BEEKEEPING *in the* KOOTENAYS BRITISH COLUMBIA

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Published by THE BEEKEEPERS' ASSOCIATION OF BRITISH COLUMBIA, KOOTENAY DIVISION, NELSON, B.C.

A CHARGE OF TWENTY-FIVE CENTS IS MADE FOR EACH COPY TO COVER THE COST OF PRINTING AND DISTRIBUTION.

OCTOBER, 1918.

The Beekeepers' Association of British Columbia

(Incorporated 1916)

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Beekeeping in the Kootenays British Columbia

Beekeeping is practically a new industry in the East and West Kootenays, which is making good progress, and is capable of considerable expansion. In most of the best districts for honey production where there are beekeepers already located there is likely to be plenty of room for more colonies for some time yet, and there are many excellent locations where no bees are at present kept at all. The honey produced, which is nearly all extracted honey, is in popular favor, and the demand is increasing, as it is superior to most that has been imported. It may be described as a nice table honey, of uniformly good quality, usually light amber in color, and of delicate flavor, so that it is capable of holding its own, either in home or distant markets. With suitable management a

paying crop can, as a general rule, be depended on every season. White Dutch Clover (Trifolium repens) which now grows wild and in great profusion in most localities is the main source of production. Is is surprising how rapidly White Clover becomes established and spreads after the forest trees have been cut down. This is more particularly noticeable where cattle are ranging as they help to keep down the ranker vegetation, and also act as distributors of the seed. In some localities, Alsike Clover (Trifolium hybridum) is being cultivated to a greater extent than formerly, and is also spreading naturally in the same manner as White Clover. As Alsike Clover is considered to stand at the head of all other plants in the production of honey this will be of benefit to the beekeepers. Alsike succeeds better than Red Clover where there is an excess of moisture, or acidity in the soil, or a deficiency of lime. Red Clover, largely grown for ploughing in, unfortunately does not help the beekeepers very much as the tongues of hive-bees are not sufficiently long to reach the nectar secreted by the blossoms, unless the latter become dwarfed by drought or by flowering the second time. Experiments are being made in some places in growing the biennal Bokhara Clover, generally known as White Sweet Clover (Melilotus alba), which yields honey freely over a long period, and is meeting with success. Inoculation, the same culture as for alfalfa, and a hard seed bed are usually necessary to get it started. Sweet Clover has been introduced in run-down and barren tracts in the United States, where apparently nothing would succeed, and is reported to be giving good results as food for cattle, horses, and hogs, in honey production, and in improving the soil. It will grow on any soil except that which is water-logged. Alfalfa has not as yet been known to yield honey to any appreciable extent in this section of British Columbia.

In some localities, the wild flowers yield a somewhat large proportion of the honey. The most important of these are the common Dandelion (Taraxacum officinale,) (introduced), and the Bearberry (Arctostaphylos Uva-ursi) early in the season, and later on, during July and August, Spreading Dogbane, commonly known as Milk-weed, (Apocynum androsæmifolium), Snow-berry bush (Symphoricarpos racemosus), Wolf-berry bush (Symphoricarpos occidentalis), and the Great Willow Herb, usually known as Fire-weed, (Epilobium or Chamœnerion, angustifolium). There are also Wild Raspberries growing in abundance in many places.

HONEY YIELDING WILD FLOWERS OF THE KOOTENAYS

Willows—Salicacæ. (Willow family).

Pussy Willow—(Salix discolor) etc. Flower in March and April. Both honey and pollen are obtained from the pistillate flowers, honey only from the staminate.

Dandelion—Compositæ. (Composite family). (Taraxacum officinale). Flowers in April and May.

Bearberry—(Kinnikinnik). Ericaceæ. (Heath family.) Arctostaphylos Urva-ursi.

Blueberry—Ericaceæ. (Heath family.) Vaccinium ovalifolium, etc.

Huckleberry—Ericaceæ. (Heath family). Gaylussacia resinosa.

Choke Cherry—Rosaceæ. (Rose family). Prunus demissa.

Bird or Pin Cherry—Rosaceæ (Rose family). Prunus pennsylvanica. All these flower in May.

Barberry—(Oregon Grape) Berberidaceæ. (Barberry family). Berberis aquifolium and Berberis repens.

Wild Red Raspberry—Rosaceæ. (Rose family). Rubus strigosus.

Wild Black Raspberry—Rosaceæ. (Rose family). Rubus occidentalis. All these flower in June.

Dogbane—(Milk-weed) Apocynaceæ. (Dogbane family) Apocynum androsæmifolium (Spreading Dogbane).

