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A MANUAL

OR AN

EASY METHOD

OF

MANAGING BEES.

BY JOHN M. WEEKS,
OF SALISBURY, VT.

FOURTH EDITION.

PUBLISHED AT BRANDON.

1859.





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A
MANUAL,
OR AN
EASY METHOD
OF
MANAGING BEES,
IN THE MOST
PROFITABLE MANNER TO THEIR OWNER,
WITH
INFALLIBLE RULES TO PREVENT THEIR
DESTRUCTION BY THE MOTH.

BY JOHN M. WEEKS,
Of Salisbury, Vermont.

Fourth Edition.

BRANDON:
VERMONT TELEGRAPH OFFICE.

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A MANUAL,
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EASY METHOD
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MANAGING BEES.

RULE I.

OF THE CONSTRUCTION OF A BEE-HIVE.

A Bee-Hive should be made of sound boards, free from shakes and cracks: it should also be planed smooth, inside and out, made in a workmanlike manner, and painted white on its outside.

REMARKS.

That a Bee-Hive should be made perfect, so as to exclude light and air, is obvious from the fact, that the bees will finish what the workman has neglected, by plastering up all such cracks and crevices, or bad joints, as are left open by the joiner. The substance they use for this purpose is neither honey nor wax, but a kind of glue, or cement of their own manufacturing, and is used by the bees, to fill

up all imperfect joints, and exclude all light, and air. This cement, or glue, is very congenial to the growth of the Moth, in the first stages of its existence.

The moth-miller, enters the hive, generally, in the night—makes an incision into the glue, or cement, with her sting, and leaves her eggs deposited in the glue, where it remains secure from the bees; it being guarded by the timber on its sides. Thus, while a maggot, (*larva*,) the moth uses the cement for food until it arrives so far towards a state of maturity as to be able to spin a web, which is more fully explained in remarks on Rule 10.

The size of a hive should be in accordance with the strictest rules of economy, and adapted to the peculiar nature and economy of the honey-bee, in order to make them profitable to their owner.

The lower apartment of the hive, where they store their food, raise their young bees, and perform their ordinary labors, should hold as much as a box of thirteen inches and one half or fourteen inches square, or one bushel.

Nature has fixed certain principles in the peculiar instinct of the honey-bee, which are unalterable by human wisdom.—(See General Observations.)

If the hive is much larger than the one already described, the bees cannot work to advantage, and will not be likely to fill the drawers in several years if they swarm, and their prosperity depends principally on swarming, for it is their nature to do so, and any management which counteracts their natural habits, impedes them in their labors, and renders them of little profit to their owner; and they finally run out, or come to an end in a few years.

Bees in large hives never swarm; and those in hives much less than the one already described, do but little else than raise young bees, and lay up a sufficient quantity of food to supply them through the coming winter, and are more liable to be robbed.

All hives of bees that swarm, are liable to swarm too much, and reduce their colonies so low in numbers as to materially injure them, and is frequently the cause of their de-

struction by the moth, which is more particularly explained in remarks on Rules 2 and 10.

The chamber of the hive should hold about two-thirds as much as the lower apartment, and be made perfectly tight, so as to exclude all light from the windows of the drawer, and also to protect them from the chilly night-air:—otherwise, the cold air of night so alters the condition of the animal heat in the drawer, that the bees are compelled to lie in idleness until an equilibrium can be formed in the box the following day. Bees make comb in the night, and fill up the cells with honey in the day-time. Comb is made of honey, ruminated in the stomachs of the working bees: it exudes from the interior of its abdomen, and forms in little flakes betwixt its folds, and is taken by the bees in their mouth from thence, and welded on to enlarge the cells and fill up their tenement with comb. Now, as it requires an exact uniformity of heat in all cases to make comb and enlarge the cells of a colony, we are able to account for the fact that bees will store much more honey

in drawers than *caps*, which are more exposed to the cold and damp air of night.

Drawers should be small, like No. 2, 4, and 8, for all purposes except such as are used for multiplying colonies and transferring swarms, which should always be large, like No. 1.

Hives should have cleats on their sides, so as to suspend them in the air, some distance from the floor of the apiary, the better to secure the bees from destruction by mice, reptiles, and other vermin.

The back side, or rear of the lower apartment of the hive, should slant forward so as to render the same smallest at the bottom, the better to secure the combs from falling when cracked by frost, or nearly melted in hot weather.

No timbers or boards should be placed very near the lower edge of the hive, because it facilitates the entrance of depredators. That the back side should slant forward, is obvious from the fact, that bees generally rest one edge of their combs on that side, and build towards the front in such a manner as to enter upon the same sheet where they intend to

deposit their stores, when they first enter the hive, without being compelled to take any unnecessary steps.

The bottom of the hive should slant downward from rear to front, so as to afford the greatest facility to the bees to clear their tenement of all offensive substances, and let the water, which is occasioned by the breath and vapor of the bees, run off in cold weather.—It also aids the bees very much in preventing the entrance of robbers.

The bottom board should be suspended by staples and hooks near each corner of the hive, in such a manner as to afford a free entrance and egress to the bees on all its sides, which will better enable them to keep their tenement clear of the moths.

There should be a button attached to the lower edge of the rear of the hive, so as to enable the apiarian to govern the bottom board in such a manner as to give all the air they need, or close the hive at pleasure.

The hive should have two sticks placed at equal distances, extending from front to rear, resting on the rear, with a screw driven thro'

the front into the end of the stick, which holds it fast in its place, and a ventilator near the top of the lower apartment of the hive, to let off the vapor which frequently causes the death of the bees in the winter by freezing.

The door to the chamber should be made to fit in the rabbings of the same against the jams, in such a manner as to exclude the light from the windows of the drawers, and also to prevent the entrance of the little ants. It should also be hung by butts, or fastened by a bar, running vertically across the centre of the door, and confined by staples at each end. The under side of the chamber floor should be planed smooth, then scratched with a sharp scratch, so as to raise little ridges, to enable the bees to hold fast, otherwise they may fall suddenly upon the bottom board, which may induce them to leave the hive and flee to the woods. That the inside of the hive should be made smooth is evident, from the fact that comb adheres much more firmly to a smooth board than it does to the small fibres, or splinters which are left by the saw, and the comb is less likely to drop.

Some good managers of bees, have recommended rubbing the inside of the sides of the hive with bees-wax, to enable the bees to hold fast until they had secured the comb at the top of the hive, where they always commence their labors. The old custom of washing the hives with salt and water, sweet herbs, and other substances, to give them a pleasant effluvia, should be speedily abolished.

When bees die, the hive should be cleared of its contents, and scraped out, and the chamber rubbed with a cloth wet in clear water, then set in its place in the apiary, and there let it stand until wanted for use. An old hive thus prepared, is better than a new one for the reception of a swarm of bees. The task, which is arduous and difficult in attaching the comb to the new wood, in this case, has been accomplished by the previous swarm.

Note—It is found by experiment that the combs in all hives, under two years old, that are robbed, die of starvation, or otherwise, may be preserved for a new swarm, which forwards the labors of a new colony, nearly half, if the combs remain in a good state of

preservation. The apiarian should examine before using, to see that the hive is clear from spiders and cobwebs.

There should be three sheet-iron slides, which answers for a whole establishment.— One of which should be nearly as wide as the chamber, and one or two inches longer than the length of the chamber. The other two should be the same length of the first, and half its width only.

All hives, and all their appendages, should be made exactly of a size, and shape, in the same apiary.— The trouble of equalizing colonies is far less than it is to accommodate hives to swarms. Much perplexity, and sometimes serious difficulties occur, where the apiarian uses different sized hives, and drawers. But this part of the subject will be more fully discussed under its proper rule.

A perfect snow-white is the best color for a bee-hive. All shades of colors are conductors of heat and cold, in proportion to their proximity towards a perfect black. It is better to let the hive remain the color of the wood than paint any shade of color, which may be the

cause of melting the combs in summer, or freezing the bees in winter. To preserve the greatest uniformity of temperature in the hive, both summer and winter, the apiarian will find it for his interest to make all his hives of plank at least one and a half inch thick, or boards three-fourths of an inch thick, doubled in such a manner as to exclude insects from the joints.

R U L E II.

ON SWARMING AND HIVING.

The apiarian, or bee-owner, should have his hives in readiness, and in their places in the apiary, with the drawers in their chambers, bottom up, so as to prevent entrance.

When a swarm comes forth, and has alighted, cut off the limb, if convenient, (unless the hiver is used)—shake it gently, so as to disengage the bees, and let them fall gently on to the table, board or ground, (as the case may be,)—place the hive over them before many rise into the air, taking care at the same time to lay one or more sticks in such a manner as to raise the hive so as to give the bees rapid ingress and egress. If the bees act reluctant-

ly in taking possession of their new habitation, disturb them by brushing them with a goose-quill or some other instrument not harsh, and they will soon enter. In case it is found necessary to invert the hive to receive the bees, (which is frequent from their manner of alighting,) then first secure the drawers down to the floor, by inserting a handkerchief or something above them: now invert the hive and shake or brush the bees into it: now turn it gently right end up on the table, or other place, observing the rule aforesaid.

