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Beekeeping in Oregon

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INTRODUCTION

Beekeeping is a specialized branch of agriculture requiring careful study and attention to detail. In order to succeed financially the beekeeper must be well acquainted with the fundamental behavior of bees and the various manipulations necessary about an apiary. This information must be gained by a study of the best literature on the subject, supplemented by personal experience in managing bees for honey production. The occupation is thus rather for the occasional man with special qualifications than for the average farmer. As a pastime, however, for persons fairly adapted to the work it offers good possibilities. This Bulletin is prepared for beginners in beekeeping and especially for the farmer or orchardist who desires a few stands of bees for pollenizing purposes and for obtaining sufficient honey for home use, rather than for the man of experience in commercial honey production.

Beekeeping in Oregon. There are probably few sections of Oregon where a few stands of bees cannot be successfully maintained, so as to produce average season a surplus of honey. Since each locality has its own peculiarities and problems as to climatic factors and honey plants, it is advisable for one contemplating commercial beekeeping to study the locality well and adapt to the conditions such manipulation as the occasion warrants for obtaining the maximum yields of surplus honey. Broadly speaking the state divides itself into four beekeeping districts, each with its own peculiar problems and plants, as follows:

Irrigation Districts of Eastern Oregon
Humid Mountain District
Willamette Valley District
Southwestern Oregon District

The irrigated districts of Eastern Oregon include our largest commercial apiaries. The Umatilla and Malheur irrigation projects are the leading commercial honey-producing sections of the state. Alfalfa and sweet clover are the principal nectar-producing plants. Many native plants, however, are of secondary importance and frequently produce some surplus.

The Humid Mountain district includes areas of both the Coast Range and the Cascades where there is sufficient moisture to produce a growth of fireweed (*Epilobium angustifolium* L.) in burned-over sections. Where this plant is abundant and there is sufficient soil moisture, crops of high-grade honey are the rule. Other important plants of this region are maple and cascara.

The Willamette Valley is becoming more and more important as a commercial honey-producing section, but owing to the undependable weather conditions during the time the better honey plants are in bloom, and owing also to the abundance of European foulbrood, this section has been slow to develop. Some of the best honey plants, however, are to be found in the Valley, including alsike and white clover, and vetch. There

are many plants of secondary importance, which frequently produce considerable surplus—for example, maple, cascara, and French pink.

Southern Oregon has fewer large commercial apiaries. Climatic conditions are good. The honey plants are alfalfa, sweet clover, white clover, and vetch.

GETTING A START

Methods of starting. There are a number of ways by which the amateur may get a start with bees. These are listed in the order of their relative practicability, the most feasible first and the least advisable at the end.

1. Purchase pure-bred Italian bees in a modern hive from a reliable beekeeper.
2. Have a neighbor beekeeper hive a swarm for you.
3. Anchor decoy hives and capture stray swarms.
4. Buy bees in an old box hive and transfer to a modern hive.
5. Hive bees from a bee tree.
6. Buy a nucleus from a reliable dealer.
7. Purchase bees by the pound with a queen.

The first method is the advisable one in the majority of cases. Spring is the best time to buy, as errors made during the honey flow need not result so seriously as later. After one has mastered the more simple manipulations, additions to the apiary may be made by some of the other methods more cheaply than by direct purchase of the first-class hive and colony. It is to the pure-bred standard, however, that we should endeavor finally to bring all the colonies in the apiary. Pure-bred bees are more docile to handle, more resistant to disease and to wax moths, than hybrids. By purchasing from a bee man it is generally possible to obtain his advice and assistance in the beginning steps and manipulations, which, though seemingly complicated, are easily mastered.

Methods 2 and 3 are simple. Usually the swarm obtained is composed of hybrid or black bees. They may prove difficult to handle and must be requeened (see page 21).

Method 4 is a very common method of getting a start. Transferring (see page 17) is not a pleasant task for even the experienced beekeeper and may prove a discouraging experience for the beginner. Requeening is likewise necessary when a hive is obtained by transferring. Method 5 has the same disadvantage as Method 4 and to a larger degree.

Methods 6 and 7 are frequently employed by experienced beekeepers for rapid increase. A fair knowledge of bees and their care is essential to success by these methods.

Races of bees. There are a number of strains or varieties of the honey-bee. The two most common forms in the West are the black or German bees and the Italian. Various crosses of the two occur, known as hybrids, these generally being less desirable than either of the pure strains.

The Italian bees have many points in their favor and are the general choice of American beekeepers. They are not easily excited, do not swarm excessively, keep their hives clean of wax moths, are resistant to

disease, and are excellent honey gatherers. There are several strains, as three-banded, the leather-colored, and the golden Italian. Any of these, if from good stock, will be found satisfactory. The Caucasian and Carniolan races have promising qualities but are not well enough known to be generally recommended.

CHOOSING THE LOCALITY

When attempting to decide upon a location for an apiary, there are two points especially important to consider: the honey plants and the site for the apiary.

Honey plants. For a number of reasons it has been impossible to make a careful survey of the honey plants of Oregon; however, as opportunity presents itself, information is being collected on the relative values of different honey plants, their distribution, and the conditions under which each secretes nectar.

Beekeepers in the locality can be of invaluable assistance in pointing out the heavy nectar-producing plants. Wild bees are usually present in sufficient numbers so that a careful survey of the flora of a district will reveal the plants on which the bees are working. A note-book should be carried and seasonal notes on honey plants jotted down. The more common, valuable honey plants of Oregon with their approximate time of blooming are listed below. These do not occur in all sections, of course, and many of value are undoubtedly not included.

Plant	*Date of flow*	*Region where found*
Alfalfa	Late June, July, August	Irrigation districts of Eastern and Southern Oregon
Sweet Clover	Late June, July, August	Irrigation districts of Eastern and Southern Oregon
Fireweed	Late June, July, August	Humid Mountain sections
White and Alsike Clover	June	Willamette Valley Lower Columbia Coastal plain.
Oregon and Vine Maple	April and early May	West of Cascades.
Vetch	May	Mostly in Willamette Valley
Fruit Bloom	Late April and early May	Willamette Valley Eastern Oregon Columbia Valley
Dandelion	April and early May	In most sections
Snowberry	June, July, August	Mostly in Western Oregon
French Pink	June, July	Willamette Valley
Locust	Late May and June	Irrigation districts
Willow	Late February, March, April	Mostly in Western Oregon
Wild Buckwheat	Late August, early September	Eastern Oregon
Cascara	May	Western Oregon
Rabbit Brush	August, September	Eastern Oregon

Owing to our very limited knowledge of the honey flora of many sections of the state the foregoing list is very incomplete. Additional information can be supplied by beekeepers of the state and it would be greatly appreciated.

The site. There are a number of points to consider when selecting a site for the apiary. Some of the more important factors to consider are listed, leaving it to the individual to make adjustments to his particular conditions.

1. Good drainage and fresh water for the bees to drink.
2. Protection from the prevailing cold winds. Bees eat more stores where cold wind strikes the hives. Windbreaks on north and west are especially desirable. Do not have hive face prevailing wind.
3. Plenty of sunlight in early morning and late afternoon. Avoid the west side of a building.
4. Where hives are to be on sloping ground arrange so as to carry heavy supers of surplus honey down hill, empty frames up hill.
5. If apiary is among hills, locate in valley, since bees will then fly up hill for netcar and down when laden.
6. Avoid locating apiary near tall trees. They invite swarms, and from them recovery of the bees is difficult.
7. Bees adjacent to highway or to watering troughs for stock may frenzy animals and prove a nuisance. Where necessary to locate near street, build fence high enough to compel bees to rise above passers-by when starting out.
8. Bees within one-half mile of a large river or lake are often lost during a heavy honey flow. Returning laden with honey, they become tired and drop into the water.

Placing the hives. The hives should not rest directly on the ground. Pieces of two-by-six lumber, bricks, or special stands may be used for supporting the hives. A stand six inches high is generally the best. A sloping board should be placed from the ground to the entrance. This permits laden bees to drop near the hives and ascend by means of the board to the entrance. The hives should be perfectly level from side to side but should slant slightly toward the opening. It is desirable to place the hives so that it will be unnecessary to pass directly in front of them while working in the yard.

TOOLS AND EQUIPMENT

For beginning in beekeeping, let simplicity be the guide in selecting tools. A hive tool, a smoker, a bee veil, a modern hive with supers, and a good book on beekeeping are the essentials. As the business develops one may consult any bee-supply catalogue, and from the wide range of apparatus obtain such equipment as is advisable. The usual mistake is to buy too many useless pieces of apparatus.

Frames. Even, straight combs made up of worker cells expedite rapid manipulations and increase the value and productiveness of the colony. To obtain this type of comb it is necessary to use full sheets of foundation in the frames. For the brood chamber and full-depth supers use full sheets of medium brood foundation, supported in the frames by cross wires. For shallow supers use thin super foundation, which usual-

ly is not wired. Several extra hives and supers with the frames fitted with foundation should be kept on hand.

