

one could be able to deny or confirm such a statement.

In the second method of treatment by medication I do not think that an absolute destruction of the spores takes place any more than in the starvation method. As I have shown above, two per cent. carbolic acid was not sufficiently strong to destroy the spores; consequently it is not likely that 0.2 per cent. (one pint in 500) would be strong enough. I tried 0.2 per cent. but found it quite unsuccessful. Its action then must have another explanation. To test this I made up a sterilized beef broth containing one per 500 of carbolic acid and in it placed my infected silk threads. I found that there was no indication of growth. These threads were then taken out and placed in ordinary sterilized beef broth and I obtained a luxuriant growth, i.e., the 0.2 per cent. carbolic acid in the culture fluid, although it did not destroy the spores prevented their germination. That then is the explanation of the value of carbolated syrup in the treatment of foul brood, it prevents the germination of the spores. The bee-journals contain numerous examples of cases where carbolated syrup produced an improvement, but as soon as it was stopped there was a relapse. It is evident that here again as in the starvation process there must be combined an extremely thorough cleaning up, so that the best possible results may be obtained from the treatment. Medicated syrup does not destroy the spores, it simply prevents their development and gives the bees a chance to rid themselves of the infection, and in that respect I certainly think resembles the starvation process. Its advantage over that is that it can be carried on for a longer time.

In the course of these experiments I tried another substance which has been much used since Lorteth's work on the subject, viz.: Beta Naphthol. I do not think myself, from recent work on this substance, that Beta Naphthol should be ranked very high as an antiseptic, mainly on account of its insolubility in water. I found, however, that a beef broth containing 1 per 1000 Beta Naphthol would not allow spores of bacillus alvei to

germinate, and consequently had an equal value with 1 per 500 of carbolic acid. It has an advantage over carbolic acid on account of the disagreeable taste of the latter, and I think would be more acceptable to the bees. Salicylic acid in syrup has apparently the same effect, and I would not recommend the addition of borax, as it has been shown that borax lowers considerably the antiseptic value of salicylic acid.

I tested also formic acid in the same way, but my results so far have not been satisfactory, owing to the uncertain strength of my sample of formic acid. I prefer to reserve a report upon it and other substances, which I wish to try, until later.

Mercuric chloride I have not tested, as I do not think it wise to use it around the hive. The idea of using a 1 per 1000 solution to spray the diseased combs, as suggested sometimes, is, I think, absurd, and would be a rather serious operation for any living brood.

You will see that I consider all these methods of treatment do not in themselves necessarily presuppose the destruction of the spores, but depend upon the fact that for a longer or shorter period the spores are prevented from germinating, and in this period they are eliminated from the infected bees. Whether the vitality of the bees themselves has an effect upon the elimination or destruction of the spores is a point which would be extremely interesting, but one on which at present we have no definite information. From the results of bacteriological work on other diseases, we know that the animal body is engaged in a constant warfare with the diseased germs which may be introduced, and this also may be the case in foul brood. Much more extended investigations, however, would be necessary to prove this. It is much safer for apiarists to accept the possibility of a recurrence of the disease after a course of treatment, owing to the lodgment somewhere of some of the spores of bacillus alvei, and by care and cleanliness remove this possibility. To do this, the hives and frames in which a foul broody colony has lived must be sterilized, and this may be