WINTERING BEES IN COLORADO

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As the single case appears in summer, still packed around the brood chamber.
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From time to time, with the advancement to better beekeeping, we find it well to discard some of our previous orthodox methods as something better appears and seems to give satisfactory results. Extreme conditions or unforeseen incidents cropping up from one season to another, are the chief difficulties against which we must guard. Perhaps the staking of reputations is a matter of minor importance as compared to the fortunes of the individuals operating the business.

There are a great many theories published on the causes of winter loss and many factors of great importance are credited with success or failure in having bees appear in spring sufficiently strong to send the colony on the way to successful honey production for that season. Many colonies come through in the spring strong enough to gather a satisfactory surplus; others gather enough for the following winter, and a great many perish over winter from various causes.

Our attention might well be devoted to ascertaining the causes of the failures. To study the failures is, however, not enough and even may be the wrong method of attack. Let us first understand why we have some alive. Keeping in mind the successes and the failures, our object should then be to duplicate the successes. Those that are successful in the survival of the fittest in their winter struggle against adverse conditions, are good indications that we can do better than take an annual winter loss of from 10 to 70 percent.

Severe winter losses occur in some bee yards in Colorado from time to time. It is sometimes very difficult to recover from these financial losses particularly in a season following a dearth when a beekeeper can least afford it. Such losses as occur in some large yards would put a smaller beekeeper completely out of business, and are a serious handicap to the owner of the larger enterprise.

Some beekeeping sections of Colorado are situated at over 7000 feet altitude, while other sections are as low as 3,500 feet, with varying temperatures as a result. This variation of altitude and temperature makes it impossible to advocate any standard method of fall management and winter preparation. However, since the fundamentals of success are equal for all localities, we can adapt ourselves to the differences of altitude and the variations of temperature. These two factors would seem to constitute the major part of our differences of procedure for success in wintering.

WINTER FOOD

Quality.—We must, if we are using honey as a winter food, use the best of it. Honey gathered late in the fall and not properly ripened, is poor stores. It is too prone to granulate or ferment and starve the colony to death, even though it has an abundance of food, but not of the proper quality. Where the double brood chamber is used till the main flow, it is good policy to reserve the first super of honey
Fig. 1. Capped and ripened stores make for better wintering.
gathered from the main flow for the winter food chamber. It should, when full and well capped, weigh over 50 pounds. It may not be all used for winter, but it insures enough for winters of more than the average length if none has been extracted from the brood chamber. It is only under exceptional circumstances that honey should be taken from the brood chamber. It is more satisfactory to have the old honey worked over in the spring by the bees. This can be assisted by brazing the cappings with a hive tool, using the flat side and just crushing the caps so that the honey runs a little.

The advantage of brazing the cappings is demonstrated in spring feeding. It is known that spring feeding stimulates brood rearing. The same results may be attained to some degree by the above-mentioned method. The bees move the honey readily and stimulated brood rearing is the result. It is said that a comb of honey will raise a comb of brood. This observation should govern the brazing of the cappings if that method of stimulation is resorted to. Again, the moved honey is not so liable to granulate if not required before the spring honey flow is sufficient to take care of immediate needs. Honey, if left in the hive from season to season, seems liable to granulate and will tear extracting combs if used for that purpose. If the bees can move the honey quickly, that also makes the brood nest more elastic and avoids the constriction that sometimes occurs where solid walls of honey are the rule.

Quantity.—The food chamber, well filled and capped during the main flow, is not removed from the hive but is set down on the brood chamber at the time of last extracting and after disposal of the queen excluder from the hive. For populous colonies, this quantity of winter stores should be adequate. For extracted honey production, the food chamber should be the equivalent of one ten frame standard super. For comb honey production, the food chamber may be the equivalent of one shallow extracting super, since the rule is that more honey is stored in the brood chamber in the case of the latter form of production.

**GRANULATION OF WINTER STORES**

Where persistent granulation occurs in spite of all precautions, it becomes necessary to feed some material for winter use which will not granulate and which will take the place of that food which we must extract. For winter use, a syrup made from pure granulated cane or beet sugar of best quality, may be made according to the following formula: Two or two and one-half volumes of sugar dissolved in one volume of hot water with one teaspoonful of tartaric acid to twenty pounds of sugar.

The acid prevents granulation of the sugar when thoroughly mixed and dissolved. The same success may be attained by using steam to heat the water and dissolve the sugar, heating it sufficiently to boil the mixture. The sugar must be thoroughly dissolved or disastrous results may be obtained.
For feeding the syrup, excellent results are obtained by using a ten-pound pail with perforated lid. The perforations are made in the central part of the lid, only, and no larger than those made by a small one-inch nail. About 30 holes are sufficient within a two-inch circle. Feeding should be done at night or when the bees have stopped flying so that no robbing will result. Invert the pail over the bee escape hole in the inner cover. The contents will be gone in 48 hours as a rule. Feeding is done very soon after the first killing frost. If left much later, it will be difficult for the bees to take the feed down and evaporate it to a satisfactory consistency. Sugar syrup, well prepared and used with discretion, is an excellent substitute for poor honey for winter feed for bees.