Hives. The common Langstroth hive is the one that should be used by the beginner on account of its simplicity, both in construction and handling. Hives made to hold ten frames are to be recommended. While such hives can be made at home with less cost (not counting labor) than they can be bought, the factory hives are as a rule advisable for

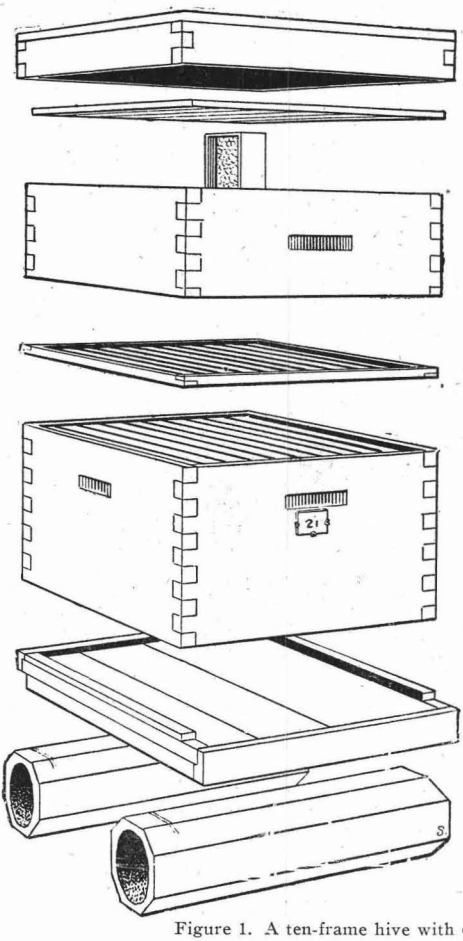


Figure 1. A ten-frame hive with comb-honey super.

the beginner. All hives and frames should be uniform and interchangeable and without complicated parts. Hives should be painted, not only to prevent weathering and decaying on the outside but also to protect the bees during hot weather. White paint is to be preferred.

A double cover is very much to be preferred to any other type. The beginner might prefer to adopt the shallow extracting super or full

depth super in preference to the pound section super, for the reason that the bees will work more readily in this type of super than they will in the comb honey section and as a result there will be less trouble with swarming. Some form of entrance should be devised which will permit the regulation of the size of the entrance to the strength of the colony. During the winter this entrance should be protected by a wire mesh which will keep out mice but will allow the bees to go back and forth. (Figure 10.)

Smoker. The type of smoker illustrated (Figure 4) is the one to be recommended. It is made in various sizes, and where one is needed for a considerable length of time the larger size gives better satisfaction, since it does not have to be supplied with fuel as often as the smaller

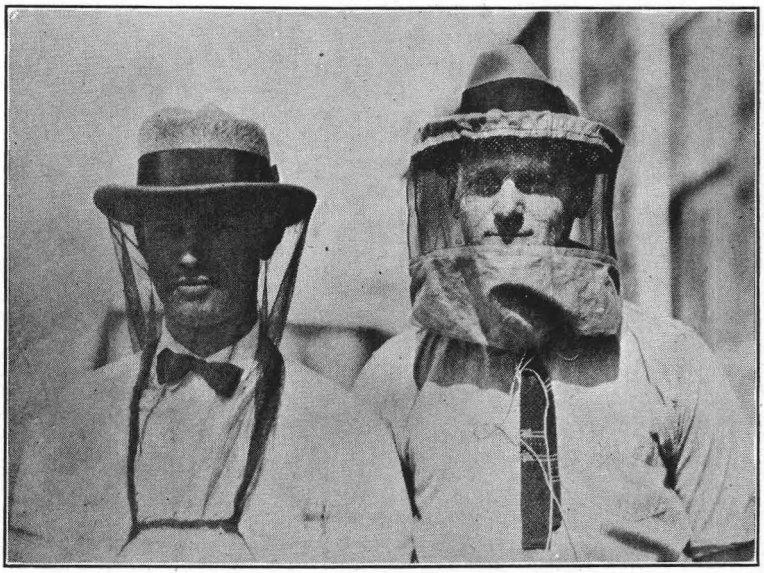


Figure 2. Home-made veils. The one to the left made from black net is satisfactory for limited use only. The one to the right is made from black wire screen and is more satisfactory for continued use. Some prefer to sew the screen to the rim of an old straw hat.

size. Dry planer shavings, ground-up corn-cobs, burlap, oiled rags, and dry rotted wood all make good fuel for the smoker.

Bee veils. The bee veils on the market are satisfactory, but since the cost of material and trouble in making are slight the home-made veil is most commonly used. A piece of black netting in the shape of a sack but open at both ends does well. The hem at each end should be supplied with elastic to hold the veil tight about the hat band and about the shoulders. When a veil is in almost daily use it is advisable to make it out of more substantial material, and for that reason the black wire netting is to be preferred. A convenient method is to sew the wire cloth to the band of a straw hat and in turn sew a piece of heavy netting or cloth on the lower edge of the screen which is so made that it fits closely around the shoulders. The two principal requirements for a

good bee veil are that it be absolutely bee tight and that it be comfortable. That portion through which the worker looks must be made of black material.

Hive tools. On account of the fact that bees fasten down the hive covers with propolis, or bee glue, which they also spread all over the inside of the frames, it is necessary to have a small tool for prying the hive cover loose. There are several kinds on the market, or a blacksmith can make one from a bit of scrap iron. A screw-driver is a very poor substitute.

Queen excluder. Queen excluders (Figure 1) are so made that they contain perforations through which worker bees may pass, but the queens, on account of their larger size, cannot. When used they are

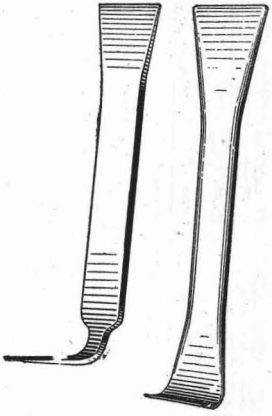


Figure 3. Hive Tools.

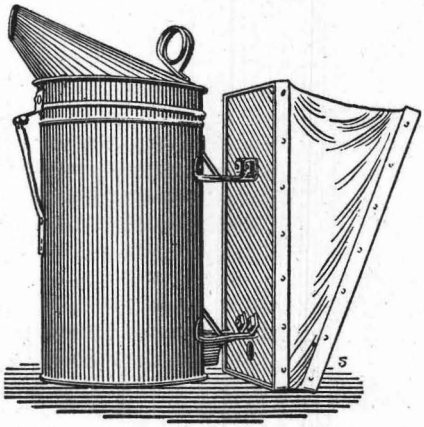


Figure 4. The most satisfactory smoker. (*From Farmers' Bulletin 447, U. S. Department of Agriculture*)

placed between the body of the hive and the supers to keep the queen from ascending and laying eggs in the extracting frames or comb honey sections. The wood-and-wire type of excluder is preferable.

A catalogue of bee supplies and equipment will be furnished by any of the supply dealers.

MANIPULATION OF HIVES AND BEES

Always approach a hive from the side, and never stand in front of it while handling frames. Many experienced beekeepers, and some amateurs, can work with bees, needing neither veil nor smoker, but the amateur had best have his veil on and the smoker going well before attempting to open the hive. Black clothing of all kinds should be avoided. If netting is used as a veil, straw hats, on account of their color and stiffness, are desirable for headgear.

If the operator happens to be stung during any of the manipulations, he should not begin striking about, but quietly remove the sting by scraping it out with the edge of the hive tool or the finger nail. Trying

to pick it out with the thumb and finger will result in squeezing the poison sack and forcing of more poison into the wound.

Puff a few whiffs of smoke in at the entrance. This disturbance will drive the guards from the entrance, will cause the bees to begin filling up on honey, and to a great extent will prevent their flying out to attack the operator when the hive is opened. The next step is to insert the edge of the hive tool under the cover to pry it loose. As the cover is

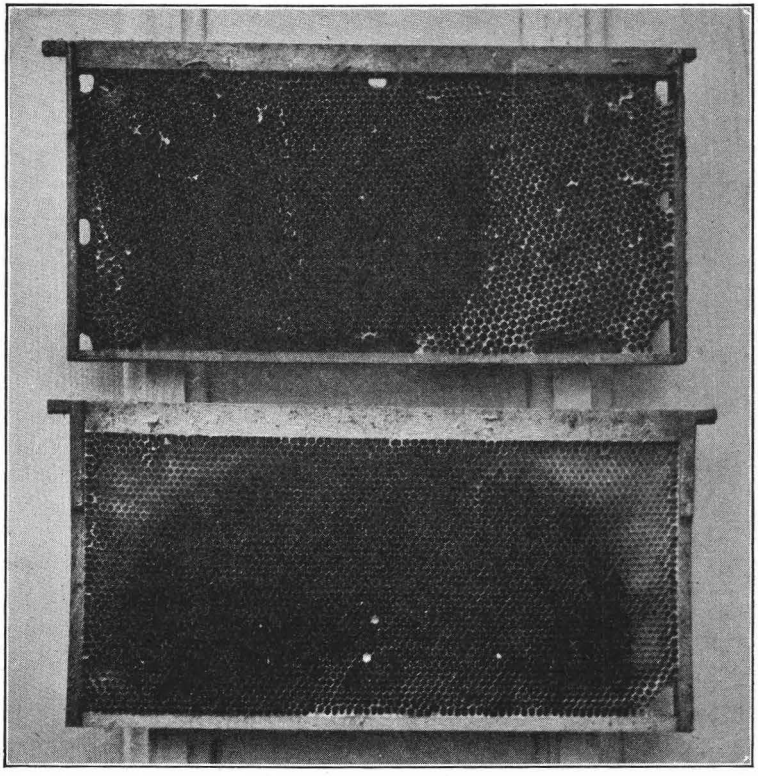


Figure 5. Good and Bad Comb.

raised, puff some more smoke under it but not down between the frames. After giving the bees a minute or two to get settled, frames should be loosened and taken out. They will usually be stuck together with propolis and may be hard to separate. Avoid breaking them apart with a jerk, for in so doing you may crush some of the bees, and possibly the queen. Quick motions of any kind should be avoided, and in handling the frames make each movement reasonably slow.

