

important factor in deciding which plan to adopt is convenience. If the beekeeper has a deep and dry cellar and well insulated from changes in temperature, by using it he can save himself the cost of making cases and the labour of packing the bees. If, on the other hand, the apiary—perhaps an out-apiary some distance from the beekeeper's residence—is well sheltered from wind, and no suitable cellar is available, cases may be used and the bees, snugly packed away in them, will need no attention throughout the winter, nor indeed until spring is well advanced, by which time they will be found to be in a more forward condition than those that have been brought out of the cellar and have been placed on their summer stands without protection.

WINTERING OUTSIDE.

In wintering bees outside, it is very necessary to protect the apiary from wind, and if there is not a good windbreak on all sides, consisting say of evergreens, which are much more satisfactory than buildings, a fairly close board fence about eight feet high should be erected around the apiary.

The best and most economical type of wintering case for the bees is one made to take four hives en bloc and usually back to back. It uses less material per colony than cases made to take only one or two hives, and each colony is warmed on two sides by its neighbours. The credit for inventing the four-colony case is by general consent accorded to Jacob Alpaugh, a Canadian.

The case should be at least large enough to allow for four inches of packing between the hives and the sides and bottom of the case, and eight or ten inches surmounted with an air space on top of the hives. Where the regular single-walled ten-frame Langstroth hives are used, these spaces will require a case having inside dimensions of 48 inches by 41 inches, and about 28 inches high. The sides and floor of the case should be of grooved and tongued boards. The roof should be of thin boards nailed to a strong frame that telescopes over the sides, and it should be covered with roofing to make it waterproof.

It is convenient to make the case collapsible. The sides may be held together by hooks, or they may be held together more firmly by means of a thumb-screw placed near the top and operated from the inside in combination with dowels in the floor to prevent spreading below, the thumb-screws and dowels to be held in cleats fixed on the sides.

The construction of the flight holes in the case needs particular attention. They should be cut in the sides of the case opposite the entrances of the hives, but at least a foot apart. In winter, the flight holes should be of the smallest size that permits the passage of bees without danger of blocking, but in spring, a considerably larger size is necessary. A satisfactory way to meet these conditions is to cut the hole four or five inches wide by one inch high and to have a close-fitting piece of wood revolving on a screw which will reduce it to one inch by three-eighths of an inch, or three-eighths by three-eighths of an inch. There should be no projecting ledge beneath the winter entrance to lodge snow and ice.

The packing material should be of small size, supplying numerous dead air spaces, such as planer shavings or dried leaves that have been kept for at least a year. The material on top may be placed in a large sheet or a large bag for easy removal and replacement to permit of the occasional examination of the colony in spring.

The Canadian conditions require cases of somewhat different construction to those that are used in many parts of the United States. In our experiments at Ottawa, it has been found that the entrance is too small in spring if it consists