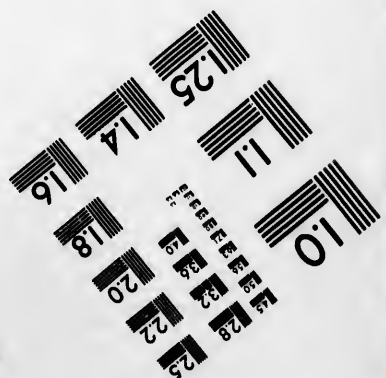
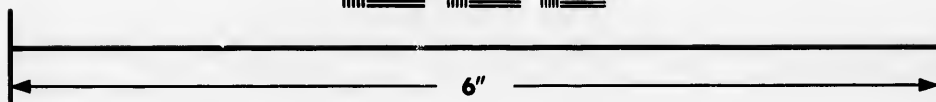
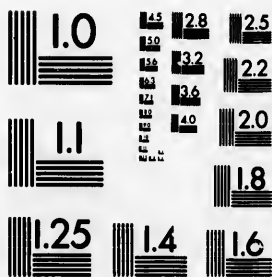


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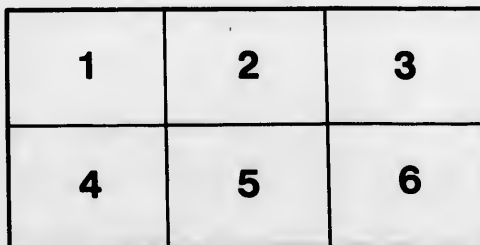
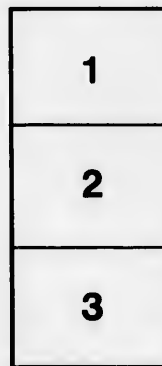
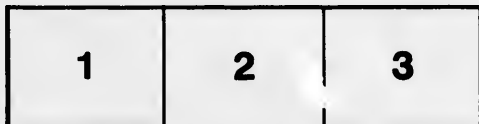
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THE
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Practical Reference Book,

GIVING MINUTE DIRECTIONS

ON THE

CULTURE OF THE HONEY BEE,

Both in Common and Moveable Comb Hives, and illustrating
a system of Artificial Swarming, by which good
Swarms can be made two weeks in ad-
vance of Natural Swarming.

CONTAINING ALSO

*The result of more than twenty years' extensive practical ex-
perience in Bee Culture in the climate of Canada.*

BY

S. H. MITCHELL, ST. MARYS, ONT.

STRATFORD :

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PREFACE.

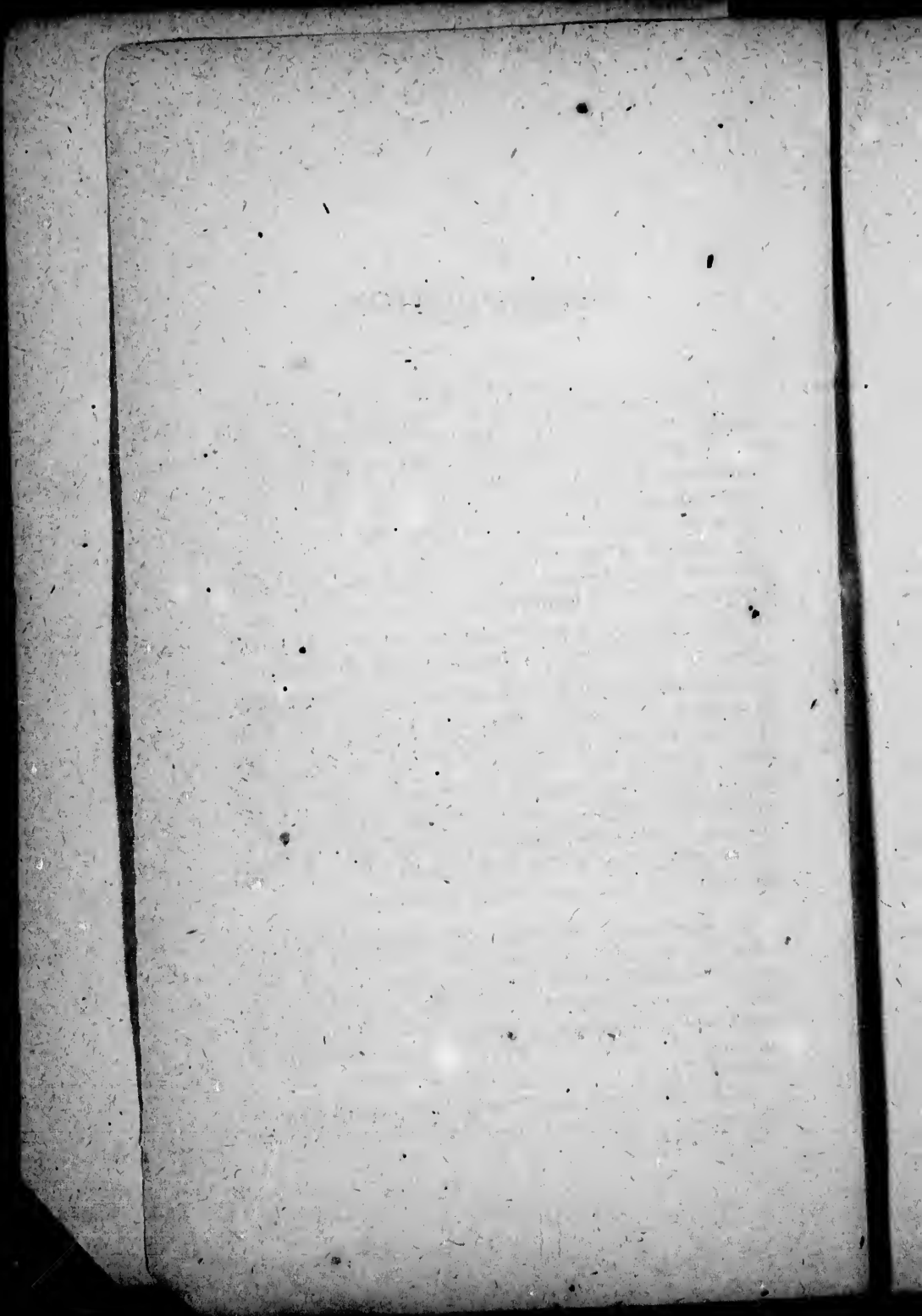
During twenty years' practical experience in bee-keeping in the climate of Canada, I have from year to year, when meeting with the bee-keeping public, been continually pressed with questions relating to the successful cultivation of the honey bee. These questions I have always deemed it a pleasure to answer, either with the pen or verbally, as fully as my time and ability would permit, always believing that my light is none the less for lighting that of my neighbors.

The object, therefore, of publishing this work, is to answer in a practical and condensed form all necessary questions relative to the management of the honey bee. In writing this work it has been my object to express, in as few words as possible, the results of my own practical experience, as well as that of other eminent apiarians, rather than relate the process by which those results were reached; and I have not departed from this rule, except in some instances where my experience differs from that of other apiarians that have written before me.

As there are still many who are determined to plod along in the paths of their ancestors, and keep bees in the common box hive, I have given directions in this work for the box hive, as well as for moveable comb hives, hoping that such bee keepers will, after perusing the work, be enabled to see the great advantage to be derived from the moveable comb system.

S. A. MITCHELL.

ST. MARYS, ONT.



INTRODUCTION.

There is but little doubt that the honey bee has been more or less associated with man from the earliest dawn of creation. The observing and thinking mind has in all ages been deeply interested in the honey bee and its workmanship. The study of the honey bee is well calculated to awaken in the mind of every true lover of nature not only a deep interest, but a lasting admiration of its wonderful instincts. The indomitable energy and perseverance of honey bees in collecting stores for the future should put to shame the lazy, slothful loafers who are everywhere to be found trying to live without labor on the industry of others.

Bees are sometimes kept for pleasure or recreation, but chiefly for profit. They are the only live stock that can truly be said to be self-supporting. They not only gather their food in summer, but lay up their store for winter, and with but little care will yield a bountiful supply of delicious sweets for their owners. If bees required strict attention every day to sustain life, they would undoubtedly be better cared for than they now are by most bee-keepers.

No good farmer complains of the trouble and expense of caring for cattle, pigs, and sheep two or three times a day. Less than half this time given to studying the nature and wants of the honey bee, and putting the same into practice, would seldom fail to give abundant success.

Although a great many works have been written on bee-culture, still there is no branch of rural industry

so much neglected. The amount of ignorance that exists in relation to the nature and management of the honey bee is truly astonishing.

I have been gravely told by an old bee-keeper who had kept bees for ten years, that the drones were the mothers of the whole family.

Another confidently asserted that there was a king and a queen in every hive. There is also a vague belief among a great many that good luck has all to do with successful bee management. Others that I have met with say that it is unlucky to sell a swarm of bees, and that they would sooner have a swarm of bees stolen from them than to sell one. Is there any wonder that such individuals do not have success? They are depending upon luck and chance, instead of knowledge and care.

According to ancient history, honey was at one time the only sweet known. Over two thousand years ago, in Aristotle and Pliny's time, we learn that bees were cultivated to some extent. And even so far back as when the children of Israel were about to enter into the land of promise, it was spoken of as a land flowing with milk and honey. But bees were then in a wild and rude state.

Within the past few years the progress and advancement in bee culture has been very rapid, and more has been accomplished than for centuries previous. By the introduction of valuable works on bee-culture, and the system of moveable comb-hives, it has now become a branch of business that any one may easily learn and readily understand.

THE
BEE-KEEPER'S CATECHISM.

Question 1. What constitutes a good swarm of bees?

Answer. Every prosperous swarm or colony of bees has a fertile queen, some thousands of workers, and during the warm season several hundred drones.

Ques. 2. Give a description of the queen.

Ans. The queen differs in shape from the drones or the workers. She is larger than the workers, but not so large as the drones, and is longer than either; her abdomen tapers gradually to a point; her wings being considerably shorter than her body; the upper side of the native queen is nearly the same color as the other bees, but the under side is of a bright copper color. The Italian queens are mostly of a rich golden yellow, though both the natives and the Italians vary considerably in their color. In her movements she is quick and shy, especially when disturbed. She possesses a curved sting, but may be handled with impunity, as she will not sting except when she comes in contact with another queen. If two queens are taken and placed under a glass tumbler, a battle immediately ensues, and is kept up until one or the

other is slain. And yet it is a singular fact that the great and wise Creator has so ordered it that it is impossible for both to be stung at the same instant.

Ques. 3. What benefit is the queen to the colony ?

Ans. The queen is the mother of the whole colony. Every egg is deposited by her. This fact is easily proven by removing the native queen from a stock of black bees and introducing an Italian mother in her place. If the change is made in June, in three months scarcely a black bee will be found in the colony. The queen will sometimes lay eggs every month in the year in strong stocks, but will lay the most in May and June. At this season she will frequently lay two or three thousand per day.

Ques. 4. How long will a queen live ?

Ans. Probably the average age of the queen is not more than three years. I have known instances where queens attained the age of five years, but they are seldom very prolific after the first three years of their life. The bodily strength of the queen is greater than that of either the workers or the drones. She is also more tenacious of life. It takes more pressure to kill her, and even when crushed, her body frequently will show signs of life for hours.

Ques. 5. When the queen dies or is taken away, what is the result ?

Ans. The worker bees miss her. In an hour or two afterwards they become alarmed. Usually they set up a loud buzzing. They run up at the sides of the hive and all over the stand. They will fly away a short distance and back again. They run to each other, and strike their antennæ together. If there is a young worker brood or there are eggs in the cells at

the time, order will be restored in three or four hours, and the worker bees immediately commence the labor necessary to repair their loss, always selecting such brood as will produce a queen in the shortest possible time. If there is no brood or eggs, the excitement will be seen at intervals, generally mornings and evenings, for one, two, and sometimes three days. After this they resume their usual labor, bringing in both pollen and honey. The number of bees decreases rapidly, and as the bees die off, other stocks rob away the honey. The moth or miller takes advantage of the opportunity to deposit hundreds of her eggs in the combs. They hatch and devour the combs, and are blamed for the destruction of the colony, when the true cause was the loss of the queen.

Ques. 6. Give a description of the drone.

Ans. The drones are the male bees, and are larger than either the queen or the workers. Their wings are long enough to cover the whole abdomen. Their movements are clumsy and awkward. Their hum when on the wing is loud and heavy. They are physically incapable of working, their proboscis being too short to extract honey from the flowers. They have no cavities on their legs for carrying pollen, and they are also destitute of a sting, so that they cannot assist in protecting the stores of the hive. They are called the lazy drones, but are more to be pitied than blamed.

Ques. 7. Of what use are the drones?

Ans. It is said by some that they assist in keeping up the necessary animal heat of the hive. But they are of little use for this purpose, as they are not bred till the weather is warm and the colony is strong in numbers. They are bred only at the approach of the

swarming season, expressly to fertilize the young queens. Without drones, the young queens would remain barren, and consequently the race would soon become extinct. The number of drones in a colony is often large. This is necessary where there is but one or two hives kept. As the young queen has to be impregnated high in the air, there is less danger when drones are plenty of her being caught by birds or lost by accident. Where a large number of hives are kept, the drones of one hive in twenty are amply sufficient.

Ques. 8. How long will a drone live?

Ans. The life of the drone is but short at most. Whenever honey becomes scarce, the workers immediately commence to sting them to death, and in a short time they are all massacred. If the supply of honey fails suddenly, they frequently tear the brood from the cells in all stages of development, from the egg to the full size drone, and drag them out to perish.

Ques. 9. Give a description of the worker bees.

Ans. The worker bees are the smallest of the family, but although the smallest, still they are the most industrious; in short, on them devolve all the labor of the hive. They have a sack for carrying honey. They have a trunk to insert in the flowers, out of which they run a long small tongue, with which they can lick up the smallest particle of honey or liquid sweet. When the weather is warm and no wind, they fly very fast—nearly a mile a minute. On their posterior legs is a small hollow or cavity; into it they pack the pollen or dust of the flowers in neat pellets, to carry it to the hive for feeding the young brood. They are armed with a sting which the great and wise Creator has given them for the purpose of protecting their stores, but it is seldom used against man if they

are properly treated. They labor in warm weather through the day gathering honey, pollen, propolis, water, &c. They fight invaders of all kinds night and day, with heroic fortitude and determination. They build comb, feed the queen, nurse the brood, repair broken comb, fill up cracks or crevices in the hive with propolis; in fact, they are never idle when the weather permits them to work, except when they gorge themselves with honey and remain still for the purpose of secreting wax to build comb with. The sex of the workers is universally acknowledged by intelligent apiarists to be that of undeveloped females that are incapable of fertilization by the drone.

Ques. 10. How long do the workers live?

