

There is occasionally a still, mild day in Winter, upon which the sun shines out bright and strong for an hour or two, and bees in single-walled hives enjoy a real cleansing flight, while the momentary rise in temperature passes away ere it has penetrated the thick walls of a chaff hive.

On the other hand, there are days and weeks, and sometimes months, unbroken by these rises in temperature; and the bees must depend for their existence upon the heat generated by themselves, and the more perfect the non-conductor by which they are surrounded, the less will be the loss of heat.

When bees are well protected, there is less necessity for flight than when the protection is slight. If the bee-keeper thinks, however, that bees in chaff hives ought to fly on a warm day, but they do not fly he has only to remove the covering over the bees and allow them to fly from the tops of the hives.

For several Winters I left quite a number of colonies unprotected. I discontinued the practice only when thoroughly convinced that, in this locality, the losses were lessened by protection. In mild Winters the bees came through in pretty fair condition.

In severe Winters the bees in the outside spaces, or range of combs, died first; the cluster became smaller; the bees in more ranges died; and by spring all were dead, or the colony so reduced in numbers, and the survivors so lacking in vitality, as to be practically worthless.

#### VENTILATION.

I have never seen any ill effects from dampness, but I have always given abundant ventilation above the packing. When the warm air from the cluster passes up through the packing, and is met by the cold outer air, some condensation of moisture takes place. This moistens the surface of the packing slightly, but it is comparatively dry underneath. With a good, strong colony of bees and ventilation above the packing I have never known of trouble from moisture.

#### CHAFF HIVES.

In the giving of protection, chaff hives have the advantage of being always ready for winter, and of doing away with the labor and untidiness of packing and unpacking, but they are expensive and cumbersome. It is some work to pack bees in the fall and unpack them in the spring, but light, single-walled, readily-movable hives during the working season are managed with enough less labor to more than compensate for that of packing and unpacking.

Then there is another point. The work of packing and unpacking comes when there is comparative leisure, while the extra work caused by having great, unwieldy hives, is brought in at a time when the bee-keeper is working on the "keen jump."

#### CORK DUST FOR PACKING.

For packing material, I have used wheat chaff, forest leaves, planer shavings and dry sawdust. I have never used cork dust, but it is probably the best packing material. Its non-conductivity is nearly twice that of chaff, while it never becomes damp. The only objection is that it is not readily obtainable, and usually costs something, while the other substances mentioned cost nothing. What they lack in non-conductivity is easily made up in quantity and this brings up the point of the proper thickness for packing.

I have often thrust my hand into the packing surrounding a populous colony of bees, and found the warmth perceptible at a distance of four inches from the side, and six inches from the top. This would seem to indicate the thickness when chaff or saw-dust is used. I presume that packing has often been condemned when it was not more than half hand—that is, when not enough material was used. I do not appreciate the argument of those who advocate thin packing. I do not believe that the benefit of the heat from the sun can compensate for the lack of protection during the months of extreme cold.

#### DEAD-AIR SPACES.

Hollow walls, with no packing, have their advocates; and it has been asked if these dead-air spaces were not equally as good non-conductors of heat as those filled with chaff. They are not. In the first place, the air is not "dead," it is constantly moving. The air next to the inside wall becomes warm and rises; that next the outer wall cools and settles; thus there is a constant circulation that robs the inner wall of its heat.

#### BOXES FOR CHAFF PACKING.

If chaff hives are not used, how shall the packing be kept into place? I know of nothing better than boxes made of cheap, thin lumber. If there is a lack of room for storing them in summer, they can be so made as to be easily "knocked down" and stacked up when not in use.

Of course bees can be packed more cheaply by setting the hives in long rows, building a long box around them, and filling it with the material used for packing. With this method the packing must be postponed until there is