Snowberry— Caprifoliaceæ (Honeysuckle family) Symphoricarpos racemosus.

Wolfberry— Caprifoliaceæ (Honeysuckle family) Symphoricarpos occidentalis.

Canada Thistle—Compositæ (Composite family) Cirsium arvense. All these flower in June and July.

Great Willow Herb or Fire-weed—Onagraceæ. (Evening Primrose family) Epilobium, (or Chamœnerion) angustifolium.

Golden Rod—Compositæ. (Composite family) Solidago canadensis etc. Flower in July and August.

In localities principally devoted to the production of fruit there are not nearly enough bees kept to ensure the pollination of the blossoms.

The chief problems that have confronted the beekeepers in the Kootenays have been difficulties in wintering, and in the control of swarming. The latter has often been contributory to the former. Excessive swarming frequently caused by not providing the bees with sufficient hive room, and generally occurring during the short honey flows, peculiar to this region, has resulted in their being unable to store enough honey to winter on, so that they have died of starvation, unless fed with sugar syrup in the fall. The use of single-walled hives, with little or no additional protection in winter, has also been responsible for many of the losses that have been sustained. In some localities honey-dew, the excretion of aphides, collected and stored in the combs by the bees, has been the main cause of winter fatalities.

As a rule the snow commences to fall early in November and remains on the ground until about the end of the following March so that usually the bees are confined to the hives for nearly five months. At some time however, during this period, there may come a warm wind, or "Chinook", which, combined with brilliant sunshine, may raise the temperature for a few days to almost summer heat. When this occurs it is liable to bring the bees out of the hives prematurely with the result that thousands of them alight on the soft snow, become chilled, and are not able to get back again. Under such circumstances the bees are not so likely to fly from hives that are well insulated, as they are from hives not well protected, as the inside temperature does not warm up so quickly, and cause them to become restless.

The bees kept in the Kootenays are mostly pure Italians. This race does so remarkably well here that it would seem a pity to introduce any other, except in isolated districts for purposes of experiment. These bees are well suited for beginners as they are very quiet under manipulation, not much inclined to use their stings, and therefore easy to handle. The queens are so very prolific that there is no trouble in making increase. During the years 1916 and 1917 a considerable number of combless two-pound packages, including queens, of this race were shipped in from the

United States. Those that came from California, being only four or five days on the journey, generally arrived in good condition, but shipments from greater distances, such as the Southern States, being longer in transit, a large proportion were dead on arrival. If these bees can be obtained in good shape during April, or early in May, when they seem to travel best, and placed on four or five built out combs, for a start, and fed with thin syrup until they are able to obtain sufficient food from outside, they have been found to produce enough honey the first season to pay for their cost several times over. The Provincial Government regulations now in force require that each shipment of bees without combs must be accompanied by an Inspection Certificate, from a duly authorized State Inspector, showing that the apiary from which they are sent has been recently inspected and found to be free from disease. Otherwise they are liable to be held in quarantine at the port of entry in the province. Queens are allowed to come in through the mails without restriction. The importation of bees on combs is not permitted. The postal regulations in the United States have recently been revised so that bees in combless packages can now be sent through the mails. Endeavors are being made to get this extended to Canada.

In 1918 shipments of bees in combless packages have been almost a total failure owing to delays in transit.

In the year 1914, the Kootenay Beekeepers' Association was organized and the beekeepers have benefited in many ways by co-operation. This year (1918) the Kootenay Association has been amalgamated with the Beekeepers' Association of British Columbia, which was incorporated in 1916 under the Agricultural Associations Act, and is now known as the Kootenay Division of that Association. The objects of the association are:

To promote and encourage the keeping of bees by the most suitable methods for their profitable management.

To assist members in disposing of their produce to the best advantage by the adoption of uniformity in the packing and grading for market, and the provision of a special distinctive label or seal for the use of members only, which shall be a guarantee of excellence and purity.

To obtain the most advantageous terms for members in the purchase of bee supplies.

To effect the standardizing of such bee appliances as may be found most suitable for the province

To promote and regulate local exhibits of bees, honey, wax, etc., and arrange for the judging of same.

To aid in the dissemination of reliable and practical information with regard to the bee industry and further its progress in every way possible.

The annual subscription is one dollar.

METHODS OF BEEKEEPING FOUND SUITABLE FOR THE KOOTENAYS

Hives.

What is known as the ten-frame hive, taking ten Langstroth frames, is considered to be the most convenient and suitable for general use. If preferred this can take the form of a double-walled brood chamber, with single-walled hive-bodies as supers. A complete hive of this description was, for the convenience of the beekeepers, standardized by the Kootenay Beekeepers' Association.