REMARKS.

Bees swarm from 9 o'clock in the morning to 3 o'clock in the afternoon on a fair day, differing in the season according to the climate. In Vermont, they generally swarm from the middle of May to the 15th of July: in late seasons some later. I have known them to swarm as early as 7 in the morning, and as late as 4 in the afternoon. I have also known them to come forth when it rained so hard as nearly to defeat them by beating down many to the ground which were probably lost from their colony; and I once had a swarm come forth on the 16th day of August.

Two reasons, and two only can be assign-

ed for the swarming of bees. The first is want of room, and the second, to avoid the conflict of the Queens. It may be possible that a swarm may come forth before the hive is full of comb, but from more than forty years observation, I have never seen an instance of it, when the hive was not full of bees at the first swarming. This is always the cause of their first swarming, unless the stock had lost their Queen previous to swarming, in which case, the colony assume the condition of a hive that has once swarmed, and may come out before the hive is full of comb or bees.

The old Queen goes out with the new colony, and leaves the remaining stock without a head, (or female.) But nature has supplied them with the instinct, and they commonly have the means of repairing the loss, which a new colony, unaccompanied by a Queen, could not obtain. They have the *larva* or grub of the common worker, and the power to convert it to a Queen. They soon discover their loss, and immediately set themselves to work to fill the vacancy, in constructing several royal cells into which they remove the young grubs which

would have become workers, and by feeding them on royal jelly, in a few days they have a Queen. The eggs are commonly laid in litters, about three times a week, during the breeding-season; and the bees, to be more sure of succeeding in their experiments, divide themselves into squadrons, and undertake to make more than one, by taking them from different litters, and also avoid the confusion of having a number of Queens hatch at the same time. This fact accounts for hearing more than one Queen at the same time. Two Queens cannot exist together long in the same hive. Nature has implanted an implacable hatred betwixt them, and as soon as the notes of the first-hatched Queen are heard, they are answered by tones of defiance by the nymph Queen younger, which is yet in her cell, and has not seen the light; and if not prevented by the workers, her elder sister tears her from her cell, and immolates her to her love of undisputed sway. But if the bees should be sufficiently numerous to protect their Queen of their own making, for whom, as the work of their own hands, they seem to have a blind

attachment, the elder Queen collects her followers, sallies forth, and seeks a new habitation. This is the cause of second and third swarmings which take place, and which frequently so weaken the hive as to cause many of the evils to which bees are subjected, for which I think I have discovered the remedy. See remarks on Rule 10.

If the second swarm does not come out before the 17th day, there is reason to believe that the Queen has disposed of all her competitors, and there will be no further swarming that season. The first Queen is usually heard the 8th day after the first swarming.

I know of no rule by which the exact day of their first swarming can be known with certainty. The apiarian will estimate near the time by the number of bees in and about the hive, as it will become very much crowded.

The day of second swarming, and all after that during the same season, may be most certainly predicted, as follows: Listen near the entrance of the hive in the evening. If a swarm is coming forth the next day, or in a short time, the Queen will be heard giving an alarm at

short intervals. The same alarm may be heard until swarming takes place, or one Queen is destroyed by the other. The observer will generally hear two Queens at a time in the same hive—the one much louder than the other. The one making the least noise, is yet in her cell, and in her minority.—The sound emitted by the Queens is peculiar, differing materially from that of any other bee. It consists of a number of monotonous notes in rapid succession, similar to those emitted by the mud-wasp when working her mortar, and joining it to her cells, to raise miss-wasps. If, after all, the weather is unfavorable to their swarming several days while in this peculiar stage, they will not be likely to swarm again the same season.

Bees are very tenacious to preserve the lives of their sovereigns, particularly those of their own raising; and when they find they have more than one in the hive, they will guard each so strong as to prevent, if possible, their coming within reach of each other. They being thus strongly guarded to prevent the fight, is unquestionably the cause of their giving the

alarm, as described in the foregoing article.— The knowledge of the existence of another Queen in the same hive, inspires them with the greatest uncasiness and rage ; and when the oldest one finds herself defeated in gaining access to her competitor, she sallies forth with as many as see fit to follow her, and seeks a new habitation.

Before the bees sally forth, they fill their sacks with honey, and some of them carry bread on their legs, which supplies their wants, till they have found a new residence, and laid the foundation of their cells. In a very crowded state of the hive, many bees are sometimes compelled to lie out before the Queen leaves, and in the confusion of swarming, not being apprised of her intention to depart, leave without filling their sacks, and this is one cause of the irritability they manifest. This difficulty is obviated in the Vermont Hive. The drawers furnish them room for their labors till the Queen and all her followers have finished their arrangements, and are not compelled to leave empty-handed.

Another reason why bees are sometimes ir-

ritable, and are disposed to sting when they swarm, is, the air is forbidding to them, by being cold, windy, damp, extremely hot, or otherwise, so as to impede them in their determined emigration. In all such cases, the apiarian should be furnished with a veil, made of millinet, or some light covering which may be thrown over his hat, and let down so low as to cover his face and bosom, and fixed in such a manner as to prevent their stinging.— He should also put on a pair of thick woollen gloves or stockings over his hands, thus managing them without the least danger.

Experience and observation have taught that the Queen leaves the old stock first, and her colony rapidly follow. They fly about a few minutes, apparently in the greatest confusion, until the swarm is principally out of the hive. They then alight, generally on the limb of some tree, shrub or bush, or some other place convenient for them to cluster in a bunch not far from the old stock, and make their arrangements for a journey to a new habitation. Perhaps not one swarm in a thousand know where they are going, until after they have

left the old stock, alighted, and formed into a compact body, or cluster ; and not then, until they have sent off an embassy to search out a place for their future residence. Now, if the bees are hived immediately after they have alighted, before they send off their embassy to seek a new tenement, they will never fly away, admitting they have sufficient room, (for it is want of room that makes them swarm in the first place,) and their hive is clear of every thing that is offensive to them.

It is proper then that bees should be hived immediately after they have clustered in a body. If this is not done before they have had time to send off an embassy to select a proper habitation, they should be immediately moved to the apiary, or to some place several rods from the spot where they alighted, in order that they may not be found by their messengers at their return. That bees do send forth messengers to seek out a new residence after they have swarmed, and clustered in a body, is evident from the fact that many swarms have been known to enter and take up their abode where a few bees were seen a short

time previous. They likewise have been known in frequent instances to remain over night, and even several days and nights, before they left for the woods; and furthermore, when the bees go direct from the old stock, the bee-hunter takes their course, by setting his compass, and fixing the old stock as his starting-point; for bees always take a direct and straight course towards their new residence, when they first start. Now if the hunter takes the old stock as his starting-point, in connexion with the place where the bees clustered in a body, he will run as far from his bees as east is from any other point of the compass.

Although bees have several thousand eyes, yet, they are fixed in their places in their head, like so many suns, and as they do not turn in their sockets, like the eyes of men and quadrupeds, they are unable to traverse a crooked path without extreme difficulty: and when their sight is entirely obstructed for any length of time, they are compelled to alight.

When bees leave for a new residence that is unknown to their owner, several miles distant,

(and it is believed that bees even see the tree they have selected for their residence, among many others,) and if the wind blows so strong as to vary them from their course, if their observation is not impeded, they will go direct to it: but if a hill intervenes so as to entirely obstruct their sight, they may be usually found clustered in a body not far from the direct line, before they descend the hill on its opposite side. It is believed that the wind, in such cases, usually sags them out of their course; and although it may be but a few steps, yet the bees get so confused that they are compelled to re-organize before they can proceed on their journey.

Experience has taught it is best to remove the new swarm to the place where it is intended to stand during the season, immediately after hiving. They are creatures of habit, and very soon become associated with the objects and places about them; and if their hive and companions are not found in the usual place, they have no means of finding them. More or less bees are lost by every removal; and the longer they remain in the place where they are hived, the more will be lost when removed.

No confusion or noise which is uncommon to the bees should ever be made during their swarming or living. The only effect of noise, ringing of bells, &c., that I could ever discover, was, to render them the more hostile and unmanageable.

A clean hive is all that is needed for a swarm of bees, with careful and humane treatment.

A cluster of bees should never be shook, or jarred any more than merely to disengage them from the limb or place where they are collected, nor should they fall any great distance, because their sacks are full when they swarm, which render them both clumsy and harmless, and harsh treatment makes them irritable and unmanageable.

When bees go from the old stock direct to the woods, without alighting, it is when they lie out of the hive before swarming. It is believed that they, being clustered in a body on the outside of the hive, assume the organization of a regular swarm, and their embassy is sent forth to search out a new residence before the swarm leaves the old stock. This difficulty is obviated in the Vermont Hive. In

stead of lying out before swarming in idleness as in the old box, they go up into the drawers, and are constantly employed in depositing the fruits of their labors, and are less liable to organize in a body before swarming. It is indeed true that bees have been known to leave and go directly to the woods when they did not lie out before swarming. But, in all such cases with which I am conversant, an attempt to swarming had been made previous, and the bees had returned to the old stock.