Ans. The life of the worker bee is but short. They are subject to many accidents. Many get chilled in cold weather, and fall down and perish. They sometimes fall into water and get drowned. Many are slain in the attempt to rob their neighbours. Others are devoured by birds, toads, &c., so that during the working season their life probably does not average more than six or eight weeks. During the winter they live from four to nine months.

Ques. 11. When does the colony begin to rear brood?

Ans. In strong colonies, some brood is reared in almost every month of the year, the least brood being reared between September and January. During this time, the brood generally occupies but a small circle in the middle of the cluster. According as the spring advances and the weather gets warmer, the circle of brood is enlarged, the queen depositing her eggs with the greatest regularity, so as to concentrate the animal heat as much as possible for the development of the brood. When the weather gets quite warm and the

flowers begin to yield their rich nectar, breeding goes on with great rapidity, the queen often laying one or two thousand eggs per day. She now deposits them wherever she can find an empty cell to receive them. Brood rearing and honey gathering go hand in hand. When honey is very abundant, brood is reared with astonishing rapidity. When honey becomes scarce, the rearing of brood is immediately checked, their God-given instincts teaching them that it would not be wise or safe to use the stores already collected for the purpose of rearing much brood. and run the risk of starving to death themselves.

Ques. 12. How long a time is required to develop a queen ?

Ans. From the time the egg is deposited until her Royalty emerges from her cell is about sixteen days.

Ques. 13. How long time is required to develop a worker ?

Ans. About twenty-one days.

Ques. 14. How long time is required to develop a drone ?

Ans. Twenty-four days.

Ques. 15. Is there any difference between the eggs that produce queens, workers, or drones ?

Ans. The eggs are all alike, the only difference being that those that produce queens and workers are impregnated, while those that produce drones are unimpregnated. A fertile queen will lay both impregnated and unimpregnated eggs. It should be borne in mind that a queen once impregnated, it is for life.— She goes out to meet the drones no more. The queen has a small globular sac about one thirty-third of an

inch in diameter, which communicates with the oviduct. This sac contains the drone semen. Over this sac the queen has perfect control. When she is depositing eggs in the worker cell she brings them in contact with the mouth of the sac, and each egg as it passes through the oviduct becomes impregnated by receiving a portion from the sac. When laying for drones, the queen withholds the contents of the sac, and the eggs pass unimpregnated.

Ques. 16. How are queens impregnated?

Ans. The queens are impregnated on the wing, high in the air. After issuing from the cell, the queen makes what is termed by apiarians her bridal tour in about three or four days, coming out of the hive to meet the drones in the air seldom earlier than eleven o'clock, a. m., or later than three o'clock, p. m. I have several times seen them go out on their excursion to meet the drones, and have timed them by the watch. They remain in the air from ten to twenty-five minutes, when they return. If they have succeeded in meeting with a drone, the male organs will be seen to adhere to the abdomen of the queen. In the month of July, 1869, I watched a young queen hatched in one of my observing hives, until I became weary. I then set my man to watch. After some time, the queen came out, mounted high in the air, and was soon lost to sight. In about fifteen minutes she returned to the hive with the male organs adhering to her. She entered the hive, when the worker bees removed them from her, and in two days she began to lay worker eggs. If she does not succeed in meeting with the drone the first day, she will usually come out every fine day until impregnated.

Ques. 17. What is the result of retarding impregnation?

Ans. It was discovered by the celebrated apiarian,

Francis Huber, that if a young queen is not able to fly to meet the drone (on account of faulty wings, bad weather, or other causes) during the first twenty-one days of her life, she never lays anything but drone eggs, and hence is worse than useless. Subsequent experiments of all careful observing apiarians have fully confirmed his truth.

Ques. 18. What is the difference between a fertile and an unimpregnated queen ?

Ans. There is a perceptible change in the form of a fertile queen, her abdomen becoming somewhat swollen, and lengthened a little. This difference will show itself mostly at the height of the breeding season. Late in the fall and winter, when there is scarcely any breeding, there is but very little difference. A fertile queen lays chiefly worker eggs in regular order, commencing in a small circle in the centre of the clustered swarm, and deposits them just opposite each other in the combs, gradually widening each circle and spreading them into the adjoining combs, so that the distance from the centre or point where she commenced, to the outside of the brood, will be nearly equal on all sides. When the young bee emerges from the cells in the centre, she returns and deposits eggs in them again. Sealed worker brood should present a flat smooth surface. A fertile queen will lay unimpregnated or drone eggs, only when the colony becomes strong and they anticipate swarming, always depositing them in the drone cells. An unfertile queen lays chiefly if not all drone eggs, and deposits them irregularly, sometimes in drone cells, and sometimes in worker cells. Queens sometimes become unfertile through old age, and lay drone eggs only. They should then be removed. When drones' eggs are deposited in worker cells, the bees lengthen them out, and cover them with an oval cap. When this is the case, it indicates a drone-laying queen. Mr. Quimby says a drone queen when laying in work-

er cells does it more irregularly, or the bees do not nurse all that are laid. About half the cells are sealed over after being lengthened at least one-third.

Ques. 19. How is it possible for unimpregnated eggs to hatch?

Ans. It is easier to ask than answer this question. It is probable that the eggs laid by the queen bee and fertile worker have from the previous impregnation of the egg from which they sprung, sufficient vitality to produce the drone, which is a less highly organized insect than the queen or worker.

Ques. 20. How is the wax for building combs obtained?

Ans. The wax is a natural secretion of the worker bees. When it is necessary for them to build combs, they gorge themselves with honey, and lie clustered together for some hours. The wax then exudes from the folds of their abdomen, in thin, almost transparent flakes or scales. These are removed as fast as formed, and used for building combs. When I have been removing combs covered with bees, I have frequently seen some of the workers with the scales of wax protruding from them, causing them to present quite a novel appearance.

Ques. 21. What is the value of a pound of wax in the comb?

Ans. As animals consume large quantities of food to enable them to secrete a few pounds of fat, so I have proven by careful experiments that it requires about twenty pounds of honey, or liquid sweet, to enable bees to secrete one pound of wax. I would not, however, be understood to estimate that every pound of comb is

worth twenty pounds of honey to the apiarian. I have repeatedly tested its real practical value to a swarm of bees by putting a swarm in a hive filled with empty combs and putting another of equal size the same day into an empty hive, and I have always found that the swarm in the combs, during the time they were filling them, stored about twenty-five pounds of honey for every ten pounds of those that had their combs to build. A hive containing two thousand cubic inches inside, will require about two and a half pounds of wax in the combs to fill it, and will hold, leaving ordinary room for breeding, about fifty pounds of honey. A swarm of bees will fill these combs, while those in the empty hive are building combs and storing twenty pounds. It will be seen by this that every pound of comb is worth twelve pounds of honey to the apiarian. The pound of wax would be worth in market about thirty cents; the twelve pounds of honey, worth, at eighteen cents per pound, two dollars and sixteen cents; showing a loss of one dollar and eighty-six cents for every pound of wax sold. But this is not all. The combs are of great value, especially in frames for natural swarms. If a frame or two of comb is put into the empty hive, the bees build after the pattern, and seldom, if ever, build crooked, and I never knew a swarm that had clean empty combs to leave for the woods. A comb in each hive will often save several swarms in a season that otherwise would have departed to parts unknown without the gracious ceremony of bidding you farewell.

Ques. 22. How many kinds of cells are there?

Ans. There are three different sizes of cells. The smallest size are called worker cells, and are about half an inch in depth and one-fifth of an inch in diameter. They are used for rearing worker bees in, and also for storing honey. Occasionally a few drones are raised in them, but this rarely happens except when there is

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a drone-laying queen, or when there is no queen, and a fertile worker is depositing eggs in her place. When drones are reared in worker cells, they become dwarfed, and are but little, if any, larger than workers. The drone cells are larger—about one-fourth of an inch in diameter and a little more than half an inch in depth. Drone cells are seldom made directly in the top of the hive, but are usually joined on the worker cells about the centre of the hive or a little below. As the bees cannot pass immediately from one size to another, there will be some irregular intermediate cells between. Both the worker and the drone cells are built hexagonal, or in other words six-sided, and are used both for rearing brood and for storing honey, according to the wants of the colony. The next size are the queen cells. These differ greatly from the others. They are built cylindrical, or round; are about an inch in length, and hang generally from the edge of the combs one or two in a place, with the open end downwards. They are built thick and heavy at the sides, requiring about as much wax to complete one as would make forty or fifty other cells.

Ques. 23. How do bees get propolis, and what use do they make of it?

Ans. Propolis, or bee-glue, is resinous gum gathered by the bees from different kinds of trees and plants. In this section it is gathered chiefly from the Balm of Gilead. It is carried on the legs of the bees, the same as pollen, but in smaller pellets. The bees use it, to fill up all holes, cracks and crevices about the hive, and no matter how shaky or shattered their domicile may be when they enter it, they soon make it waterproof with propolis.

Ques. 24. What is pollen, and what do the bees use it for?

Ans. Pollen or beebread is the fine mealy dust from the anthers of the flowers. It is of different colors varying according to the flowers from which it is gathered. Corn, pumpkins, squashes, melons, and cucumbers, are very valuable to the bees, yielding large quantities of pollen late in the season; thus giving the bees a liberal supply to store for winter. Pollen is used for the purpose of feeding the young larvæ. The bees gather astonishing quantities of it in the breeding season, and store in empty cells close to the brood, to be mixed up with honey and water, and used as required.

Ques. 25. What can be given to bees as a substitute for pollen?

Ans. Unbolted rye meal has been successfully used as a substitute for pollen. Two years ago I discovered that they would work better still on wheat flour, if mixed with one-third oatmeal. Place it in shallow dishes out of the wind, and drop among it small pieces of comb wet with honey or molasses to induce the bees to commence taking it. It is beneficial to promote early feeding, and checks the propensity to rob; for idleness is the forerunner of mischief among bees as well as among the human family.

Ques. 26. Describe the process of natural swarming, and how queens are reared?

Ans. The swarming season is one of great interest to the bee-keeper. He is now anticipating in a short time the reward of his labor and care. The issue of natural swarms is in a great measure dependent on continuous fine weather and a bounteous supply of honey. The first swarms will not issue in bad weather or when honey is scarce. If such weather continues, the bees will destroy the drones, and allow the old queen to destroy the young queens in their cells. I

have repeatedly witnessed their animosity to each other, and have seen the old queen in the very act of tearing and biting the queen cells open, and then stinging the unfortunate young queen to death in her cell; after which the worker bees would remove them. The first indications of swarming are seen in the breeding of drones. When they begin to fly in considerable numbers, the supposition is that the bees are beginning to prepare for swarming. But the only sure token is the presence of queen cells with royal larvæ in them. We occasionally get a swarm as early as the last of May, but the great swarming month with us is June. When the hive becomes crowded with bees, and all the cells are full of honey or brood, the workers construct a few queen cells at different times, so that the last made will be about four or five days younger than the first, and will mature accordingly. In moveable comb hives the frames of comb can be lifted out, when the cells will be readily discovered even by the inexperienced. You cannot easily mistake them, although you never saw one before. If you wish to find them in the common box hive, take a piece of rotten wood, or make a roll of cotton rags about an inch in diameter; set fire to one end of it; now go to the hive; blow a few whiffs of smoke under it; tip it gently back, giving the bees more smoke at the same time; now carry the hive from its stand a little, and turn it bottom up without jarring it, being careful to turn the hive edgewise with the combs, so as not to break them down; now drive the bees down into the hive with your smoke; and some of the cells can almost always be seen when they exist. There is a possibility, however, that some of the cells are out of sight. If cells are seen nearly or quite sealed over, we may confidently look for a swarm the first fine day. The progress of these cells is the only sure indication of swarming. The average number of queen cells reared in a strong colony is about eight. I never

knew them to build less than three. In the year 1870 I had a strong stock of Italians that I had made queenless for the purpose of getting queen-cell for making artificial swarms. I gave them only one frame of worker brood comb. They built thirty-six queen-cells on it. I never saw or even heard of so many on one comb before. Queens are always raised from worker eggs. Some tell us that the bees build queen cells, and the queen deposits the eggs in them. Others say they are transferred by the workers from other cells and placed in the queen-cells. In my experience I have not found either of the above theories correct; but I have observed that the bees select worker eggs in the cells best adapted for the purpose, and cut them down and then build the queen-cells around the eggs. In this process, two or three of the adjoining cells are sacrificed to make room for the queen-cells. The young larvæ in these cells are supplied bountifully with royal jelly, a pungent stimulating substance, of a light cream color, resembling a mixture of starch and milk. Those cells, when only about half finished will have the larvæ in them actually floating in royal jelly. They are gradually lengthened downwards until the eighth day, when they are sealed over. The cell now resembles a peanut in shape and appearance. In about eight days more the perfect queen emerges from the cell and helps herself to honey, if she can find it. The effects produced upon the royal larvæ by the above treatment are so wonderful that those who have not been eye-witnesses to them almost universally reject them as the idle whims of those who are afflicted with the disease called "bee on the brain." Some of these effects I will briefly notice:—

- (1.) By the above treatment the worm chosen for a queen arrives at maturity almost one third sooner than if it had been reared a worker.
- (2.) Its productive organs are perfectly developed, so

that it fulfills the office of a mother.

- (3.) Its life is lengthened to a remarkable extent. Had it been reared a worker bee, it would not have lived more than seven or eight months; as a queen, it may live three or four years.
- (4.) It is changed in size, shape, and color. Not only is the body changed, but its limbs are changed also, and the sting is more curved.
- (5.) Its instincts are entirely changed. Reared as a worker, it would have been ready to sting as soon as provoked in any way; but as a queen it may be tortured in any manner, and will not attempt to sting. As a worker, it would have treated a queen with veneration and respect. But now if it comes in contact with another queen, it fights a duel at once, and does not give up until it either falls a victim or slays its adversary. As a worker, it would have left the hive frequently, to gather honey, pollen, propolis, water, &c.; but as a queen it never leaves after impregnation, except in company with a new swarm. The old queen always accompanies the first swarm except some accident befalls her, and then there may be exceptions to this rule. For example, if the old queen should die at any time when the hive is full of bees, and brood and honey is plentiful, the bees will construct queen cells to replace her, and will be almost sure to swarm once or twice with the virgin queens reared. The same result follows sometimes when the first swarm issues and returns. The old queen sometimes cannot fly, being overloaded with eggs, or some other cause. She crawls out, falls down, and cannot regain the hive. The swarm then returns, and about a week after comes out with the first virgin queen matured.

Ques. 27. What is the difference between the issue of first and second swarms ?