In lifting out the frames, remove one from near the outside first. Carefully avoid rolling the bees between the frames. This excites and angers them, and may injure the queen. If the comb is not wired in,

hold the frame vertical while examining it. The adhering bees may be shaken off in front of the hive.

It is seldom necessary to look for the queen herself in opening and manipulating a colony, but it is essential that every care should be taken that she is not injured. In order to avoid possible injury it is advisable in setting off supers so to place them that there will always be plenty of room between the bottom bars and any object on which the hive body rests. An inverted outer cover is a convenient place on which to place the supers temporarily.

When the frames which are being handled are unwired and are heavy with honey or brood, special care should be taken always to hold them so that there is no danger of the combs breaking out of the frame.

If it is desirable to set most of the frames outside the hive, an empty hive body may be used, which will also serve as a carrier if frames are being changed from one hive to another. If it is desired to get the bees from a frame, they may be brushed off, though most of them may be shaken off by a quick jerk.

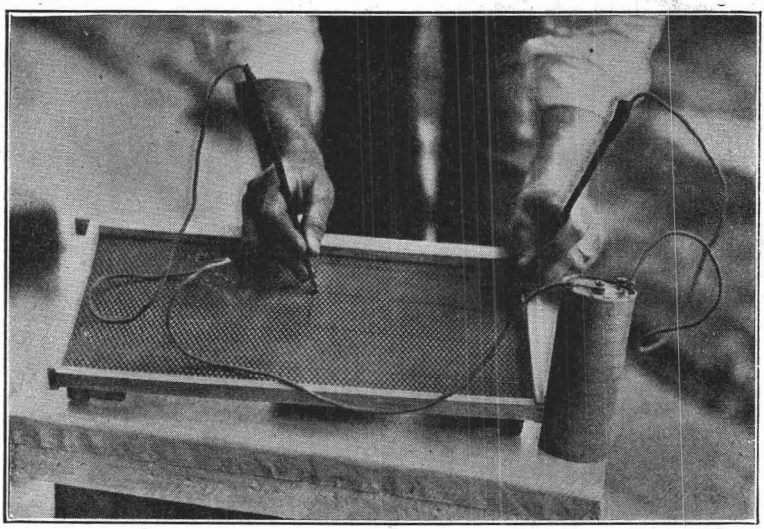


Figure 6. A simple form of electrical imbedder. A small transformer may be used and is more economical when electrical current is at hand.

It is not as hard as the inexperienced person might think to locate the queen and brood, though a little experience is necessary to do it easily. The beginner should have some more experienced person examine the frames of one or more hives and point out the queens, the brood, etc.

GENERAL MANAGEMENT

At all times avoid disturbing the bees unnecessarily. The beginner has a tendency to open the hives too frequently. An experienced bee man learns to judge largely from external appearances when conditions warrant an examination. Choose a bright day when the bees are flying

freely. Approach the task with the feeling that you have sufficient leisure to perform the required manipulations without haste. Avoid excessive use of smoke, quick motions, and unnecessary jolts or jars.

The discussion of general management is divided for convenience into seasons, with approximate dates for certain duties; these are largely suggestions to be accommodated to the seasonal variation and different localities.

SPRING

The normal colony of bees should come out of winter with approximately 15,000 young workers. In order to secure the maximum honey crop it is essential that this number be increased to 100,000 workers at

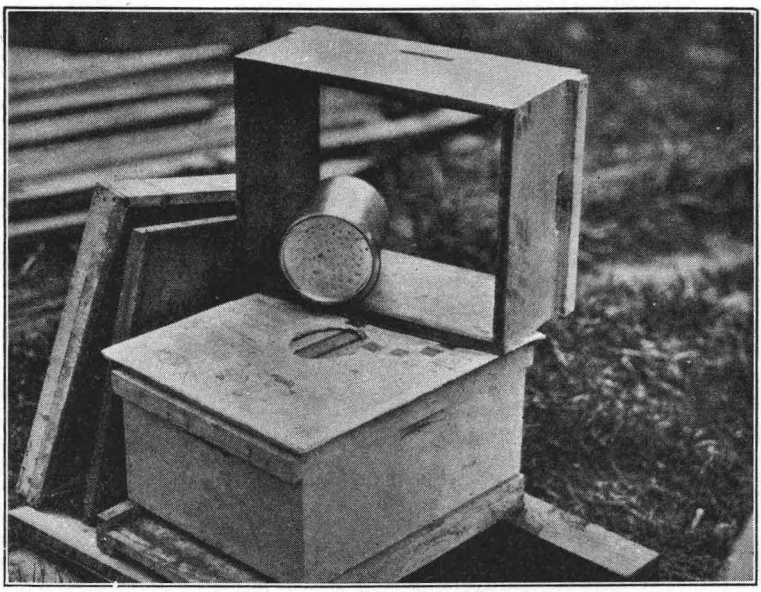


Figure 7. A simple economical feeder. More efficient than more expensive feeders on the market. Any clean friction-top bucket may be used. The newspaper prevents the loss of heat from the colony below, while the empty hive and bee-tight cover protect against robber bees.

the beginning of the main honey flow. A first examination should be made about the first of March, on some day when the bees are flying well. The three most important concerns on the first examination are: (1) to see that there is a laying queen by noting the presence of normal brood, (2) to see that there are sufficient stores in the hives to last until a good honey flow will start, and (3) to see that there are sufficient bees in each colony to keep up the colony heat, do field work, and care for the brood.

Queenless colonies should be united with queenright colonies. Colonies short on stores should be provided with sugar sirup or honey known to be free from disease. Weak colonies should be united with strong colonies. Extreme care should be exercised during these early

spring manipulations in order to avoid chilling of brood by exposing it to cold air. A second examination may be made in another two or three weeks and throughout the remainder of the spring as occasion demands, which usually is about every ten days or two weeks. Never open up a colony of bees for examination, however, unless you are positive you have a definite object in view. Then complete the manipulation as soon as possible.

In order that the colony may build up normally during the spring it is essential that the following conditions be present: (1) there should be a good, reasonably young queen at the head of every colony; (2) there should be sufficient stores—not less than twenty pounds; (3) there should be sufficient good worker comb for the queen to expand her brood nest, but not an excessive amount of room for the bees to keep warm; (4) there should be a sufficient force of workers; (5) there should be no disease present.

The normal colony of bees probably uses 200 pounds of honey, if not more, from the time brood rearing starts in early spring until the beginning of the main honey flow. In view of this need of the colony and the further fact that whenever the amount of available stores in the hive decreases to close to fifteen pounds the queen tends to stop her laying, it becomes essential that the colony be provided with ample stores. The most satisfactory method is to reserve at least a shallow extracting super of honey as a food chamber above each colony, using this, so far as possible, as a reserve food supply throughout the year. Where one finds it necessary to feed sugar sirup, nothing but the best sugar should be used. This may be made into a sirup by dissolving two parts of sugar (by volume) in one part of water and one teaspoonful of tartaric acid to every twenty pounds of sugar. Extreme care should be exercised that this material is not scorched in the least and that all crystals are dissolved. To do this add the tartaric acid to the water while it is heating. When the water comes to a boil remove it from the heat and stir in the sugar. The most practical feeder is the ordinary friction-top honey bucket as illustrated (see Figure 7). When feeding for stores from fifty to one hundred holes should be punched in the cover with the use of a lath nail. Over the top bar of the hive which is to be fed, place several thicknesses of newspaper, in the center of which is torn an opening slightly smaller than the bucket which is to be used as a feeder. These papers prevent the loss of heat from the colony below. The bucket should then be turned bottom up over this opening in the newspaper. A hive body with the frames removed may be placed over the bucket and over this a bee-tight cover. Aside from a super of honey, which is always superior when available, this is the most economical and practical bee feeder devised.