Bees become associated with the human family, and will not often flee to the woods, unless they are neglected by their owner, or driven away by bad management. One of the principal causes of fugitive swarms is, want of vital air in the hive. The heat of the sun exhausts the air in the hive of its vitality in a few minutes, in a very hot day, and the bees are compelled to leave it. In 1838, many swarms were known to leave green trees where they were not well shaded by their own branches, and that of other trees. Special care should be exercised by the apiarian that the rays of the sun are excluded from the

hive. Animal heat in the hive is absolutely necessary to enable the bees to make comb; but *pent* heat is fatal, both to the lives of the bees, and their work. An umbrella should be held over the hive during hiving the bees in a hot day, unless it can be otherwise shaded.

No inconvenience will result from letting the bees into the drawers, in first hiving them, if the colony is so large that a majority of them cannot occupy one of them.

Bees commence making their comb where the largest proportion of the colony have sufficient room to work. Now, if a majority of the bees can get into one of the drawers, they will begin to make comb there, (for they always commence at the top and work down,) of course they will raise young bees and deposit bread in the drawer. If the swarm is so large as to be unable to work in the drawer, there is no danger of letting them in; and yet, if the swarm is very large, there may be danger, if the bees are prevented from entering the drawer, because they sometimes go off for want of room in the lower apartment. I therefore recommend letting the bees into the drawers at

the time of hiving them, in all cases, except when the swarms are small—then, the rule should be strictly adhered to: notwithstanding I have lived hundreds of swarms for seventeen years last past, and have not lost a single swarm by flight to the woods, yet I hear of some losses of this kind, which render these remarks necessary. My practice in hiving is, to get the bees into the shade, hive them as soon as possible, hang on the bottom board, fasten the same forward by means of the button so as to prevent the escape of any of the bees except through the mouth of the hive, place the same immediately where I intend it to stand through the season. Let the bottom board down three eighths of an inch on the third day after swarming, and turn the drawers four days after hiving, (unless they were turned at hiving.)

Occurrences have been heard of where there would seem to have been variations from the foregoing rules concerning swarming, to wit: Bees have been known to swarm before the hive is full of bees or comb, and then, swarm again two or three days after. Now,

there is reason to believe that the old stock lost their Queen before swarming, and the bees assumed the condition of a hive that had once swarmed, and sent forth another to avoid the conflict of the Queens. Very large colonies have been known to swarm out several bushels of bees under such circumstances.— Variations from the common rules of making Queens, more frequently occur as follows, to wit: When the old Queen goes out with a swarm, she leaves without providing more than one class of grubs, (*larva*,) which are capable of being converted to Queens; and as the bees always make a plurality of them, they will all be of an age; and in the confusion of swarming, all that are hatched will sally out, and the hive left destitute of the means of repairing their loss. This accounts for seeing more than one Queen in some small swarms, or there may be more than one class of grubs in the hive after first swarming, and the bees make some Queens from each class. Then more than one Queen may be seen with a swarm; for all the Queens leave, that are hatched. The swarming season usually clos-

es in about seventeen days after its commencement, and the bees seem to possess a peculiar instinct in their nature, which teaches them that the season is too far advanced at this time for them to form new colonies with safety; and they will not permit any of their Queens to depart. I have observed, in repeated instances, very compact bunches of bees on the bottom board, some larger than a hen's egg, about the hour of swarming. On examining them, by separating off the bees in my hand, I always found the Queen in the center, unhurt, yet nearly smothered. The bees will commit no violence upon her person, other than pile on, and cluster around her in such a manner as to exclude from her all the vital air, and she dies of suffocation.

R U L E III.

ON VENTILATING THE HIVE.

Graduate the bottom board and ventilator at pleasure by means of the button or otherwise, so as to give them more or less air, as circumstances may require.

REMARKS.

Bees require more air in order to enable them to endure the heat of summer and the severity of winter, than at any other time. If they are kept out in the cold, they need as much air in the winter, as in the heat of summer. It is in a mild temperature only, that it is safe to keep them from the pure air. If placed below frost in a dry sand-bank, they seem to need scarcely more than is contained in their hive at the time they are buried, during the whole winter. If kept in a clean, dry cellar, the mouth so constructed as to keep out mice, gives them enough. But if they are kept in the apiary, there should be a slow, imperceptible current of air constantly passing in at the bottom and off at the top through the ventilator, to let the excess of animal heat escape in summer, and also to throw off the vapor caused by the breath and other exhalations of the bees, which causes frost and ice in the hive in winter, and which is frequently the cause of the death of the bees.

R U L E I V.

ON PREVENTING ROBBERIES.

At the moment it is observed that robbers are within, or about the hive, raise the bottom board so near the edge of the hive as to prevent the ingress or egress of the bees, and stop the mouth or common entrance and ventilator. At the same time, take care that a small space on all sides of the hive be left open, so as to afford them all the air they need. Open the mouth only at evening to let out the robbers, and close early in the morning, before they renew their attack.

R E M A R K S.

Bees have a peculiar propensity to rob each other, and every precaution necessary to prevent it should be exercised by the cultivator. Families in the same apiary are more likely to engage in this unlawful enterprize than any others, probably because they are located so near each other, and are more likely to learn their comparative strength. I never could discover any intimacy between colonies of the same apiary, except when they stood on the same bench; and then, all the social intercourse seems to subsist between the nearest neighbors only.

Bees are not likely to engage in warfare and rob each other, except in the spring and fall, and at other times in the season when food is not easily obtained from blossoms.

Bees do not often engage in robbery in the spring, unless it is in such hives as have had their combs broken by frost or otherwise, so as to cause the honey to drip down upon the bottom board. Much care should be exercised by the apiarian to see that all such hives are properly ventilated, and at the same time closed in such a manner as to prevent the entrance of robbers in the day time, until they have mended the breach, so as to stop the honey from running.

Clear water should be given them every day, so long as they are kept in confinement.

I have known many good stocks to be lost in the spring by being robbed; and all for want of care. Bees rob each other when they can find but little else to do; they will rob at any time when frost has destroyed the flowers, or the weather is so cold as to prevent their collecting honey from them. Cold, chilly

weather prevents flowers from yielding honey without frost.

Bees need but little air at any time when they rob; and yet more is necessary for them when confined by compulsory means, than otherwisc. When deprived of their liberty, they soon become restless, and use their best efforts to make their way out of the hive;—hence the importance of leaving a small space all around the bottom, to admit air and to prevent their melting down, or use a screen bottom board, which is better.

R U L E V.

ON EQUALIZING COLONIES.

Hive one swarm in the lower apartment of the hive; collect another swarm in a drawer, and insert the same in the chamber of the hive containing the first. Then if the swarms are small, collect another small swarm in another drawer, and insert the same in the chamber of the hive containing the first, by the side of the second. In case all the bees from either of the drawers, mingle and go

below with the first swarm and leave the drawer empty, then it may be removed, and another small swarm added in the same manner.

REMARKS.

It is of prime importance to every bee cultivator, that all his colonies be made as nearly equal in numbers and strength, as possible.—Every experienced bee-master must be aware that small swarms are of but little profit to their owner. Generally, in a few days after they are hived, they are gone;—no one can trace their steps; some suppose they have fled to the woods—others, that they were robbed: but after all, no one is able to give any satisfactory account of them. Some pieces of comb only are left, and perhaps myriads of worms and millers finish off the whole. Then the moth is supposed to be their destroyer, but the true history of the case is generally this:—The bees become discouraged, or disheartened, for want of numbers to constitute their colony, abandon their tenement, and join with their nearest neighbors, leaving their combs to the merciless depredations of the moth. They are

sometimes robbed by the adjoining hives, and then the moths finish or destroy what is left.

When bees are collected in drawers for the purpose of equalizing colonies, by doubling, &c., they should be permitted to stand until evening before they are united, it being a more favorable time for them to become acquainted with each other by degrees; and the scent of the bees in the lower apartment will enter through the apertures during the night so much that there is a greater degree of sameness in the peculiar smell of the two colonies, which takes off their animosity, if they chance to have any.

Second swarms are generally about half as large as the first, and third swarms half as large as second ones.

Now if second swarms are doubled, so as to make them equal in number with the first, the owner avails himself of the advantage of a strong colony, which will not be likely to become disheartened for want of numbers, nor overcome by robbers from stronger colonies.

It is far less trouble, and less expense, for the bee-owner to equalize his colonies, than to

prepare hives and drawers of different sizes to fit colonies.

When colonies and hives are made as near alike as possible, many evils are avoided, and many advantages realized: every hive will fit a place in the apiary—every drawer a hive, and every bottom board and slide may in any case be used without mistakes.

Swarms may be doubled at any time before they become so located as to resume their former hostility, which will not be discovered before they form a rational character and acquire rights of property. Bees are provided with a reservoir, or sack, to carry their provision in; and when they swarm, they go loaded with provision suited to their emergency, which takes off all their hostility towards each other; and until these sacks are emptied, they are not easily vexed, and as they are compelled to build combs before they can empty them, their contents are retained several days. I have doubled, at a fortnight's interval in swarming, with entire success. The operation should be performed within two or three days—at the farthest

four days. The sooner it is done, the less hazardous is the experiment.

