

peculiar, shooting out from the infected point in all directions. On potato it produces a yellow growth. All these characteristics show conclusively that it is identical with bacillus alvei. There seems no doubt, therefore, that the foul brood which we have in Ontario is the same disease, and produced by the same bacillus as in other places.

Many prominent beekeepers, both here and in the States, however, maintain that wherever unsanitary conditions are allowed to prevail, wherever chilled brood is allowed to putrify, or decapitated drones are left to decay in the hive, foul brood may arise *de novo*. This is not a new theory either in beekeeping or in medicine, but unfortunately it is a theory which is not supported by the results of investigation. Diphtheria naturally will develop more readily if unsanitary conditions are present, but it certainly will not develop if the bacillus diphtheria is absent.

The same is true of other diseases, and consequently when we come to consider such a decidedly infectious disease as foul brood, and learn the facts about it which such men as Cheshire have told us of, we naturally come to the same conclusion. If I were to maintain that a Carniolan queen might lay an egg which would develop into a humble bee, beemen would be inclined to think that not only my bee knowledge, but also my scientific knowledge, was at fault, but yet in all the bee journals I find many prominent beekeepers maintaining that an ordinary microbe which produces putrefaction may become metamorphosed into the specific cause of foul brood. It is easy enough, however, to combat such an opinion upon *a priori* grounds; not quite so easy, however, to offer convincing proof.

In order to do this I thought it worth while to try some experiments. With this end in view I obtained some comb containing chilled brood, and endeavored to isolate bacillus alvei from it, but without success.

There were plenty of other bacteria, but none which presented the well-marked morphological character peculiar to bacillus alvei. Again I had sent to the laboratory

a piece of perfectly healthy comb. I killed the brood by chilling, then I infected some of the cells from a pure culture of bacillus alvei. I allowed all the killed brood to putrify in a moist chamber for two weeks; at end of that time I obtained bacillus alvei again from the cells which had been artificially infected, but could find no traces of it in the other cells. I left this comb in a moist chamber for several months and again examined, but with the same results; in the cells in which bacillus alvei had been placed it was still to be found, in the others it was not present.

It seems to me that an experiment such as the above conclusively shows that there is a distinct difference between foul brood and ordinary putrefaction.

In considering the subject of the vitality of bacillus alvei, the first question which naturally arises is its power to resist heat. We know that bacilli which produce spores and those which do not stand in entirely different positions in this regard. The sporeless bacillus is destroyed at a much lower temperature than one which contains spores. Consequently in considering the question of the vitality of bacillus alvei, which produces spores very quickly and easily, we may confine our attention entirely to the vitality of the spore.

This is of special interest, as the question has been repeatedly raised, whether it is dangerous to use a comb foundation made from foul broody wax. Does the temperature to which the wax is raised in the manufacture of comb foundation sufficiently destroy the vitality of the spore? Can the spore germinate and infect the brood when once enclosed in the wax?

These questions have been raised by many careful thinkers among beemen, and certainly deserve attention. The second point ought to be considered first, since if surrounding a spore with a film of wax prevents its germination, we need pay no further attention to the question of heat. The crucial test of this would naturally be, supply a healthy colony with comb foundation known to contain the spores, and observe the result. This I had hoped to try with the assistance of your