Stimulative feeding. Stimulative feeding is not generally to be recommended for the beginner in beekeeping. It should not be practiced earlier than four weeks before the beginning of a surplus honey flow. It may be practiced during late August and early September, to stimulate for fall brood rearing. For stimulative feeding the same method of feeding may be used as when feeding for stores, with the exception that the sirup may be made much thinner (one part of sugar to five parts of water) and there should be only one to three small holes in the cover of the feeding bucket, to permit of only slow feeding.

Weak colonies. In early spring and late fall very weak colonies should not be tolerated. They should be united with strong colonies. Never unite weak colonies with other weak colonies except in the summer time. The most practical method is to remove the cover from the strongest colony, place over the top bars one sheet of newspaper with one or two small holes punched in it, and over this place the weak colony. In this way the bees unite very gradually with practically no fighting. Other methods may be used by more experienced beekeepers, but this is to be recommended for the beginners. When the two colonies to be united are not set close to each other it would be advisable to move the weaker colony about a foot a day until it is close to the stronger colony with which it is to be united. When it is desirable to unite two colonies each of which has a queen it is important that the poorer queen be removed. If it happens that the better queen is with the weaker colony and the colony is exceptionally weak, it would be advisable to place her in an introducing cage for three or four days, preferably in a cage in which she can liberate herself by eating through a layer of candy. It is well not to open the hive for some five or six days at least.

Both swarm control and disease control are quite largely confined to the spring months but will be treated more fully on another page.

SUMMER

During late spring and early summer the beekeeper is primarily concerned in keeping his colonies from developing the swarming instinct so that they will devote their entire energy to brood rearing and honey gathering. It is essential that every colony, in order to gather its maximum amount of surplus honey, reach its greatest strength at the beginning of, or shortly preceding, the main honey flow, rather than during or too soon before the main honey flow.

When the supers are put on it is desirable to have the bees go to work in them immediately. In extracted-honey production the second story of the brood nest may be raised and the first super placed between the two stories of the brood nest. When a second extracting super is put on it may be placed between the first story and the first super. The queen should always be placed in the lower hive body.

When comb honey supers are put on it is advisable that the colony be crowded into a one-story hive. For a more detailed description of the handling of supers in comb-honey production the reader is referred to Farmers' Bulletin 1029.

In many sections of the state the white honey flow, whether it be from alfalfa, fireweed, or clover, is followed by a darker, inferior flow. It is advisable to remove the surplus of the high grade honey before the poorer grade of honey starts coming in. It is important, however, to avoid taking honey off before it is sufficiently ripened. Honey that can readily be shaken from the comb is entirely too green to be extracted.

FALL

The main object of proper fall management is to get every colony of bees in ideal condition for successful wintering. The young bees which are reared from the middle of August to the last of September are the ones which will survive the winter and will constitute the main working

colony during the early spring months. Every attention should therefore be given towards making it possible for the colonies to build themselves up under most favorable conditions during the time mentioned. If the beekeeper will make it a point to see that every colony is headed by a reasonably young queen from good stock, and is supplied with sufficient stores, and sufficient brood rearing room, the colony will take care of itself. The practice of stimulative feeding during this period, however, is used successfully by some.

WINTER

If possible the bees should be so prepared for winter that they will not need any attention from late October until the first of March. There are three conditions necessary for successful wintering: first, a large

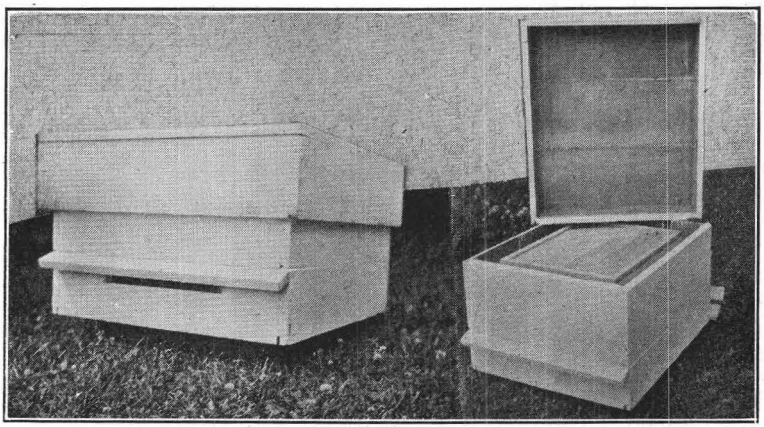


Figure 8. A one-colony packing case for winter. This should be so constructed that the shavings will be kept dry throughout the entire winter and spring. An opening is provided in the front so the bees may have a flight when the weather permits.

supply (15,000 young workers in addition to old workers) of bees in every colony; second, an abundant supply of winter stores—not less than forty or fifty pounds of honey, and preferably more; third, sufficient winter protection for the particular locality.

The first of these three conditions is automatically provided for by the bees if the beekeeper makes it a point to see that favorable conditions are provided for the colony to build up for the winter, as mentioned above, in fall management.

In order to be sure that every colony has sufficient stores, careful check should be made during October to see whether there are any indications of shortage of stores. If there is a shortage, feed a thick sirup as described under spring management. Enough feed should be provided to make up for the shortage in stores. Many beekeepers practice with considerable success feeding ten pounds of sugar sirup indiscriminately to all colonies whether they apparently need it or not at the end of the brood-rearing season in October. The same method of feeding may also be used as is described under spring management.

Figure 9. A good substitute for a winter packing-case made from tarred building paper, with a packing of shavings underneath. Since the paper must be supplied new each season this method is no more economical than a good packing-case and is less convenient and efficient.

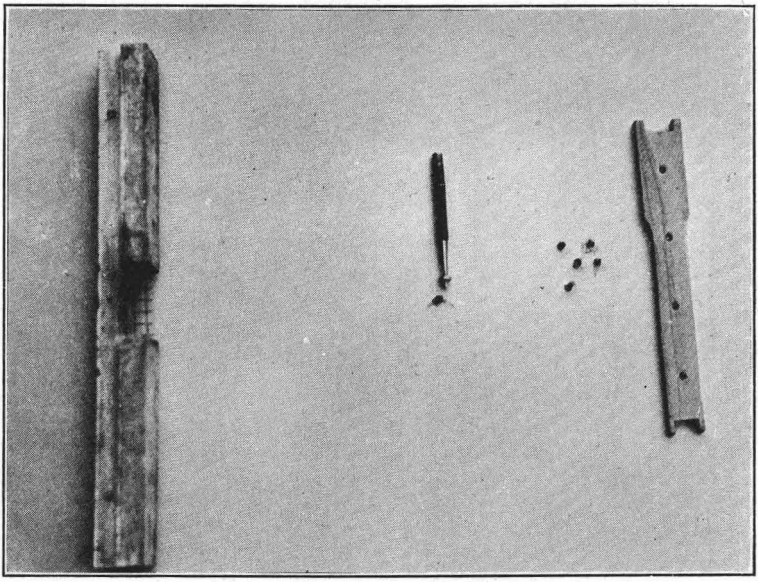


Figure 10. To the right is shown how eyelets may be conveniently inserted in frames to prevent the wire cutting into the wood. A common nail-set with a small nut on the end is used to drive in the eyelet. To the left is shown a mouse-proof entrance guard which is important for protection against mice during the fall and winter.

Bees do not hibernate during the winter. When the temperature within the hive drops to 57 degrees Fahrenheit, the bees form a cluster. If the temperature about the cluster continues to drop below 57 degrees, the bees start generating heat by activity in the center of the cluster to counteract the outside temperature. As a result of these activities, the colder it is outside the cluster, the warmer it is in the cluster. If the temperature outside of the cluster is sufficiently low the temperature within the cluster may rise to the point where brood rearing will start abnormally, and when it once starts it is continued throughout the winter. When bees are compelled to counteract low outside temperature they consume an unnecessary amount of stores, produce an excess of moisture, and lower their vitality. For this reason it is apparent that some outside protection is desirable in any section of the country where the winter temperature is frequently below 57 degrees.

The one type of winter packing-case which seems to meet with the most favor is the single-colony packing-case such as is illustrated (see p. 15). In the western part of the state it is especially desirable that these packing-cases be made water-tight. Any type of packing-case, however, which provides at least two inches of packing material on the bottom, three or four inches of packing material on the sides, and three to six inches of packing material above the bee colony, and at the same time is water-proof, should prove practical. A thicker layer of packing material would be advisable for Eastern Oregon. It is also very desirable that the bees be so located that their hive openings are not turned towards the prevailing winds, and so far as possible the entire apiary should be protected by some windbreak. The winter protection should be left on as late as possible during the spring, in order to give the bees added warmth for spring brood rearing.

TRANSFERRING

Transferring bees from old boxes, barrels, and like makeshifts to modern, movable, frame hives is absolutely necessary for efficient honey production. Prepare the modern hive, with each frame containing full sheets of foundation; or better, replace two or three frames with old, dark but clean drawn-out combs. All transferring should be done at the beginning of or during a good spring honey flow.