Ans. Nine-tenths of the first swarms issue between the hours of 11 o'clock, a. m., and 1 o'clock, p. m. I never knew in my experience an old queen to come off with a swarm sooner than ten o'clock, or later than three o'clock. (The Italian bees will swarm earlier and later than the native black bees.) First swarms rarely if ever issue except the weather is very fine; but after swarms will come out sometimes with but little regard to either the time of day or the weather. I have known the Italians to issue as early as six o'clock a. m., and as late as five p. m. As a rule the after swarms go farther from the parent hive than the first swarms. They are sometimes accompanied with a plurality of young queens. I have known ten or twelve to be with quite a small swarm. When this is the case they are apt to cluster in two and sometimes three different places. Each part having a queen will remain. If a part has no queen, it will either find the others and unite with them, or return to the old stock. When a number of queens are with a swarm, they are much more restless and discontented, and it is well to remove all but one, and destroy them if not wanted. The presence of a number of these virgin queens with a swarm is almost a sure indication that the parent stock is done swarming. Some writers tell us that there are as many swarms as there are young queens, and that when two or more queens issue with a swarm, it is because they have been kept back by bad weather or unfavorable circumstances. I would say here that my experience has been entirely the reverse of this. When the weather has been the most favorable, I have frequently taken from second and third swarms from two to eleven young queens, and as before stated, I have known the bees to build as many as thirty-six queen-cells. I cannot believe that the bee ever intended a separate swarm for each of these.

Ques. 28. What are the indications of second and after swarms?

Ans. After the first swarm leaves the hive, the bees, when they are numerous and honey is plentiful, generally decide to swarm again, and sometimes three or four times. When this is the case, a number of the worker bees cluster around the cells, and so prevent their destruction by the first emerging queen, who makes every effort to destroy her royal sisters. This, however, is prevented by the worker guards. Enraged by repeated failures, she makes a peculiar sound called by bee-keepers piping. It may often be heard a rod or more from the hive, when everything is very still. It sounds to my ear as if they were repeating the word "Toot! Toot! Toot!" in a soft, mellow tone. This is sometimes answered by some of the young queens still in their cells. The sound from these will be hoarse and somewhat muffled. This piping of the young queens will usually be heard the evening previous to the issue of the swarm, and is almost a certain indication that the bees will swarm again. The piping for the second swarm will usually be heard about one full week after the first swarm has come off. If the first swarm were kept back by bad weather the piping would be heard sooner. If no piping is heard for fourteen days after the issue of the first swarm, no after swarms need be expected.

Ques. 29. How long a time will bees continue to swarm?

Ans. Eighteen days after the issue of the first swarm all swarming will be over for the season, except where buckwheat is largely grown. Occasionally a swarm will come off; but such a swarm will not come off for about a month or more after the issue of the last of the after swarms, and should be looked upon as a first swarm. It will be accompanied by a fer-

the queen, and the combs will be left full of brood, queen-cells finished, &c.

Ques. 30. Why do bees sometimes return after swarming ?

Ans. Because the queen is not with them. Sometimes an old queen refuses to leave the hive, and sometimes she leaves, and cannot fly, being over-burthened with eggs. I have often picked them up after the swarm had returned, and put them in the hive again. In a day or two she would come out again and usually fly well enough. If the old queen is lost, the swarm will return and wait for the first young queen to emigrate with them.

Ques. 31. How can it be told if the queen is with the swarm when on the wing ?

Ans. If the queen is not with them, they scatter more, and often alight on the leaves and grass and everything else, in search of their beloved queen. How the bees can tell when on the wing if their queen is not with them is a mystery that would take a wiser head than mine to solve. But the fact that they can tell is certain. I once had a large first swarm that I hived, and the next day I observed that they were lazy, restless, and discontented. I at once came to the conclusion that an elopement was intended, and watched them closely. All at once, they came rushing out pell-mell, as if stark mad to be off. Before I got to the hive, fully one-half of them were in the air. I then closed the entrance, so that only one or two bees could pass at once. Fortunately the queen was still in the hive, and as she came out I caught her, and placed her under a tumbler, and then opened up the hive, and let the rest out in a thick cloud. They at once took a bee line for the woods, and flew about as fast as I could run for about twenty-five rods. All at once they seemed

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to discover that the queen was not with them, and al-
 most as sudden as an army would stop at the word
 "halt," did the cloud of bees whirl round and scatter
 in other directions in search of their queen. Great
 numbers of them settled down all over the ground,
 grass, &c., until one could scarcely set down his foot on
 an area of half an acre without stepping upon them.
 In a short time they again gathered together thickly in
 the air, and then again scattered until they were appar-
 ently lost. At this time I should judge they were
 scattered over an area of nearly three acres. They
 then gathered in a thick cloud in the air, and started
 to the empty hive they had left. I then clipped a lit-
 tle of the queen's wings and let her enter the hive with
 the swarm, and had no trouble with them after. (I
 would here remark that if the wing of an old queen is
 clipped so that she cannot fly, the bees will not go to
 the woods with her. But a young unimpregnated
 queen should never have her wings clipped.)

Ques. 32. Why do bees cluster when they swarm?

Ans. Bees after issuing from their hive usually
 cluster in about ten or fifteen minutes. In my experi-
 ence, I have hived some thousands of swarms, and I
 never knew but one swarm to leave the parent hive
 and depart to the woods without clustering. In fact it
 is almost impossible for them to do so, as they always
 fill themselves with honey before they leave the old
 hive (so as to have a good supply to start with in their
 new home.) By the time they have flown ten or fif-
 teen minutes in the air to wait for all the swarm to
 issue, and ascertain if the queen is present with them,
 they become so fatigued with flying that they are al-
 most compelled to cluster. For this reason it will be
 seen that the noise of horns, tin pans, bells, &c., does
 no good whatever. The bees will cluster just as well
 without the music.

Ques. 33. How can bees be prevented from going to the woods ?

Ans. If the bees are on the wing, get before them if possible and throw water among them with a long-handled dipper, throwing the water so as to cause it to scatter like rain through the bees. This will seldom fail to cause them to cluster. If the water is very cold, it will be all the more efficient. To prevent bees that are hived from leaving, if moveable comb hives are used, go to any stock that can spare a comb containing brood and honey. Brush back all the bees, and see that there are no queen cells in it. If there are put it back, or else cut them out; then place the comb in the hive that is to receive the new swarm. The advantages of this plan are—first, that the bees will never leave; second, it greatly encourages them, and should bad weather confine them in the hive, there will be no danger of starvation; third, if the frame containing the comb is placed in the centre of the hive, the bees will be certain to build straight combs. If the swarms are in a box hive, place over them a box of honey taken from the old stock. But the best and surest way of preventing the escape of swarms is by taking the matter into your own hands, and making all swarms by artificial means.

Ques. 34. How can swarming be prevented in moveable comb hives ?

Ans. The prevention of first swarms is not desirable or advantageous, except perhaps in extremely poor seasons. It may be done by examining the combs every ten days while the swarming season lasts, and removing all the queen-cells. Combs that are full of honey may be removed from the body of the hive, and plenty of room be given for storing surplus honey. My hive, having room for two large honey-boxes at the top, will be found especially adapted to stocks that

do not swarm, as all the bees may be kept at work. Second swarms may be prevented by removing the combs and cutting out all the queen-cells but one. It may be done any time after the first swarm has come off, and before the second issues.

Ques. 35. How can swarming be prevented in box hives?

Ans. The first swarm cannot easily be prevented, and it is best always to let them swarm once. Put the first swarm in a hive and then remove the parent stock to a new location, and set the new hive in its place. The result will be that the old bees of the parent stock that are under the influence of the swarming propensity will join the new stock in the old location, and they will seldom swarm again. This plan may be practiced with moveable comb hives to advantage, when for lack of time or any other reason the bee-keeper will not take the trouble to cut out the queen-cells.

Ques. 36. What should be done with after swarms?

Ans. If second swarms are allowed to issue and it is desirable to keep them, it is always safest and best to unite two of them together. They will then make a good stock to winter. It should be remembered that it will pay to unite them, even supposing they are to be destroyed in the fall for their honey. The reason is simply this—that when the swarm is small they cannot generate heat sufficient to work the wax and carry on breeding to advantage. Take for example two swarms of bees, three quarts in each swarm; hive them separately, and suppose in the fall that each swarm has collected ten pounds of honey, that is full amount for both twenty pounds. Now if the two swarms had been united together they would have collected at best thirty pounds. It will be seen by this that there is a great loss by having small swarms separately, but the ques-

tion is asked why should it be so? As before stated, the small swarms cannot generate sufficient heat. To make it plain, suppose that it takes two quarts of bees to generate and keep up the heat necessary to work the wax, build combs, rear brood, &c. If then the swarm contained only three quarts of bees, it could send only one quart out to gather honey. But two such swarms, if together, could send to the fields four quarts of workers, and still retain two quarts in the hive, and would also have the advantage of all the bees during the night, when heat is most required. As a rule, every swarm when first established should have at least seven or eight quarts of bees. Early in the season the swarm may be somewhat smaller; later in the season it should be larger. For the reason given above, artificial swarms should not be made until the old stock is well filled with bees. Of course, if combs or brood are on hand to give them, swarms may be made correspondingly weaker. If third swarms come off, it is best always to return them. The best way to do it is to hive them in a box hive, and set them beside the parent hive till the next morning, then set a wide board about three or four feet long up slanting in front of the old hive, one end close to the entrance and the other resting on the ground; shake out the bees, about a quart at a time at the end of the board, and as they run up, the queen will easily be seen and should be taken away. If the swarm is returned immediately and there is more than one queen left in the old hive, they will be apt to come out again, but if hived and left till morning, they will seldom come out again.

Ques. 37. How after should bees be allowed to swarm?

Ans. In the climate of Canada, as a rule it will be found that one swarm is enough, and the surest road to successful bee culture. The greatest curse to bee

culture is to allow the bees to swarm three or four times, and hiving each small after swarm by itself. By so doing the old stock is reduced in numbers until it cannot guard its comb or honey, and it falls an easy prey to robbing bees or the moth worm, and the after swarms are but little better. New beginners in bee culture are almost sure to make this great mistake.

Ques. 38. How should bees be hived?

Ans. Before swarms issue, everything should be ready. Hives should be on hand, cool and clean, to put bees in at once, so that there will be no delay. In hiving bees, it is a good plan if no protection is used, to wash the face and hands in cold water just before commencing, and go at the work at once without using a towel, and the bees will seldom sting. It is best for new beginners to use a veil and pair of gloves, not that it is really necessary; for bees when swarming, being filled with honey, rarely ever sting, but the inexperienced are apt to be cowards, and therefore fail to do the work properly. As soon as the bees have clustered, lose no time, but put them in the hive at once. Not that there is great danger of their leaving, but if other stocks are kept and another swarm should come off, it would be almost certain to unite with them, and cause trouble. For this reason, be expeditious but at the same time be deliberate and cool, and take sufficient time to do everything right. For the box hive and most other hives, a table or stool will be wanted. A stool four feet square, made by nailing inch boards upon two by four scantling, will be found the most convenient. Set the hive on it, with its back close to the edge of the stool, so that the stool will project well in front of the hive. Make the entrance to the hive large. If it is a box hive, put a bit of wood under the front edge that will raise it about an inch; now take a tin pan. Any common milk pan will do. If the cluster is large, put your pan under them, and raise it slowly

up, separating a part of the bees with the edge of the pan, letting them roll back into it, and pour them directly in front of the entrance. Shake the remainder into the pan and pour them in front of the hive as fast as they will run in. They will come out of the pan very easy, as they cannot get their toes into it to stick fast. If the bees should clog up the entrance, move them back a little with your finger or a small stick. If they cluster outside, brush them down, and get them all to enter lest the queen should be left out. Sometimes they cluster on the body of a tree, or in the crotches or some other difficult place. If this is the case, use a tea cup with a handle to it, and dip them off a tea cup full at a time, and then brush off the remainder with a quill or wing. When they cluster high up in a tree, ascend with a ladder, shake the bees in a basket, cover the basket with a cloth, and lower them with a cord. Sometimes the limb may be carefully cut off and lowered, and the bees shook in front of the hive. My hive is so constructed that no table or stool is wanted when hiving, or at any other time. When putting bees into it set the hive close to the cluster. See that the frames and moveable ends are in their places, put the honey boxes on upside down, so that the bees cannot enter them. Now draw the alighting board forward to a level or a little more, and drop the bottom of the hive down on it, so as to make the entrance as large as possible, and pour the bees on the alighting board close to the entrance. As the sides are a guide to them and the entrance is large, it will be found that they will run up the inclined bottom in half the time required to get them into any other hive. When first swarms are issuing it should be remembered that they are accompanied with the old queen. About one in twenty-five of these cannot fly, sometimes through old age, but generally on account of being overburdened with eggs. When this is the case, she will drop down in front of the hive and run about on the ground. When swarms remain long in the air and scatter great

ly, it is an indication that the queen is not with them. Look carefully for her in front of the hive, and in the direction that the swarm went. If she is found, catch her carefully by the wings, so as not to injure her. Put her in a wire cage, or under a tumbler. Have an empty hive close beside the old hive. In a few minutes the swarm will return to the old hive to search for their queen. As soon as they commence to enter, move the parent stock away, and put the empty hive in its place, and as they commence to enter it let the queen run in with them. When all are in, set them on another stand and return the parent stock to its old stand again. This will be found less trouble than if the bees had clustered, and the queen will be saved, and her value would be about half the worth of the swarm. As soon as bees are hived, they should be moved to the stand where they are to remain. Give plenty of air. A box hive should have the front raised at least three-fourths of an inch. The front of my hive may be left open one inch, and it will require no shade. But all single boarded hives should be shaded from the sun. I believe that the leaving of fully nine-tenths of the swarms after being hived is caused by heat from want of sufficient ventilation. If a swarm leave after being hived and cluster again, it is well to let them have their own way to a certain extent, and put them into another hive, and set them in another location, and they are almost sure to stay. But if they are put in the same hive again, and in the same place, they are almost sure to come out again, and leave for parts unknown.

Ques. 39. How can bees be separated when they cluster together?