As a general rule, second swarms only should be doubled. Third and fourth swarms should always have their Queens taken from them, and the bees returned to the parent stock, according to Rule 10.

RULE VI.

ON REMOVING HONEY.

Insert a slide under the drawer, so far as to cut off all communication between the lower apartment and the drawer. Insert another slide between the first slide and the drawer. Now draw out the box containing the honey, with the slide that is next to it.—Set the drawer on its window end, a little distance from the apiary, and remove the slide. Now supply the place of the drawer, thus removed, with an empty one, and draw the first inserted slide.

REMARKS.

Care must be exercised in performing this operation. The apertures through the floor in the chamber must be kept closed by the

slides during the process, so as to keep the bees from rushing up into the chamber when the box is drawn out. The operator must likewise see that the entrances into the drawer are kept covered with the slide, in such a manner as to prevent the escape of any of the bees, unless he is willing to be stung by them. If the bees are permitted to enter the chamber in very warm weather, they will be likely to hold the occupancy of it, and build comb there, which will change the hive into one no better than an old fashioned box.

I have succeeded best in expelling the bees from the drawer, by the following method, to wit:—Shut the window-blinds so as to darken one of the rooms in the dwelling-house—raise up one casement of a window—then carry the drawer and place the same on a table, or stand, by the window, on its light, or glass end, with the apertures towards the light. Now remove the slide, and step immediately back into the dark part of the room. The bees will soon learn their true condition, and will gradually leave the drawer, and return home to the

parent stock; thus leaving the drawer and its contents for their owner; not however until they have sucked every drop of running honey, if there should chance to be any, which is often the case, if their work is finished.

There are two cases in which the bees manifest some reluctance in leaving the drawer. The first is, when the combs are in an unfinished state—some of the cells not sealed over. The bees manifest a great desire to remain there, probably to make their stores more secure from robbers, by affixing caps to the uncovered cells, to prevent the effluvia of running honey, which is always the greatest temptation to robbers.

Bees manifest the greatest reluctance in leaving the drawer, when young broods are removed in it, which does not often occur, except in such drawers as have been used for feeding in the winter or early in the spring. When the Queen has deposited eggs in all the empty cells below, she sometimes enters the drawers; and if empty cells are found, she deposits eggs there also. In either case, it is better to return the drawer, which will

be made perfect by them in a few days.

Bees never make honey, but extract it from such flowers and other substances as yield it without producing any change from its original state. Good honey is taken principally from white clover, orchards, sugar-maple, bass, and other forest trees, while in blossom. Poor honey is extracted from buckwheat, and low land flowers, hence, those who would save their good honey unadulterated by that which is poor, will remove it before the latter can be extracted.

Special care is necessary in storing drawers of honey, when removed from the care and protection of the bees, in order to preserve the honey from insects, which are great lovers of it, particularly the ant. A chest, made perfectly tight, is a good store-house.

If the honey in the drawers is to be preserved for winter use, it should be kept in a room so warm as not to freeze. Frost cracks the combs, and the honey will drip as soon as warm weather commences. Drawers should be packed with their apertures up, for keeping or carrying to market. All apiarians

who would make the most profit from their bees, should remove the honey as soon as the drawers are filled, and supply their places with empty ones. The bees will commence their labors in an empty box that has been filled, sooner than any others. Drawers in old stocks, should be turned so as to let the bees into them as early in the spring as blossoms are seen.

R U L E V I I . -

THE METHOD OF COMPELLING SWARMS TO MAKE AND KEEP EXTRA QUEENS FOR THEIR APIARIAN, OR OWNER.

Take a drawer containing bees and brood comb, and place the same in the chamber of an empty hive, take care to stop the entrance of the hive, and give them clean water, daily, three or four days. Then unstop the mouth of the hive and give them liberty. The operator must observe Rule 6 in using the slides, in removing the box from the original hive.

R E M A R K S .

The prosperity of every colony depends entirely on the condition of the Queen, when the season is favorable to them.

Every bee-master should understand their nature in this respect, so as to enable him to be in readiness to supply them with another Queen when they chance to become destitute.

The discovery of the fact, that bees have power to change the nature of the grub (*larva*) of a worker to that of a Queen, is attributed to Bonner. But neither Bonner nor the indefatigable Huber, nor any other writer, to my knowledge, has gone so far in the illustration of this discovery as to render it practicable and easy for common people to avail themselves of its benefits.

The Vermont hive is the only one, to my knowledge, in which bees can be compelled to make and keep extra Queens for the use of their owner, without extreme difficulty, as well as danger, by stings, in attempting the experiment.

The idea of raising her royal highness, and elevating and establishing her upon the throne of a colony, may, by some, be deemed altogether visionary and futile; but I will assure the reader, that it is easier done than can be described. I have both raised them, and

supplied destitute swarms repeatedly.—

When the drawer containing bees and brood comb is removed, the bees soon find themselves destitute of a female, and immediately set themselves to work in constructing one or more royal cells. When completed, which is commonly within forty-eight hours, they remove a grub (*larva*) from the worker's cell, place the same in the new-made Queen's cell, feed it on that kind of food which is designed only for Queens, and in from eight to sixteen days they have a perfect Queen.

As soon as the bees have safely deposited the grub in the new-made royal cell, the bees may have their liberty. Their attachment to their young brood, and their fidelity to their Queen, in any stage of its minority, is such, that they will never leave nor forsake them, and will continue all their ordinary labors, with as much regularity as if they had a perfect Queen.

In making Queens in small boxes or drawers, the owner will not be troubled by their swarming the same season they are made.— There are so few bees in the drawer, they are

unable to guard the nymph Queens, if there are any, from being destroyed by the oldest, or the one which escapes from her cell first.

In examining the drawer, in which I raised an extra Queen, I found not only the Queen, but two royal cells, one of which was in perfect shape; the other was mutilated, probably by the queen which came out first. Now when there are few bees to guard the nymphs, it would not be very difficult for the oldest Queen to gain access to the cells, and destroy all the minor queens in the drawer.

When a drawer is removed to an empty hive, for the purpose of obtaining an extra Queen, it should be placed some distance from the apiary, the better to prevent its being robbed by other swarms. When it is some distance from other colonies, they are not so likely to learn its comparative strength.— There is but little danger however, of its being robbed, until after the bees are out of danger of losing their Queen, which generally occurs in the swarming season.

The Queen is sometimes lost, when she goes forth with a swarm, in consequence of

being heavily laden with eggs, and too feeble to fly with her young colony; in which case the bees return to their parent stock in a few minutes. In fact all occurrences of this kind originate in the inability of the Queen. If she returns to the old stock, the swarm usually comes out again the next day, if the weather is favorable. If the Queen is too feeble to return, and the apiarian neglects to look her up, and restore her to her colony again, (which he ought to do,) the bees will not swarm again until they have made another, or are supplied, which may be done immediately by giving them any spare Queen.

The Queen is sometimes lost, in consequence of the young brood being too far advanced at the time of the departure of the old Queen with her swarm. She may become barren or diseased, and die of old age, and all the grubs (*larva*) may have advanced so far towards the perfect fly at the time of her death, that their nature could not be changed to a Queen before the bees had become apprised of her true condition, or she may be lost at second swarming, as explained

in remarks on Rule 2d, or she may be lost by accident when she goes out of the hive into the air for exercise, or for the purpose of forming the sexual union with the drone; because, on returning to the hive, she has been known to enter her neighbor's hive by mistake, and lose her life before she could make her escape.

NOTE.—I think all close observers of bees will accord with this doctrine, when they reflect upon the fact that the Queen frequently sallies forth for exercise or for other purposes, of which we see repeated indications during the breeding season, to wit: the bees assume the appearance of the commencement of swarming: they fly very thick before the hive, and run in every direction on its outside. In short, it would seem that hostilities had commenced in great earnest betwixt that and some unknown hive, or that they were in a real sport. Now the bees miss their sovereign when these peculiar feats are seen, and on her return, all is quiet.

RULE VIII.

ON SUPPLYING SWARMS DESTITUTE OF A
QUEEN, WITH ANOTHER.

Take the drawer from the hive, which was placed there according to Rule 7, and insert the same into the chamber of the hive to be supplied; observing Rule 6 in the use of the slides;—or remove a box containing brood comb as above described, and the bees will make one for themselves;—or take a Queen from any small swarm, and introduce her at the mouth of the hive.

REMARKS.

Colonies destitute of a Queen may be supplied with another the moment it is found they have none; which is known only by their actions.

Bees, when deprived of their female sovereign, cease their labors; no pollen or bee-bread is seen on their legs; no ambition seems to actuate their movements; no dead bees are drawn out; no deformed bees, in the various stages of their minority, are extracted, and dragged out of their cells, and dropped down about the hive, as is usual among all healthy and prosperous colonies.

Colonies that have lost their Queen, when standing on the bench by the side of other swarms, will run or fly into the adjoining hive without the least resistance. They will commence their emigration by running in confused platoons of hundreds, from their habitation to the next adjoining hive. They immediately wheel about and run home again, and thus continue, sometimes for several days, in the greatest confusion, constantly replenishing their neighbor's hive, by enlarging their colony, and at the same time reducing their own, until there is not a single occupant left; and remarkable as it is, they leave every particle of their stores for their owner or the depredations of the moth.