Method One. When a number of colonies in box hives are to be transferred and the problem of labor is a factor, some form of the indirect method of transferring is preferable. Briefly this method is as follows: Turn the box hive bottom up and remove the bottom. This is done because ordinarily the comb is not fastened to the bottom but is fastened to the sides and top, making it easier to remove the bottom. Prepare the new hive by placing in it some old, dark worker comb, known to be free from disease (the queen always prefers to lay in dark comb). Place the new hive on top of the old box in such a way that there will be direct communication between the old box hive and the new hive, with no outside opening except at the front for the field bees to enter. Now with two sticks, pound or drum on the sides of the old box hive until the bees start migrating up into the new hive. Continue this drumming until most of the bees seem to be in the new hive. Then

place a queen excluder between the two hives. In two or three days examine the new hive and see if the queen is laying in the combs provided. If she is, leave the old hive below for three weeks from the time the drumming was done, which will allow all of the young bees below to emerge, after which the old box may be removed and the wax and honey rendered out, or destroyed. If the queen did not go above on the first drumming, repeat the process.

Method Two. There are a number of variations in the practice of the direct method of transfer. In our manipulation the following has been found a satisfactory plan. Where only a few colonies are to be transferred and one is anxious to get the bees at work in their new home, this is by far the most rapid method of transfer.

Prepare the new hive as before and carry to the site of the box hive. Remove the box hive to one side and place the new hive on the old hive stand. Arrange an alighting board, and connecting with this and extending out some little way, lay a canvas on which to shake the bees. Invert the old box hive, remove the bottom, and over this place a small box approximating the dimensions of the bottom of the hive. Pry off the top (which is now below) sufficiently to allow smoke to be puffed in from below. With sticks pound or drum on the sides of the hive, giving an occasional puff of smoke from below. Continue this drumming for some time. The bees will desert the box hive and cluster in the box above. When most of them have clustered above, the bees may be dumped on the sheet in front of the new hive. The queen will usually be observed as the bees enter the hive, but in case she has not left the old combs more smoke and drumming will induce her to do so. It is necessary that the queen be in the new hive or accounted for before this manipulation is finished. The old box hive may now be placed below the new hive, with a queen excluder between, where it should remain for twenty-one days. It should then be removed and the wax and honey saved. During transferring is an excellent time to introduce a new queen, as in their disorganized state the bees are more likely to accept her.

Note: Neither of the foregoing methods should be used when American foulbrood is present.

SWARM CONTROL

Swarming may be termed a response of the bee colony to the instinct of reproduction. The colony is the unit of the organization and the casting of a swarm is their natural method of increase. As the heavier honey flow comes on in the spring, with its stimulus to increased brood rearing, there is a natural tendency toward swarming. The preparation for swarming may start as early as the first week in April. Careful observations indicate that the maximum production of honey is obtained where swarming is prevented and the colonies remain intact. When one desires increased colonies rather than maximum production, division is necessary; but even then natural swarming should be prevented as far as possible. The natural swarms may be lost; to hive them is a task, with danger of losing the queen, and must often be done at an inopportune time.

Without doubt the control of swarming is one of the bigger problems which the beginning beekeeper is forced to face. At best he can hardly expect to eliminate more than 90 to 95 percent of the swarming except under very favorable conditions. If he will observe the following rules, however, he will be able very largely to solve this problem and proportionately increase his prospects for a honey crop.

First, see that all colonies are headed by reasonably young queens, as colonies headed by old queens have a tendency to supersede their queens during late spring, and many times swarm during the process of supersedure.

Second, by using only good worker comb in the brood nest, eliminate so far as possible all drones from colonies run primarily for honey production. The presence of an oversupply of drones encourages swarming.

Third, see that all colonies of normal strength are provided with an opening large enough to permit of ventilation but not larger than they are able to protect. See that all colonies are protected from the direct rays of the sun during the hottest part of the day in the hottest part of the year. They should, however, have the morning and late afternoon sun. Ordinarily white paint on the outside of the hive and a double telescope cover provide sufficient protection from the sun in Oregon.

Fourth. By far the most important factor in preventing the desire to swarm is to keep the brood nest from becoming overcrowded, thereby keeping the young emerging bees busy with hive duties and allowing the queen ample room to increase her brood nests, and at the same time allowing sufficient empty comb for the surplus of honey that the bees may bring in. As a general rule it is not the strongest colonies which start preparations to swarm but the colonies which are most crowded in the brood nests. On the other hand, in an effort to discourage swarming, one should avoid giving too much room to weak colonies in early spring.

If the bees are examined every ten days or two weeks for evidences of preparation for swarming and young queen cells destroyed and other conditions leading to the preparation for swarming removed, many of the colonies will be easily induced to give up all preparation for swarming. Others will be more persistent in their efforts. They should be treated as indicated below.

Artificial swarming. Where bees persist in their desire to swarm, or where preparations in the hive, such as capped queen cells, have gone so far that prevention seems doubtful, artificial swarming may be resorted to. Where moderate increase is not undesirable this practice satisfies the instinct of the bees and is possible at a convenient time. Artificial swarming is accomplished in the following manner.

Remove from its stand the colony to be divided, and put in its place a hive containing drawn comb or frames of foundation. Remove the center frame from the new hive and exchange it for a frame of brood from the old hive, taking care to see that all queen cells are removed. Find the queen and place her on the frame of brood in the new hive. Remove all queen cells in the old hive. Place a queen excluder on top of the new hive containing the queen and the empty frames and then place the old hive above this.

After about five days examine the old hive above carefully for queen cells. Destroy all cells which are started, unless increase is desired, in

which case the hive may be removed to a new location. When the division is used for increase, all cells should be destroyed and a cell from a good breeding queen or a young queen may be introduced. If original queen is of high quality one or two of the best cells may be left.

Hiving a swarm. When a swarm is cast in the apiary there is great excitement for a time on the part of both bees and beekeeper. The individual bees usually rise, dip, whirl and twist, eventually clustering on some projecting object. Here they will remain for an indefinite time, but usually for at least several hours.

The beekeeper should have a fully equipped empty hive with frames of drawn comb or full sheets of foundation ready for this emergency. The parent hive from which the swarm emerged should be moved to one side, the new hive set on the parent hive stand, and an entrance board provided. The smoker should be started for use in case of need. If the swarm alights on a small unimportant limb of a tree the limb and all may be removed and carried to the hive, where a few of the bees are shaken directly at the entrance, while most of the cluster is shaken off the limb about a foot back from the entrance. When the object on which the cluster alights cannot be removed the main mass of the bees can be brushed or shaken into a basket to be carried to the new hive. Normally, the mass of bees will start moving toward the entrance of the hive and ordinarily the beekeeper will have no trouble in getting them into the hive. The addition of a frame with healthy brood from another colony will practically insure that the bees will remain. It is also well to see that the hive is shaded during the first few hours that the swarm occupies it. If the swarm does not cluster too far from the apiary, the new hive may be placed on the permanent location before the swarm is hived. If the swarm is hived at some other location it is very important that the newly hived swarm be moved to its permanent location as soon as all the bees are in, or at least not later than early the following morning, before the bees have an opportunity to take new observation flights.

INCREASE

An all too common mistake made by beginning beekeepers is to endeavor to increase their number of colonies too fast. A good rule to follow is to work primarily for honey production and secondarily for increase, making the profits from the bees cover the expense necessary in buying equipment for the increase. If a person cannot manage a dozen colonies successfully for surplus production there is no reason to expect that he can manage twice that many. Conditions will arise, however, when the beekeeper will find it advisable to make a certain amount of increase. He may do this by the methods already referred to, such as buying combless packages, nuclei, or entire colonies, but he can do it most profitably by dividing his present colonies at the proper time during the year. The most advisable time to make this division for increase will depend upon the time of the main honey flow. When the main honey flow comes during June, as is true in the clover sections in the Willamette Valley, increase can well be made in late June or early July, following the main honey flow. When the main honey flow comes during July and August a division of the strongest colonies during early spring would be advisable. This division should be made about the time

that maple is in bloom, or fruit bloom is on. The colonies should not be weakened to the point where they will not be able to build up to maximum strength by the time the main honey flow starts. When division is made in early spring it is important to introduce a laying queen into the division. When increase is made during the early summer time, a queen cell from a selected breeder may be used.

REQUEENING

Good queens are absolutely essential to satisfactory, profitable beekeeping. Italian queens are advised for all beginners. Because all the colony is the progeny of the queen, her disposition and qualities and those of the drone with which she mates are reflected in the workers. Hybrid or black bees are often excitable, do not keep their hives clean, and do not hold foulbrood in check. Where inferior strains or irritable bees occur, therefore, requeening is the practical solution of the problem. The qualities to seek are gentleness, prolificness, vigor in the offspring, and resistance to disease. Prolificness or ability in egg laying is largely a matter of breeding, but is influenced also by the age of the queen. Two years is the average length of highest productivity of a queen and one should plan to requeen systematically every other year at least. Many queens may with profit be replaced at the end of one year. By clipping off a portion of one wing at the time of introducing a queen and clipping the other wing the following year one can keep track of the age of each queen and the correct time to supersede her. Introduction of a new queen should be made if possible during a good honey flow. At the time of transferring, a queen may be opportunely introduced.