It should not be necessary to resort to feeding sugar syrup in this State, considering the excellent quality of honey produced. Very little indigestible matter is contained in our white honey. It would seem that the granulation factor may be greatly overcome by maintaining a uniform temperature within the hive during the winter months. Too radical changes in temperature should be avoided as much as possible.

Fig. 2. Resorting to the winter case to prevent too rapid changes in the hive temperature.
Another important factor in successful wintering is the quality of the queen. To say that each colony is queen right, is not sufficient. Each colony must have a good queen. Poor queens observed in the summer should be replaced from the surplus kept in nuclei during the summer for that purpose. A queen unable to preserve a large quantity of compact brood in the brood-rearing season is far from an asset. The boarder queens must be eradicated if we are expecting returns from those colonies affected that way. The advantage of having some surplus queens in nuclei is considerable. A poor queen may be removed at a moment's notice at sign of deterioration. Systematic re-queening must be done not later than August 15 for best results. It is the young bees from this young queen that carry the colony over the winter. Egg laying for the queen, is, as a rule, over by October 1 in the colder regions, and a young queen requires at least six weeks of maximum production to put a colony into good winter condition and the prospects are just so much better if she comes from a nucleus with a good start behind her.

Re-queening may be done just as soon as the break in egg laying does not interfere with the main honey flow. If we find the main flow over by August 20, eggs laid in the last week of July and the first week in August will, when hatched, play but a small part in the main flow, so that re-queening at this time is desirable, since it gives the young queen a maximum of time to build up the colony for winter, without interfering with the honey crop.

To send a colony into winter quarters with a good force of young bees is very essential. Young bees are vigorous, will last over the winter better than old ones, and a vigorous queen will give those bees in quantity.

Winter protection may be either natural or artificial or both. Sheltered places, away from prevailing winds, are of inestimable value, for just the same reason as we stand around the corner from a piercing wind on a cold winter day.

Hedges, groves, trees, shrubbery, or a cheap lattice fence are all effectual in filtering the wind so that the full force of a north wind or a prevailing westerly does not strike the bee yard with its full force. Buildings, on the other hand, only divert the wind, make it whirl and sometimes make it more severe than if no protection were afforded. Solid board fences do not filter the wind for the same reason that a building does not.

If it is not feasible to take advantage of natural windbreaks, and where good honeyflows warrant the establishment of a yard, a cheap lattice fence made from slabs or a poor grade of lumber is very practical. The boards should be set a couple of inches apart so that the wind may partially drift through the open spaces thus preventing the whirling draughts that occur behind solid obstructions. The fence need not be more than eight feet high and may be conveniently made
after the fashion of a portable railway snow fence. Figure 2 shows a natural wind protection on the left of the picture and running along the north and west sides of the yard.

**PRINCIPLES OF ARTIFICIAL PROTECTION**

**To Preserve Uniform Temperature.**—It is, after all, for one particular reason that we go to the expense of protecting colonies artificially. Changes of temperature within the hive, particularly sudden changes, have a very pronounced effect on the success of wintering.

Unprotected colonies allow the inner temperature of a hive to change with the wind, or even over night if it freezes a little harder than usual. On warm days they warm up suddenly and great activity results. This activity, prolonged over a period of days, stimulates the queen’s activity and even in the winter she may lay some eggs and start rearing some brood. Great quantities of energy of the bees are used up. When the warm spell is over and the temperature of the hive drops below 57 degrees, the bees will cluster and leave some of the brood beyond the cluster to perish. The energy used by the old bees in partially raising this brood is lost, the vitality of the colony is lowered considerably and the life of the old bees is shortened.

On the other hand, if the temperature outside goes very low.

Fig. 3. The double winter case. Removed in summer for ease in manipulation.
demanding activity on the part of the bees to keep the hive at a reasonable temperature, muscular activity comes into play, the temperature rises and they do not always stop at the required 57°F. More often they keep going right on up to the brood-rearing temperature and the same thing will happen as in the previous case. Some outside disturbance such as mice, will often cause sufficient disturbance to create a like condition. Poor stores containing too much indigestible matter, cause an irritation from the accumulation of faeces and have a similar result.

To Prevent Granulation.—Comb-honey producers are agreed that even temperatures tend to reduce granulation. The general concession is that to prevent granulation of honey in combs, a fairly even temperature is desirable. Cases are common where bees have died on full combs of honey which had granulated so hard it was impossible for them to work it over in the winter and spring, when water is unavailable. To attempt to regulate the temperature where the winter stores tend to granulate is quite a problem. To remove it from the hive and attempt to keep it in a heated room is scarcely practical. Stored in the hive and protected, it is always ready for use.