Kootenay Hive-case.

An improvement on the double-walled hive, just referred to has been introduced in the form of a permanent hive-case, made to take the ten-frame single-walled hive-bodies, with a three-inch space all round them. This space, as far as the top of the first single-walled hive-body, or brood-chamber, is kept permanently packed with planer shavings, or other suitable material, all the year round. It is covered in at the top to prevent the packing from falling into the hive when opened. There is also a three-inch space underneath the floor which is kept permanently packed as well. The bees have more protection in this hive-case than in the double-walled hive, and the temperature is kept cooler and more uniform in summer. The supers being all under cover are completely shaded from the hot rays of the sun. There is not the trouble of packing in the fall, and unpacking in the spring, as in the case of the single-walled hives. It is less expensive than the double-walled hive, the larger proportion of the material used in its construction being ¾ inch shiplap. The design is simple, and it can all be easily taken apart. The outer edge at the top of each storey, or "lift," is slightly bevelled so that it may be lifted off easily and replaced quickly without sticking or jarring. The floor is made to slope half an inch from back to front, at the same time permitting the case itself to stand perfectly level. Blocks on the inside corners of the cover raise it so as to provide permanent ventilation and allow any bees to escape that may get shut in.

Single-walled Hive-bodies.

The outside dimensions of the ten-frame single-walled hive-bodies, as used in the Kootenays, are 16¾ inches wide, 20 inches long, and 9½ inches deep, the bee space being above the frames. The material generally used, which is the most suitable, is white pine lumber, dressed on both sides. The ends are ⅞ inch in thickness, and the sides ¾ inch.

As lumber 7–8 inch in thickness has to be sawn specially, which makes it often difficult to procure, and also makes it more expensive, it has been suggested that it would be better in future for the hive-bodies to be made throughout of ¾ inch material, this being the standard of the lumber trade in Canada, and therefore more easily obtainable. This would make a difference of a quarter of an inch in the length, viz. 19¾ inches instead of 20 inches. These hive-bodies made throughout of ¾ inch material, as suggested, will take ten Langstroth frames, spaced 1⅜ inches from centre to centre, and a division board ¾ inch in thickness. Or ten frames can be used, spaced 1½ inches from centre to centre without any division board, the inside width, viz. 15¼ inches, being just right for this purpose, with the allowance of a bee-space (¼ inch) on the outsides of the outer combs.

When the single-walled hive-bodies are utilized as supers, for the production of extracted honey, it is a good plan to use nine frames only, spaced wider apart, without any division board, as the combs will then be correspondingly thicker when filled with honey, making it much easier to slice off the cappings with the uncapping knife.

Langstroth Frame.

The specification of the Langstroth frame, which was adopted as the standard of the Kootenay Beekeepers' Association, is as follows: **Material**, white pine. **Top Bar**, length 18¾ inches, width

1 1-16 in., depth 7-8 inch. Slip cut out for nailing in foundation. **End Bars, or Posts,** length 9⅛ inches, width 1 1-16 inches, thickness ⅜ inch. Housed at each end to receive top and bottom bars. Pierced for wiring. **Bottom Bar,** length 17⅝ inches, width ¾ inch, thickness 5–16 inch. **Lugs,** width ⅜ inch, thickness 5–16 inch. **Metal spacers** extend width of end bars to 1⅜ inches. **End Staples** under lugs extending ¼ inch.

As some beekeepers have not used the end spacing staples, whereby the length of the top bar, viz. 18¾ inches, is apt to permit it to drop down into the hive-body, it has been suggested that the top bars in future be made 18 15-16 inches in length. Beekeepers can easily reduce this to 18¾ inches, if they wish.

In order to conform to the ¾ inch standard of the lumber trade, and by so doing economize material, it is also suggested that the depth of the top bar be reduced to ¾ inch, instead of ⅞ inch, and the end bars be made 5–16 inch in thickness, instead of ⅜ inch.

