

after exertion which causes a waste of tissue. (If the temperature sinks so low that the bees have to add to other methods of maintaining warmth, that of physical exertion, such exertion producing a waste of tissue, will be followed by consumption of bee-bread, if it is in reach, and if not by great physical depletion of the bees, which, if carried far enough, will destroy their life. If, however, the bee-bread can be had, dysentery will soon follow unless the bee can have a purifying flight in the meantime.)

If the above be correct, of which I have no doubt, and in which I believe Professors Cook and Kedzie share my opinions, it will be seen that in any location always yielding clear non-nitrogenous honey all the apiarist needs to do to insure success, is to keep his bee clusters above that temperature which induces any physical exertion upon their part.

In all such locations successful wintering depends alone on temperature. I think the future is going to develop easy practical processes for correctly determining the wintering qualities of our natural stores; but here we have developed a system of management which brings our bees out nearly honey-less in the fall (the same having gone into surplus) when we feed sugar syrup for winter, at a handsome profit.

I note that as we advance to northern latitudes, where we experience the longest confinement, as a rule, we find the clearest honey. Could Northern Michigan and Canada have the frequent flights of Missouri and Kansas, bee-diarrhoea would be of little dread to our bee-keepers; but as we advance southward we find the honey increasing in nitrogen.

I am very glad to have demonstrated during the past winter, the conditions upon which bees consume pollen in the form of bee-bread, for a knowledge of the facts very much simplified preparations for successful wintering.

Now, we need not lift a comb, in preparing our bees for winter. No doubt you have readers who disbelieving in the pollen theory—as they should and must do till they have sufficient evidence—think success rests alone in temperature in all places and seasons. Let us reason upon this one moment. If it was just a question of the rising and falling of the mercury, would we, who have been wintering in cellars and all climates, outdoors, protected, and unprotected, have remained in the darkness so long? No it could not be. Temperature is the great auxiliary, but not the prime manager of bee-diarrhoea. Temperature cannot and does not furnish the material for chemical analysis. Last winter I put into a cellar 73 colonies of bees, whose hives contained combs of sugar syrup and nothing else. Not one

showed any signs of dysentery. Their bodies at all times were apparently as slim as in summer. Notwithstanding I allowed the temperature to go below twenty degrees Far. for several weeks, and it was hovering about the freezing point nearly all winter, and ten colonies in the same cellar upon natural stores, all had diarrhoea, all perishing but three. Nearly all of the seventy-three came through alive, though very many bees flew out upon the cellar bottom and perished. When I set those bees out for a flight on the 19th day of last April, after 151 days confinement, the day being warm and pleasant, with no snow, they flew lively, darkening the air, yet not one bee could be detected voiding *anything*, not even water. My white hives and my white shirt, failed to show one spot from these bees.

Do you wonder that I believe that I have mastered bee-diarrhoea? With forty-nine sugar-fed colonies, wintered outside, only partially protected, I demonstrated that bees could be frozen to death, upon the best of stores within the cluster, with no diarrhoea at all.

I was aware that my cellar was dangerously cold, but I thought the danger existed only with the stocks upon natural stores. I found my mistake, and demonstrated that bees will readily succumb to cold, actually freezing to death. I opened and examined these frozen bees but found no faecal matter whatever. Well we care nothing about old Boreas, for everyone knows how to keep their bees warm. But in the past, with this warmth, we have known our bees to perish with diarrhoea, but in the future with pure oxygen food added, we feel sure that success is certain. The cellar mentioned was extremely damp all winter long, this dampness was equal to a few degrees lower temperature; I think otherwise, of no ill effect. Colonies that were damp and mouldy, as in fact nearly everyone was, came through in splendid condition. Mr. Boomhower, of N.Y., who has always wintered successfully, writes me that he has wintered in eight different cellars, some dry and some damp, and always with uniform success. Mr. Barber, also of N.Y. State, another successful one, writes that he believes a damp cellar better than a dry one. I have had no experience and have no theory with which to controvert his opinion in this respect, but with Mr. Boomhower, I do not believe that dampness is *necessary* to success. I do not believe that ventilators are necessary. I have no knowledge of apiculture, experimental or otherwise, that tells me so.

My cellar is eighteen by thirty feet. I shall put between two and three hundred colonies therein, in hives without any upward ventilation, and as soon as the mercury in the cellar sinks below