To Reduce the Consumption of Stores.—Temperatures ranging below 45 degrees F., outside of the hive on an open stand, force the bees to cluster. Also, that temperature and lower force them to generate heat. The farther down the temperature goes, the greater the necessary heat production. Sometimes our temperatures range as low as 20 degrees below zero Fahr., causing at least enough heat to be generated to keep the cluster at 57 degrees. It is claimed that bees are least active at clustering temperature. Then our object should be to maintain the inner temperature of the hive at approximately 57 degrees. The less the activity, the less the consumption of stores will be for that winter.

Fig. 4. A quadruple case unpacked in spring.

Fig. 5. A quadruple case in the operation of packing.
(Both, Courtesy of Mr. Frank Drexel)
HOW TO ERADICATE THESE OBJECTIONABLE FEATURES

To maintain a uniform temperature, it is necessary to resort to some form of insulation. In so doing, there are some features we must take into consideration. The efficiency, initial cost, cost of maintenance, length of life and the convenience of the insulating materials are all of vital importance to us when we decide to adopt some immediate form of artificial winter protection. Heretofore, there were two generally recognized methods—outside and cellar wintering. The former has gained so much favor of recent years that a great deal more attention has been given to it.

The Outdoor Packing Case.—The outdoor packing case consists in general of a container to hold some form of cheap insulating material. Planer shavings, straw, dry leaves, sawdust and oats are all materials in use to some extent. Shavings seem to be very satisfactory where obtainable. The tendency to absorb moisture and to decay seems to be the rejecting feature of insulating materials of these types.

Types of Winter Cases.—Colony protection is normally done in one of three ways out of doors. In other words, there are three types of packing cases in general use—the single, double and quadruple. Choice of a type depends entirely on the individual. The first and the last are in more general use and are of different forms. Each has its own advantages and disadvantages. There are some points to bear in mind that may assist one in choosing which shall be standard for all yards or for one particular yard.

The efficiency, economy and convenience must be deliberated upon before buying materials. Many claims for both the single and multiple cases are advanced. The total points in favor of one or the other should be the basis of our final decision, but we should not lose sight of the object for which they are designed, namely, the elimination of winter losses. First, consider if you can afford to take an annual winter loss of from 10 to 70 percent, and then balance it against your annual winter cost of packing, which need not exceed, in any case, more than 30 cents per colony per winter. At 30 cents per colony, if you value your colonies at $10.00 each in the spring, no one can afford more than four percent winter loss due to winter killing.

The Single Winter Case.—The single winter case, that is, one for each colony, has some advantages as well as disadvantages over the
quadruple case. The advantages are: They are left on the colony for protection during the winter and summer, thereby affording the very necessary spring protection, necessitating less trouble in packing and unpacking; they do not need to be disturbed till the latter part of May or early June, and can be readjusted at a moment's notice; they afford easy access on all sides at all times; they dispense with the cover and bottom boards of the hives, thereby reducing the expense of that equipment necessary in the quadruple case. However, the brood chamber of the colony is scarcely so accessible as in the unpacked hive.

Fig. 7. Obviates the necessity of the bottom board and metal cover; allows for four inches of packing on all sides and six on top.
Fig. 8. The quadruple case. One entrance on each side.  
(Courtesy of Mr. Drexel)

The Multiple Case.—The multiple case, usually of the quadruple variety, has also its advantageous and drawback features. The cost of production may be lowered to some extent and the packing affords no obstruction in the summer. These features are somewhat offset by the trouble and expense of packing and unpacking, and the moving of colonies from winter to summer stands to afford accessibility on all sides in the summer. The danger of unpacking too early in the spring to take full advantage of the operation and the unwieldy size of the case are points not in its favor.

Costs of Packing Cases.—The cost of materials is usually an item in the decision of the beekeeper before he decides to use winter protection. Suppose the materials for one colony cost $4.00 and save three pounds of honey per year or bring a colony through winter in such good condition that it gathers three pounds more than it would otherwise do. The honey is sold at 15 cents per pound, giving 45 cents. The case should last 15 years. Forty-five cents for 15 years returns $6.75. The single case illustrated cost $3.72 cash outlay. It saves the cost of bottom board and cover, reducing the cost to about $1.72 per case. The winter losses should be reduced to a negligible quantity.

SUMMARY

Beekeeping is not entirely a job for the summer. Some forethought for the winter will dispose of a great deal of our worries and disappointments. Some points to remember are:

1. Good young queen in each hive.
2. Plenty of good sealed stores.
4. Some added protection, as insulation.