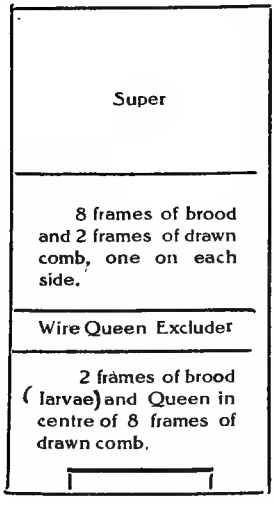
SWARM CONTROL AND THE TREATMENT OF SWARMS

As only one main honey flow, usually commencing about the middle of July, can as a rule be reckoned on in the Kootenays, and this of comparatively short duration, it is essential to have all the hives at their maximum strength at this particular time, so that the bees are in just the right condition, and therefore, in readiness to take the fullest advantage of it. They may then be expected to store the largest quantity of honey possible. A good system of swarm control can usually be relied on to accomplish this. If the bees swarm, as they generally do under ordinary circumstances, when left to their own devices, just before, or at some period during this honey flow, the crop will be nearly all lost to the beekeeper, unless the colony is built up again, as near as can be, to its original strength, prior to swarming. Failing this the bulk of the honey that is gathered is used up by the bees in the production of more brood and bees instead of being stored in the supers.

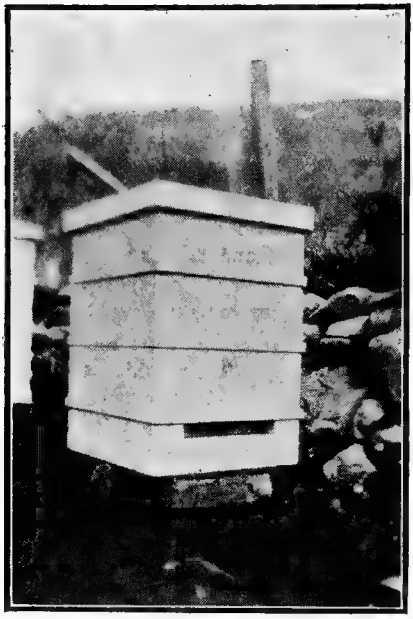
Some beekeepers make the mistake of dividing their colonies just before the honey flow and thereby lose the honey crop.

There are two methods of swarm control that have been tried here and found to be satisfactory. The first is what is usually known as the Demaree plan, and is operated as follows: Just before the colony is ready to swarm put all the brood excepting one or two frames, in a second story over a queen excluder, (two frames seem to be best, as otherwise the bees may neglect the queen), leaving the queen below with the one or two frames of brood, the vacancies at the sides being filled with empty combs, failing which full sheets of foundation. Cut out all queen cells at the same time, if there are any, and search for and destroy any queen cells, on the eighth or ninth day afterwards, that may be found in the second story. The brood frames in the second story, as soon as the brood hatches out, will be used by the bees for storing honey. Add other supers above the second story, as needed.

DEMAREE PLAN



HIVES USED IN THE KOOTENAYS.

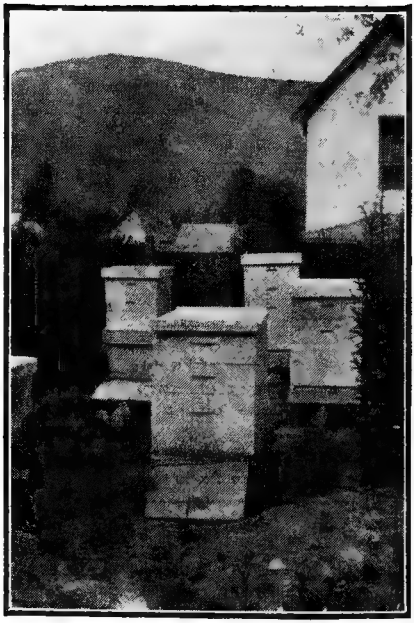


"KOOTENAY" HIVE CASE.

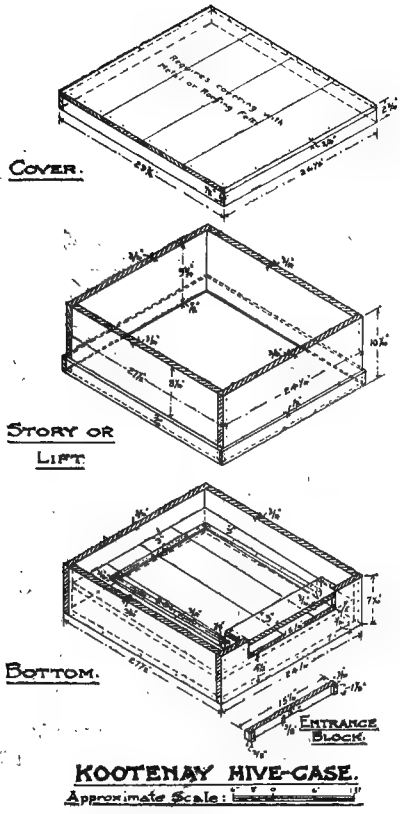
Permanently packed. There are 3 inches of packing below the floor and on all four sides. The flat cover is 3-8 inch larger all around than the top of the case, and small triangular blocks nailed in each corner inside raise it and ensure permanent ventilation. The stories or "lifts" are all alike, and as supers are put on are added as necessary. In this hive-case the bees are warmer in winter and cooler in summer. When packing for winter all that is necessary is to add the top covering over the frames.