Ans. When large first swarms cluster together it is best by all means to separate them, as they would not collect so much honey by fully one-third if left together, and the stock will not be worth more at the end of the season than either one would be if they had been sepa-

rated. To separate them, take a wide board four or five feet long, set a box hive on each end, now sprinkle the bees well with cold water. This will cause them to move slowly, and give a better chance to get the queens. Now pour the bees out, a few at the entrance of each hive to start them running in. Now pour them out a quart or two at a time in the centre, between the hives, and watch for the queens. Capture them, and put them under a tumbler; or, what is better, put them into a wire cloth queen cage, and tie a piece of cotton over the end of it. If you do not find them at first, shake out the bees of one hive a quart or two at a time on the end of the board. They will immediately march the length of the board to the other hive, and enter it. Now set down the empty hive and shake out the full one, and the bees will march back again, and so keep on until both queens are caged. Now divide the bees equally and put them into hives where they are to remain, and give a queen to each; and the work is done. Set the hives at least ten yards apart immediately. The bees being restless by being mixed, part of them not having their own mother, if near together will sometimes unite again, and cause more trouble. When bees are mixed up and two or three queens are with them, they are not long together before a knot of bees about the size of a hen's egg gather around each-queen, and keep her a prisoner. This lump of bees may be rolled about without separating. When this is the case, there is certain to be a queen in the centre of the lump. I have sometimes found them dead in the lump, and believe that occasionally the bees smother them by clustering so tightly round them. If the knots of bees are found, secure them under a tumbler, and saturate them with thin honey or molasses. Put a lump in each hive, and divide the bees. The honey will cause the bees to separate, and release the queen. The other bees will gather round to lick up the honey, and will

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receive her all right. It is well to remember that there is not always a queen with each swarm that clusters together. Of course if there is only one queen, two cannot be found. A queen may not have come out with each swarm, or one may have fallen down and been lost. If there should be only one queen, and you desire to separate the bees so as to increase your stocks as fast as possible, go to either of the parent stocks and take out a card of comb that has a queen cell on it. Put in a hive and fill up the rest of the hive with empty combs. If combs are not on hand, the bees should have a queen cell given them that would come at least within two days, or the bees would build too much drone comb to be profitable. Another way to dispose of them would be if there is a small second or third swarm in the yard that has been hived not more than three days, put the queenless part in with them, and a good strong stock will be the result. Another way would be to hive the half with the queen. Set it in its place, cover it up with a sheet so that the others cannot enter it; now scatter the remainder about, a few here and there. The bees will separate and return to the stocks where they belong. If left to return in a mass they would be almost sure to all enter one of the parent hives, and the part that did not belong there would sometimes be killed. When bees are returned, they usually swarm again in a few days, and have a queen with them.

Ques. 40. What are the advantages of artificial swarming?

Ans. (1.) Where artificial swarms are made, no swarms are lost by flight to the woods. (2.) The apiarian can choose his own time for swarming his bees, and the time and trouble of watching his bees the whole of the swarming season is avoided. Strong stocks of bees that could well spare a swarm frequent

ly refuse to swarm at all, even after being watched the whole season. By artificial swarming you are sure of increase. The swarming is in the hands of the apiarian. He can increase or limit the swarming to suit the season and his wants.

Ques. 41. When should artificial swarms be made ?

Ans. Artificial swarms should not be made until the drones appear, and stocks are strong and full of bees. They should never be made when there is a scarcity of honey or in bad weather. As a rule bees may be divided any time after they begin to work in the honey boxes, provided the weather is good. If a fertile queen is on hand to give to the queenless part, they can be divided two weeks sooner. If a mature cell is given them, they may be divided a week or ten days sooner than if left to develop a queen from brood.

Ques. 42. Describe the method of making artificial swarms ?

Ans. To those using only box hives, I would emphatically say, do not attempt to make artificial swarms, as they will in most cases prove only a source of loss, trouble, and annoyance. The way to do it is to drive into an empty hive a little more than half the bees and the old queen. Move the parent hive to a new stand, and set the new hive in its place. There are a number of methods practised for making artificial swarms. Most bee-keepers who use moveable comb hives have some favorite way of making new colonies. I will first describe the method adopted by me, as it differs from any now before the public in some respects. About ten or twelve days before I intend making my artificial swarms—generally about the middle of May, but sooner or later according to the strength of the bees, earli-

ness of the season, &c.—I select a strong stock, look over the combs, find the queen, put her in a wire cloth cage, tie over the end of the cage a small bit of thin cotton, and put back all the combs. I now go to another strong stock and take out two combs. One of them should have plenty of worker brood in it; the other should contain chiefly honey. Look carefully over the two combs until sure the queen is not on them. If she is on them, return her to the hive, cut a hole in the comb close to the brood, but where there is some honey for the queen to feed on, and put in the queen, cage and all. Now set the frame in an empty hive close to one side, but leave room enough for the bees clustering over the brood. Put the frame, containing mostly honey, in next to it, and fill up with empty frames, or combs, if on hand. There should be bees enough to cover the brood. If there are not enough, some bees may be shaken in with them from other cards of comb. Now move the parent stock away to another stand, and set the hive with the two combs in its place. The next day, in the evening, take out the queen cage, drop some thin honey through the wire until the queen is well smeared with it, so she cannot fly; now take her out carefully, and put her in with the bees, and she will be well received. If by bad weather coming on or any other cause the swarm should be too weak for profit, give it a frame or two of worker brood from a strong colony. The result of this process is that you have a strong colony queenless. They have not been weakened by taking away any of the brood or bees, and they will generally build eight or ten queen cells. Those cells, all but one, are to be cut out ten or eleven days from the time they were made queenless, and immediately used to form new colonies with. If more cells are wanted than is likely to be built in one stock, a strong stock may be made queenless in the same manner every two or three days, or all the cells may be cut out of them when ready, and another card

of comb containing young larvæ and eggs be given them, and they will construct queen-cells again and again as often as brood is given them. The cells to be used may be cut out one at a time, and the comb from which they are taken returned to the hive. If more are cut out at once, while you are forming a colony with one, the others are apt to get chilled if the air is cool, or if laid in the sun the heat may destroy them.

Cut out the cells with a sharp thin-bladed pen-knife, leaving about an inch of comb attached to the upper end of the cell. Now proceed to make your new colonies according to the directions given above; only instead of the caged queen, you will insert a queen cell. Cut a hole the shape of a wedge, the large end up, in the comb among the young brood, where the bees will cluster on it and keep it warm. Make the comb attached to the cell a little wedging in shape, and put it in so that as it lowers it will fasten itself. If it will not stay otherwise, a little piece of comb can be squeezed between the fingers and put in over it, so as to tighten it. If it will only stay in, the bees will fasten it secure as soon as they cluster upon it. Great care should be taken not to press or injure the cell in handling it. Three or four days after examine and see if the young queen is out all right. About one queen cell in twenty-five will be destroyed.

In the year 1869, I made fifty Italian stocks in this way, putting a cell raised from Italian brood in each one. I only lost two cells. Those were evidently destroyed by the bees, as they were torn open at the sides.

If the young queen is not to be found, another cell should be given to them. If they are found weak, build them up by giving them combs of brood from other stocks that are strong.

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When dividing swarms, the entrance to each should be constructed so that only two or three bees can pass in and out at a time, to keep out the cool air and prevent robbing.

The advantage of this method of making swarms is that queen cell is obtained two weeks sooner than it would be safe to divide the bees, and have one part to build cells. And a stock when divided, and a mature queen cell is given to the queenless part, it will not be more than two or three days before it has a queen, and the swarm will build but little if any drone comb in that time. It will be easy to ascertain where there is but two or three combs, if the swarm has a queen. And there will be no trouble of cutting out the queen cells to prevent swarming.

Again, by this method all swarms may be made early about two weeks in advance of natural swarming, and every bee-keeper knows that the surplus honey is obtained every year from the early swarms, or those that swarmed but once. It is best to make swarms always in the middle of a warm day, as the bees are less irritable, and there will be less danger of chilling the brood.

Another method of making swarms, and a very safe one, is to select two strong and populous stocks, and take four frames of comb, and brood from each; brush back all the bees into their respective hives, put the combs into an empty hive, placing those combs that have the best brood on the outside. Fill up the vacant spaces with empty frames, then move a populous stock five yards or more from its location, and set the new hive with the combs in it on its stand. The bees that are roaming the fields will enter it. Nurse the brood and raise a queen. In ten or eleven days after the hive must be opened, and all the queen cells but one cut out, or swarms will issue and spoil the colony. To

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make swarms by this method, always choose the early part of a fine warm day, when the bees are flying briskly.

Another method is to divide by taking out of the parent hive two cards of combs. Put them and all the bees that are clustered on them, and the queen, into the centre of an empty hive; move the parent hive away five yards or more, and set the one containing the queen, two cards of comb, and the bees that are on them, on the old stand. The parent stock must be looked over ten days after, and all the queen cells cut out except one. The parent stock, while queenless, will be almost certain to build the two empty frames put in full of drone comb. For this reason, and because of the trouble of finding the queen in a hive overflowing with bees, I do not like it so well as the other methods described.

Ques. 43. What rules should be carefully observed when making artificial swarms?

Ans. (1.) Be sure that the stock is populous enough. If swarmed when too weak it will be robbed of its power to generate heat for breeding. When this is the case, both swarms will not breed half as fast as the one would if it had not been divided.

(2.) Swarms should never be made when honey is scarce or when the weather is bad.

(3.) If frames of empty comb are on hand, they should always be given to the queenless part.

(4.) If the queenless part is given a mature queen cell, it will have a fertile queen about twelve days sooner than if left to rear one from worker brood. And it will be less trouble to insert a queen-cell than to have to cut out all the cells but one to prevent warms from issuing.

(5.) When empty frames are put into queenless stocks they should be put in next the sides of the hive, so that if drone comb is built in them it will be used to store honey in instead of raising a horde of useless drones. When empty frames are put into stocks that have a queen and a good stock of bees, it is best to put them in the centre of the hive alternately—first a full one, and then an empty one, and the frames will be filled rapidly, and the bees will breed faster.

(6.) It is always best to have a stock or two in the yard to supply comb and brood to any that may be weak.

(7.) Stocks that are raising queens should be examined in about three weeks from the time they were made, or if given a mature queen cell in twelve days, to see if they have a fertile queen. If there are no eggs, and the queen cannot be found, introduce a fertile queen or a queen cell, or give them two or three combs of brood and eggs. This will not only give them the means of rearing a queen, but will strengthen them greatly.

Ques. 44. How can bees be quieted and handled without danger from their stings?

Ans. The whole secret of taming bees is very simple. When a honey bee has his sack full of honey or liquid sweet it will not sting of its own accord. Hence bees may be tamed by sprinkling them over with thin honey or sweetened water. They cannot endure to see honey or molasses going to waste and will always accept of it, and fill their sacs to their utmost capacity. If bees have smoke blowed upon them when in their hive, they become alarmed, and retreat before the smoke, and seeming to think that their honey is to be taken from them, they rush to the cells, and cram themselves with honey. They may now be handled with impunity, and will not sting unless compelled by pressure to do so. If

the hive is shut up, and you then rap on the hive for a few minutes with a stick, it will alarm the bees, and they will fill themselves, and may be handled without danger from their stings.

Ques. 45. Describe the method of opening a moveable comb hive?

Ans. Have a roll of cotton rags about an inch in diameter, or a piece of half rotten wood, commonly called touchwood; set fire to one end; go to the hive you wish to open, blow a few whiffs of smoke into the entrance, and then wait a minute or two, and blow in more smoke. Now contract the entrance so that only one or two bees can pass in at the same time. Take off the moveable cover, and blow in some smoke at the top of the hive. In my hive it is best to raise one of the honey boxes a little, but not sufficient to let out any of the bees, and blow in some smoke. After the bees are driven back with the smoke, lift off one of the honey boxes, and blow a little more smoke in among the combs. The strongest stock may in this way be subdued in five or ten minutes. Now take off the other honey box and the comb frame stops that cover the end of the frames. You can take them off with your fingers by lifting the outside edge first. Sometimes it is necessary to separate small bars of comb that connect one comb to another with a knife. Now take hold of the end of the frames with your fingers, raise them a little, and move two of them together a little (but not enough to crush the bees on them) so as to have a little more room next the outside comb. Then lift the outside comb out first. In all moveable comb hives bees will sometimes build their combs somewhat crooked, and will always build them more or less wavy; or in other words a comb will be full and prominent on one side and there will be a corresponding depression in the adjoining comb, so that it cannot be lifted straight out without breaking the combs; and sometimes two combs

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will be attached to one frame. And here the bee keeper finds that in most hives he cannot get the frames out without breaking the combs to pieces. When this is the case, it is evident that the hive is but little if any better than a common box hive. This difficulty is entirely overcome when my hive is used. If the frames will not come out readily, take a small chisel or screw driver, put it into the hole made for the purpose in the centre of the cleft, and pry out the moveable end. There is no difficulty in getting it out, as the shape of the hive is such that it cannot fasten except when the bees glue it, and there will be no danger of the combs being broken, as the bees are compelled to build a straight face on the side of the comb next the moveable end, in order to leave room for themselves to get to the ends of their cells. Both ends may be taken out, but it is seldom necessary to take out more than one. When the moveable end is out, crooked combs can be taken out without difficulty. If two combs are fastened to one frame, put your hand in where the end came out, and cut it apart with a knife.

It will be necessary with most hives to have a chisel or screw driver to pry the frames loose. But with my hive it will not be needed unless you wish to take out the moveable end.

When examining hives, it is well to have an empty hive on hand to put the frames in, as they are taken out, and as you put them in, cover them up to keep away robbers. If you wish to set my frames down, turn them bottom up, and lean them against the side of the hive.

If it is necessary to examine hives when honey is scarce, it is best to take them inside some building, where the robbers will not trouble. Set an empty hive in its place to catch the bees that may be out until the hive is returned.

Ques. 46. When is the best time to open moveable comb hives ?

Ans. The best time is during the warm part of the day, when the bees are flying. Early in the morning and late in the evening, and also on cool and cloudy days, it is always more difficult to subdue and handle bees. Especially avoid opening hives after sundown, as they will be almost sure to sting.

Ques. 47. How can bees and combs be transferred from the box hive to the moveable comb hives ?

Ans. Blow some smoke into the entrance of the box hive you wish to transfer, and rap on it for a minute or two until the bees fill themselves with honey. Now move the hive away to a shaded place, and set an empty hive in its place; now proceed to drive out the bees. Turn the hive carefully upside down. Have ready a driving box. (An empty hive will do.) Put it on the old hive, so that it will fit closely mouth to mouth, wrap a cloth round where the hives unite, so that not a bee can escape. Now take a light stock and rap smartly round the lower hive for twenty or twenty-five minutes, and the bees will ascend into the empty hive. Lift it carefully off, and put it on the old stand. Now pry off the side of the hive next to the face of the combs, and cut out a comb and lay it on the table. Now lay on a frame, and mark inside. Now trim off the comb, so that when fitted into the frame it will be in about the same position (top edge up) that it occupied in the old hive. If a comb is not large enough to fill a frame, take two pieces; cut a straight face to each; put them together, and then mark out and trim them.

It is best to cut the combs a trifle larger than the inside of the frames, and spring the frame over them. The frames of my hive, being somewhat wedge shape and not very wide, make them particularly

adapted for holding combs that are transferred. To hold the combs into the frames, put through the sides of the frame small pins of wood about two inches long. Now put the frames of comb into an empty hive. Set it on the old stand and shake the bees out of the box, and let them run into it.

Ques. 48. What rules should be observed when transferring bees?

Ans. (1.) Be careful not to injure the brood, and put it together as compact as you can, so that the brood will be in the centre of the hive as much as possible.

(2.) Always do it on a warm day, so that the brood will not get chilled.

(3.) The best time is when the white clover begins to blossom. If the stock has cast a swarm, it should not be transferred until a young queen has become fertile, about three weeks after it has cast a swarm.

