

adjustment of temperature. An improper temperature is to be dreaded chiefly on account of the increased consumption of stores thereby induced and the consequent increased accumulation of fecal matter in case the stores are impure. For these reasons, viz., the saving in stores and the lessened risk of disease I hold that it pays in this climate to winter in the cellar. I cannot find any ground for choice between a temperature of 35° F. and any of the intervening points up to 50°. I do not find a high temperature an antidote to poor stores.

5th. Scant stores cause the bees anxiety and scattered stores activity, and the two together make place for all the other untoward consequences I have mentioned. But we all agree here.

All the above mentioned conditions cause discomfort in the way and for the reasons intimated and I mention them not because I think them ordinarily fatal or even in themselves greatly injurious, but because they cause undue exertion and consumption of food with a result more or less detrimental owing to the quality of the food. If successful wintering turned on any or all of these the problem would have been solved long ago. There is no such uncertainty attached to the securing the conditions desired in these things as to make their operations long a matter of doubt.

No, brethren, the thing that causes uncertainty in the results is the uncertainty existing as to the quality of the winter stores which bring me to the sixth and last item to be considered.

From my experience of ten years with an apiary ranging in numbers from two colonies at the beginning to 500 colonies now, I am forced to the conclusion that the great cause of our wintering troubles is a poor quality of stores. Some apiaries are no doubt placed where the natural stores obtained are always of a quality to be relied on, but mine I have no doubt are not thus fortunate. The reasons for my conclusion that improper food is the prime cause of our winter losses I draw from the following facts which are within my own experience and knowledge.

In the autumn of '79 I had fifteen colonies and as that was a year of great scarcity I fed each colony largely of sugar syrup and wintered on the summer stands. In the spring a pint cup would have held all the dead bees from all the colonies. Having purchased a few colonies in the spring of '80 I went into the disastrous winter of '81 with sixty colonies to thirty of these I fed a limited amount of sugar syrup, of these sixteen survived, of the thirty not fed three survived. For the present I pass over the next three winters to the still more disastrous

winter of '84-'85 only saying that during the fall of '83 as an experiment I supplied a few colonies with sugar stores and those thus prepared wintered so very much better than those having honey stores that in the autumn of '84 I gave all my 200 colonies empty combs and fed them syrup. The result was that while all other bees with but few exceptions in that part of Michigan perished there was not a colony of mine in normal condition but so far as I could judge wintered perfectly. These bees were wintered in a cellar. During the following winter my loss was about 12 per cent of bees managed every way precisely the same except that their stores were partly honey and partly syrup, and this though the winter was much more favorable for the successful wintering of bees.

During the next winter that of '86-'87 I had in two cellars at home nearly 400 colonies. Of these about two-thirds had honey stores exclusively, but the other third being in single sections of Heddon's new hive were almost destitute of honey and consequently were supplied with stores of sugar syrup. Each kind was divided between the two cellars. The temperature of one cellar was kept at 50° F. almost without variation, while that of the other varied from 35° to 40°, but this difference in the temperature seemed to have little effect on the condition of the bees—if there was any difference it was in favor of the lower temperature. But what a marked difference was there in each cellar between the colonies with sugar stores and those with natural stores! Of the former the bees were the picture of comfort and contentment, quiet, closely-clustered and not easily disturbed, not a diarrhetic sign and only now and then a bee dropping from the cluster dead. Of the latter the bees were uneasy, not closely-clustered, easily disturbed, dying by the thousand and many of the hives bearing the unmistakable signs of disease and as I have said if there was any difference those in the cellar with the rather high even temperature suffered the more.

One fact more: During the three winters from '81 to '84, which I passed over above, I wintered my bees in the same cellar on natural stores under precisely the same external conditions so far as it was possible for me to judge, yet the first winter they wintered perfectly while the other two winters they wintered ill and with considerable loss. I cannot account for this unless there was a difference in the quality of the stores.

Outside of my own experience there is one thing I do not fail to remember and that is that there is little agreement and apparently little prospect of agreement among bee-keepers as to