

the bottom. I hold that about two and a half or three in width, and about five tenths and three eighths in height, and in case of snow storms you must have a sort of safety valve, if you do not the boiler will burst, the snow will settle down, and it will steam up, but if you have the entrance as wide as he has it and give it an upward, ventilation it will cause the colony to suffer.

Mr. Pringle—This subject was discussed last winter pretty fully, some took the position that there ought to be a little upward ventilation, but that it would not do to seal them tight on the top, I said they could be hermetically sealed at the top if you are careful of the lower ventilation, and see that they do not get choked up. But if you have them hermetically sealed at the top, and you neglected them during a snow storm, you are apt to lose them. You must attend to the ventilation at the bottom during heavy snow storms, or you will lose your bees.

Mr. Gemmell—The old theory was that you could not winter bees at all unless you had upward ventilation, but I think in a great many cases they were never protected then as we protect them now with packing. In regard to a space between the hive proper, and the outside cover is that detrimental or a benefit to the colony? Now if we want solar heat, the heat from the sun is a great benefit, and if you have an air space between the hive proper and the outside case, you are going to destroy the benefits of the solar heat from the top of that hive, it is something like what you might call a tight air space, a non-conductor of heat. Now then, if we can secure good wintering without an air space on top of the hive proper on the outside case, cannot we use less packing and get the benefits of the solar heat by allowing some to strike on the hive and penetrate into the colony?

Mr. Pringle—Solar heat is so irregular that I do not think it would be well to depend on that!

Mr. Gemmell—Don't you think we have two or three times in the winter when solar heat would be a benefit to the bees?

Mr. Hall—I am sorry he is not satisfied when he is well off. He wintered his bees last winter a little contrary to what he did in the past. He says he was successful: do be satisfied with success. I have tried Mr. Hedden's theory, he is a bright bee-keeper, but like my friend, he is not satisfied with success. I have bees seven miles from home that are exposed to the sun, and they are also exposed to 10 below zero, and that frost lasts longer than the sun does, and I certainly take the non-conductor to keep the frost out and we will take the heat of

the bees to get up the solar part of it. Last winter these bees were covered after a big storm and I wasn't feeling well enough to dig them out, and I have what I call yards or drop boards to save me the trouble of cutting the grass and these hives that were snowed up the worst I dig well in front of them about twenty inches by thirty-three or thirty-six inches, and I laid the board on top of this hive and I did not do any more to them. One of the hives was queenless, and was lost but the six were equal to any in the yard, and three of them, the best. There was no top ventilation, and there was a space at the front about 4½ inches to five. The mice are at liberty to go in, but they do not go inside my hives. These hives did so well that if my hives become covered with snow again, I will go out and give each one a well, because my experience of last year was so satisfactory.

Mr. Frith.—This solar heat theory is discussed all over the province especially in individual minds. Mr. Hedden I believe has the credit of starting this theory, but we must remember that Mr. Hedden lives in a different section of this hemisphere to what we do; where we are living we get one sunshiny day in twenty, from sometime in the beginning of December, to the end or middle of February. Where Mr. Hedden lives I think he gets about seven sunshiny days in eleven. In the Eastern part of this Province down where Mr. Brown lives they get eight or nine sunshiny days, but all through this section we simply get about one sunshiny day in twenty, so that it would be very uncertain for us to depend upon solar heat. I have carried on a great many of experiments in this line, and I find where you winter out doors the better way is to keep out the frost. I have come to this conclusion that the bees require so much oxygen during the winter, that it makes very little difference as long as you don't put the draft right into the cluster of bees. It makes very little difference whether you get the oxygen from the top of the hive or the bottom, or the sides.

Mr. Gemmell—What about the moisture?

Mr. Frith.—They must have sufficient dry atmosphere to carry off the moisture, and if you know just how many cubic feet of air per day it will take to carry off the moisture and supply the bees with oxygen it makes very little difference where they get it from.

Mr. Pringle.—If you intend to ventilate by calculating the amount of oxygen that will enter during any given time you will make a great mistake, because three times