Colonies lose their Queens more frequently during the swarming season than any other.

In the summer of 1830, I lost three good stocks of bees in consequence of their losing their Queens, one of which was lost soon after the first swarming—the two others not many days after the second swarming—all of which manifested similar actions, and ended in the same results, which are more particu-

larly explained in remarks on Rules 2 and 7. The Queen, when lost in swarming, is easily found, unless the wind is so strong as to have blown her a considerable distance. A few bees are always found with her, which probably serve as her aids, and greatly assist the apiarian in spying her out. She is frequently found near the ground, on a spire of grass, the fence, or any place most convenient for her to alight, when her strength fails her. I once had quite a search for her majesty, without much apparent success. At the same time there were flying about me a dozen or more common workers. At last her royal highness was discovered, concealed from my observation in a fold of my shirt-sleeve. I then returned her to her colony, which had already found their way home to their parent stock.

The Queen may be taken in the hand without danger, for she never stings by design; her timidity disarms her of every species of hostility; she may be drawn in quarters, and she will not sting. In trying many experiments I never could discover in her, the least

hostile feeling, except when conflicting with one of her own species: her only exertion seems to be, to make her escape; and yet she has a sting much longer than a worker.

The Queen is known by her peculiar shape, size, and movements. She differs but little in color from a worker, and has the same number of legs and wings. She is much larger and longer than any of the bees. Her abdomen is very large and perfectly round, and is shaped more like the sugar-loaf, which makes her known to the observer the moment she is seen. Her wings and proboscis are short. Her movements are stately and majestic; at the same time shy, and rather inclined to conceal herself from human observation; with seeming jealousy of being caught. I have known her to remain in the air on the wing several minutes after her whole colony were alighted when I stood near the swarm. She is much less in size after the season for breeding is over. She is easily selected from among a swarm, at any season of the year, by any one who has often seen her. Cut off the limb and shake the bees on a table to find the Queen.

RULE IX.

ON MULTIPLYING COLONIES TO ANY DESIRABLE EXTENT, WITHOUT THEIR SWARMING.

The large drawer, No. 1, should always be used for this purpose. Insert slides, as in Rule 6, and remove the drawer containing bees and brood-comb, place the same in the chamber of an empty hive, stop the entrances of both the new and old hives, taking care to give them air, as in Rule 4. Give clean water daily, three or four days. Now let the bees, in both hives, have their liberty.

REMARKS.

This operation is both practicable and easy, and is of prime importance to all cultivators, who wish to avoid the necessity of hiving them when they swarm; and yet it will not prevent swarming, except in that part of the divided colony which contains the Queen at the time of their separation. The other part being compelled to make another Queen, (and they generally make two or more) may swarm to avoid their conflict, as explained in remarks on Rule 2. The hive containing the old Queen may swarm for want of room; but, at any rate, in performing the operation, it has

saved the trouble of hiving one swarm, and prevented all danger of their flight to the woods.

Multiplying colonies by this rule is a perfectly safe method of managing bees.

R U L E X.

ON PREVENTING THE DEPREDATIONS OF THE MOTH.

All such stocks as are infested with the moth, will manifest it as soon as warm weather commences in the spring, by dropping some of the worms upon the bottom board. Let the apiarian clean off the bottom board every other morning; at the same time strew on a spoon full or two of fresh, pulverized salt.

Immediately after a second swarm has come forth from a hive, the same season, the old stock should be examined; and if swarming has reduced their numbers so low as to leave unoccupied combs, the apiarian should take the Queens from the swarm, and let them return to the old stock.

Third and fourth swarms should always have their Queens taken from them and the bees returned to the parent stock.

REMARKS.

“This insect (the moth) is a native of Europe; but has found its way into this country, and naturalized itself here.”—*Thatcher*.

This unwelcome visitor has interested the attention and called forth all the energies of the most experienced apiarians of our country, and of many of the greatest naturalists in the world. Their movements have been observed and scrutinized by the most learned—their nature has been studied; various experiments have been tried to prevent their depredations; but after all, the monster in gaudy hue marches onward, committing the greatest havoc and devastation, with but little molestation. I have lost my whole stock at least four times since 1808, as I supposed by the moth. I tried all the experiments recommended in this and other countries, that came to my knowledge; but after all, I could not prevent their ravages.

In 1830, I constructed a hive (which was patented in 1836) which I supposed would afford all the facilities for managing bees in every manner that their nature would admit

of, and at the same time render their cultivation most profitable to their owner. By constructing windows of glass, on every side of the hive, nearly the size of its sides, and darkening them by closing doors on the outside of the windows, which may be opened at pleasure, I have been able to discover many important facts, both in relation to the nature and economy of the bee, and its enemy the moth; but, probably, much yet remains to be learned concerning both.

The moth, when first discovered by the common observer, is a white worm or maggot, with a redish crusted head, and varies in size according to its living. Those which have full and unnoledsted access to the contents of a hive, will frequently grow as large as a turkey-quill, and an inch and a half in length. Others are scarcely an inch in length when full grown. They have sixteen short legs, and taper each way from the centre of their bodies.

The worms, like the silk-worm, wind themselves into a cocoon, and pass the dormant (chrysalis) state of their existence, and in a

few days come out of their silken cases perfect winged insects or millers, and are soon ready to deposit their eggs, from which another crop will be raised.

The miller, or perfect moth, is of a grayish color, from three-fourths of an inch to an inch in length. They usually lie perfectly still in the day time, with their head downwards, lurking in and about the apiary. They enter the hive in the night, and deposit their eggs in such places as are uncovered—of course unguarded by the bees. These eggs hatch in a short time, varying according to circumstances, probably from two or three days to four or five months. At an early stage of their existence, while yet a small worm, they spin a web, and construct a silken shroud, or fortress, in which they envelope themselves, and form a sort of path, or gallery, as they pass onward in their march; at the same time being perfectly secure from the bees, in their silken case, which they widen as they grow larger, with an opening in their front only, near their head, they commit the greatest havoc and devastation on the eggs,

young bees, and all that come in their way as they pass.

When the moth has arrived to his full state of maturity, he makes preparation to change to a miller, by winding into a cocoon, as has been already explained. The miller is surprisingly quick in all its movements, exceeding by far the agility of the quickest bee, either in flight or on its legs. Hence the enemy becomes so formidable that the bees are easily overcome, and soon fall a sure prey to him.

Now, in order to remedy the evils of the moths, and prevent their ravages, and at the same time aid the bees in their prosperity, and make them profitable to their owner, I found it necessary to use a hive differing materially from the old box, and commenced operations in the one already referred to, (called the Vermont Hive,) in a course of experiments which have produced results perfectly satisfactory. From 9 seasons experience in its use, I have not the least doubt that bees may be managed to the best advantage, and without ever being materially injured by the moths.

A bee-hive should be made in a perfectly workmanlike manner, so as to have no open joints; the boards should be free from shakes and cracks, because the bees will make their tenement perfectly tight, so as to exclude light and air, by plastering up all such places as are left open by the workman, with a kind of mortar, or glue, of their own make, which is neither honey nor wax, but is very congenial to the growth of worms in the first stages of their larva state, and being secured from the bees by the timber, in a short time they are able to defend themselves by a silken shroud.

Now the miller enters the hive and makes an incision into the bee-glue, or cement, with her sting, and leaves her eggs. These eggs hatch there, and the brood subsist on the glue until they have arrived so far towards maturity as to enable them to encase themselves in a silken shroud; and then they move onward.

Now, unless the bees chauce to catch him by the collar, or nape of his neck, while feeding, and drag him out of his place of conceal-

ment, they will be compelled to cut away the combs all around his silken path, or gallery and drag out the worm and his fortress all together. At the same time, the bees are compelled to cut away the combs so far as to destroy many of their young broods in making room to remove the annoyance. I have known them to cut away their combs from four to eight or ten inches to remove this silken shroud, and have known them to cut and drag out their only remaining Queen before she was transformed to the perfect fly, which occasioned the entire loss of the whole colony.

Repeated experiments have demonstrated the fact, that placing bees on the ground, or high in the air, is no security against the moths. - I have lost some of my best stocks by placing them on the ground, when those on the bench were not injured by them. I have made a groove in the bottom board, much wider than the thickness of the boards to the hive, and filled the same with loam. I then placed the hive on the same, in such a manner as to prevent any crack or vacancy

for the worms; and yet in raising the hive four weeks afterwards, I found them apparently full grown all around the hive in the dirt. I have found them very plentiful in a tree ninety feet from the ground.

The best method, in common practice, to prevent the depredations of the moth, is, to suspend the bottom board so far below the lower edge of the hive as to give the bees free entrance and egress all around the same during the moth season, or to raise the common hive, by placing under it little blocks at each corner, which produces good effect. But I know of but one rule, which is an infallible one, to prevent their depredations, and that is this: keep the combs well guarded by bees. See Rule 10, and remarks on 12.