Hive-cases that take ordinary single wall hive-bodies, permanently packed as far as the brood-chamber and covered in, have been found an improvement on the double-wall hives for this section of British Columbia.

Double-wall hives.

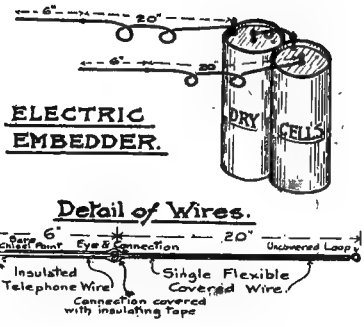


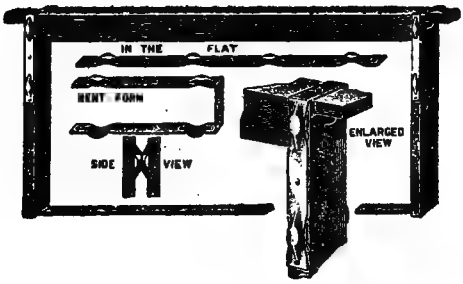
Single wall hives.



KOOTENAY HIVE-CASE.

Approximate Scale:



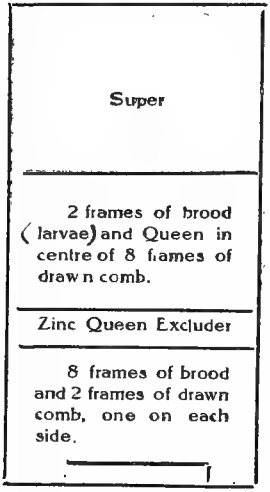


Metal-spaced Langstroth Frame.

The second method, which is a variation of the Demaree plan, is in some respect preferable to the first, and is worked as follows:

When the bees cover all the frames in the brood chamber, some time in May, find the queen and place her with two frames of brood in the centre of a second story, over a queen excluder, adding empty combs, or frames containing full sheets of foundation, at the sides. Put in frames containing built out combs or full sheets of foundation, at the sides of the brood combs left below. The bees will usually build queen cells below the excluder, all but one of which should be destroyed on the eighth or ninth day afterwards. After the young queen has hatched below, and is mated and laying, the old queen above can be removed. If she is provided with two or three frames of brood and put into a fresh hive on a new stand this will make a good nucleus. The old queen however, can be left until the combs below are partly filled with brood. By this method, if carefully followed, it is scarcely possible for the bees to swarm, the old queen being above the excluder, with ample room for egg laying. A powerful colony can by this means be built up in readiness for the honey flow in July, and a young queen assured to each hive so treated every year. After the old queen is removed from the second story queen cells may possibly be built there. If so these should be destroyed on the eight or ninth day afterwards. A colony headed by a queen of the current year does not swarm as a general rule. Bees will not usually build queen cells when an all-wire queen excluder is used, but will almost invariably do so, either above or below a zinc excluder if there is brood in the queenless part.

Variation of Demaree Plan



Another plan for swarm prevention, which has the merit of simplicity, is to remove or cage the queen, when the bees are strong enough to make preparations for swarming, and cut out all queen cells but one on the eighth or ninth day afterwards.

When swarms issue there are methods that may be followed and a good crop of honey obtained, as well as increase of colonies. When as much increase as possible is desired the well known plan of hiving the swarm in a new hive on the old stand, transferring the supers to it, and dividing up the brood frames into two-frame nuclei, with a queen cell to each, is good procedure. For moderate increase the following directions can be put into practice: After a first, or prime swarm issues, (1) Move old hive to a fresh stand. (2) Hive swarm in a new hive on the old stand, on built out combs, or full sheets of foundation. (3) Transfer supers to swarm. (4) On the third or fourth day afterwards transfer four or five frames of sealed brood from the old hive to the swarm after cutting out all the queen cells they may contain. Put these in the second story over queen excluder. (If preferred the old queen, that is with the swarm, may be taken away at this stage, and a queen cell or newly hatched queen substituted which should prevent the possibility of second swarming.

A variation of this method, which is sometimes followed, is to place the old hive close to the swarm, that has been hived on the original stand, and face it the same way. A week later the old hive is moved to a new location, ten feet or more distant. The swarm is by this means further strengthened with the flying bees from the old hive, and the latter will be too weakened to swarm again.

