

his excellent article, on page 327 of the C. B. J., Dr. Tinker, says, "In all the cases I have ever seen of true diarrhœa, the large proportion of water was the most marked feature."

That my hives were populous, and the bees in healthy condition, when set out, is proven by the fact that, although there was a week of bad weather after the 6th of May, and a snow storm on the 10th, yet on the 21st, when I went out to take them home, several stocks had built full sheets of new comb in vacant spaces in the upper stories, from the bloom of the hard maple. There was no spring dwindling in this lot of bees, and from some of the hives I took sections for market on the first of July, which, Canadian readers will admit, was pretty early.

As to the suitability of pollen as a part of the food of bees in winter Mr. Heddon is radically in error. Prof. Cook says bees never hibernate, they are always active. Very well. The largest experience shows that activity causes waste of tissue, and that it is the main function of nitrogenous food to construct and repair tissues, and that the amount to be supplied must augment with the work to be done. Further, one of the great aids to digestion is proper variations of food, as to its nature, so that the appetite may not fail or be wearied; and Lethby in his "Lecture on Food," says of the nitrogenous elements "They assist the assimilation of the hydrocarbons, and in this way help the development of heat or force without contributing directly to it." Since it is evident from the foregoing that the want of nitrogenous food for a considerable time must result in impaired vitality and death, and since it has been shown by actual experiment and observation that its consumption causes no evil effects from the accumulation of feces, when the temperature of the cluster and temperature of the hive are right, therefore, any method of preparation for winter, which deprives the bees of pollen, for six months at a time, is unscientific.

In regard to the quantity of air necessary for a stock of bees while in winter quarters, I fear Mr. Heddon's kind effort "to lead his companions out of the darkness" will result disastrously to those who may accept his assistance. I too once believed the teaching that bees require little or no air in the cellar, and the mistake cost me \$100. Anyone who believes that a hive full of air is sufficient to last a stock of bees all winter, and acts on that belief, will be very likely to lose his bees. Let us consider the matter in this way. The least quantity of honey consumed in 160 days is, say, five pounds. Five pounds of honey contains an ascertained quantity of carbon, which on being oxidised in the blood of the bees,

requires a known quantity of oxygen, the whole of which must be derived from the surrounding air, by breathing. Let those who think that a hive full of air contains sufficient oxygen for this purpose, figure it out, and they will find it fall very much short of the required quantity. The oxidation of the carbon contained in five pounds of honey during the process of assimilation produces an ascertainable quantity of carbonic acid gas, and aqueous vapor. Even if the oxygen were in sufficient quantity, the carbonic acid and vapor exhaled would so vitiate a hive full of air that it would be incapable of supporting life, long before the winter had passed. It may be replied that a hive has been sprinkled with water in freezing weather till it was hermetically sealed with ice, and then covered over with snow, and yet the bees lived. Everyone knows that the internal heat from a hive of bees when covered over with snow, will soon melt the snow for several inches around it. Allow me to cover the whole exterior surface of a hive with pitch, so as to prevent the entrance of air, or the diffusion of gas through the joints, or through the pores of the wood, and I will defy any bee-keeper to save the bees. By leaving only a very small entrance open in such a hive, and placing it in a cellar, I believe I can produce genuine diarrhœa without a particle of pollen. This has been called the "crucial test." As soon as I can find some way of preparing bees for winter, absolutely without pollen, I shall make the experiment.

The test for carbonic acid is so simple that every bee-keeper may know whether the air in his repository is impure or not. Pour some clear lime water into a tumbler and blow the breath into it through a straw, and observe the milky appearance it produces. Procure from a druggist five bottles, containing half an ounce, eight ounces, ten ounces, twelve ounces, and sixteen ounces, respectively. Fill the sixteen ounce bottle with rain water, take it into the apartment, the air of which is to be tested, and pour out the water. Emptying the bottle allows it to fill with the air of the room. Pour into the bottle a half ounce full of lime-water. Cork the large bottle and shake it well. If the lime-water does not become milky in appearance, and shows no precipitate after standing for some time, the air does not contain more than four volumes of carbonic acid in 10,000, which is as pure as it is outside. If there is no milkiness when the 12 oz. bottle is used, it shows that there are not more than five volumes, and when the ten oz bottle is used, not more than six volumes, which is as much as can be allowed. If there is turbidity when the eight oz bottle is used, it shows that there are more than eight volumes in 10,000, which is too much