Large hives that never swarm, are never destroyed by the moth, unless they lose their Queen, melt down, or meet with some casualty, out of the ordinary course of managing them. They are not often in the least annoyed by them, unless there are bad joints, cracks, or shakes, so as to afford some lurking places for the worms. The reason for their prosper-

ous condition is obvious. The stock of bees are so numerous that their combs are all kept well guarded during the moth season, so that no miller can enter and deposit her eggs.

Hives made so small as to swarm, are liable to reduce their colonies so small as to leave combs unguarded, especially when they swarm three or four times the same season. All swarms, after the first, sally forth to avoid the battle of the Queens; constantly making a greater draft, in proportion to the number left, until the combs are partly exposed, which gives the miller free access to their edges.—The seeds of rapine and plunder are thus quickly sown, and soon vegetate, and fortify themselves by their silken fortress, before the bees are aware that their frontiers are invaded. While the moths are thus engaged in establishing their posts on the frontiers of the bees, the latter are constantly and indefatigably engaged in providing themselves with another Queen, to supply the place of the old one, which has departed with a swarm, and raising young bees to replenish their reduced colony. Now as the moths have got possession of the

ground on their frontiers, it requires a tremendous effort on the part of the bees to save their little colony from a complete overthrow.

If late, or second and third swarms are always returned immediately, according to the rule, the combs are kept so guarded that the moths are compelled to keep their distance, or be stung to death before they can accomplish their purposes.

Hives made so large as not to swarm may lose their Queen, and then they will abandon their habitation and emigrate into the adjoining hive, leaving all their stores to their owner, which, unless immediately taken care of, the moths will not fail to destroy.

The moths are often complained of when they are not guilty. Hives are frequently abandoned by their occupants, in consequence of the loss of their Queen, unnoticed by any observer, and before anything is known of their fate, the hive is destitute of bees, and filled with moths.

In the summer of 1834, one of my neighbors had a very large hive that never swarmed, which lost their queen; and in the course

of a few days the bees entirely vacated their tenement, and emigrated into an adjoining hive, leaving the whole of their stores, which amounted to 215 lbs. of honey in the comb. No young bees or moths were discovered in the hive. Instances of this kind frequently occur, and the true cause is unknown, from inattention.

The Queen is much more tenacious of life than any other bee, and may live much longer. It is believed that the common bees do not often live to exceed 18 months. The Queen is supposed to live several years. By clipping one wing of a Queen accompanying a second swarm, she has been known to come out with the first swarms for several successive years. But one Queen exists in the same hive any great length of time. When there are more than one, the peculiar sound of each, as explained in remarks on Rule 2, is heard by the other, which usually results in a battle between them, or the issue of a swarm in the course of a day or two, unless the swarming season is nearly at a close, then, the common bees sometimes smother

them as explained in remarks on Rule 2.

Bees, when placed in a dark room in the upper part of the house, or some out-house, are easily kept (not cultivated) a while, and may be of some benefit to their owner; but as they are liable to most of the casualties that swarming hives are, they cannot be as profitable. It takes several years before much comfort, other than the amusement of seeing them work, can be realized; besides, if they chance to escape the moth, the combs are rendered exceeding dark colored and filthy where the bees locate in the winter; and a disagreeable smell, which is caused by their winter breath and other exhalations, is the result. In a few years the bees acquire habits of indolence, and as a natural consequence, soon manifest it by their irritability, unlike those colonies which are industrious and in a healthy and prosperous condition.

Large colonies never increase their stock in proportion to the swarming colonies. There is but one female in a large colony, and they can do but little more in raising young bees than to keep their stock good by replenishing

them as fast as they die off or are destroyed by the birds, reptiles and insects, which are great admirers of them, and sometimes swallow them by dozens. Now if it requires five swarming colonies to be equal in number to the one first described, it is not difficult to imagine that five times as many bees may be raised by the swarming colonies: for one Queen will probably lay as many eggs as another.

The swarming hives are no more liable to be destroyed by the moth, during the swarming season, than others, if the hives are kept well replenished with bees according to Rule 10.

R U L E X I.

ON FEEDING BEES.

If it is found that a swarm need feeding, hitch on the feeder, well stored with good honey, while the weather is warm in October; or place comb filled with strained honey in the chamber of the hive, or on the bottom board, or both at the same time, without

dripping,—and the bees will store the honey in the lower apartment of the hive, if done while the weather is warm.

The apiarian should use the same precaution in feeding, as directed in Rule 4, to prevent robberies.

REMARKS.

The best time to feed is in the fall, before cold weather commences. All hives should be weighed, and the weight marked on the hive before bees are hived in them. Then, by weighing a stock as soon as frost has killed the blossoms in the fall, the apiarian will be able to form a just estimate of their necessities. When bees are fed in the fall, they will carry up and deposit their food in such a manner as will be convenient for them in the winter.

If feeding is neglected until cold weather, the bees must be removed to a warm room, or dry cellar, and then they will carry up their food, generally, no faster than they consume it.

A feeder should be made like a box with five sides closed, leaving a part of the sixth side open, to admit the bees from their common entrance with its floor level, when hitch-

ed on the front of the hive. It should be of sufficient depth to lay in broad comb, filled with honey. If strained honey without combs is used for feeding, a float, perforated with many holes, should be laid over the whole of the honey in the box, or feeder, so as to prevent any of the bees from drowning; and at the same time, this float should be so thin as to enable them to reach the honey. It should be made so small that it will settle down as fast as the honey is removed by the bees.— There should be a tube inserted vertically through the float and made fast to it, extending upward through the top of the box in such a manner as to receive the honey from a tunnel and convey the same directly under the float. A light of glass should be placed in the back side, and a door to close and darken it at pleasure.

Great profits may be made in large apiaries by feeding cheap honey in the fall. The bees, being compelled to carry up and deposit the cheap honey in the lower apartment of the hive, (and they will live on that as well as any other,) their owner can compel

them to carry as much pure white clover honey into the drawers the following season, there being no room to store it below.—Swarms will feed out and deposit ten pounds of honey a day and night, each hive. Small drawers cannot be depended on as feeders, except in the spring and summer, unless they are kept so warm that the vapor of the bees will not freeze in them. It would be extremely hazardous for the bees to enter a frosty drawer. They will sooner starve than attempt the experiment. Drawers may be used without danger from robbers, but when the feeder is used, robbers must be guarded against as directed in Rule 4.

Bees should not be fed in the spring unless they are nearly destitute of honey, because they fill up the brood comb too much with honey: when fully fed in the fall, the bees store up the honey in such a manner as will be convenient for them in the winter, and notwithstanding the cells for raising young bees are filled up with honey at that time, the bees consume the honey and empty the breeding cells in the course of the winter, so

that the Queen is not interrupted in depositing her eggs to raise young bees in the spring following.

A good swarm of bees in the Vermont Hive should weigh at least 25 pounds the 1st of December, in addition to the weight of the hive.

Care should be exercised, in fall-feeding, to supply them with good honey, otherwise the colony may be lost before spring by disease. Poor honey may be given them in the spring, at the time when they can obtain and provide themselves with medicine, which they only best understand.

Sugar dissolved, or molasses, may be used in the spring to some advantage; but ought not to be substituted for honey, when it can be obtained.

RULE XII.

ON WINTERING BEES.

Turn over the drawers so as to prevent the entrance of the bees, or their breath, in September or fore part of October. When cold

weather commences, suspend the bottom board half an inch, and open the ventilator.

REMARKS.

The watery substance which is caused by the breath and other exhalations of the bees, and collects in the drawers in cold weather; should be kept out of them; because frost forms in them, and runs down through the apertures on to the bees as often as it melts, and makes the bees damp and the combs mould; besides, this vapor penetrates and fills the timber (drawers and chamber) and causes a disagreeable smell the following season, and is the cause of introducing the little ants into the chamber.

There are three principal causes of death among bees in the winter, to wit: want of honey, (not bread, for they never eat it except when in the larva state) want of air, and freezing.

Bees sometimes die of starvation, with plenty of honey in the hive at the same time. In cold weather they crowd together in a small compass in order to keep warm; and then, their breath, and vapor collect in frost

in all parts of the hive, except in the region they occupy. Now, unless the weather moderates, so as to thaw the ice, the bees will be compelled to remain where they are located until their stores are all consumed that are within their reach. One winter we had cold weather ninety-four days in succession, during which time the bees could not move from one part of the hive to another. I examined all my hives on the eighty-third day, and on the ninetieth day I found four swarms dead. I immediately examined for the cause, which was as already stated. I then carried all my hives into a warm room and thawed them, so that the bees could move.

Too much swarming frequently occasions the loss of the old stock the winter following, because their companions are so reduced in numbers that the necessary animal heat can not be kept up in the hive to prevent them from perishing by cold. All such stocks should be stored in a dry cellar or some warm room, where they can be kept comfortable during cold weather. It is believed that bees may be kept through the winter without los-

ing them, if the apiarian is attentive to their wants. If destitute of honey, he will feed them.—If suffering for want of air, (which is the most frequent cause of death,) he will ventilate them.—If freezing, he will thaw them out. In short, if they are apparently dead, he will resuscitate and bring them to life and activity, which may be done in all cases (except when smothered) if attended to in season. In February 1838, I had a swarm that were starved by design. I resuscitated them three times without feeding in three successive days before life was extinct. The life of bees many times is in a state of suspension considerable time before their death, and may be resuscitated by human aid, when otherwise life would become extinct. I have resuscitated them repeatedly under various circumstances for myself and neighbors. Some of the best stocks I now own were once apparently dead. A screen bottom board should be used so as to let up the warm air into the hive, and at the same time enable the apiarian to control and keep the bees in the hive during the process.

of resuscitation. The feeder should be used in every case, to give the bees exercise, and restore activity.