When a first swarm issues and increase is not required a very good plan is to remove all the brood from below and place it in a top story above the supers. Then return the swarm to the old brood chamber, that has been filled with empty combs, or full sheets of foundation, below a queen excluder. Cut out all the queen cells in the brood frames above and also any more that may be built there, on the eighth or ninth day afterwards. Or a small entrance can be given above so that a young queen can fly out and get mated and then be used to replace the old queen below. If this is done it would be advisable to use another queen excluder so as to confine the young queen to the top story and so prevent her from laying eggs in the super.

One of the largest producers of honey in the province, who uses eight frame hives, manages them as follows:

All queens are clipped and allowed access to two hive-bodies (sixteen Langstroth frames) a queen excluder being placed above the second one. One additional deep hive-body only is used as a super, the combs from which are removed and extracted as soon as they are filled with honey, and then replaced, to be extracted again and again as soon as ready. When a swarm comes out it is returned to the same hive, all queen cells but one being destroyed, and the old queen killed. When adopting this method it will doubtless be found necessary to use more than one super in most localities so that the honey will then have a better chance of being ripened and sealed over by the bees.

THE PRODUCTION OF EXTRACTED HONEY.

Extracted honey is mostly produced by using the ordinary deep Langstroth frames in the supers, although shallow extracting frames 4¾ inches in depth are sometimes used as well. The latter are made 4¾ in. deep so as to be interchangeable with hanging section frames. If a good supply of built out combs is on hand, this being a beekeeper's most valuable asset, large yields of honey can be obtained, in spite of the honey flows being of short duration in the Kootenays, provided that the hives are at full strength, and this is maintained while the flow is on. It is important to keep on adding supers as soon as the bees require more room, which it is better in this climate, to place on the top, instead of between. Three deep supers will generally be found sufficient and need to be kept in readiness. When filled these will contain about 150 lbs. of honey. The largest quantity of extracted honey reported as having been taken from one hive in the Kootenays, in a single season, was 342 pounds, at Castlegar in 1918.

THE PRODUCTION OF SECTIONS AND CHUNK HONEY

Comparatively few of the Kootenay beekeepers have as yet started to produce sections and chunk honey, although there is a good demand for both. Bees will commence work in sections more readily if they are alternated with extracting frames, especially if these contain built out combs. For this purpose hanging section frames made to take, preferably 4¼x4¼x1½ inch, plain, or no-bee-way sections are required, with two

hanging fence separators to each. If shallow frames are used full sheets of super foundation may be put in them and the combs can then be cut out and sold as chunk honey, or they may be extracted in the usual way. They should not be wired.

The most perfect sections, that are mostly free from pop-holes, are usually obtained by using top and bottom starters. The top starter of thin super foundation should be about 3¼ inches in depth, placed in the centre, and firmly fixed at the top and sides, and the bottom starter about ⅝ inch deep. The space between each should be not less than ⅛ inch nor more than ¼ inch. An easy and expeditious way of fastening the foundation is to use liquid wax, melted on the top of hot water, preferably in a double boiler. An ordinary glue-pot can be used for this purpose and kept heated over a small oil or spirit stove. Water is put in with the wax in the top boiler, and a brush about ¾ inch wide, cut in the shape of a wedge, is required, which is dipped down low enough to reach well into the water every time it is used. The hot water with the wax keeps the brush from cooling too quickly and getting clogged. A very thin layer of wax can be quickly laid on by this means. It is a good plan to coat all the inside of the section with wax at the same time which will make it easier for the bees to form their attachments when building comb. The inside of frames might with advantage be treated in the same way. After embedding the wires in the foundation in the frames they can also be covered with a thin coating of wax, if this work has been done with a spur embedder. If, however, an electric embedder is used, which does the best work, this will not be necessary.

A NEW ELECTRIC EMBEDDER.

