

the thing. These, of course, need be only three-sided, the bottom board forming the fourth.

Now as to the need of top ventilation my observation of the habits of the bees leads me to conclude that they do not like it and do not want it. When the swarm prepares for winter all above is sealed as tight as wax and glue can make it. After all this work has been done to fix up the home for winter we come along and lift up their covers, put on our devices for an upper chamber and our porous quilts and go away congratulating ourselves that we have done a good job for the little fellows. Possibly they know best what they need. We know they need air and warmth. They know they don't want any currents of air on their backs or any drafts. I should not be at all surprised if that air hole which was so useful in the ventilation of Mr. C's friend's bees was all glued tight as a drum before they fairly settled down for winter. My bees will seal up the openings in the zinc of the honey boards which I left over them in place of a Hill's device. Before Mr. C. goes much on that upper tube arrangement he had better find out whether it was not after all a dummy. But the bottom ventilation is wholly in accord with the bees' wishes, as it is wholly in accord with the scientific ventilation of our homes, which is no longer at the ceiling but at the floor. Mr. Ruttan, of Coburg, Ontario, discovered this principle and it is now being applied in ventilation of a large number of public buildings and private dwellings in this country.

By this method drafts are avoided and the heat is around the person and the vitiated air is drawn rapidly out of the house.

What we do for our own houses we may, it seems, by this method of ventilation as worked out by Mr. C., do for the bees. I think he deserves the thanks of the bees for giving a plan which is so much in accord with their own manifested desire to receive all their fresh air from beneath the cluster and so beneath their food, and to keep the upper portion of their home hermetically sealed.

G. A. ADAMS.

Perrysburg, Ohio, Jan. 29th, 1888.

For the CANADIAN BEE JOURNAL.

VENTILATION.

THE question of ventilation of bee-hives and special depositories has been discussed to a large extent for several years, but as yet we are no nearer a solution than when the question first began. Now, why is this? The advocates of ventilation assert that direct upward ventilation is the only practical form

that can be used. In advocating this doctrine the disputants are most certainly begging the question. The assumption by them is that the same rules scientifically considered that apply to the human being, apply to the honey bee. Now this may or may not be correct, and theory and practice considered in this direction alone don't seem to "jibe" at all. The doctrine of "hibernation" is not taken into consideration at all. Whether that doctrine is correct or not, when the definition of the word is strictly applied, is not a matter of discussion now; but the doctrine has some force and carries some weight in discussing ventilation.

Have we any proof whatever as yet that bees require the same amount and quality of air, in proportion to human beings, as do the humans to preserve life? Theory seems to say we have, but practice denies it *in toto*.

Again, suppose they do, how can we compare a single bee, or a whole colony even, with one or more humans, as to the amount of oxygen actually required to sustain life for a given period or the amount of nitrogen that should be mixed with it in order to form the right proportions of each? We know the proportion of each necessary to preserve human life, and we know that about that proportion must be constantly kept up. Do we know either positively or approximately how many cubic inches of air are required per day for a colony of bees, or how long a time it will require a colony to exhaust the oxygen from a given quantity of air? One thing we do know—bees will live when the ordinary means of access of air are completely cut off; and the more quiet the colony can be kept the longer will life be sustained under that condition. I am not writing this article to *provoke* discussion, but simply to see if certain differences cannot be harmonized. Philosophical and scientific theories are valuable so far and no further as they form a basis for practical facts, or can be sustained by them. Bees live under all forms of ventilation; the main point is to determine that form which will give us the maximum of safety. In determining this matter it strikes me that theories are of little value, but that results of experiments alone can give us the solution, and that the whole matter rests in the hands of our larger apiarists.

J. E. POW.

North Attleboro, Jan. 27, 1889.

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