922, a three-year-old cow gave a very typical temperature reaction, but both the intradermal and opthalmic tests were negative. She is now isolated awaiting retest. Whether the first two animals were tubercular can never be proved, but it is probable that they were healthy and the test was at

TABLE 2.—TUBERCULIN TESTS ON THE HEALTHY HERD, 1901 TO 1922, INCLUSIVE.

DATE TESTED	TOTAL NUMBER TESTED	NUMBER OF REACTIONS	REMARKS
TESTS ON ISOLATED HEALTHY HERD			
1901, October	17	4	Disease developed since last test
1902, June	13	0	
1902, December	13	0	
1903, April	15	0	
1903, December	20	0	
1904, May	24	1	Reactor brought from untested herd
1904, November	25	0	
1905, May	28	1	Reactor proved tubercular
1905, November	30	0	
Total	185	6	Every reactor was tubercular
TESTS AFTER NO DISEASED ANIMALS WERE ON THE PREMISES			
1906, May	24	0	
1906, November	37	0	
1907, June	30	0	
1907, November	34	0	
1908, October	36	0	
1909, May	39	0	
1910, September	40	0	
1911, October	35	0	
1912, October	36	0	
1913, December	29	0	
1914, June	34	0	
1915, May	33	1	No tubercular lesions
1916, May	32	0	
1917, May	32	0	
1918, May	33	0	
1919, October	30	1	No tubercular lesions
1920, October	32	0	
1921, October	32	0	
1922, November	33	1	Intradermal and ophthalmic tests negative
Total	631	3	No proved tuberculosis
Grand total, healthy herd	816	9	Six had tubercular lesions

fault with them just as it must have been at fault with the cow tested in 1922.

For the sake of argument it may be assumed that the test was at fault in all three cases. How accurate and reliable has this tuberculin test been in the Station herd? In the tubercular herd maintained from 1901 to 1905, it was not especially accurate, as it gave a false report in 11 out of 64 tests. The tuberculin tests selected out all the tubercular cattle from the general herd in two years, namely, 1900 and 1901, which is a remarkably fine record. In 1904 and 1905, it showed two other cows to be tubercular and lesions were found in their bodies. In 1915 and 1919, two animals that reacted were probably not tubercular, while in 1922 the test on one cow contradicted itself. Since the healthy herd was established in October, 1901, it has been subjected to 816 tuberculin tests. The test showed six animals to be tubercular which were later proved tubercular. Since 1905, the tuberculin test has shown three animals as tubercular which displayed no lesions of the disease. Three possible errors in 816 tests is as accurate as one could ever expect such a test to be.

SUMMARY

The tuberculin test has been invaluable in securing and maintaining a tubercular-free herd at this Station. The test has not been perfect, but it has been so accurate that by its use a tubercular herd was freed of the disease and a healthy herd maintained for 17 years without one demonstrated case of tuberculosis.

The tuberculin test is only a means of diagnosing tuberculosis and as such its greatest accuracy is obtained in herds comparatively free from the disease. It is dangerous to introduce into a valuable healthy herd an animal that has been in a diseased herd, even tho no reaction is obtained with the tuberculin test. The animal may possibly have the disease or may be in the process of developing it.

Precautions must always be taken to prevent infection of the healthy herd. The tuberculin test does not prevent infection; it tells when an infection has occurred. It acts as a preventive of infection indirectly by locating the diseased animals so that proper precautions may be taken to prevent them from infecting healthy animals.