A new type of electric embedder has been designed and has proved a great success. It is so simple that anyone can make it at a small cost. It does first class work expeditiously and more satisfactorily than if performed with a spur embedder. Only a little practice is necessary to get into the way of using it. The wires will then be firmly embedded and waxed over in the centre of the foundation greatly adding to its strength and rendering it less liable to stretch or break down from the weight of the bees while being built out into comb. The material required is two 22 inch lengths of single flexible electric lighting cord and two pieces of stout insulated wire, such as is used for outdoor wiring, about seven inches long, the latter being for holding in the hands. A small loop is made at one end of each of the two flexible wires, so that they can be attached to two dry cell batteries. The other is joined to one end of the stouter insulated wire, which has a loop made for this purpose. The other ends are stripped of the insulating material for about three quarters of an inch and are flattened with a hammer or filed to a chisel point. All is then ready for use after being attached to two dry cell batteries. The frame, already wired and filled with foundation, is laid on the board ordinarily used for the spur embedder. Commence at one end of each wire and hold the chisel points against it a few inches apart. As soon as the wire becomes heated and melts the wax sufficiently lift the point at one end, so as to break the circuit, pressing the wire into the middle of the foundation at the other, and holding it in this position until the melted wax has cooled, which is almost instantaneous. Then start off again. The length of wire that can be embedded at one operation depends on the strength of the current, and also on the tightness of the wires. The wires should be as tight as possible. If there is much embedding to be

done and electric lighting current is available this can be used instead of the dry-cell batteries. In this case, it will be necessary to make a rheostat, or transformer, so as to reduce the voltage. This can be arranged by passing the current through an ordinary electric flat-iron, but a better way is to pass it through water in a quart glass jar. An Economy or Mason jar answers well. Two coarse perpendicular wires, reaching from top to bottom, are fixed inside the jar so that they cannot touch each other. The connectionswith the embedder are made at the top of these wires. The jar is filled with water and a little salt is added, it may be as much as half a teaspoonful, which will bring the current up to the strength required to do the work. This current will be found more regular than from the dry-cell batteries which are gradually getting weaker all the time. The strength of the current should not be great enough to make the wires too hot and is regulated by the amount of salt which requires to be added a little at a time until it is found to be just right.

PREPARATION OF HONEY FOR MARKET.

Honey for the retail trade is usually put up in either upright screw-cap glass jars, holding 12 or 16 ounces net, or metal pails with levers lids, of four or five pounds capacity, net. Members of the Beekeepers' Association can obtain the Association registered honey labels, specially designed for use thereon. Cans holding 60lbs. are a handy size for storing honey and selling it in bulk. Sections are generally sold just as they are taken from the hives, after being scraped free from propolis and wax. It would be an improvement, however, if they were put up in cartons so as to protect them from dust and insects. Chunk honey, also called "bulk comb honey," is comb honey cut into strips and put into glass jars the space at the sides being filled with liquid extracted honey. The latter requires to be heated first of all to about 130 degrees (Fah.) and kept at that temperature for two or three hours so as to retard granulation as long as possible.

FEEDING AND FEEDERS.

Feeding, to some extend, is as a rule, necessary every year in the Kootenays. June being sometimes a wet month, the bees may be unable to obtain sufficient food from outside in which case they will require to be fed. Syrup feeding in early spring is often essential also, equal parts of sugar and water being given at these periods. If sufficient honey for winter, about 30lbs., is not left in the hives at the time of extracting, it will be necessary to feed syrup, two parts of sugar to one of water, to make up the deficiency. This feeding which should be as rapid as possible should be finished by the end of September, but if not then by the middle of October, at the latest, so that the bees are able to store and seal it over in the combs before the weather gets too cold. A good feeder can be made out of a four or five pound lever lid honey pail. About a dozen small holes, just about large enough to pass an ordinary pin through, are pierced in the lid. It is then filled with syrup and inverted over the feed-hole that has been cut in the centre of the quilt. A glass Mason jar with the lid perforated in the same way also makes an excellent feeder, only in this case a small wooden platform covered with screen wire has to be made so as to provide a bee-way under it. Dry sugar feeding with brown sugar answers well for supplying colonies in need in June and is good for stimulating nuclei. The dry sugar feeder is made by nailing a thin piece of board on each side of a

Langstroth frame, the greater part of the top bar being sawn out so that the sugar can be put in and the bees able to take it from the top. It is intended to hang at one side of the hive and has the advantage of not requiring attention for some time as it will contain five pounds of sugar. Candy is a make-shift and only used for feeding bees when the weather is too cold for them to be able to take syrup.

WINTERING.

Bees require to be packed for winter about the end of October, before the snow comes, and then left undisturbed until the following spring. Entrances may need looking to occasionally during the winter in case they should get clogged with dead bees which can be raked out with a bent wire. Bees in single-walled hives, if well provided with good food, will come safely through the winter, as a general rule, if several thicknesses of sacking are tied round outside and covered with tar paper to keep out the wet. A hive-body half filled with sacks makes a good porous top covering. If double-walled hives, or hive-cases, as previously described, are used, all that is then necessary is to add sufficient top covering, about six inches in depth, over the frames. It is a good plan to leave the queen excluder on all the winter. If it is reversed, it will provide a double bee-space and thus ensure a clear passage way over the combs. The bees require about thirty pounds of sealed stores to carry them through the winter. Any honey dew the bees may have stored should be removed from the hives, and kept for spring feeding, honey, or sugar syrup, being substituted. With porous coverings, winter entrances for strong colonies are best left about eight inches long by three-eighths of an inch deep, for weaker colonies this can be reduced to three or four inches. Non-porous coverings necessitate a larger entrance.