(4.) Leave out all the drone comb and the drone brood. The drone comb that has honey in and the scraps should be put in a honey box, and set on the top of the hive if the bees need it, and they will soon carry the honey down into the body of the hive.

(5.) If there are other bees near by, the transferring should be done in some out building, where robber bees can be kept out, or the stock is almost sure to be ruined by robbers.

Ques 49. How can the largest amount of surplus honey be obtained?

Ans. Carefully observe the following rules :

(1.) Be careful not to allow the bees to over swarm and weaken themselves too much. Weak swarms never lay up surplus honey.

(2.) The boxes should be large, but not more than five inches deep. They should have glass on at least one side, to see when the bees have filled them. Bees will not store as much honey by about one quarter in a number of boxes that will hold only four or five pounds each as they would in boxes that will hold from fifteen to twenty pounds each.

(3.) Every hive should have two honey boxes. Turn over one box first so the bees can enter it. (Put a piece of clean comb in it, if you have any, to induce the bees to commence early.) When this box is about one third full, turn over the other. The result will be that when the first box is filled, the second one will be about half full. Now take off the full box, and put on an empty one immediately on, and so continue throughout the season. By this method you will have room for the whole colony to work to advantage throughout the season. When a hive has only one honey box, and it is more than half full, nine-tenths of the bees must remain idle while the tenth part are filling the remaining portion of the box. And again, when the box is removed, the bees seem instinctively to know that they have been robbed, and are very reluctant to commence again in an empty box; and if honey be not very plentiful, they will seldom commence again for four or five days, and often do no more for the season.

(4.) After the bees have commenced in the honey boxes, if the weather is very hot, and the bees clustering outside the hive, when flowers are plentiful, remove the front stop that covers the ends of the frames, set it up edgewise close to the honey box, letting the thick edge rest down on the frames. Raise the front of the outside cap and shift it back until it will touch the stop,

and let it rest on the moveable ends. This will not only give them ample ventilation, but the bees will have a short road directly into the honey boxes, without passing through the body of the hive, and they will store more honey. But if the weather is rather cool, or if the stock is not very strong, it should not be done. Under such circumstances it would diminish the amount of surplus honey.

(5.) By using my patent honey boxes directly over the frames, they are so constructed that the bees and heat of the hive can enter them from every card of comb; thus enabling the bees to store as much honey in them as they would in the body of the hive.

Ques. 50. When should honey boxes be put on?

Ans. The honey boxes should be put on old stocks about the time the white clover commences to blossom. They should not be put on young swarms for five or six days after they are first hived. When putting on boxes, it is well to blow in some smoke, to drive the bees down out of the way.

Ques. 51. What is the best plan of taking off honey boxes and getting rid of the bees?

Ans. In taking off boxes of honey, most apairians recommend to blow smoke under them. But this should never be done; for when smoke is blown on them they bite open the cells in the box, and fill themselves with honey. This causes the honey in the box to leak more or less, and the bees being full of honey, are reluctant to fly, and sometimes will not all leave the box. If no smoke is used, the bees will leave in half the time. When you wish to take off boxes, pry them loose at both ends, and put in a small bit of wood under each end, but not thick enough to raise it sufficient to let out the bees. Let it remain for about five minutes, for

the excitement caused by loosening the box to cease. Then lift the box gently and slowly up, and step back for two or three steps, and then walk deliberately away with it, and there will be little or any danger of getting stung. In putting on another box, drive the bees out of the way with a little smoke, or slide the box on from the side, so as to push the bees out of the way, and not kill them. The boxes as taken off may be set in some out-building, and left bottom up, so that the bees will come out rapidly. Leave the door open for the bees to escape, and it is seldom that any of the bees will return to carry honey from the box. If boxes are left until honey in the flowers is scarce, it will be necessary to put the boxes in a barrel or tight box, and cover with a white sheet. The bees, seeing the light, will leave the boxes and cling to the sheet. It should be turned over and over until all the bees have left.

Ques. 52. How are queens usually lost ?

Ans. If queens are lost when there are eggs or young larvæ in the hive, bees will rear another queen. (See ques. 5.) All virgin queens must run some risk of being lost in their flight to meet the drones for impregnation, and if lost at this time, it is always fatal to the stock ; because the colony have no brood from which they can rear another queen. The first swarm being accompanied with the old queen that is already impregnated, will run no risk of being lost. But the old stock from which the swarm came, and all after swarms, will have young queens that will fly out to meet the drones when they are four or five days old. During the queen's flight she may be caught by birds, or some other accident may befall her ; but it is usually the result of placing hives too close together. The young queen on returning, is liable to make a mistake, and enter another hive, and is sure to be slain. There is another way the queens are lost, that has probably escaped the

notice of all previous writers. During the year 1869 I was raising a great many Italian queens. I had swarms of black bees that were coming off during the time those queens were making their bridal tour. When hiving the black bees, I repeatedly caught a bright Italian queen with them. As I had no Italians that were allowed to swarm naturally, the wonder was where the Italian queens came from. By examining those swarms where I had inserted Italian queen cells seven or eight days previously, I found in every instance that a queen was missing, and when the queen was put back the bees received her all right, thus showing that it was their own queen. I may add that those hives had been examined three days after the cells had been put in, to see that they had come out all right, and the young queens were found on the combs. From the above, and similar observations since, I am led to believe that if a queen meets a swarm just issued from a hive when on her bridal tour, she is attracted by their peculiar hum, and unites with them, and the hive where she belongs is left queenless. The only way to prevent queens being lost in this way, is to make all swarms artificially, and so prevent natural swarms from issuing.

Ques. 53. What are the indications of the loss of the queen?

Ans. The motherless colony will exhibit marked signs of distress, especially early the next morning after the loss. The bees will be seen running about the hive up its sides. Some will fly a short distance off, and return again. This agitation will often be seen for a week or more.

If it be an after swarm lately hived, the bees will sometimes all leave and join another swarm.

A stock of bees while queenless build almost all drone comb. If on opening the hive of a young

swarm it is seen that three-fourths of the combs are drone, it is almost certain that the stock is queenless.

Another indication that a stock is queenless, is, when the drones are allowed to live after other stocks have killed them off. A queenless stock never destroys their drones, but there are occasionally stocks that are not queenless that allow their drones to live a month or more after other stocks have destroyed their drones ; but such cases are rare.

An experienced bee-keeper will seldom fail to detect a queenless stock by the action of the bees. They hang around the hive in a careless, sluggish way. They do not repel moths or robber bees with half the courage or vigor that is manifested by a stock that has a fertile queen. Whenever a stock begins to get weak in numbers, or any of the above indications are seen, open the hive at once, and see if there are any brood or eggs. If there are none, look for the queen, and if she cannot be found they should have a queen given them with as little delay as possible.

Ques. 54. What should be done with queenless stocks ?

Ans. If a stock is found queenless when the bees first begin to fly in spring, it is best to break it up and unite the bees with another stock that is weak, but that has a fertile queen. If they have honey in frames, it can be given to any stock that is in want by exchanging frames, or if box hives are used, it can be fed at the top of the hive and covered with the cap.

If a stock is found queenless after drones begin to fly, give it a fertile queen, if one can be spared, or if you have after swarms to come off, give it a second or third swarm. Blow some smoke into the queenless stock, and then hive the new swarm with them.

If you have no fertile queen or after swarm to come off, give them a queen cell nearly mature, or give them a frame or two of worker brood and eggs. This will not only enable them to rear a queen, but greatly strengthen them.

Whenever queenless stocks are to be saved, some plan must be adopted to keep up their strength, until they have mature brood of their own, or else they are sure to fall a prey to moths or robber bees. Always supply them with bees from natural swarms, or give them a frame of worker brood from strong stock.

Ques. 55. How can bees be united successfully?

Ans. There is but little difficulty in uniting swarms, early in the spring before they have commenced labor for the season, or during the swarming season, when honey is plenty. To unite early in the spring, or in cool weather in the fall, take out the combs with the bees adhering to them, and put them together in the same hive, leaving out the frames that have the least honey and those that contain no brood. Smoke them a little until the fill themselves with honey.

Second swarms are worth but little, if hived separately. Two or three of them should be united. (See *question 36*.) They will then seldom fail to fill their hive and make a good stock to winter. Swarms that issue the same day will unite without quarrelling. But if you put a second or third swarm in with one that have been hived for some time, it will be necessary to smoke them well with tobacco smoke, and it will be well to sprinkle them with thin honey if on hand, and then introduce the others with them at once. Watch them for some time. If they commence to fight, smoke them again until they quit.

In the autumn when honey is scarce, if you wish to

unite stocks in moveable comb hives, move the strongest one of the two from its stand. Set an empty box hive in its place. Take out the frames, wing off the bees in front of the box, and let them run in. Fetch the other swarm to it, and wing them off the same in the box. Now select all the best combs of brood and honey, and arrange them nicely in one of the hives, and then hive the bees into it, like a natural swarm, and they will not quarrel. If at a time when the weather is warm and the bees can fly, some of them will be apt to return to their old location. To prevent this, they may be shut up for a day or two. Put a board over the top of the hive, with a hole four inches square through it, and covered with wire cloth to give them plenty of air, and if the weather is warm shade it from the sun.

Ques. 56. How can it be known when bees are robbing?

Ans. Whenever honey is scarce, bees will be inclined to rob each other. This is often a source of loss and vexation to the bee-keeper. It is difficult for the inexperienced to distinguish between the honest inhabitants of a hive and the robbers.

An expert bee-keeper will, however, detect a robber at once by its actions. When attempting to enter a hive, it will not alight and go honestly in, but will dart forward and then away again in a cowardly, roguish manner, always trying to enter where there is no guard to oppose its entrance.

When robbing has commenced to any extent, there will often be seen a number of bees around one bee, each one pulling and biting it, and one ready to take its honey if it has any.

Again, when bees that are robbing come out of a

hive with their load, they always run a little way from the entrance, and fly up with their head towards the hive, rising up slowly and heavily, making a circle or two in order that they may know their way back for another load. If this is seen late in the evening, when other swarms are quiet, they are certain to be robbers.

During the breeding season, about noon on fine days, the young bees sally out in considerable numbers to play in the air. They also turn their heads towards the hive similar to a robber bee, when they take wing. This flight of the young bees so closely resembles the bustle of robbers that it is difficult to discover the difference. Those young bees are lighter in color, and do not fly far from the hive before they return. It should be remembered, also, that young bees never fly except for an hour or two in the middle of warm days. If you cannot tell them by these peculiarities, kill one or two of them as they come out of the hive, and examine them. If their sacs are full of honey, they are robbers. Another way to tell is to sprinkle flour upon them, and then watch and see if they enter other hives.

When robbing is going on in a large apiary, and the robbers are fully to work at a stock (except when the weather is cool) it may be known by the cross disposition of the bees. At such times one can hardly walk among them without being attacked. The whole apiary will often be in a commotion, and fighting and killing more or less at every hive. When such is the case, the bee-keeper may rest assured that there are one or more stocks in the yard that are being robbed in a wholesale manner, and should endeavor to stop it at once.

Ques. 57. What rules should be observed to prevent robbing?

Ans. (1.) It should be remembered that prevention is

better than cure. Therefore never crowd hives together in bee sheds so close to each other that the hives are only a foot or two apart. When they are so thick it is very difficult to tell when robbing is going on; and again, if one hive in a shed is robbed as soon as there is no more honey in it, or if it is removed, the robbers will attack the next, and so keep on until all are ruined. Bees after they have robbed one hive become perfectly infatuated, and will rush into another hive near by in thousands, although they may be slain as fast as they enter. Therefore set all hives at least ten feet apart. More would be better, if there is plenty of room in the yard.

(2.) In the spring of the year observe the strength of all your stock, and close the entrance of all weak ones, so that only one or two bees can pass in at once. The stronger stock may be left so that three or four bees can pass at once. If any of the stock is very weak, as soon as any of the stronger ones can spare it, take a card or two of brood from them and give it to the weak ones, and when all are strong spare no pains to keep them so.

(3.) As soon as honey begins to fail in the fall, keep a close watch, especially on the weakest stocks. If the robbers commence early in the fall at a stock it is usually queenless. It should then be examined, and see if it is queenless, and if it has but a weak supply of bees it is generally best to sweep the bees from the combs and put them in with another stock. If there is a stock in the yard that is weak, and has a fertile queen, a good stock may be made out of the two.

(4.) Be careful to leave no refuse bits of honey about where the bees can get at them, for they are sure to excite the bees to rob.

Feeding bees also has a tendency to induce robbing.

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To avoid this, always feed in the evening, so that the bees may store the food, and the excitement caused by feeding them be over before morning.

Ques. 58. How can robbing be stopped ?

Ans. When it is discovered that robbing is commenced, shut up the hive so that only one bee can pass at a time, and see that the hive does not get choked up altogether. If many robbers cluster round the entrance, sprinkle them until they are nearly drowned with cold water. This hydropathic treatment will cool their thievish propensity very suddenly, and as soon as their jackets are dry, they will return home apparently ashamed of their conduct. If you cannot succeed in stopping them in this way, after sundown stop the hive entirely. Provide upward ventilation, using wire cloth to keep the bees in, and remove the hive to a cellar or some dark place for three or four days, when they may be returned to the stand in the evening, and opened so that only one or two bees can pass in at once.

Those who use my hive will find it admirably adapted to prevent robbing. The inclined bottom gives the bees an immense advantage over the robbers or moths or any other insects that attempt to enter. Again, the hive is so constructed that the bulk of the honey is stored at the top of the hive. Bees instinctively store their honey as far from the entrance as possible, always clustering below it to protect it. My hive being large at the top where the honey is stored, and small at the bottom where the bees cluster, it does not require more than half the number of bees to protect the stores that are required in hives that have a broad surface at the bottom. When my hive is used, if robbing is commenced, contract the entrance so that only one bee can pass. If this does not stop it, open the bottom of the hive after sundown about three-fourths

of an inch. Now see that the base sets close and level on the boards, so that no bees can get out. Now take out the alighting board, and put it in to shut up the house as in winter. The base of the house and the wire cloth behind will give the bees plenty of ventilation. Leave them shut up three or four days, then open the house in the evening, and close up the hive, so that only one or two bees can pass at a time. It is seldom that the robbers will attack them again, as they usually forget, and give up the place in three or four days.

Ques. 59. How can the ravages of the moth-miller be prevented?