Buying a queen. To begin with, a beekeeper will find it advisable to buy most of his queens from reliable breeders. Guaranteed, untested queens are to be recommended in preference to tested queens, except where a high-grade queen is being purchased for breeding purposes, as mentioned below.

The mailing-cage method. Queens ordered by mail come in small wire cages. Remove the pasteboard from in front, exposing the wire, and from the end, exposing the candy. There should be at least a half inch of candy; otherwise the queen is apt to leave the cage too soon. Open the hive and slip the cage down between two frames near the middle of the hive, turning so as to expose the wire, and pressing the frames together to hold the cage in place. It is also well to have the candy end higher than the opposite end to prevent dead bees clogging the opening. Do not disturb for at least five days. The bees eat in through the candy and release the queen, this usually requiring sufficient time to allow her to assume the hive odor, after which she will be accepted by the bees.

Smoking method. This is a very simple and generally successful method. Smoke the hive rather excessively, blowing in a few puffs of smoke at intervals for a few minutes; pound lightly on the side of the hive and otherwise demoralize the bees. Open the shipping cage, remove the queen, clip her wing, and run her in at the entrance. Do not disturb for five days. This method is not generally recommended for the beginner in beekeeping.

REARING YOUR OWN QUEENS

One of the most essential factors in securing a crop of honey is to have every colony headed by a good queen. This is doubly important in sections where European foulbrood is prevalent. It is also quite generally recognized that many queens shipped through the mail never fully recover from the long journey. For these reasons it is advisable that small as well as large beekeepers learn to produce the majority of their queens, and rear them from their best stock. To many this may seem an impossible task, but it should not be. One or two hours' time and a little thought and attention to a few details are all that is necessary by the following method. Moreover, better queens can be produced by no other method.

The first thing is to select your breeding queen. This will usually be the one in your strongest colony, if her bees are reasonably gentle and her colony is free from European foulbrood. It is also advisable that her bees be uniformly colored. If you do not have a queen from which you feel it would be desirable to breed you had better buy a tested Italian queen from some reliable breeder and ship her in a nucleus—not in the ordinary queen mailing cage.

When the time comes that you should normally be expecting swarming, go to the colony where your breeding queen is and insert a frame of new worker comb in the center of the brood nest. At the end of two days examine the comb for eggs. If the comb contains a patch of eggs equal to your two hands in size, it is ready for use. If there are only a few eggs leave it one more day but no longer. Now, go to a strong colony which you wish to requeen and remove the queen and all the brood. This is generally spoken of as the "cell-building colony." Leave this colony without brood or queen over night and then go to your breeding queen, take out the frame of fresh eggs mentioned above, and place it in this queenless colony, which should now be in good condition to start and care for queen cells.

In ten days go to your cell-building colony and examine to determine how many large, well-formed cells have been built by the bees. Next, proceed to make as many colonies queenless as you have good cells and allow them to remain queenless for about twenty-four hours. For the first time it might be well to kill a few less queens than you have cells as you are apt to have an accident with one or two cells in transferring them to the colony.

After your colonies have been queenless for about twenty-four hours, go to your queen-rearing colony and remove one of the cells by cutting around it with a sharp knife, removing a piece of comb as large as a silver dollar surrounding the cell. Extreme care should be exercised that the cell is not injured. Avoid tipping it to one side, jarring, jamming it, or exposing it to direct sunlight or cold air for very long. Now cut an incision in a frame of comb at the top of the brood nest in one of the queenless colonies, to fit the bit of comb to which the queen cell is attached, and insert your piece of comb with the cell on it. Follow this method until all cells are placed in queenless colonies.

At the end of about four days, examine the cells. If they have been opened at the lower end, the probabilities are that your young queen has

successfully emerged and in another week or ten days should be laying. If the cell has been opened at the side, it means that the young queen was killed and the bees have proceeded to rear one from their own brood. In such case another effort should be made to requeen this colony.

LOCATING THE QUEEN

Before introducing a new queen into a colony it is always necessary first to find and remove the old one. This may be done as follows: Start in with one of the outside frames. When a frame is removed the exposed surface of the next frame should be glanced over before taking the time to look over the frame which the beekeeper has in hand, since the queen has the tendency to pass rapidly to the darker part of the

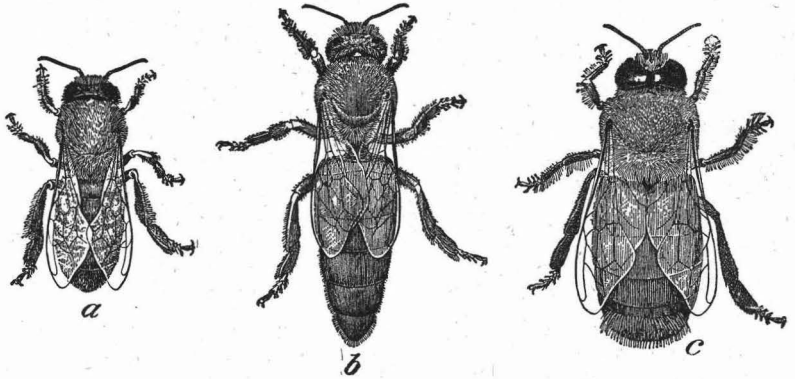


Figure 11. The Honey-bee. *a*, Worker. *b*, Queen. *c*, Drone. (Twice natural size.)

hive. If she is not seen upon the exposed surface of the next frame the frame in hand should be examined rather carefully. After each frame is examined it should be placed in another empty hive body. Proceed in this manner until the queen is found or until each frame has been examined. If the examination of all frames does not reveal the queen, then examine the bees which are scattered about on the inside of the hive body. If she is not found there, it is then advisable to arrange to strain all the bees through a queen excluder. This may be done by emptying or brushing all bees from the inside of the empty hive into the hive body containing the frames and bees, and replacing the empty hive body on the stand, with the queen excluder over the top. Each frame may then be taken and the bees either shaken or brushed from the frame on to the queen excluder. One or two of the frames of brood might well be placed below the queen excluder after the bees have been removed from them, in order to attract the workers down. Each frame is in turn shaken or brushed above the queen excluder until the queen is seen walking about on top of the queen excluder endeavoring to pass down with the workers.

THE BEE FAMILY

An apiary consists of any number of colonies of bees. A colony, during the summer months, consists of a queen, two or three thousand drones, and from ten to a hundred thousand or more workers. After the

close of the honey flow the drones are driven from the hives and allowed to perish. This they soon do, since they cannot gather nectar for themselves. During the winter months the older worker bees die, and each colony is usually greatly reduced in numbers in the spring.

The life of a queen bee is from one to six years. Her sole mission in life is to lay eggs in the cells provided by the workers. As soon as she begins to decline the bees rear a new queen to supersede her, and in such cases it is not uncommon to find a mother and daughter queen in the hive at the same time. As soon as the young queen matures and is able to supply a plentiful number of eggs, the old queen crawls away and dies, or is disposed of by the workers.

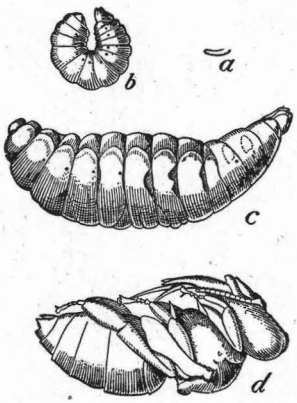


Figure 12 The Honey-bee, *a*, Egg. *b*, Young Larva. *c*, Old Larva. *d*, Pupa. (*Three times natural size.*)

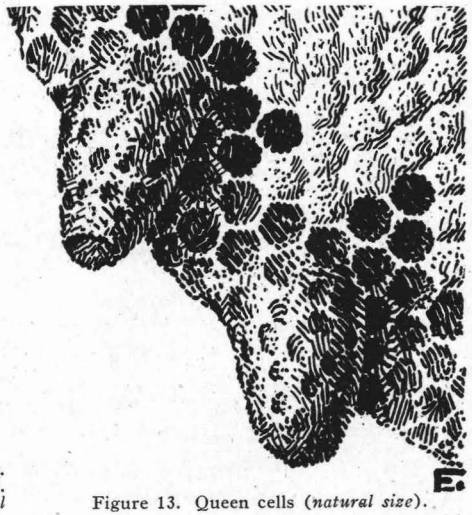


Figure 13. Queen cells (*natural size*).

The workers are undeveloped females. They attend to the gathering of pollen, nectar, propolis, water, etc., and to the general care of the hive. During the working season the workers are said to live about six weeks; during the inactive season they live from fall until the following spring.

The drones are developed from early spring until the end of the honey flow, and may be found present in the hives during that period. The queen is capable of laying both unfertilized and fertilized eggs. The unfertilized eggs always produce drones, while the fertilized eggs produce workers or queens, depending upon the food the larvae receive.

