

made in attempting to combat the disease. "The disease," he says, "manifests its presence by defects in the combs filled with brood, and which only contain a putrid mass; instead of the bee pupæ there is only rottenness in the cells, which, however, being capped always preserve a healthy appearance. If these cells are broken open, a blackish liquid flows out, which spreads the infection through the hive. This disease only manifests itself in cells which contain a nearly mature larva or a capped one. The bees themselves remain in good health, and work with the same activity, but their numbers decrease daily. This disease, however, was not so general in a hive but that a small portion escaped; some new bees emerged, but in too small numbers to supply the daily losses. Thus a hive attacked by this scourge will perish from scarcity of population. At first it was not noticed that this disease was epidemic, and the hives emptied by death of the bees, were filled with fresh swarms, and these contracted the same disease and perished. Yet another mistake was made. The remains of the hives that were lost were taken into the streets of the town to expose them to the sun, in order to extract all the wax, and the bees from the neighborhood sucked up the honey, caught the disease, and communicated it to other hives, and all, without exception perished in a short time. The epidemic, having reached the island, spread everywhere and the mortality among the bees was general, either from eating infected honey, or from stopping up the infected combs, or from the bees nourishing their brood on infected honey." Della Rocca criticizes Schirach's statement regarding the misplacement of the larvæ by the queen as a cause of the disease, because "everybody knows that the queen has nothing else to do but deposit eggs. These are then cared for and nourished by the bees, and when the larva is nearly ready to change into the pupa, the bees close the cell, and every position which is given the larva depends on their good pleasure and not on the queen's." Della Rocca himself thinks that "some pestilential blight had without doubt corrupted the quality of the honey and the dust from the authers," and recommends "burning everything without pity, as there is no other resource when the disease is well established, as the pest is without doubt the most terrible in the natural history of bees."

Neither Wildman (9), Keys (10), Woolridge, Needham (11), Rhein, Reaumur (12), or other authors about the same time (latter end of the 18th century) mention this disease.

Bevan (13) names the disease "Pestilence," and also quotes Schirach's name "Foul Brood," and says regarding it, that the "Pestilence has been attributed to the residence of dead larvæ in the cells, from a careless deposition of ova by the queen . . . it has also been attributed to cold and bad nursing, that is, feeding with unwholesome food."

Nothing further of note appears in bee literature till the year 1860, when Dr. Leuckhart (14) writes that he was formerly of the opinion that foul brood was caused by the same fungus (*Parhistophyton ovatum*) which is noticed in a disease of the silk worm, but now after observation and experiment, is quite certain that the disease is caused by neither vegetable nor animal parasite. He also notes that the term "foul brood" is applied to a number of diseases affecting bees.

Molitor Mühlfeld (15) recognizes two forms, one contagious and the other not contagious, and thinks that the only cause of contagious foul brood is a fly (*Ichneumon apium mellificarium*) which lays its eggs on the young larvæ of the bee.

A discovery of note was Preuss's (16) in 1868. He contradicts Mühlfeld's statement about the fly, and states that foul brood cells can be detected by

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