Ans. The only sure preventive against the ravages of the moth is to keep all stocks strong and populous, so that there will be bees enough to cover the combs. Such a stock never was and never will be destroyed by the moth-worm. During the last eight years, I have not lost a single stock by the moth, although I never had less than forty, and sometimes over one hundred in my apiary. This result has been attained, not by the use of moth-proof hives, for such a hive never has and never will be made, for the millers will go anywhere that a bee can, unless the bees are strong enough to keep them out. Neither has the above result been attained by setting moth-traps, or spending much time in hunting and destroying them. When at work in the apiary I destroy whatever moth-worms I see, and seldom spend any more time in search of them. My motto has been to look after the bees and keep them strong, and if by any means a colony should become weak, and I had not a supply of bees to give it, I would take out the bees and unite them with some other stock. In the spring of the year there is seldom a stock that has bees enough to cover the combs. But it should be remembered that the miller does not commence to trouble hives and deposit her

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eggs until June, and by this time all stock, if taken care of, will be strong. There will often be seen around hives and sometimes in the combs in the months of April and May some moth-worms. It is well to destroy them, although they have usually done all their mischief as a worm. But they will crawl into some crack or corner and transform into the miller, ready to deposit eggs to breed another host of worms. When a quantity of black dust, resembling coarse gunpowder, is found on the bottom of the hive, it is certain that the moth-worm has taken possession, and the black dust is the excrement falling from them. Such a hive should be broken up immediately, unless you have bees or mature brood enough to populate the hive at once. If you wish to save it, take out the combs; cut out the moth; hunt out all the worms and destroy them; put in more bees or three or four cards of brood; and if they are queenless (as nine out of ten of such stocks are), give them a fertile queen or a queen cell nearly mature. It is of no use to try to save the stock after the moth-worms have taken possession, unless steps are taken to strengthen the stock. I may remark here that I have found that the Italian bees drive out both the miller and robber bees with double the spirit and determination that the black bees do, and I find that the Italians are seldom if ever destroyed with the moth-worm except they are queenless. When I see a bee-keeper spending nearly all his time in chasing moth-millers and hunting out the worms, and setting traps to destroy them, &c., while he totally neglects his bees, and allows them to over-swarm, to become queenless, &c., I consider him just about as wise as a man who would attempt to bring a dead horse to life by killing the flies and carrion worms that gather around it. It should be remembered that the moth-worms always take possession of a lifeless stock, and that every stock that is permanently queenless may be said to be dead.

Ques. 60. What rules should be observed when feeding bees ?

Ans. (1.) The best food is undoubtedly honey. The best way to feed it is to have it put into frames by strong stocks, and then put it into the hives, removing empty combs and putting half combs in their place. Combs filled with honey may be taken from box hives, and fastened into frames, and given to stocks that need it.

(2.) When honey is not on hand in frames, boxes of honey may be put on the top of the hive, as soon as the bees can fly in the spring ; but this would not do in the fall, for the bees would fail in cold weather to ascend to the box, and starve, except when my hive and honey boxes are used. There being no honey board intervening between the frames and the boxes, and the boxes having strips at the bottom, all that will be needed is to take the box of honey and pry off three strips from the bottom of it, leaving every other one. Then set the box on, and the bees can ascend into it in the very coldest weather.

(3.) If strained honey is on hand (or a thick syrup may be made of the best refined Muscovado sugar) it may be poured into empty combs. To do this take the frames of empty comb from the hive ; lay them flat on a wide board with one end elevated nearly half pitch. Now warm the honey a little, but not warm enough to soften the combs too much, and pour it into the cells in a very fine stream. Leave about one-third of the comb at the bottom not filled. Let it cool, and then turn and fill the other side. After filling the combs, and they are returned to the hive, feed a few pounds at the top of the hive to induce the bees to seal over the cells. Honey and syrup, if not sealed over by the bees, are apt to absorb impurities, and render the bees unhealthy.

(4.) Bees may be fed in my hive in the easiest possible way. When the weather is warm, early in the fall, take a large pan that will hold enough honey to winter the bees. Fill in the honey. Break into it bits of old comb about an inch square, until the surface is well covered with it, so that the bees will not drown in the honey. Lift the hive from its place, and set on the pan. Draw out the alighting board, and drop down the bottom of the hive, and set the hive back over the pan. A little of the honey may be smeared on the bottom of the hive to start the bees at the feed. Now put the alighting board in for a door, and turn the buttons. See that the base sets down close, so that not a single bee can get out. Give upward ventilation by tacking wire cloth over the bottom of a honey box; take off the glass and set it on; leave the bees shut up a day or two until all the honey is carried up into the hive; put the pan in just before dark when all the bees are at home. By this process all the feeding is done at once, and not a robber can interfere.

If the weather is cold, it will be necessary to feed at the top of the hive in the honey boxes. Put in a shallow dish or saucer (a flower pot saucer is best), break it half full of bits of comb, or put in some cut straw; bore a hole with a half-inch bit through the top of the box; pour the feed through the hole as often as the saucer is emptied, and stop up the hole with a plug.

(5.) When bees have honey sufficient to carry them safely through the winter until the first of April, it is best not to feed in the fall but to feed in the spring in small quantities. About one pound every other day, and feed regularly until flowers are abundant. Fed in this way, it will not only keep the bees alive, but stimulate them to raise a large amount of brood, so that when flowers appear they will be strong in numbers.

Candy may be fed to bees to good advantage by making a crib two inches deep, the size of the top of the hive. Set it on directly over the frames; lay the candy sticks on the frames crossways of each other, so as to leave room for the bees to crawl through them in every direction. Cover over the crib with boards; lay over the boards and around the sides of the crib several thicknesses of old thick cloth, if the bees are to be wintered out of doors; put over all the outside cap, and the bees will cluster among the candy and feed on it even in the coldest weather, if there is a good swarm of bees. It has been said that bees will not winter on candy alone. In order to test it I took one season a swarm of bees that had only about one pound of honey in the fall. I gave them about seven pounds of candy on the frames as directed above. They passed through a severe winter successfully, and came out strong in the spring. Probably there is no feed as cheap as candy, as a pound of it lasts a swarm about as long as two pounds of honey or sugar syrup.

(6.) Whatever method is adopted to feed bees, the greatest care should be taken to prevent robbing. When a swarm of bees are fed, it excites them to fly out in great numbers, and they are careless about guarding the hive. Robbers that are running around seem instinctively to know this, and at once attempt to rob them. For this reason it is best always to feed at night just after sunset, and always contract the entrance so that only one or two bees can pass.

(7.) As a rule, it seldom pays to winter many light stocks that need feeding, especially when the work has not been done early in the fall. It is far better, especially for the inexperienced, to make two or even three such stocks into one good one. (See ques. 55.) If light stocks have to be fed in winter, it is best to house them, where it will not freeze, in a dark room.

Ques. 61. How can bees be wintered successfully when housed?

Ans. To winter bees successfully, it is necessary to have strong stocks. In the fall every stock should be examined to see if there are plenty of bees and honey. If deficient of stores they should be fed. If there are not enough bees, two swarms should be united. Every stock should have twenty-five pounds of honey and at least a peck of bees. If bees are housed, it should be in a dry cellar, or some house so constructed that it will not freeze and will be perfectly dark. Not a ray of light should be allowed to enter to disturb the bees. The object of housing bees is to secure an even temperature, just cool enough to keep them in a state of inactivity, and thereby lessen the amount of honey consumed. The bees should not be housed until the winter has commenced in good earnest, for it is desirable to let the bees fly as late in the fall as possible. The hives should be placed on shelves, a foot or more from the floor, and should have full ventilation upward, especially the strongest stocks. Moveable comb hives should have the covers over the frames removed. Box hives should be inverted, and if there are mice, a piece of wire cloth should be fastened over the hives to keep them out. Means should be provided to ventilate the house and keep the air as pure as possible. A cellar may often be ventilated by leaving the door open mild nights.

If a large number of swarms are housed they generate considerable heat, and are apt to get too warm and become uneasy, and some means should be adopted to let in cool air without letting the light in.

When bees are housed, they should be examined only when necessary. The less they are disturbed the better. They should be set out on a fine day, when the bees can fly freely, for bees that have been wintered in

the dark will always fly when they are brought to the light, and if the weather is cold they will perish in thousands. When setting out stocks set them five or six yards apart, so that the bees will not get mixed up too much.

Ques. 62. How can bees be wintered successfully in the open air?

Ans. In travelling through different parts of Canada, I have observed that about nineteen bee-keepers out of twenty winter their bees in the open air, or what is worse, in bee sheds or in outhouses, where it will freeze hard and where the sun cannot strike the hives to thaw the frost that will accumulate in most hives, under such circumstances. The frost on the combs, condensed from the breath of the bees, prevents the bees from reaching their stores, and they starve.

Bee-keepers who keep only a few swarms cannot be persuaded to go to the expense of building houses especially adapted for wintering bees in; hence the great want of bee-keepers has been some method by which they could winter their bees successfully in the open air.

After twenty years, extensive experience in bee-culture, and with almost all kinds of hives, I found that my great want, as well as others, was a hive not only perfectly adapted to the wants of the bees in summer, but in which the bees could be successfully wintered without housing. After numerous experiments I invented my combined hive and bee-house, for which letters patent were granted me on the fifth day of February, 1868. It is built entirely different from other hives, having a base to it that serves as a house for enclosing the lower part of the hive, the alighting board serving as a door to shut the house up in winter. When the door is put in, it makes the entrance to the

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hive dark, and also protects the entrance from the weather, so that it can be opened sufficiently to let all the dead bees and filth fall out. The base of the house sits on boards directly on the ground, so that no cold air can circulate under the hive. This makes the hive at least one third warmer than any hive that sits on a stand. It is ventilated during winter from the rear, the cold air first passing through a piece of wire cloth, then passing through the base of the house, and then enters the hive. By this method no wind or cold current of air comes in contact with the bees. Again, the hive is double boarded, all around, forming a perfect hollow wall all around the bees. This hollow or dead air space is obtained by using inch lumber, and making the outside case close and strong, and then using half-inch lumber for the inside. The grain of the lumber both inside and outside all runs the same way, so that alternate wet and dry weather does not affect it. In other double hives, the hollow space is made by nailing half inch lumber over the outside of the hive, the grain of the lumber crossing each other, and as soon as exposed for a season to the weather, the thin lumber on the outside is warped and drawn from its place, so that the cold air circulates through, causing it to be but little if any better for wintering bees than a single boarded hive.

To prepare bees for winter in the combined hive and bee house, see that the bees have honey to last them till spring, and also that there is a strong stock of bees; for it should be remembered that a weak stock of bees seldom winter well. The hive should be set on a broad board directly on the ground in a dry place, where no surface water will lie. Take out the alighting board and let down the bottom of the hive fully half an inch, or until your thumb will enter to the first joint, and every particle of filth and dead bees will come out during the winter. Now put the alighting board in for a door, and turn the buttons top and bottom;

then take a bundle of straight straw—that threshed with a flail is best—cut it off straight the same length as the honey boxes. The honey boxes should be set on the hive with the strips down tight and close together, so that no bees can get out under or between them. Now turn the wires that fasten the glass in, and take off one of the glasses, and lay the straw into the box until it is full. Take a glass from the other box at the opposite end, and fill it with straw. Leave the two glasses off, and put on the outside cap, and your bees are ready for the most severe winter. The boxes, when thus filled with straw, form a perfect screen, allowing the foul air and moisture to pass off, and retaining the heat of the bees. Whenever fine days occur, so that the bees can fly through the winter, the door should be taken out and put in for an alighting board. Some bees will often be lost in the snow, but those are mostly diseased bees and dead ones that have been brought out of the hive. The benefit derived to the colony by having an opportunity to discharge their feces far more than makes amends for what bees are lost. The only time when there is danger of losing many bees is when there is light new-fallen snow, or when it may become cloudy or cold suddenly. When letting the bees out of my hive, draw the alighting board forward until the outside end will be the heaviest, and will balance down, so that the other end will rest under the front edge of the bottom of the hive. This will give the bees a large space to play on and clean themselves, and if the weather is cool, will save the life of many bees. If the board is used this way through the cool cloudy days of spring it will save the lives of hundreds of bees that would otherwise fall around the hive, and become chilled and die.

When bees cannot fly up from the snow but get chilled and die, a bushel or two of coal dust or black earth or tan bark should be scattered thinly in front of the hives. It will absorb the heat from the sun, caus-

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ing the surface to be one-third warmer, and the bees will fly up readily. The entrance of the hive should be towards the south, so that the bees will have the full benefit of the sun when passing in and out of the hive.

To winter bees in box hives, or single-boarded moveable comb hives in the open air, set the hives on a low stand, not more than five inches high, prepared so that the cold air cannot circulate under them. Give entrance below equal to about one square inch. There should be ventilation at the top under the cap equal to two square inches. The cap should be stuffed with straw, and should have an inch hole through each end. This will let the moisture pass off, and prevent the bees from smothering should ice collect around the bottom of the hive. The hives should face the south, and may have a wide board or two put up four or five inches from them on the north side, and the space between the hives and the boards stuffed with straw.

When the hives are ventilated as directed, no matter how much snow lies around them, if they are covered entirely up with snow all the better. When wintering bees in single-boarded hives, I have frequently shovelled dry light snow on the hives until covered a foot or more over the top of them. I have found that bees buried in snow winter remarkably well, and consume but little honey.

Whatever method be adopted for wintering bees, avoid bee sheds, and houses where it will freeze hard, and the sun cannot strike the hives, for the frost often collects on the side of the hive and combs, and prevents the bees from reaching their stores, and they starve with honey in the hive; whereas if the hive had been where the sun would have shone upon it on mild days, the frost would have been melted, so that the bees could have reached their stores.

If bees are in a box hive so constructed that no ventilation can be given them above, the ventilation below should be larger. For a strong stock, two inches square, covered with wire cloth to keep out the mice, would not be too much. The object in giving so much ventilation is to prevent the frost from getting on the combs. It should be remembered that a strong stock of bees seldom if ever freeze while the combs are dry and free from frost.

Mr. Quimby says in his work entitled "Mysteries of Bee-keeping Explained," page 304, "Bees must have air at all times, and must be kept from freezing. The first condition will secure the last. If the bottom of the hive rests on the board, and there are but small openings at the bottom and none at the top, all the moisture condenses on the combs and sides of the hives. A warm day melts it, and everything in the hive is wet. Sudden severe weather freezes all solid. In this way even strong heavy stocks are lost. A special vent should be opened at the top to correspond with the bottom. A current of air passing through will carry off the surplus moisture, and keep the combs comparatively dry, but a great deal of heat that would be beneficial to the bees will go with it. This moisture is received in the cover of the honey boxes, which may with benefit be filled with hay, straw, or cobs to absorb it."

Mr. Langstroth says in his work—"Hive and Honey Bee," page 346,— "If the colonies are strong in numbers and stores, have upward ventilation, easy communication from comb to comb, and water when needed, and the hive entrances are sheltered from piercing winds, they have all the conditions essential to wintering successfully in the open air."

