

bottom of the wintering trouble, therefore take away everything and feed pure sugar syrup, and wintering bees is as safe as wintering horses. But who that has followed this teaching has wintered with unfailing success? I have seen colonies that starved with abundance of pollen in the combs easy of access, with no signs of diarrhoea, and I have never seen any satisfactory explanation of this, if pollen is so disastrous in its effects. I need not tell you of the labor of feeding, although I have tried to reduce it to a minimum, and have no great difficulty in getting a colony to take 20 pounds in 24 hours, still the word "feeding," in my family, is heard with no little unpleasant feeling. Then I have found it difficult to strike the happy medium as to consistency. Sometimes the syrup granulates in the cells, when, so far as I know, there is just the same amount of acid as at other times when it seems to attract enough moisture to run out of the cells. If you feed sugar syrup, there is danger of your yielding to the temptation to wait longer than you should in the hope that the bees may fill up from late flowers. Better feed up early enough, and then if a flood of late honey should come, you can extract again. I do not say how much, but at least some weight should be given to the objection that a pound of sugar fed to bees helps just so much to raise the price of sugar and lower the price of honey. If you are inexperienced you may gain a considerable amount of experience in a short time by starting the bees at robbing when feeding at a time when they are not gathering from the fields.

In spite of the real gain there may be in having all the light honey stored in sections, and having the bees winter on cheaper stores, it is not at all impossible that I may go back to the old plan of allowing eight frames in the hives at all times, and encouraging the bees to keep these heavily provisioned with stores of their own gathering.

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### FOUL BROOD.

#### THEORIES OF THE FIRST CAUSE OF THE DISEASE.

**A**S to what may be the first cause of foul brood I believe no theory has as yet been advanced that will satisfactorily cover all cases.

The theory of Cheshire, that it is caused by bacilli, or minute vegetable organisms, is the one generally held by those who have studied the disease. If we accept this, we must suppose that all cases of foul brood are traceable to infec-

tion from some first case or cases. Bacilli can no more grow without seeds than corn or wheat. It seems somewhat difficult to account for all cases on this supposition, although if Cheshire's theory be true, that the bacilli or spores may be deposited by the bees from infected hives on the blossoms they visit, to cling to and be carried away by other bees that visit the same flowers, we can easily see that the disease may be quickly spread over wide reaches of territory. The intervening links might then be destroyed in some way, leaving cases of foul brood apparently many miles away from any source of contagion. Even without this way of spreading, the disease may be carried far and fast by swarms escaping to the woods, and by robbing.

The credence given to Cheshire's conclusions is no doubt largely because they are in accord with what is known as the "germ theory" of disease. This is very captivating, very plausible and a very convenient pair of shoulders on which to lay the burden of most of the diseases that inflict the inhabitants of this mundane sphere.

It is not my intention to attack this theory. Apparently it rests on too firm a foundation to be overthrown. The whisper, though, is not unheard in scientific circles, that over zealous investigators have sometimes mistaken effect for cause, in concluding that because bacilli accompany a disease they necessarily produce the disease.

There are objections to the bacillus theory in the case of foul brood. One is, that Cheshire declared himself unable to detect either bacilli or spores in honey, and gave it as his opinion that the disease was never, or at least but very seldom, transmitted by means of honey. So far as I know, no microscopist has had any better success in detecting either bacilli or spores in honey. Yet the almost uniform testimony of all who have had practical experience with it is, that it is through the medium of the honey that it is most frequently and surely transmitted. The most practical and successful methods of cure are based on this assumption, while those which ignore it have in practice proven uncertain and unreliable.

#### STARVATION AS A FOUL BROOD CURE.

Cheshire declares, furthermore, that foul brood is not simply a disease of the brood, but that *bacillus alvei* affects the mature bees, both workers and queen. If so, they are very easily disposed of, for I have repeatedly cured the worst cases of foul brood by simply confining the bees without food for forty-eight hours, then putting them into a clean hive, and still more simply by brushing them from their infected