Two kinds and three different sizes of cells occur in every colony of bees. First, there are the hexagonal cells for the drones and workers. Both are the same shape, but those of the drones are larger. Then there are the large peanut-like cells of the queens, which are built on the edges of the main combs and hang downward. As the queen crawls about over the combs laying eggs, she apparently lays them in rings of cells, filling a certain area before going on. Eggs in worker cells are fertilized, while those in drone cells are unfertilized.

Brood rearing in Oregon generally begins in February, increasing in extent as the season advances, and reaching its maximum during or before the height of the honey flow. The queen bee places a single egg in each cell, laying, it is said, from 1,500 to 2,000 or more eggs each day during the honey flow. Regardless of whether they are to form drones, workers, or queens, each egg requires three days to hatch. The larva of the worker then spends six days in the larval stage and twelve days in the resting or pupal stage (the period when the cell is capped over). The total number of days required for the complete development is twenty-one.

The queen requires three, five and one-half, and seven and one-half days, respectively, for corresponding stages, and matures in sixteen days. The drone requires three, six and one-half, and fourteen and one-half days for the three stages and a total of twenty-four days for complete development. The table shows the number of days spent in the different stages by queen, worker, and drone.

	EGGS	LARVA	PUPA	ADULT STAGE REACHED
	Days	*Days*	*Days*	*Days*
Queen	3	5½	7½	16
Worker	3	6	12	21
Drone	3	6½	14½	24

For the first three days after the eggs hatch, all larvae are fed a somewhat similar rich food, a substance which is thought to come from glands in the head of the worker bee. The larvae which are to become queens are fed royal jelly the remaining two and one-half days of the larval stage. The worker and drone larvae are changed to a diet which is a mixture of pollen and honey, after three days, and it is asserted

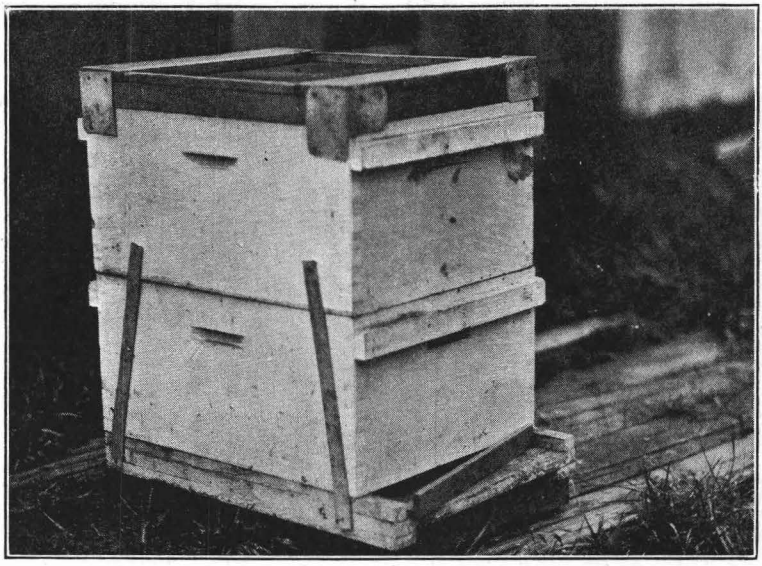


Figure 14. A two-story colony prepared for moving. Note the screen for upward ventilation and clustering. Metal straps are used to hold the hive bodies and bottom board in place. Strong metal corners hold the moving screen in place.

that this difference in feeding governs the development of larvae from fertilized eggs, workers or queens being developed at the will of the worker bees.

MOVING BEES

The two most essential factors to keep in mind when moving bees from one location to another are: first, to make provision that the bees will not go back to their previous location or be lost; second, to make provision against the over-heating of the colony by providing sufficient ventilation. When bees are moved a distance of less than two miles the problem of getting them to relocate is a most important one. This may be accomplished either by moving the bees a foot or two each day where the distance is very short, or by placing a good supply of green grass over the entrance of the hive after they have been placed in their new location. When this is done the bees on endeavoring to escape by the entrance will find their way blocked and will be forced to work their way through this mass of green grass. They will then take new observation flights before flying out to the field, and a relatively small percentage of them will go back to the old location. The green grass will gradually dry up, and it is then less of an obstruction at the entrance, and can in time be removed by the beekeeper.

In the preparation of bees to be moved some distance as intimated above, the important thing is to provide sufficient ventilation so that the colony will not smother. Necessary disturbance due to the process of moving causes an excess production of heat, and if ventilation is not provided the combs will melt and the bees will practically all be smothered or drowned in honey. It is best to move the colony as a two- or even in some cases a three-story colony in order to provide sufficient room for clustering in a colony that is very strong. When it is necessary to move a strong colony in a one-story hive, it is advisable to have a screen over the entire bottom of the hive as well as over the entire top. In either case a space of at least two inches should be provided for clustering between the top bars and the top screen. Extreme care should be taken that the hive bodies are securely fastened together and that all possible openings are securely closed.

When bees are moved beyond two miles there is little danger of their going back to the former location, but a little grass thrown over the entrance will help to avoid loss of bees which fly out and become lost before they note the change in their location.

When bees are moved only a short distance and are to be confined for a relatively short time, say not to exceed an hour, a screen over the entrance allows all the ventilation needed. This is also true when moving very weak colonies in the summer time or moving normal colonies in very early spring or late fall, even though the distance and time are considerable. The usual danger, however, is to provide insufficient ventilation, and one might better provide too much than not enough.

ROBBING

Robbing, unless very extreme, can frequently be stopped by piling wet or green grass over the entrance of the hive that is being robbed. Never smoke the entrance of the colony where the robbers are entering. Smoking only confuses the guards and does not affect those that are

doing the robbing. The entrance should be reduced to the point where only one or two can pass in and out at the same time. If robbing becomes extremely bad it may be necessary to close the colony entirely or to remove it. If it is removed it is advisable to replace it temporarily with a hive containing only empty drawn comb. This will tend to avoid having the robbers start in on a neighboring colony.

HONEY PRODUCTION

The use of pound section supers is not generally advised for the beginner. Expert handling and favorable location are necessary for this type of honey production. It is generally recommended that the individual who is producing honey for his own use employ shallow ex-

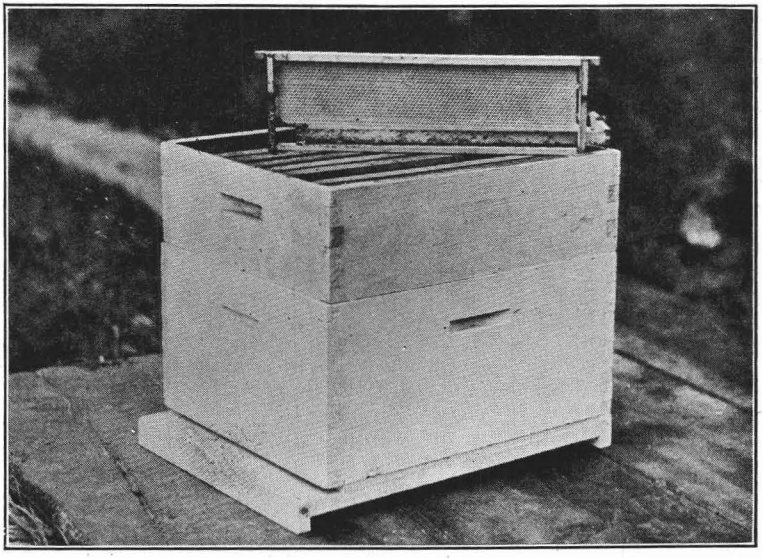


Figure 15. Shallow extracting super and frames. These are desirable when one or two colonies are kept for producing only the family supply of honey. Extracted, chunk, or comb honey may be produced at will in the same super. These frames are adapted to women beekeepers.

tracting supers and produce chunk honey. Portions of the comb may be cut out as needed.

As the apiary increases in size one should plan to produce extracted honey. If there is a dependable flow of good light honey which does not granulate in the comb one may find it profitable to produce some comb honey.

Where extraction is practiced, swarm control is simpler, larger production is generally obtained, and one will have the frames of drawn comb on hand to use again and again, which is a decided advantage.

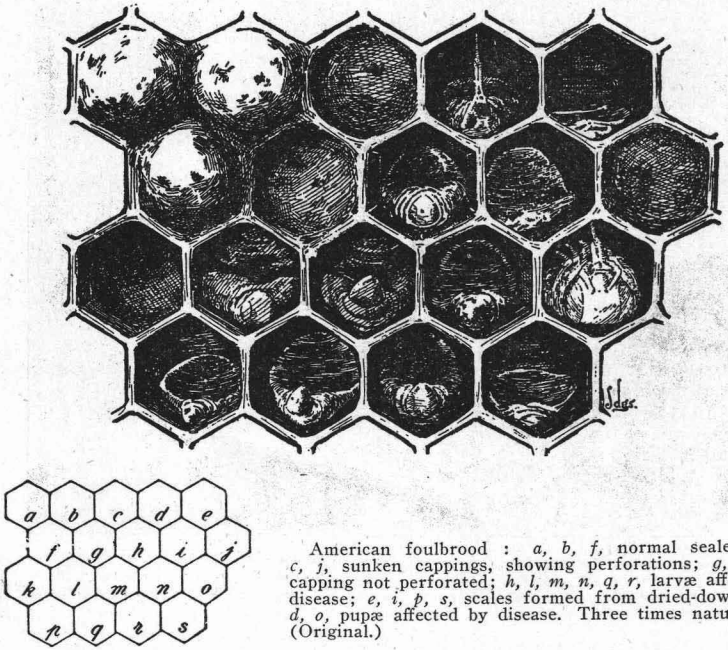
HONEY AS FOOD

Honey is a most delicious, wholesome, and nutritious food. It should cease to be regarded as a delicacy and become a staple article of

diet. It is more readily assimilated than sugar and can be substituted for sugar in cookery and on the table. Excellent recipes for its use may be obtained by writing to Oregon State Agricultural College, or sending to the United States Department of Agriculture for Farmers' Bulletin 653.