Those who have bees in moveable comb hives that have broad frames will find it beneficial to the bees to cut a hole through the centre of the combs with a pen

knife three-fourth of an inch square, to enable the bees in very cold weather to reach their stores without leaving the cluster to crawl around the edge of the frame. It is not so necessary in my hive, because the frames are not very wide. Therefore I have never taken the trouble. For the last three years, while using my hive and wintering in the open air, I have been very successful in wintering bees, losing scarcely any except a few that among so many were overlooked by mistake and died for want of food.

Most practical apairians agree that bees wintered in the open air begin to breed earlier than those that are housed. It is true that bees that have been housed where it will not freeze are when first set out considerably stronger in numbers, but they die off rapidly during the first three or four weeks after they are set out, so that the bees properly wintered in the open air usually swarm first.

Ques. 63. Is it necessary to supply bees with water?

Ans. I have never found it necessary to supply bees with water during the winter, but in the months of April and May when the bees are breeding freely, they require water; and a great many bees are drowned when getting water, by being blown into it by the wind. Shallow dishes should be placed in the sun, on the south side of buildings, out of the wind. Put in about two inches of water, and strew cut straw over the top of it.

Ques. 64. What diseases are bees subject to?

Ans. The diseases that bees are subject to are few. Probably the greatest scourge that ever bees have been afflicted with is a disease, known as foul brood. In all my long experience I have never seen a case of it,

neither in my own apiary nor that of my neighbors. The disease first affects the sealed brood in the hive, causing the death of the larvæ. It turns black and stinking in the cells, so that the disgusting smell may be perceived some distance from the hive. The worst feature of the disease is that it is contagious. As soon as the disease has progressed so as to affect the brood in most of the combs, the honey in the hive becomes affected with the poison. As the stock soon becomes very weak, other stocks rob away the honey, and carry the infection with them.

Those acquainted with the disease say that as soon as it is discovered that a stock has foul brood, the bees should be driven out and put in an empty hive, and shut up until they have consumed all the honey they have carried with them, and that great care should be taken not to let other stocks get any of the honey.

Mr. Quimby says that the poison in the honey is destroyed by adding one quart of water to ten pounds of honey. Stir it well and heat it to the boiling point, and carefully remove all the scum.

At the Provincial Beekeepers' Convention, held in the city of London, in September, 1869, the question was submitted,—“Has foul brood ever been discovered in Canada?” Several members answered in the affirmative. It was then resolved that cases of undoubted foul brood having been reported, this Association would strongly urge the total destruction by fire of all stocks and hives affected by this dread scourge of beekeeping, so as to prevent its spread.

Ques. 65. What trees and plants are the most valuable for bee pasturage ?

Ans. Trees and plants that yield honey in the early part of the season are very valuable to bees. Not

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only are many light stocks saved by them from starvation, but it induces early breeding. There is but little doubt but for every pound of honey gathered in May, enough extra bees are raised to gather five pounds of honey in June.

The golden willow is one of the first trees to yield honey. It is easily propagated, and grows with astonishing rapidity. The gooseberry and currant are valuable shrubs for producing honey; after those the cherry, plum, pear and apple; next, the sugar maple and the dandelion yield their delicious sweets. The honey locust and the thorn are two valuable trees, blossoming just at the time when the dandelion is failing, and before the yield from the white clover. The common burrs of our forest yields a bountiful supply of honey. Those and the raspberry are very valuable for yielding honey in wet weather, when clover will yield scarce any.

White clover is of great importance. It yields large quantities of honey of the very best quality. It never fails, except in very wet cold weather. Alsike clover not only makes excellent hay, but yields large quantities of honey, and lasts longer than the white clover. Just as the clover begins to fail, the linden or basswood when plentiful supplies the bees with a rich harvest. Squashes yield a large amount of honey; three or four bees may often be seen on one flower. I once counted seventeen in one blossom, and I have frequently seen the Italian bees drive the black bees out of those flowers, and take possession themselves. Melons, pumpkins, cucumbers, and most kinds of running vines produce honey. Thistles, milkweed, burdocks, sorrel, catnip, mustard, and many other weeds that are such pests to many farmers are made to give up their rich nectar to supply the hive of the industrious bee. For fall pasturage perhaps there is nothing more valuable than buckwheat. Where it is extensively sown, late swarms often fill their hives from this source alone.

Ques. 66. What is the best location for an apiary?

Ans. There are but few locations where a few stocks of bees cannot be profitably kept. Still there are locations that are especially adapted to the wants of the bees, and stocks kept in those favored spots will yield much larger returns.

In choosing a location for a large apiary, the first consideration is the pasturage. Some situations only a few miles apart will yield double the quantity of honey that others will.

A piece of land sloping to the south with hills or woods on the north and north-west, to break the wind, would be a desirable location for an apiary. If this cannot be had, a tight fence seven or eight feet high may be built, or a belt of trees may be planted on the north and west, composed of golden willow, honey locust, basswood, thorn, white wood, &c. These kinds of trees grow rapidly, and will in a few years not only break the wind, but will yield large quantities of honey.

Each hive should have a separate stand. It should not be more than five or six inches high, and may be made by nailing an inch board sixteen inches wide, and two feet long on two pieces of 2x4 scantling. The land should be made smooth and level, and seeded with white clover, and the hives put as far apart as the room will admit.

Ques. 67.—Are bee houses necessary?

Ans. Bee houses are not only unnecessary and useless, but are often a source of great loss to their owners. The main objections to them are the following:—

(1.) The cost of construction.

(2.) Those who use them are almost certain to crowd the hives placed in them too close together, and thereby incur the loss of many queens. (See ques. 52.)

(3.) Mr. Quimby says they are objectionable on account of preventing a free circulation of air. Also, it is difficult to construct them so that the sun will strike the hives in the morning and afternoon, which is quite essential. If they front the south, the middle of the day is the only time the sun can reach all the hives at once. This is just the time when they need it least, and in hot weather the combs are sometimes injured by melting. But when the hives stand far enough apart on separate stands, it is very easy to arrange them to stand in the sun morning and afternoon, and be shaded four or five hours in the middle of the day.

(4.) The difficulty of getting around the hives and of opening or handling them without disturbing and enraging all the other stocks is a serious objection to them, especially when moveable comb hives are used.

(5.) They have a tendency to induce robbing, and it is more difficult to tell when others are robbing them. (See question 47.) Besides, they usually afford lurking places for spiders, moths, mice, toads, &c.

Ques. 68. Can bee-keeping be made profitable?

Ans. The profits derived from bee-keeping are in some instances almost fabulous. I will not in this work attempt to publish the extreme statements of some writers, but will content myself with giving some of my own experience.

In the spring of 1864 I set apart six swarms of average prosperity. From the six I had ten extra good stocks, all of which wintered well without feeding, and I took from them two hundred and thirty-

five pounds of surplus honey. Leaving the profits as follows :—

DR.

To interest on \$48, value of six old, at \$8 each.....	\$ 2 88
Estimate of labor.....	10 00
Interest on \$30, value of 10 moveable comb hives.....	1 80
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CR.

By ten new stocks, at \$8 each.....	\$80 00
235 lbs. surplus honey, at 20 cts per lb....	47 00
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	\$127 00
Debits deducted	14 68
	<hr/>
Net profits from six stocks.....	\$112 32

In the year 1868, by no means an extra season, on account of the severe drouth cutting short the honey season very early, from thirty-seven stocks in the spring, I obtained seven hundred pounds of surplus honey, and had thirty-one good stocks, besides selling forty-nine dollars' worth of bees. Leaving the profits as follows :

DR.

To interest on 37 stocks at \$8 each.....	\$17 76
Labor for the season.....	37 00
Interest on thirty-one moveable comb hives at \$3 each.....	5 58
	<hr/>
	\$60 34

CR.

By 31 new stocks at \$8 each.....	\$248 00
700 lbs. honey, at 18 cts. per lb.....	126 00
Bees sold.....	49 00
	<hr/>
	\$423 00
Debits.....	60 34
	<hr/>
Net profit from 37 stocks.....	\$362 66

By the first account it will be seen that the six swarms gave a net profit of \$18 72 each. In the last account, the net profits are \$11 69.

During the past ten years (excepting the year 1869) I may safely say that my apairy has averaged a net profit of six dollars per swarm.

Ques. 69. What is the best remedy for bee stings ?

Ans. Soda or saleratus mixed with hartshorn will generally neutralise the poison and prevent swelling, if applied immediately. The milky juice of the poppy will usually prevent swelling and pain. An excellent remedy, and one usually at hand, is to bathe the part for some time with cold water. It soothes the pain and allays inflammation.

Ques. 70. Are the Italian bees superior to the natives ?

Ans. Having had several years' experience with Italian bees, and having carefully observed their habits, I find them superior to the common black bee in the following particulars :—

(1.) Their individual strength is greater. They fly with greater ease and more rapidly.

(2.) They defend their stores against both the moth-miller and robber bees with double the vigor and energy that the black bees do.

(3.) They breed more rapidly and swarm earlier in the season. Old stocks that have over-swarmed, become populated again much faster than the black bees do.

(4.) They gather honey from flowers that the black bees do not frequent. I have frequently seen them working on the second growth of red clover; but I have never yet seen the black bees work upon it.

Ques. 71. How can a stock of bees be Italianised with success?

Ans. Look over the combs and find the black queen and remove her. Now put the Italian queen into a wire cage, and introduce according to directions given in question 42. In about three months, if in the breeding season, nearly all the stock will be Italians.

Ques. 72. How can a large apairy be Italianised?

Ans. First, be sure to get a pure Italian queen. Introduce her in a strong stock, after removing the black queen. Leave her in a week. Then take her out, and introduce her into another stock. The queenless stock will build queen cells from her brood. Those cells, all but one, are to be cut out in about ten days, and remove as many black queens as you have queen cells, and insert a queen cell according to directions given in question 42. Remove the Italian queen as often as necessary. To get the number of cells wanted, go over every stock until all have Italian mothers. The queens the first season will probably nearly all mate with black drones. The worker bees from them will be hybrids, but the drones will be pure. Hence the next

season, all the drones in the apiary being pure Italians, the work will be half done. Then rear another queen for each hive from the original pure one. There now being none but pure drones in the apiary, the young queens will seldom mate with a black drone. Should there be one mate with a black drone, it may easily be known by the workers being hybrids. When this is the case, remove her and introduce another, or give another queen cell.

Ques. 73. Describe the honey extractor and its uses?

Ans. The honey extractor is a machine in which combs are emptied of their honey by means of centrifugal force. When moveable comb hives are used, the outside frames and those containing the most honey can be taken out of the hive; the bees swept off with a small wing or goose quill; then with a sharp honey knife, shave off the caps, if the honey is sealed over. Then place the comb, frame, and all into the honey extractor. Give it a few turns, and all the honey will fly out of one side. Then change sides with the combs, and throw the honey out of the other side. Put the combs back into the hive, and they will soon be filled again and may be emptied as often as filled.

The bees, not having to build any comb, will store nearly double the amount of honey, but the honey will not be as saleable as that stored in boxes. Still there is but little doubt but that the honey extractor will shortly come into general use, because it will be found that extracted honey can be sold for about one-third less than box honey.

Ques. 74. What care do bees need in January?

Ans. Bees that are housed should not be disturbed any more than is actually necessary to see that all is

right. Bees that are wintered in the open air should be allowed to fly when the weather is mild and the sun warm, unless there is light newly-fallen snow on the ground, in which case the hive should be shaded by putting a board before it. When hives are double-boarded, the bees will not come out except when it is warm enough for them to return. If the weather is very cold, and there is plenty of snow on the ground, it may be shovelled on the hives to protect them from the cold. (See ques. 62.) If the bees are in the box, and have no upward ventilation, examine the hives occasionally to see that the dead bees and ice do not stop the entrance and smother the bees.

Ques. 75. What care do bees need in February ?

Ans. Hives that have flat bottom boards should be cleansed whenever the weather is sufficiently warm for the bees to fly. Stocks that are short of stores may be fed with candy or honey. (See ques. 60.) Bees that are housed should be left undisturbed as much as possible. Should any become uneasy, it may be known by some of them leaving the hive and smearing the combs with feces. They should be set out of doors the first day that is warm enough for them to fly, and returned again at night.

Ques. 76. What care do bees need in March ?

Ans. When warm days occur give the bees flour for pollen. (See ques. 25.) Clean out all dead bees and filth out of flat-bottomed hives. Regulate the entrance according to the strength of the colony. Remove bees that are housed on warm days, and set them on the stands where they are to remain during the season. Be sure and feed all needy stocks, and keep a sharp lookout for robbers whenever the weather is warm.

Ques. 77. What care do bees need in April ?

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Ans. The labors of the season fairly commence with bees in this month. Continue to give flour for pollen until the bees begin to collect it from other sources. Remove the absorbing material and stop all upward ventilation, so as to give the bees the benefit of all the heat they can generate. Immature bees or eggs may often be found on the bottom of the hives, and are a sure indication that the bees have a laying queen. If no such indications appear, and the bees are weak, they should be examined to see that they are not queenless. If queenless, add bees to a weak stock that has a fertile queen. When examining hives, do it towards evening, and it will not be likely to induce robbing. Be careful not to expose any honey or sweet for the bees to get a taste of, as it is sure to induce robbing. Turn box hives bottom up on a fine clear morning, and place them so that the sun will shine down between the combs, and then see that there are no clumps of dead bees wedged in between the combs. If there are, remove them with a bent piece of wire. Feed all needy stocks until the apple trees blossom.

Ques. 78. What care do bees need in May?

Ans. Do not give the bees access to the boxes until the first white clover blossoms appear, because it allows part of the heat to escape, and thereby retards breeding. As soon as boxes are put on, induce the bees to commence in them at once, by taking a piece of white comb and dipping one edge in melted bees wax, and stick it fast in the top of the box before cooling. Give ventilation and entrance room according to the weather and the strength of the colony. If the bees are to be swarmed artificially, steps should be taken toward the end of the month to have queen cells ready for one when wanted. (See ques. 42.)

Should a stock be found queenless at this season, a

queen may be taken from a strong stock and given to it, leaving the strong stock to rear a queen. Stocks that are weak should have a comb or two of brood given to them, taken from strong stocks that can spare them.

When examining stocks, if there is much drone comb in them, remove it, and put in worker comb, if on hand, or place the drone comb at the sides of the hive where it will be used for storing honey in. All the hives that may be needed should be painted and ready for use. White lead and linseed oil is the best paint. It stands the weather best, and is cooler both in summer and winter.

Ques. 79. What care do bees need in June ?

Ans. Give honey boxes to all strong stocks as soon as the white clover blossoms. As soon as one box is partly full, give another, so as to have plenty of room for every bee to work to advantage. (See ques. 49.) If the weather is hot, and stocks very strong, remove front stop of my hive. This will give the bees upward ventilation and a short road to the honey boxes. If the bees are permitted to swarm naturally, close attention will be required. Be very careful not to allow the bees to over swarm. One good swarm is enough to prevent swarming. (See ques. 34.) If any stocks seem less prosperous than others, the cause should be sought for and removed.