Experiments carried out with packed hives by the Bureau of Entomology, United States Department of Agriculture, have shown that much heat is lost from unprotected hive bottoms. It is stated that "failure to insulate the bottom of the hive largely offsets the value of insulation around the hive in the wintering of bees. Experiments conducted with a number of insulated hives showed that much heat was lost from the unprotected hive bottom. Beekeepers have repeatedly claimed that excessive insulation is even more detrimental in winter than insufficient insulation, because of the failure of the colony to warm up on bright days. To test this theory a colony was packed in the fall with sixteen inches of sawdust on all sides, top, and bottom. Temperature records were made at frequent intervals every day throughout the winter and spring. The colony remained in excellent condition in every respect throughout the winter, and after brood rearing began it built up with great rapidity. Then, to continue observations on the effect of insulation, on the building up of the colony, the packing was allowed to remain all summer. Except for the impossibility of manipulating the colony, it remained in excellent condition. It seems clear, therefore, that beekeepers need not fear detrimental results from abundant insulation at any season of the year."

BEE DISEASES.

There has not been much trouble with disease in this section of British Columbia. Occasional outbreaks of American Foul-brood have occurred from time to time. It has not always been possible to trace the source of infection but it most frequently originates from hives that have been brought in from infected areas. No doubt, it is sometimes started by

containers that have been used for imported honey being thrown out where bees have had access to them. There have been a good many cases of Sac-brood, and American Foul-brood and Sac-brood have occasionally both been found present in hives at the same time.

After long spells of wet weather there have been several instances of the so-called "disappearing disease," indicated by numbers of bees crawling from the hives and congregating on the ground, or clustering on the stems of grass, or other vegetation, having lost the power of flight. This is thought by some to be identical with the Isle of Wight disease, now so prevalent in England, but only occurring on this continent in a milder form. It has always subsided and disappeared here after a change to sunny and dry weather conditions without treatment.

Owing to a serious outbreak of European Foul-brood on the Lower Mainland an Order-in-Council has recently been made prohibiting the movement of bees, within the province, without a Certificate of Inspection showing that the apiary from which they came has been inspected by a Government Inspector within a period of thirty days, prior to such movement, and found to be free from disease.

USEFUL HINTS.

Syrup for Spring Feeding.—White granulated sugar dissolved in hot water, equal parts of each. Give syrup to the bees warm, and in the evening, so as to prevent robbing from being started.

Syrup for Winter Food.—Two parts of white granulated sugar to one part of water, by volume, and boiled for about fifteen minutes. Add one ounce of cream of tartar for each forty pounds of sugar, before boiling point is reached. The latter helps to invert the sugar and retard granulation. Keep well stirred until sugar is dissolved. Burnt sugar is injurious to bees. Give syrup warm, and in the evening, and use plenty of warm coverings round feeder to conserve the heat.

Candy.—To ten pounds white granulated sugar add one and a half pints of hot water, half an ounce of salt, half a teaspoonful cream of tartar Put whole in a stewpan over a brisk fire and keep well stirred until sugar is dissolved. When it comes to the boil draw pan back so that it simmers gently for ten minutes. As the scum rises skim it off. Then place stewpan in a larger vessel containing cold water. As soon as it has cooled sufficiently so that the finger may be kept in without scalding keep stirring until it becomes of the consistency of thick cream, and pour out into deep pans or dishes lined with stout paper. If of the right consistency it should be smooth in the grain and soft enough to be easily scraped with the finger nail when cold.

Safe Queen Introduction.—Queens can invariably be safely introduced by means of the large wire-cloth cage made to enclose a Langstroth frame A frame of sealed hatching brood from which the bees have been shaken off is put into the cage, and then the queen. The cage is put in the centre of the brood nest in the hive and allowed to remain for several days, until a good number of young bees have hatched, when the frame can be taken out and replaced in the hive.

Supersedure Cells. — Queen cells built on the face of the comb are usually an indication of supersedure of the queen.

When to add Supers.—When the bees extend to the outside combs in the brood chamber add another story of built out combs, or full sheets of foundation. When they are found working on the outside combs in this add another story, and so on.

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