and skill which beget confidence in the accuracy of the results obtained. Although these experiments were made in the interests of sanitary science, bee keepers are under great obligations to Dr. Sternberg for ascertaining the thermal death point of the spores of bacillus alvei, when ^{exposed} to moist heat. I believe Dr. Sternberg is entitled to the credit of priority in determining this point.

Dr. Sternberg says: "It will be understood that the experiments included in this report relate to moist heat, that is to say, the test organisms were in fluid cultures, and in a moist condition. The effects of dry heat (italics in both cases are mine) on desiccated organisms is Quite another matter. This has been studied by Koch and Wolffhurgel, and their results have been given by Dr. Goe. Hohe, in his essay on 'Dry Heat,' in the report of the committee for 1885."

I took the liberty of addressing a letter to Prof. Rohe, explaining the question under discussion, and the ground I had taken, that spores in melted wax are in the position of spores ex-Posed to dry heat, and ask him if he could favor me with a copy of his essay. He very kindly sent me the Report of the Committee on Disinfectants for 1885, containing his essay on "Dry Heat," accompanied by a letter from which I make the following extract :

"Comparing Dr. Sternberg's observation upon the thermal death point of micro-organisms (Public Health, XIII, page 97), I find the resistance of spores of bacillus alvei to be equal to that of B. anthracis and B. tuberculosis, two of our most resistant pathological microbes. Now, Koch and Wolffhuegel showed that a tem-Perature of 248° to 262° F. failed in three hours to destroy the vitality of these organisms. Hence, it seems to me we may extend the same observation to B. alvei. In the absence of direct experiment, it seems to me that your Point, i. e., that the heat applied in melted wax is dry heat, is well taken, and I should take Your contention as a valid one."

In another series of observations by Koch and Wolffhuegel, it was found that bacillus anthracis was killed by an exposure of 3 hours and 10 minutes to a temperature of 283°. As the result of further observations, they say: "Complete destruction of the spore-bearing Organisms did not follow, unless the temperature of 282 ° had been reached."

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Dr. Rohe closes his essay with the following Paragraph : "Koch and Wolffhuegel (Mittheilun-9en aus dem Kaiserlichen Gesundheitsamte, page 281) submit the following conclusions, which to the writer to be fully justified by the | for 3 hours," Mr. Corneil adds:

results of their own and other observations here collected." Among the conclusions here referred to by Prof. Rohe, is the following: "Bacillus spores require, for their destruction in hot air, a temperature of 234 ° F. maintained for 3 hours."

Dr. Sternberg gives a table containing the thermal death point of 37 different micro-organ. isme, as regards moist heat. The time of exposure required was from 4 to 10 minutes. The lowest temperature required was 122°, and the highest 212°, only five of the organisms requiring the latter temperature for four minutes, and one of these five was bacillus alvei; showing, as Prof. Rohe says, that it is one of the most resistant pathogenic germs known.

From the foregoing I think it is now clear that Mr. Dadant, and others who contend that a temperature of from 140° to 212° is sufficient to sterilize wax, are mistaken. Whether an exposure to, say, 200 ° for 7 or 8 hours, as in Mr. Hunt's case, is equivalent to 284 ° for 3 hours, can be only a matter of conjecture in the absence of experiment.

What is required to make sterilization a certainty is a tank having a jacket to which steam, under pressure, can be supplied, the same as is done in packing houses for rendering lard. From all that seems to be known at present, wax kept at from 284 ° to 290 ° for 3 hours might be sent out without any qualms of conscience as to its being the means of spreading foul-brood.

I purposed replying to the contention that experience in using foundation proves that it does not spread the disease, and therefore it does not contain live germs of tonl-brood, and to show that there is a cause for the partial immunity from the spreading of the disease in this way, which, up to the present, does not seem to have occurred to any of those who have taken issue with me on this subject. but I must not forget Voltaire's remark that the way to be tiresome is to say everything, so for the present I shall "break off."

Lindsay, Ont.

F. CORNEIL.

Mr. Dadant says: In the foregoing article, after stating, regarding the report of the experiments made by Dr. G. L. Sternberg, that "the results of the second experiment showed that the spores of bacillus slvpi were not killed by an exposure of 2 minutes to 212°, but that they were killed by an exposure of 4 minutes to that temperature," the experiments having been conducted with moist heat, and quoting the conclusions of Koch and Wolffhuegel, that "bacillus spores require, for their destruction in hot air, a temperature of 284 ° F., maintained