Ques. 80. What care do bees need in July ?

Ans. Remove honey boxes as fast as filled, and put empty ones immediately on. If boxes remain only for a few days after they are filled, the combs become darker, and the honey will not sell as well. Paste thick paper over the bottom of the honey boxes, and store them in a cool dry place, top side up, or take immediately to market. Return after swarms to the pa-

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rent hive, or unite two or three of them together. (See ques. 36.) Strengthen all weak colonies by giving them combs of brood taken from strong stocks. When the yield of honey is very great, a strong stock will often store its combs so full of honey as almost to stop breeding. The bees will then cluster idly about the entrance. The remedy is to use the honey extractor, or remove the outside frames of honey, and shift the other frames out in the place, and put empty frames in the centre of the hive, and the bees will work as vigorous as a young swarm. Transferring may be done now. For directions see ques. 47.

Ques. 81. What care do bees need in August ?

Ans. The honey harvest will usually fail during this month. The bee-keeper should keep a sharp lookout for robber bees. They will try stocks that are queenless most. When this is observed, they should be examined, and if weak or queenless, take out the bees and unite them with another stock, and save the contents in the frames to feed other bees with.

When opening hives, be careful that other bees do not commence to rob them, for if they once begin, it will be hard to stop them. (See ques 45.)

Ques. 82. What care do bees need in September ?

Ans. Scarcely any honey will be obtained this month. Stocks that have not destroyed their drones are probably queenless, and should be examined, and the remedy applied. Decide what stocks are to be wintered, and if they have not sufficient honey, give them honey in frames, or feed strained honey or thick syrup sufficient to carry the bees through the winter. (See ques. 60.) Stocks that are to be wintered should have about twenty-five pounds.

Ques. 83. What care do bees need in October ?

Ans. All stocks that are to be wintered should have plenty of bees as well as honey. Take up stocks that have not sufficient stores, and unite the bees with stocks that have plenty of honey, but are weak in numbers. Two light stocks may be made into one good one. Contract the entrance to the hives to prevent robbing.

Ques. 84. What care do bees need in November ?

Ans. If the directions for the previous months have been carried out, but little remains to be done, except to see that no robbing is done on warm days. If anything has been neglected, do it at once, if the weather will permit.

Ques. 85. What care do bees need in December ?

Ans. Prepare all stocks for winter, according to directions given for ques. 62. Bees that are to be housed should be put in as soon as the winter has fairly set in. (See ques. 61.)

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S. H. MITCHELL'S
PATENT
COMBINED HIVE & BEE HOUSE.



DESCRIPTION OF CUT. — "A," Moveable Cover. "B," Honey Box standing on its end—bottom view. "C," Comb Frame drawn out. "D," Button to shut up door in Winter. "E," Robber Stop. "F," Bottom of Hive. "G," Alighting Board in Summer, and Door to shut up House in Winter.

THE MOST PERFECT.

THE MOST USEFUL,

THE MOST DURABLE,

AND

ORNAMENTAL HIVE

EVER OFFERED TO THE PUBLIC.

ADVANTAGES OF THE PATENT COMBINED HIVE & BEE HOUSE.

1st. It is a combined hive and bee house, the hive being enclosed in the house ; it requires no stool or bench, and there being a perfect hollow wall all around the bees, and door to shut them up in winter, it requires no protection from heat in summer or cold in winter.

2nd. It is a self-cleansing hive, summer and winter; the bottom being an inclined plane of half-pitch it is kept perfectly clean, leaving no dead bees, comb dust, or filth for the miller to deposit her eggs to hatch and destroy the bees. It is so protected by the house and outside door that it may be opened wide in winter sufficient to be perfectly self-cleansing, thus keeping the bees dry and healthy, and the combs from moulding, and saving labor to the bees and their owner, and also gives the bees the advantage of robbers or insects entering the hive.

3rd. It has superior comb frames to any now in use, being of such a shape that only one small corner of the comb and honey comes near the entrance, enabling a weak swarm to protect themselves from robbing bees and millers, and as they are raised out of the hive they clear themselves more and more ; and as the bees do not have to build their combs so wide they build them straight-r.

4th. It has moveable ends that lift out readily, giving room to examine every comb without lifting them out of the hive. They also give room to lift them when the combs are built wavy or crooked. They give room when necessary to put in two extra frames in strong stocks to be filled for table use, or to supply weak swarms for winter.

5th. The bottom is hung so as to close entirely or be opened to any size, thus giving the bees entrance room or ventilation as circumstances require it, and can be adjusted so as to shut out drones and destroy them when not wanted.

6th. It has comb frame stops that cover the ends of frames, preventing the bees from gluing them fast. They also prevent the necessity of rabbeting or grooving inside of hive, and when said stops are taken off all the frames are loosened at once, so as to lift or slide them with ease.

7th. The honey boxes are constructed with strips, the openings coming directly over the spaces between the comb frames, so that the heat of hive and the bees can enter the boxes at every part. The queen and drones are excluded from the

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boxes, preventing all risk of brood, and when taken off and turned over, the bees run directly out, leaving the honey pure and white. The glass ends are easily removed, so that the honey can be taken out without breaking the boxes.

8th. It will give more box honey than any other hive; the heat and bees of the body of the hive coming in direct connection with the boxes, and by turning over the front stop and shifting the cap a little back, the bees can enter directly into the boxes without passing through the body of the hive.

9th. It has outside door that answers several purposes: that is, to close up for protection and warmth in winter; it keeps the entrance perfectly dark, so that the bees are not lost by flying in winter; when weak swarms are being robbed, by shutting this door for a day or two the robbing is stopped at once. This door forms an alighting board in summer, and can be drawn out to form a table to shake bees on when hiving.

10th. It has robber stop for weak swarms, so that only one or two bees can pass in and out at the same time.

11th. The alighting board is large and the entrance protected from the weather, so that bees are not lost by falling around the hive and getting chilled in cold weather.

12th. It is perfectly ventilated in winter; the cold air passing around under the bottom does not come directly to the bees. The entrance being perfectly dark, the bees remain inactive, and consume less honey. The glass is taken from the boxes and they are stuffed with straw; they thus form a screen, letting the foul air and moisture pass out and retaining the heat.

13th. It requires no bench or stool, is simple in all its parts, and easily made, and does away with the necessity of expensive bee houses.

LASTLY. It has all the advantages of the moveable comb system, which enables the apiarian to have perfect command of every comb, to cut out moth nests or drone comb, to take honey from body of the hive, to give queen or brood to weak swarms, to practice artificial swarming, to make two or more weak swarms into one strong stock.

It is the result of over twenty years' extensive experience in Bee Culture, and is guaranteed to possess greater and more advantages than any other Hive, especially for wintering bees. It is warranted to be perfectly self-protecting, and self-cleansing, even during the longest and most severe winters. Prizes were awarded to it at the Provincial Fairs held in Hamilton, 1868, and in London, 1869.

TESTIMONIALS.

MISSOURI, March, 1871.

MR. S. H. MITCHELL, —SIR, —I have used your hive for two seasons, and can safely say they are all you recommend them to be. They are the best for surplus honey I have ever used. The bees winter well in them without housing, and not a particle of filth remains in them during our longest winters.

JOSIAH WHETSTONE, ESQ.

ST. MARYS, December, 1868.

MR. S. H. MITCHELL, —SIR, —The combined hive and bee house received from you 19th June last, with young swarm of bees, has given perfect satisfaction. Although the honey season was cut short by the severe drouth, the body is well filled, and I obtained 10 lbs. of pure box honey. Although exposed to the severe heat and sun of the past season, the bees worked admirably, and not a particle of honey melted down. I believe it is the most perfect hive I ever saw, and unequalled for surplus honey.

JAMES L. BARRON.

STRAFORD, Dec. 14th, 1868.

S. H. MITCHELL, St. Marys, —SIR, —I used your patent hive last season, and it gives me entire satisfaction. I have several patent moveable comb hives in use, but I find your hive unequalled for surplus honey, and it has other advantages that no other hive with which I am acquainted possesses. Yours truly,

G. W. LAWRENCE, Solicitor.

MISSOURI, December 19th, 1868.

MR. S. H. MITCHELL, —SIR, —We find your combined hive and bee houses is just what you claim for it; perfectly self-protecting and perfectly self-cleansing, summer and winter. It is the best we have seen.

J. F. OTWELL & SON, Gardeners.

 PRICES.

One combined hive and bee house with two honey boxes, glass ends, holds 36 lbs. of honey, with Individual Right and printed description how to make, \$6. Parties purchasing at the above rate, which always includes the right to make, and preferring to order of me rather than make, will be supplied at \$3 each. Orders promptly filled on receipt of price by mail or otherwise.

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THE BEE-KEEPERS' CATECHISM, BY S. H. MITCHELL,

Is a complete reference book of nearly 90 pages, giving minute directions on the culture of the Honey Bee, both in common and moveable Comb Hives, and illustrates a system of artificial swarming by which good swarms can be made two weeks in advance of natural swarming. It is written not from theory, but is the result of over twenty years' extensive practical experience in bee culture. Price 25 cents each; \$2 per dozen. Post-paid by mail on receipt of price.

ITALIAN BEES AND QUEENS.

Having Italianized my large Apiary, I can now furnish about one hundred swarms of Italians every season at the following low prices: A good swarm in my Patent Combined Hive, with two Honey Boxes, with individual right, and printed directions how to make and how to use, \$12, Italian queens each, \$1. Bees sent safely by express to any part of Canada during the month of June. Queens ready about the 1st of July.

Practical lessons given in artificial swarming on the first and second Tuesdays in June, free to all who may wish to attend.

Agents Wanted in Every Township. County and Township Rights for Sale.

S. H. MITCHELL,

Apiarian and Market Gardener, Elgin St., St. Marys.

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INDEX.

- Question 1. What constitutes a good swarm of bees?..... 7
- Question 2. Give a description of the queen?..... 7
- Question 3. What benefit is the queen to the colony?..... 8
- Question 4. How long will a queen live?..... 8
- Question 5. When the queen dies or is taken away, what
is the result?..... 8
- Question 6. Give a description of the drone?..... 9
- Question 7. Of what use are the drones?..... 9
- Question 8. How long will a drone live?..... 10
- Question 9. Give a description of the worker bee?..... 10
- Question 10. How long does the worker live?..... 11
- Question 11. When do the colony begin to rear brood?... 11
- Question 12. How long a time is required to develop a
queen?..... 12
- Question 13. How long a time is required to develop the
worker?..... 12
- Question 14. How long a time is required to develop a
drone?..... 12
- Question 15. Is there any difference between the eggs that
produce queens, workers, or drones?..... 12
- Question 16. How are queens impregnated?..... 13
- Question 17. What is the result of retarded impregnation? 13
- Question 18. What is the difference between a fertile and
unimpregnated queen?..... 14
- Question 19. How is it possible for impregnated eggs to
hatch?..... 15
- Question 20. How is the wax for building combs obtained? 15

- Question 21. What is the value of a pound of wax in the comb ?..... 15
- Question 22. How many kinds of cells are there ?..... 16
- Question 23. How do bees get propolis, and what use do they make of it ?..... 17
- Question 24. What is pollen, and what do the bees-use it for ?..... 17
- Question 25. What can be given to bees as a substitute for pollen ?..... 18
- Question 26. Describe the process of natural swarming, and how queens are reared ?..... 18
- Question 27. What is the difference between the issue of first and second swarms ?..... 22
- Question 28. What are the indications of second and after swarms ?..... 23
- Question 29. How long a time will bees continue to swarm? 23
- Question 30. Why do bees sometimes return after swarming ?..... 24
- Question 31. How can it be told if the queen is with the swarm when on the wing ?..... 24
- Question 31. Why do bees cluster when they swarm?..... 25
- Question 33. How can bees be prevented from going to the woods ?..... 26
- Question 34. How can swarming be prevented in moveable comb hives ?..... 26
- Question 35. How can swarming be prevented in box hives ?..... 27
- Question 36. What should be done with after swarms ?.... 27
- Question 37. How often should bees be allowed to swarm ? 28
- Question 38. How should bees be hived ?..... 29
- Question 39. How can swarms be separated when they cluster together ?..... 31
- Question 40. What are the advantages of artificial swarming ?..... 33

- Question 41. When should artificial swarms be made? 34
- Question 42. Describe the method of making artificial swarms? 34
- Question 43. What rules should be carefully observed when making artificial swarms? 38
- Question 44. How can bees be quieted and handled without danger from their stings? 39
- Question 45. Describe the method of opening a moveable comb hive? 40
- Question 46. When is the best time to open moveable comb hives? 42
- Question 47. How can bees and combs be transferred from the box hive to moveable comb hives? 42
- Question 48. What rules should be observed when transferring bees? 43
- Question 49. How can the largest amount of surplus honey be obtained? 43
- Question 50. When should honey boxes be put on? 45
- Question 51. What is the best plan of taking off honey boxes and getting rid of the bees? 45
- Question 52. How are queens usually lost? 46
- Question 53. What are the indications of loss of queen? 47
- Question 54. What should be done with queenless stocks? 48
- Question 55. How can bees be united successfully? 49
- Question 56. How can it be known when bees are robbing? 50
- Question 57. What rules should be observed to prevent robbing? 51
- Question 58. How can robbing be stopped? 53
- Question 59. How can the ravages of the moth miller be prevented? 54
- Question 60. What rules should be observed when feeding bees? 56
- Question 61. How can bees be wintered successfully when housed? 59

Question 62. How can bees be wintered successfully in the open air?	60
Question 63. Is it necessary to supply bees with water? ...	65
Question 64. What diseases are bees subjected to?	65
Question 65. What trees and plants are the most reliable for bee pasturage?	66
Question 66. What is the best location for an apiary?	68
Question 67. Are bee houses necessary?	68
Question 68. Can bee-keeping be made profitable?	69
Question 69. What is the best remedy for bee stings?	71
Question 70. Are the Italian bees superior to the natives? 71	
Question 71. How can a stock of bees be Italianized with success?	72
Question 72. How can a large apiary be Italianized?	72
Question 73. Describe the honey extractor and its uses? 73	
Question 74. What care do bees need in January?	73
Question 75. What care do bees need in February?	74
Question 76. What care do bees need in March?	74
Question 77. What care do bees need in April?	74
Question 78. What care do bees need in May?	75
Question 79. What care do bees need in June?	76
Question 80. What care do bees need in July?	76
Question 81. What care do bees need in August?	77
Question 82. What care do bees need in September?	77
Question 83. What care do bees need in October?	78
Question 84. What care do bees need in November?	78
Question 85. What care do bees need in December?	78

ADVERTISEMENTS—

Of Hives,	79
Of Italian bees,	83
Of Italian queens, &c.	83

he
.. 60
.. 65
.. 65
le
.. 66
.. 68
.. 68
.. 69
.. 71
s? 71
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.. 83
.. 83

