

TUBERCLE BACILLI IN THE FAECES OF APPARENTLY HEALTHY COWS.

BY R. STENHOUSE WILLIAMS AND W. A. HOY.

(*National Institute for Research in Dairying.*)

THE increasing interest which dairy farmers are taking in the elimination of tuberculosis from their herds makes it necessary that all sources of infection on the farm shall be studied and made known.

Without such work the dairy farmer cannot be expected to realise the possible dangers of infection which may arise from cows which appear to him to be perfectly healthy, and it is only when his stock is obviously infected that he takes action, with the result that he is subject to grave losses from tuberculosis.

A study of the literature which is epitomised in Table I shows that few experiments of the character discussed in this paper have been carried out and that of the total number of one hundred and seventy-one animals examined by the various investigators, only three were examined in this country.

Table I. *Presence of Tubercle Bacilli in the Faeces of
Apparently Healthy Cattle.*

Summary of published work.

Investigator	No. of cattle examined	No. of cattle passing <i>B. tuberculosis</i> in faeces (Guinea-pig inoculation)	Tuberculin reaction
Moore and Boynton (U.S.A.)	36	0	Positive
Peterson (U.S.A.)	14	0	"
Peters and Emerson (U.S.A.)	41	3	"
Reichel and Deubler (U.S.A.)	19	2	"
	8	2	Not stated
Royal Commission on Tuberculosis (England)	3	1	Positive
Schroeder and Cotton (U.S.A.)	5	1	Not stated
C. Titze and H. Thieringer (Germany)	7	0	Not tested
	38	0	Positive

Collection of faeces.

Samples of the faeces were collected from apparently healthy cows which were in herds situated in various parts of England and Wales. It was not always possible to take samples from all the cows in each herd and not more than one sample was taken from any one cow.

Various methods of sampling were tried but in the end it was found that the simplest methods and those which created the least disturbance of the farm routine were (a) to catch the faeces as they fell, in wide mouthed sterile bottles, or (b) to take an unsoiled portion of the droppings immediately after

they had fallen. The great majority of the samples were taken by one or other of these methods. As a rule the samples were collected at milking time when the cows were in the sheds.

Preparation and Examination of Faeces.

In the early part of the work each sample of faeces was examined microscopically and a portion was inoculated into guinea-pigs after treatment, either by the antiformin or by Petroff's method. The microscopic method was soon discarded, since it was found that faeces showing acid fast bacilli failed to produce tuberculosis when inoculated into guinea-pigs. Reliance was placed, therefore, only upon the results obtained by guinea-pig inoculation. In our experience Petroff's method gave more satisfactory results than the antiformin method, but neither method entirely eliminated the danger of "septic" infection in the inoculated guinea-pigs which appeared to be more marked when the cows from which the faeces were obtained were receiving uncleaned whole mangels in their ration. It is probable that the common soil bacteria were largely responsible for the septic infection.

Results of the Examination of 438 Samples of Faeces.

Table II shows that samples of faeces were taken from 438 apparently healthy cows in various counties. Of these samples 337 were treated by the antiformin method and 101 by Petroff's method before inoculation into guinea-pigs. In each case one ounce of faeces was treated and from the sediment obtained two guinea-pigs were inoculated. Complete tests were obtained in 391 instances; by a complete test is meant, one in which both of the test guinea-pigs lived longer than 42 days. When possible the guinea-pigs were kept for 100 days before they were killed. The 391 complete tests yielded 6 positive results.

Of the 391 samples affording complete tests all but 24 were taken from as many apparently healthy cows which had not been tested with tuberculin. These 24 cows (County A) appeared to be healthy but were known to have given positive results to the tuberculin test. Their faeces, however, did not show the presence of tubercle bacilli.

If the positive results which were obtained be expressed as a percentage of the 391 complete tests, it is found that 1.53 per cent. of the samples showed the presence of living virulent tubercle bacilli.

Table II. *The Results of the Examinations of single Samples of Faeces from 438 Apparently Healthy Cows.*

Counties	No. of cows examined	No. of complete tests	Cows excreting <i>B. tuberculosis</i>
A	289	256	5
B	56	54	0
C	64	54	1
D	12	12	0
E	17	15	0
Totals:	438	391	6

It is important to remember that only one sample was taken from each cow, and that not more than one ounce out of the thirty to forty pounds of faeces which a cow excretes in a day was examined, that further results which we shall publish later demonstrate that, when treated by these methods, tubercle bacilli were only found at irregular intervals in the faeces of cows which were known to be infected, and that there is reason to think that the influence of antiformin upon the virulence of tubercle bacilli in the faeces is variable.

The positive results which have been obtained, therefore, may be fewer than those which might have been obtained by more perfect methods.

Numbers of Infected Farms.

In view of the percentage of apparently healthy cows which were found to be excreting tubercle bacilli, it appeared desirable to determine the proportion of farms on which these cows were found. This was done by selecting, from among the samples which were tested, those which came from fourteen farms on which samples were taken from almost all the cows. Two hundred and forty cows were examined on these farms and five cows on four farms were found to be excreting virulent tubercle bacilli. It is of interest to note that the fourteen farms lay within a radius of three and a half miles.

SUMMARY.

(1) Samples of faeces of 391 cows in apparently good health have been examined and it has been demonstrated that 6 (1.53 per cent.) of the cows were excreting tubercle bacilli.

(2) When the faeces of almost all the cows on fourteen farms were examined it was found that five cows on four farms were excreting tubercle bacilli.

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REFERENCES.

- MOORE and BOYNTON (1908). *29th Annual Report, New York State Dept. Publ. Health*, p. 567.
PETERSON (1909-10). *Report New York State Vet. College*, p. 65.
PETERS and EMERSON (1909). *22nd Annual Report, Nebraska Agric. Exp. Station*, p. 136.
PETROFF (1915). *J. Exper. Med.* 21, 38-42.
REICHEL and DEUBLER (1911). *J. Med. Research*, 24, 5.
Royal Commission on Tuberculosis, *3rd Interim Report*, p. 11.
SCHROEDER and COTTON, *U.S. Dept. Agric., Bureau of Animal Industry, Bulletin No. 99*.
TITZE, C. and THIERINGER, H. (1913). *Arb. a. d. Kaiserl. Gesundheitsamt*, 45, 1.

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