A cellar made in the side of a dry hill, so covered as to keep out water, is a good storage for wintering bees. There should be two ventilators at the two most extreme parts of the cellar—one near the bottom and on its side, to admit pure air—the other through the top or covering, to let the bad air escape.

RULE XIII.

ON TRANSFERRING SWARMS.

This operation should never be effected by compulsion.

FIRST METHOD.—Insert drawer No. 1 into the chamber of the hive to be transferred, as early as the first of May. If the bees fill the drawer, they will recede from the lower apartment and winter in the drawer. As early in the spring as the bees carry in bread plentifully on their legs, remove the drawer, which will contain the principal part of the bees, to an empty hive. Now remove the old hive a few feet in front, and place the new one con-

taining the drawer where the old one stood. Now turn the old hive bottom up. If there are any bees left in the old hive, they will soon return and take possession of their new habitation.

SECOND METHOD.—Take drawer No. 1, well filled by any hive the same season—insert the same into the chamber of the hive to be transferred, in September, (August would be better.) If the bees need transferring, they will repair to the drawer and make the same their winter quarters. Then proceed in the spring as directed in the first method.

REMARKS.

This management should excite a deep interest in every cultivator, both in a temporal and moral point of view.—Temporal, because the lives of all the bees are preserved;—moral, because we are accountable to God for all our acts. We are not to be justified in taking the lives of animals or insects, which are but lent blessings, unless some benefit to the owner can be derived from their death, which will outweigh the evils resulting from such a sacrifice. Duty compels me to protest in the strongest terms and feelings against

the inhuman practice of taking the lives of the most industrious and comforting insects to the wants of the human family by fire and brimstone.

When bees have occupied one tenement for several years, the combs become thick and filthy, by being filled up with old bread and cocoons, made by young bees when transformed from a larva to the perfect fly.

Bees always wind themselves in their cells, in a silken cocoon, or shroud, to pass their torpid and defenceless (shrysalis) state. These cocoons are very thin, and are never removed by the bees. They are always cleaned immediately after the escape of the young bees, and others are raised in the same cells. Thus a number of bees are raised, which leaves an additional cocoon as often as the transformation of one succeeds that of another, which often occurs in the course of the season. Now in the course of a few years the cells become so contracted, in consequence of being thus filled up, that the bees come forth but mere dwarfs, and cease to swarm. Combs are rendered useless by being filled up with old bread,

which is never used except for feeding young bees. A greater quantity of this bread is stored up yearly than is used by them; and in a few years they have but little room to perform their ordinary labors. Hence the necessity of transferring them, or the inhuman sentence of death must be passed upon them, not by being hung by the neck until they are dead, but by being tortured to death by fire and brimstone.

It is obvious to every cultivator that old stocks should be transferred. I have repeatedly transferred them in the most approved manner, by means of an apparatus constructed for that purpose; but the operation always resulted in the loss of the colony afterwards, or a swarm which would have come from them.

When it is necessary to transfer a swarm from one Vermont Hive to another of the same kind, insert drawer No. 1 into their chamber in the spring, say the first of May. If they fill the drawer, let it remain there; if they need to be changed to a new hive, they will recede from the lower apartment and

make the drawer their winter quarters, which should remain until warm weather has so far advanced as to afford them bread. Then they may be removed to an empty hive, as directed in the Rule. Now the drawer contains no bread, and should remain in the old stock until the bees can provide themselves with a sufficient quantity of that article to feed their young bees with; for bread is not collected early enough and in sufficient quantities to feed their young as much as nature requires. If the bees fail in filling the drawer, one should be used that is filled by another swarm. Thus the aged and infirm stock is changed into the full vigor of youth by their own free act, without any compulsion of their owner.

If bees are transferred from the old box hive, or from any other to the Vermont Hive, except as described in the foregoing remarks, it should be done immediately before, or forthwith after the second swarm has left the hive. Then, both old and young should be colonized together. If the operation is performed before first swarming, their owner will be sure to

lose one swarm in the wanton destruction of eggs, larva and chrysalises, and if it is done after the first swarm leaves, before a Queen is heard, he will get the bees without a Queen, because the old Queen leaves the hive with the first swarm, and another is not usually hatched sooner than seven, eight, or nine days after first swarming: and if transferring is delayed until the swarming season is through, the bees will not make a sufficient quantity of comb to cluster in; nor honey enough to sustain them through the following winter.

I would not be understood to approve of transferring from the old box until the combs are so old as to produce dwarfs.

GENERAL OBSERVATIONS.

The reader might have expected many things demonstrated in this work, which are omitted by design.

The structure of the worker is too well understood by every owner of bees to need a particular description. So also of the drone; and the Queen has already been sufficiently described to enable any one to select her out from among her subjects. If any further description is desired, the observer can easily satisfy himself by the use of a microscope. Every swarm of bees is composed of three classes or sorts, to wit: one Queen or female, drones or males, and neuters or workers.— The Queen is the only female in the hive, and lays all the eggs from which all the young bees are raised to replenish their colony. She possesses no authority over them, other than that of influence, which is derived from the fact that she is the mother of all the bees, and they, being endowed with instinctive knowledge of the fact that they are wholly

dependent on her to propagate their species, treat her with the greatest kindness, tenderness and reverence, and manifest at all times the most sincere attachment to her by feeding and guarding her from all danger.

The government of a hive is nearer republican than any other, because it is administered in exact accordance with their nature. It is their peculiar natural instinct, which prompts them in all their actions. The Queen has no more to do with the government of the hive than the other bees, unless influence may be called government. It is found by experiment that bees will go to work, and continue their labors with perfect regularity, with a dead Queen, as long as she is confined in the hive in such a manner that the bees will keep her in motion; but as she is the only female in the hive, no eggs will be laid, no brood comb made, and no young bees raised: notwithstanding there is a plenty of drones, as there are no grubs (larva) in the hive to consume the polen, the combs will be unusually loaded with bread; and the bees will finally perish by the depredations

of the moths, or want of animal heat in the winter, which is generated in the hive by a populous community only. If any one is disposed to doubt on this subject, let the experiment be tried with *skill*, and I will be answerable for the result, to wit: Take the Queen from a first swarm (second swarms frequently have more than one Queen,) kill her, and by means of a fine wire, or strong string, suspend her in the hive; now let in the swarm; confine the bees in the hive until they have found their sovereign, and clustered about her; then give the bees liberty to work. If the experiment ends here; entire loss will be the final result. Bees have so many admirers, they will soon dwindle away in numbers, and perish in consequence of losing so many of their companions, which are caught by the birds, and are lost by other casualties, unless they have the means of propagating their species. But there is a remedy by which the bees may be supplied with a Queen, which is more simple, though more difficult than the ordinary method. Take brood comb containing eggs and larva of

workers only, from any hive that contains them; place the same in a drawer in its natural position; now insert the drawer into the chamber of the hive, so that the bees can have access to them and they will have a Queen in a few days. If she finds empty cells in the hive, during the breeding season, she will deposit eggs there, because it is her nature to do so; and the nature of the workers prompts them to take care and nurse all the young *larva*, labor and collect food for their sustenance, guard and protect their habitations, and do and perform all things in due obedience, not to the commands of the Queen, but to their own peculiar instinct.

The drone is probably the male bee, notwithstanding the sexual union has never been witnessed by any man; yet so many experiments have been tried, and observations made, that but little doubt can be entertained of its truth. That the sexual intercourse takes place high in the air, is highly probable from the fact that I have seen an attempt at copulation by the drone with the Queen on their return from an excursion in the air, before

she could enter the hive, and other insects of the fly tribe do copulate in the air, when on the wing, as I have repeatedly seen. That the drone is the male bee, is probable from the fact that the drones are not all killed at once; but at least one in each hive is permitted to live several months after the general massacre.

I examined four swarms, whose colonies were strong and numerous, three months after the general massacre of the drones, and in three hives I found one drone each; the other was probably overlooked, as the bees were thrown into the fire as fast as they were examined. But there are many mysterious things concerning them, and much might be written, to little purpose; and as it is designed to go no further in illustrations than is necessary to aid the apiarian in good management, many little speculations have been entirely omitted in the work, and the reader is referred to the writings of Thatcher, Bonner, and Huber, who are the most voluminous and extensive writers on bees within my knowledge.