BEE ENEMIES AND DISEASES

Bee moth. Bee moths or wax moths sometimes attack a colony and can do a great deal of injury. They occur as elongate, smoky white worms tunneling about through the comb, leaving behind them a trail of web and excrement. Strong, healthy Italian colonies are seldom injured by moths. Only colonies weak in numbers are seriously affected by them. The weakened condition may be due to disease, queenlessness,



American foulbrood : *a, b, f,* normal sealed cells; *c, j,* sunken cappings, showing perforations; *g,* sunken capping not perforated; *h, l, m, n, q, r,* larvæ affected by disease; *e, i, p, s,* scales formed from dried-down larvæ *d, o,* pupæ affected by disease. Three times natural size. (Original.)

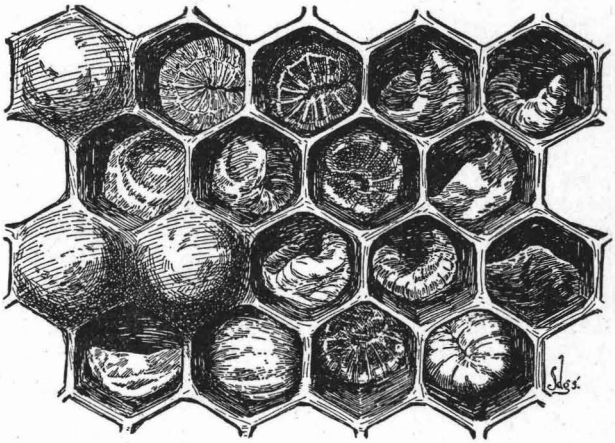
Figure 16. American foulbrood. This disease is found in a limited way in most sections of the state but is most serious in the large honey-producing sections of Eastern Oregon. (*From Farmers' Bulletin 442, U. S. Department of Agriculture.*)

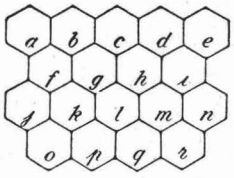
lack of stores, or some other cause. When the individual moths or larvae are not too numerous in the hives they may be removed by hand. If the colony is weak, however, and the moths are extremely numerous, the most satisfactory way is to shake the bees off the comb and fumigate the comb with carbon bisulfide, or burning sulfur. When the combs are badly eaten, they might better be melted up into wax and new sheets of foundation used in the frames.

If one is careful in avoiding any flame about the carbon bisulfide, this method is more satisfactory. Use one tablespoon to a standard hive

body. All cracks should be tightly closed and a piece of cloth may be laid over the top bars on which is poured the liquid carbon bisulfide. The liquid rapidly evaporates and penetrates all parts of the hive. This must be done when the temperature is above 70° F., and the hive should be closed for twenty-four hours. If the treatment has been successful all the worms should be dead by that time.

Bee diseases. There are two serious diseases found in Oregon. These are known as American foulbrood and European foulbrood. Each of these is due to a separate and distinct bacterium. The treatment recommended for one is not to be recommended for the other. The symptoms found, however, are rather confusing to the beginner and in many cases even to the man of experience. It is urgently recommended, therefore, that when anything appears abnormal about the brood, a liberal sample of the comb containing the discolored or abnormal





European foulbrood: *a, j, k,* normal sealed cells; *b, c, d, e, g, i, l, m, p, q,* larvæ affected by disease; *r,* normal larva at age attacked by disease; *f, h, n, o,* dried-down larvæ or scales. Three times natural size. (Original.)

Figure 17. European foulbrood. This disease is confined largely to the Willamette and Lower Columbia valleys. (*From Farmers' Bulletin 442, U. S. Department of Agriculture.*)

brood be sent in to the department for examination. It should be remembered that these diseases affect only brood or young bees in the comb, and never the old bees.

European foulbrood is apparently confined almost entirely to the Willamette and lower Columbia valleys, where it is very serious. It is

far more prevalent during the early spring months. By fall the colony with the disease has as a rule either died out completely or has overcome the disease. American foulbrood, on the other hand, is quite generally distributed all over the state, but is more serious in the large commercial honey-producing sections in Eastern Oregon. This disease is not so common during early spring, but gradually increases as the spring and summer advance, reaching its maximum seriousness during late summer and fall.

Every individual beekeeper with even a single colony of bees should realize the importance of continual watching throughout the entire working season for the first appearance of either one of these diseases. The present loss from these diseases in Oregon probably runs close to $50,000 a year, if not more. Practically this entire loss could be eliminated if every beekeeper realized the importance of eternal vigilance in this connection. Both diseases are spread largely either by colonies robbing out those weak from the disease or by the careless exposure of honey about the apiary or shop. European foulbrood spreads more rapidly than American owing to the drifting of nurse bees. This is due to the fact that in the case of European foulbrood, the young bees die during the feeding stage.

MARKETING THE HONEY

The following suggestions will be of value when the beekeeper comes to market his honey crop.

1. Grade your honey and price it according to grade.
2. Put your honey on the market in attractive containers.
3. Use an attractive label giving instructions how to liquefy when granulated.
4. Give net weight on each container and section. This is required by state law.
5. Develop a local market.
6. When selling through retail stores allow a reasonable profit for the retailer and do not cut his retail price.
7. Advertise in every way possible. A large percentage of customers never buy honey simply because they never think of it.
8. Display your honey at local, county, and state fairs. Hand out samples, recipe books, etc.
9. Write for the market reports on honey sent out by the Bureau of Markets, Washington, D. C. They are free for the asking.
10. Study the market reports in the Bee Journals.
11. Remember that honey will keep and it is often advisable to hold the crop over a few months until the market is stronger.

ORGANIZATION

The Oregon State Beekeepers Association is doing much to assist the beekeepers of the state in solving such problems as Disease Control, Marketing, and Legislation, as well as many other minor problems which can be solved only by cooperation. Numerous local associations are affiliated with the State Association. The State Association is affiliated with the American Honey Producers League.

INSPECTION

Several counties have taken advantage of the state law and have appointed bee inspectors. The names and addresses of bee inspectors will be furnished on request by the Extension Service, Oregon State Agricultural College.

REFERENCES

Bulletins. The following bulletins can, as a rule, be supplied by the Extension Service, Oregon State Agricultural College, Corvallis, Oregon. They are free for the asking. The Federal bulletins may be obtained also by writing the Secretary of Agriculture, Washington, D. C.

Farmers' Bulletin 447, Bees.
Farmers' Bulletin 653, Honey and its Uses in the Home.
Farmers' Bulletin 961, Transferring Bees to Modern Hives.
Farmers' Bulletin 1039, Commercial Comb Honey Production.
Farmers' Bulletin 1198, Swarm Control.
Farmers' Bulletin 1215, Beekeeping in the Clover Region.

Books.

"Beekeeping" by E. F. Phillips, The Macmillan Co., New York.
"A. B. C. and X. Y. Z. of Bee Culture" by A. I. Root & Co., Medina ,Ohio.
"Langstroth on the Honey Bee" by C. P. Dadant, The American Bee Journal, Hamilton, Illinois.
"Queen Rearing Simplified" by Jay Smith, A. I. Root Co., Medina, Ohio.
"Practical Queen Rearing," by F. C. Pellett, The American Bee Journal, Hamilton, Illinois.
"American Honey Plants" by F. C. Pellett, The American Bee Journal, Hamilton, Illinois.
"Honey Plants of North America" by John H. Lovell, A. I. Root Co., Medina, Ohio.
"Outapiaries" by M. G. Dadant, The American Bee Journal, Hamilton, Illinois.
"Starting Right With Bees" by A. I. Root & Co., Medina, Ohio.
"Anatomy and Physiology of the Honeybee" by R. E. Snodgrass, McGrew-Hill Book Co., New York.

Journals.

"The American Bee Journal," Hamilton, Illinois.
"Gleanings in Bee Culture," Medina, Ohio.
"Bees and Honey," Alhambra, California.
"Western Honey Bee," Los Angeles, California.
"The Beekeepers Review," Lansing, Michigan.
"The Bee World," Port Hill House, Benson, Oxon, England.
"The Beekeepers Item," New Braunfels, Texas.

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