The importance of taking the Queens from all small, and late swarms, and returning them to the original stock, cannot be too much insisted upon. It constitutes a very important feature in my system of managing bees. Even first swarms that are late, had better be compelled to remain in the parent hive. The prosperity of a hive of bees depends in a great degree upon their number being kept full.— They are their own best defenders. Their number not only protects them from the depredations of the moth and the robberies of other swarms stronger, but the animal heat which is generated in the hive by a populous community protects the combs from molding, and the bees from freezing in the coldest weather. But the apiarian derives another advantage by keeping his hives full of bees; he secures a larger quantity of honey from a full swarm, than from many small ones. The time for making much honey does not usually last more than 20 or 30 days in Vermont, and the greatest proportion of honey that is deposited in the hive for winter use is collected in fifteen or twenty days. This renders

it very important that the attention of the old stock should not be called off from gathering honey at this time, to guard their hive from the attacks of moths to which it is left exposed, by the desertion of that part of their body which has accompanied the Queen to constitute a new swarm. Hives that are well stocked with bees in the spring, swarm much earlier than feeble ones, and are able to use the best of the season to great advantage.

In speaking of the advantages of a large colony, I would not be understood to approve of the plan of those persons who so far depart from the economy of nature as to raise bees in a chamber, or in any way where their colonies will much exceed fifteen or sixteen quarts of bees.

Bees are creatures of habit, and the exercise of caution in managing them is required. A stock of bees should be placed where they are to stand through the season before they form habits of location, which will take place soon after they commence their labors in the spring. They learn their home by the objects surrounding them in the immediate vicinity of

the hive. Moving them, (unless they are carried beyond their knowledge,) is often fatal to them. The old bees forget their new location, and on their return, when collecting stores, they haze about where they formerly stood, and perish. I have known some fine stocks ruined by moving them six feet, and from that to a mile and a half. It is better to move them before swarming than afterwards. The old bees only will be lost. As the young ones are constantly hatching, their habits will be formed at the new stand, and the combs will not be as likely to become vacated, so as to afford opportunity to the moths to occupy any part of their ground.

Swarms, when first hived, may be moved at pleasure without loss of bees, admitting they are all in the hive; their habits will be formed in exact proportion to their labors.—The first bee that empties his sack and goes forth in search of food, is the one whose habits are first established. I have observed many bees to cluster near the place where the hive stood, but a few hours after hiving, and perish. Now if the swarm had been

placed in the apiary, immediately after they were hived, the number of bees found there would have been less.

Bees may be moved at pleasure at any season of the year, if they are carried several miles, so as to be beyond their knowledge of country. They may be carried long journeys by travelling nights only, and affording them opportunity to labor and collect food in the day time.

The importance of this part of bee-management is the only apology I can make for dwelling so long on this point. I have known many to suffer serious losses in consequence of moving their bees after they were well settled in their labors.

Bees should never be irritated, under any pretence whatever. They should be treated with attention and kindness. They should be kept undisturbed by cattle and all other annoyances, so that they may be approached at any time with safety.

An apiary should be so situated, that swarming may be observed, and at the same time where the bees can obtain food easily,

and in the greatest abundance. A bee-house should be so constructed as to secure the hives perfectly from the rays of the sun, and weather. All the light the bees can have about the hive is necessary, to induce them to swarm early in the season, and a plenty of good air (*not air exhausted of its vitality,*) is absolutely necessary to promote their health, prevent them from acquiring habits of indolence, and hostile feelings, at the same time, a strong current of air, in the immediate region of the hive, near the entrance, where the bees alight, must be avoided: otherwise, when the bees slack up their speed, to alight, the wind will blow them so far from the hive, that many of them fall, and perish.

Much depends on the construction of the house, as well as the hive. It has been a general practice to front bee-houses either to the east or south. This doctrine should be exploded with all other whims. Apiaries should be so situated as to be convenient to their owner, as much as any other buildings. I have them front towards all the cardinal points, but can distinguish no difference in their prosperity.

Young swarms should be scattered as much as convenient during the summer season, at least eight feet apart. If they are not housed, they should be set in a frame, and so covered as to exclude the sun and weather from the hive. As a general rule, bees flourish better in vallies than on the high hills contiguous to them, on account of bearing their burthens home with greater ease, descending, than ascending, with a heavy load.

It is not surprising that this branch of rural economy, in consequence of the depredations of the moth, is so much neglected. Notwithstanding, in some parts of our country, the business of managing bees has been entirely abandoned for years, I am confident they may be cultivated in such a manner as to render them more profitable to their owners than any branch of agriculture, in proportion to the capital necessary to be invested in their stock. They are not taxable property, neither does it require a large land investment, nor fences; neither does it require the owner to labor through the summer to support them through the winter. Care is, indeed, necessary; but a

child, or superannuated person can perform most of the duties of an apiarian. The cobwebs must be kept away from the immediate vicinity of the hive, and all other annoyances removed.

The management of bees is a delightful employment, and may be pursued with the best success in cities and villages, as well as towns and country. It is a source of great amusement, as well as comfort and profit.— They collect honey and bread from most kinds of forest trees, as well as garden flowers, orchards, forests, and fields;—all contribute to their wants, and their owner is gratified with a taste of the whole. Sweet mignonette cannot be too highly recommended. This plant is easily cultivated by drills in the garden; and is one of the finest and richest flowers in the world from which the honey-bee can extract its food.

The Vermont Hive is the only one I can use to much advantage or profit. In the summer of 1834, I received in swarms and extra honey from my best stock, thirty dollars; and from my poorest, fifteen dollars. My early

swarms afforded extra honey which was sold, amounting to from five to ten dollars each hive; and all my late swarms which were doubled, stored a sufficient quantity of food to supply them through the following winter.

The rules in the foregoing work, perhaps, may be deemed, in some instances, too particular; yet, in all cases, they will be found to be safe and unfailing in their application, though liable to exceptions, such as are incident to all specific rules.

Every bee-owner should be able to answer the following questions in the affirmative, if he wishes to make his bees profitable:

- Have you weighed and marked the weight on all your hives before using them? page 66
- Have you scratched the under side of the chamber floor? 11-12
- Did you secure the hive from the rays of the sun at the time of hiving the bees? 26
- Did you let the bees into the drawers at the time of hiving all your large swarms? 27
- Did you close the hive, and move it as directed? 28
- Have you let down the bottom board, and turned the drawers as directed? 28
- Have you removed your honey before buckwheat is in blossom? 41
- Have you taken the Queens from all your late swarms? 53-62-84-85

- Have you turned your drawers so as to prevent the breath of the bees from entering them in September? 69-70
- Have you fed your destitute stocks in October? 66-67-68-69
- Have you weighed your stock hives, and is there at least 25 lbs. in addition to the weight of the hive on the first of Dec.? 69
- Have you been particular to see that all your hives are properly ventilated, and the bees kept lively during cold weather? 71-72
- Have you turned the drawers to all your stock hives, so that the bees can enter them as soon as blossoms are seen in the spring? 42
- Have you visited your bees, and examined their true condition, two or three times in each week, through the whole year?

APPENDIX.

The Hiver is made of three rough boards, half inch thick, seven inches wide, eighteen inches long, nailed together like a common trough, open at both ends—a strap of iron riveted on its outside; across the centre of each board, with a shank or socket to insert a rod to handle it with, so that when inverted by means of the rod, and placed over the bees when alighting, forms a kind of half-hive, which they readily enter. There should be from a dozen to twenty half-inch holes bored through the top board, so as to let the alighting bees enter through the holes. When a small proportion of the bees are found in the hiver, it may be moved a few feet from the limb, which may be shaken with another rod with a hook on its end, which disengages the bees, and in a few moments the whole swarm will be found in the hiver. By the addition of ferules and joints, the hiver may be raised to any reasonable height. Thus the labor of

climbing, the use of ladders, and cutting the limbs of precious fruit-trees, is entirely dispensed with. It likewise enables the apiarian in large establishments to divide out and keep separate his swarms, which might otherwise alight many in one body.

But another method of collecting and hiving swarms, is recommended by some good bee-managers, which is of prime importance when the experiment succeeds. It is this:—Take any common rough board, fourteen inches or more in width, twelve feet or more in length, let one end of the board rest on the hive that is to swarm—say half the distance from the mouth or common entrance to the top—the other end on the ground. When swarming takes place, the bees will usually be found clustered in a body on the underside of the board, not far from the old stock.—Any one will know how to turn the board over, and place an empty hive over the bees. Bees, when swarming in this way, will be less likely to be seen, and therefore may flee to the woods unless assiduously watched. The hive should likewise be secured from the rays of the sun. See page 26.

INDEX.

	Page-
Rule I. On the Construction of the Hive,	5
Rule II. On Swarming and Hiving,	14
Rule III. On Ventilating,	30
Rule IV. On Preventing Robberies,	32
Rule V. On Equalizing Colonies, by doubling, trebling, &c.,	34
Rule VI. On Removing Honey,	38
Rule VII. The method of compelling Swarms to make extra Queens, and keep them for the use of their owner,	43
Rule VIII. On supplying Swarms with Queens, when necessary,	48
Rule IX. On multiplying Colonies to any desirable extent, without swarming,	52
Rule X. On preventing the depreda- tions of the Moth,	53
Rule XI. On Feeding,	65
Rule XII. On Wintering,	69
Rule XIII. On transferring Bees from one Hive to another,	73
XIV. General Observations,	79
XV. Questions to Bee-owners,	93
XVI. Appendix,	94







